



WHITE PAPER ON THE HIGH INTENSITY EARTHQUAKE OF 18TH SEPTEMBER 2011 IN SIKKIM



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FOREWORD

This White Paper highlights the impact, rescue, search, relief, reconstruction, rebuilding and management of the high intensity earthquake of 18th September, 2011 in Sikkim. We are all aware that the State of Sikkim was seriously affected by the devastating earthquake of 6.8 magnitude on 18th September, 2011. With the able co-ordination and assistance of the State Government, Non-Government Organizations and Government of India, we could effectively manage the disaster and restore normalcy in a record time. The incident also proved the resilience of the people of Sikkim in coming out of the trauma and getting back to normalcy. With the experience gained from managing the disaster, the State of Sikkim is marching towards Disaster Risk Reduction and putting in place an effective Disaster Management Program for the State. The Sikkim State Disaster Management Authority (SSDMA) has taken many initiatives to ensure that Sikkim is fully prepared to face any such mishaps in future.

Sikkim being an earthquake-prone State, natural disasters can neither be prevented nor avoided. But their impact can certainly be reduced. People have to live with the reality of unforeseen disasters but with preparedness and mitigation, we can face the same with resilience, endurance and safety. The last earthquake inflicted an unprecedented damage to human life, infrastructure and property of the State and it was an eye opener for us to be vigilant and re-orient our policy options and activities towards a disaster resilient State. Aftermath the earthquake, future plan of action of the State to face any eventuality has been documented in the report in proper perspective.

As we know, the approach to disaster management is now being shifted from reactive and relief centric to a holistic and integrated one with emphasis on prevention, mitigation and preparedness in pre-disaster phase and responsive to rehabilitation and reconstruction in post-disaster phase. In order to commemorate occurrence of the last year's earthquake and to sensitize the people of the State, we organized the National Conference on Disaster Management from 17th to 18th September, 2012 at Gangtok, wherein experts from various fields dwelt on their valuable experience on disaster mitigation and deliberated upon policy options for the benefit of all the stakeholders. With the enactment of National Disaster Management Act, 2005 and its enforcement in the State, we have provided greater impetus to the institutionalization of disaster management at district and State levels. We have also decided to establish a centre of excellence, named "Himalayan Institute of Disaster

Management and Change”, which will impart training courses in disaster management programmes in the Himalayan region.

The State of Sikkim is committed to aggressive Disaster Loss Reduction Policy to build a safer and disaster resilient Sikkim by developing a holistic, pro-active, multi-disaster and technology-driven strategy for disaster management through collective efforts of all Government Agencies, Non-Governmental Organizations and the public. The lives and properties in Sikkim will be made safer by the implementation of an effective, long term seismic safety policy with the following principles:-

- i) Effective preparedness, immediate emergency response, rescue and recovery
- ii) Earthquake resistance structures, design, construction and retrofitting
- iii) Information, education, communication and awareness &
- iv) regulations and supporting
- v) Sikkim Earthquake Rehabilitation and Management Fund

The above goal is targeted to be achieved by 2015.

The State has learned important lessons from the September, 2011 earthquake. By continuing to support new and ongoing efforts to protect its people and build the environment, the State can be more effective in reducing damages and injury from succeeding earthquakes. Emphasizing the role of common citizens, SSDA will outline the manner in which the State Disaster Management Authority will facilitate the inclusion of all citizen groups across the State through public awareness and local action initiatives. Of particular importance will be the Sikkim School Safety Programme, aiming to ensure safety of each child and each school in the State.

I have decided to present this document in response to assurance given to the general public of the State. It may also contribute to an informed debate and a more effective and constructive policy response as we move forward to building an earthquake and disaster resilient State in the years ahead.

Gangtok
December, 2012

(Pawan Chamling)

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White Paper on the High Intensity Earthquake of 18th September, 2011 in Sikkim

Executive Summary

On September 18, 2011 an earthquake of 6.8 magnitude on the Richter scale struck Sikkim at 6.10 PM. The epicenter of the quake was about 64 kms north-west of Gangtok along the junction point of Teesta lineament and Kanchenjunga fault in the North District of Sikkim. The high intensity tremor triggered various types of natural calamities in the form of landslides, road blocks, falling boulders, lake bursts, flash floods, falling of trees etc. and caused severe damage to life and property of the people in Sikkim. As the earthquake occurred during the monsoon season, heavy rain and landslides rendered rescue operations extremely difficult. Almost all road connectivity and communication network were disrupted.

Realizing the gravity of the situation, an emergency meeting was called on the 18th September at 7.15 PM in the official residence of the Honourable Chief Minister to give direction to the officials for carrying out relief, search and rescue operations. The very next day at 9.30 AM another meeting of the Sikkim State Disaster Management Authority (SSDMA) was held under the Chairmanship of the Honourable Chief Minister where decisions were taken to carry out search, rescue and relief operations on war footing basis and also to carryout assessment of damages caused by the earth quake.

The first responders to face the challenge of the quake hazard were the District/ Sub-division/ Block Administrations and the public, community, villagers, NGOs, Associations and volunteers. All Emergency Operation Centers (EOCs) were immediately put in the mission mode for carrying out relief, search and rescue operations. Simultaneously, the Government of Sikkim started relief, search and rescue operations with the help and co-operation of the Central Government forces, Army and various other agencies. The response was very well co-ordinated with everyone putting their best efforts in action.

Post 18th September 2011, the Chief Minister of Sikkim immediately undertook several tours of all the affected areas in the State to personally assess the damages and supervise relief operations. One of the first sites he visited was the Tashiling Secretariat, which had been severely damaged. Among others, he visited Lumsey , Nandok, Rumtek and Rawtey in the East district. In the West district, he visited Geyzing and Rinchenpong, where he met the affected public and assured them immediate relief and assistance. In South district he began his tour from Namchi. A detailed assessment of the damage caused at various sites like Solophok and Samdruptse was also undertaken and relief distributed immediately. He undertook a tour of the North District on the 23rd September, 2011 wherein he inspected the Ringhim Monastery at Mangan

and sanctioned funds on the spot for rebuilding the monastery. Thereafter, he visited the district hospital at Mangan where relief to the injured persons was distributed. He also inspected Dikchu Bazaar, Rang Rang school and the Believers Church during his tour. During his visit of West District on 25th September, 2011, he visited the historic Pemayangtse monastry located at Pelling and made a detailed inspection of the damage and interacted with the monks. He also visited the district hospital at Gyalshing and interacted with the affected victims of the earthquake and distributed ex-gratia and relief to them. On the 25th October, 2011, the Chief Minister undertook a second intensive tour of North District. He also visited the quake affected areas of Jorethang and inspected the ill fated building which collapsed and killed one woman.

In order to apprise the Central Government of the extensive damages caused by the earthquake, the Govt. of Sikkim submitted a Memorandum in September, 2011 and sought an assistance of Rs. 6890.50 crores. Thereafter, two supplementary memoranda were submitted in October seeking financial assistance of Rs.3492.13 crores and Rs.2811.99 crores respectively, from the National Calamity Contingency Fund (NCCF). Pursuant to the request of the State Government, an Inter-Ministerial Central Team visited the quake hit areas of the State, made assessment of the damages and recommended quantum of immediate Central assistance of Rs 2811.00 crores for the victims.

In response to the pressing need, the Ministry of Home Affairs, Government of India released a grant-in-aid of Rs. 200.38 crores (Rs.50.00 crores after the Hon'ble Home Minister's visit and Rs 150.38 crores in December 2011 after the High Level Committee (HLC) meeting) from the National Disaster Response Fund (NDRF) to Sikkim during 2011-12 to help carryout relief, search, rescue operations and immediate restoration works. The Government of India through the HLC approved and sanctioned Rs.227.51 crores from NDRF subject to the adjustment of 75 % of the balance available in the SDRF account for the instant calamity. Rs.41.64 Crores was also approved and sanctioned from the National Rural Drinking Water Programme (NRDWP) for repair of damaged drinking water supply works and payments of air bills for airdropping of essential supply approved on actual basis. The immediate restoration works are under completion and now, the State Government is focusing on the long term rehabilitation and reconstruction of infrastructure of the earthquake affected areas.

The Hon'ble Prime Minister visited Sikkim on 29/09/2011 and consoled the State Government as well as the quake victims in the hour of crisis. The Hon'ble Prime Minister made the following commitments:

- (i) Work on Restoration of drinking water supply sources, reconstruction of irrigation channels, and construction of flood protection works will also be taken up under Central sector schemes. Damaged national monuments will be restored by the Ministry of Culture, Government of India;*

(ii) Keeping in view the extensive and unprecedented damage, the Central Government is ready to provide assistance of Rs 1000 crores for relief, restoration and reconstruction works.

- In the meeting of the Committee of Secretaries held on 09/11/2011, it was decided that the Planning Commission may be the appropriate body for ownership of the Rs. 1000 crores proposed to be provided from the Prime Minister's Fund.*
- Central Ministries/Departments may expedite their assessment of the sectoral allocations required in Sikkim from existing schemes so that the amounts that needs to be supplemented from other sources, including Prime Minister's Fund can be worked out.*
- On the request of the State Government for Rs 1471 crores, the Planning Commission vide letter dated 27/12/2011 issued sanction for release of additional assistance of Rs.100 crores each as SPA&SCA.*
- Later the Planning Commission vide letter dated 16/01/2012 conveyed its approval for release of Rs.200 crores as advance SPA grant for 2011-12*
- The State Government vide letter dated 20/01/2012 reviewed their earlier decision for 13 Departmental HQ, proposed retrofitting major repair works pertaining to school buildings, ICDS Centers, Primary Health Centers, State Power Projects etc.*
- As far as the release of funds is concerned, the State has received a sum of Rs. 200.00 crores as advance SPA for two earmarked projects out of which Rs 146.97 crores have already been spent till date.*
- For the current year (2012-13), a provision of Rs 200.00 crores has been provided by the Planning Commission and the requirement project wise break up of funds by the State Government has already been communicated on 05/07/2012, so that the works on all projects may be taken up urgently.*
- Subsequently In the year 2012-13, against the approval of Rs 200.00 crores from the Planning Commission, Government of India, Rs 80.00 crores have been received, totaling the amount received till date to Rs 280.00 crores against the assured package of Rs 1000.00 crores.*
- Sikkim is a progressive State, capitalizing on its natural assets despite its small size, spread out population, difficult accessibility, high vulnerability to natural disasters and impending threats due to climate change. The earthquake of 18 September 2011 had a widespread impact for the State fraught with remoteness and accessibility constraints in many of its far-flung areas. Both the Central and State Government responded with full strength and with coordinated efforts could reach out to all affected areas and communities, thus minimizing loss of life and*

suffering. The efforts were supported by the Armed/Paramilitary forces, civil society organizations, NGOs, corporate groups, citizens and media, bringing together a harmonized and efficient response.

- The works and activities for post earthquake reconstruction and rebuilding under the Prime Minister's Special Package of Rs. 1000 crores are under implementation and will be completed in time. The Government is committed for quality work and all efforts are being made to explore more funding and technology to rebuild Sikkim which suffered a huge loss due to this disaster.
- The earthquake has highlighted the need to take up urgent measures for disaster risk reduction and preparedness across the State for which the State Disaster Management Authority has taken a number of steps.

According to a preliminary feasibility study report prepared by Engineering Private India Limited, the estimated cost for reconstruction of damaged infrastructure works out to Rs.1471 crores. However, the Hon'ble Prime Minister during his visit to Sikkim had announced a Special Relief Package of Rs.1000.00 crores for reconstruction of infrastructure. Out of the above amount, the Planning Commission through the Ministry of Finance, Government of India, has released a Special Plan Assistance (SPA) (Grant portion) of Rs.200 crores to the State in 2011-12 comprising of different works (i) Rs.100 crores for Reconstruction of State Civil Secretariat, Tashiling and (ii) Rs100 crores for re-construction of 13 Departmental State Headquarters (Sokeythang). The Govt. of Sikkim has since reviewed the earlier decision of construction of 13 Departmental Headquarters at Sokeythang, Gangtok and requested the Central Government to exclude the same from the list of the prioritized projects, instead, enlarge the extent and scope of the retrofitting/major repair works pertaining to School Buildings, Integrated Child Development Services (ICDS) Centers, Primary Health Centers (PHCs), State Sector Power Projects, etc. have been enlarged.

As desired by the Government of India, the Government of Sikkim prepared scheme-wise Detailed Project Reports (DPRs) pertaining to various sectors and submitted them to the Planning Commission, Government of India. All the DPRs have been processed, considered and approved by the Planning Commission. The funds would be released to the State Government accordingly.

As Sikkim and adjoining region are part of seismically active region of the 'Alpine-Himalayan global seismic belt' and prone to earthquake, earthquake resistant houses are required to be reconstructed to rehabilitate the quake victims, for which retrofitting technique for construction of houses is introduced.

Massive IEC (information, education and communication) programmes have been planned to educate the people on earthquake resilient house construction. Henceforth, mass training of masons and orientation of the local community will be taken up to make

earthquake proof house construction a standard practice. Earthquake resistant houses and a little precaution can go a long way in saving many lives and reducing unforeseen/avoidable damages.

The Government of Sikkim is determined to deal with this natural phenomena and has seized of the problem. It is determined to undertake necessary measures to reduce damages to life and property. With the enactment of National Disaster Management Act 2005, The State now provides greater impetus to the institutionalization of disaster management at the State and district levels. Sikkim State Disaster Management Authority (SSDMA) is a part of the State Government and is the nodal institution for planning, co-ordination and monitoring for disaster prevention, mitigation, preparedness and management.

The Government of Sikkim has also decided to establish a centre of excellence named “Himalayan Institute of Disaster Management and Climate Change” (HIDM) at Pakyong in the East District. An eminent disaster management expert has been appointed as Executive Vice-Chairman of Sikkim State Disaster Management Authority. The institute will impart training courses in disaster management programmes and cater to the needs not only of Sikkim but also of other States of the North East.

Sikkim is now moving towards a safer and disaster resilient State. Particularly in view of the recent earthquake, emphasis is being laid on the need for building safety, with focus on retrofitting of existing buildings to make them earthquake resistant. Priority will be given to lifeline buildings such as hospitals, which need to survive disasters and in fact be at peak performance during a calamity. While at one level the policy will gear the State to efficiently respond to any disaster of any scale through relief and recovery measures, it will also be meticulous enough to go into issues of heritage and culture, and ensure safety of the State’s cultural heritage buildings, including monasteries. A number of initiatives have already been taken and the proposed Road Map for Strengthening of Sikkim State Disaster Management Authority (SSDMA) has also been planned as under:

- 1. Sikkim State Disaster Management Policy is being formulated along with Sikkim State Disaster Management Act.*
- 2. Sikkim Earthquake Management and Rehabilitation Fund and Sikkim Land Policy for Private Sector Development 2012 have been passed by the Sikkim Legislative Assembly and is being enforced.*
- 3. Sikkim State Disaster Management Plan has been prepared*
- 4. District Disaster Management Plans for four districts have been prepared*
- 5. Gangtok Urban Disaster Management Plan is under preparation.*
- 6. City Disaster Management Plans for all cities, using the Gangtok Urban Disaster Management Plan as a model. setting up an effective “Fire Safety System” are to be completed within a year.*
- 7. Building Byelaws for the entire State including Urban and Rural Areas are under formulation.*

8. *Model Village Disaster Management Plans are to be subsequently implemented across all villages of the State along with the earthquake resistance technology for houses.*
9. *Sikkim State Disaster Response Force (SDRF) has been established on the line of NDRF and SDRF has been created within the existing Police Force along with the Civil Defence and Home Guards.*
10. *All the four Districts have been notified as Civil Defence districts for Disaster Management.*
11. *Institute of Civil Defence is being established at Pakyong, East District*
12. *Establishment of a Himalayan Institute of Disaster Management and Climate Change- at Pakyong East District as a model institute for capacity building for Disaster Preparedness, Mitigation and Response. Training can be imparted to State Disaster Response Force, Civil Defence and Fire Services under one roof. This facility may be utilized by all the NE States for their capacity building.*
13. *State School Safety Programme, making all schools disaster safe structurally as well as through capacity building activities is under implementation.*
14. *State wide programmes for making hospitals and health facilities safe from disasters and prepared to manage mass casualties is being taken up.*
15. *Retrofitting of lifeline buildings has been taken up and the State is looking for appropriate retrofitting technology.*
16. *Model monastery retrofitting and conservation project is being implemented.*
17. *Training of architects, engineers and construction workers in disaster resilient construction techniques have been taken up.*
18. *Strategic plan for transportation access, rapid damage assessment, search and rescue and relief distribution in post disaster situation in remote areas are to be prepared.*
19. *Public awareness campaigns on disaster risk reduction and preparedness has been started.*
20. *Financial resource mobilization plan for disaster risk reduction activities has been sought from various funding agencies.*

The concerted efforts are now being made to reconstruct housing and other infrastructure projects in quake ravaged areas. Tangible results will be seen in due course of time. It is estimated that 50% of the population of developing countries is living in cities and eight out of ten largest cities of the world are in developing countries. Over three quarters of those cities are exposed to at least one natural hazard. Yet, cities are ill-prepared to effectively respond to such events, and the collective efforts to reduce risk from disasters continue to be meager compared to the constant increase in risk caused by urbanization and aging infrastructure.

1 INTRODUCTION

1.1 On September 18, 2011 an earthquake of the magnitude of 6.8 on Richter scale struck Sikkim at 6.10 PM. The epicenter of the quake was about 64 kms north-west of Gangtok along the junction point of Teesta lineament and Kanchenjunga fault in the North District of Sikkim. The high density tremor triggered various types of natural calamities in the form of landslides, road blocks, falling boulders, lake bursts, flash floods etc. and caused severe damage to the life and property of the people. As the earthquake occurred in the monsoon season, heavy rain and landslides rendered rescue operations extremely difficult. Almost all the road connectivity and communication network were disrupted.

1.2 While highlighting the impact of the earthquake on Sikkim, this White Paper focuses on the measures taken by the State Government to fight this gigantic calamity. It also makes an attempt to list out future course of action for strengthening preparedness of the people for disaster mitigation. The State Government faced the calamity firmly and launched rescue, search and relief operations on a war footing. Simultaneously, the Central Government and other agencies were requested for help in the hour of crisis. Help and assistance came from various quarters. But, the State Government and local community volunteers and the district/sub-division/ block administration were the first responders who rose to the occasion and tried their level best to wipe the tears of the quake victims. Immediate relief and rescue works were also expedited with the help of the Army, Indo-Tibetan Border Police (ITBP), Sashastra Seema Bal (SSB), the Central and the State agencies in the midst of heavy odds- rains, landslides, disrupted roads and dismantled communication network. Meanwhile, first phase of relief and rescue operations are over. Now, the priority of the State Government is to focus on the long term rehabilitation and reconstruction of infrastructure of the quake affected areas. The dwelling units have to be reconstructed and are being constructed in a better way to rehabilitate the quake victims. Moreover, damaged infrastructures of various sectors have to be reconstructed and the State economy has to be put on track in a time bound manner. No doubt this is an uphill task for a small State like Sikkim, but the State Government is determined to rebuild and restore the economy with the help and cooperation of the Government of India and other stakeholders.

1.3 With the above back drop, let us mention a few lines about the topography and ecology of Sikkim.

2 TOPOGRAPHY

2.1 Sikkim joined the mainstream of India as the 22nd State of the country on 16th May, 1975. It has a total area of 7,096 sq. kms extending over 112 km from North to South and 64 km from East to West. It shares a 200 km border with Tibet, a 33 km border with Bhutan and an 85 km border with Nepal. It is bounded by vast stretches of the Tibetan Plateau in the north, the Chumbi valley of Tibet and the Kingdom of Bhutan in the east, the Kingdom of Nepal in the west and the Darjeeling district of West Bengal in the south. The State has 28 mountain peaks, more than 80 glaciers, 27 high altitude lakes, five major hot springs and more than 100 rivers and streams. Eight mountain

passes connect the State to Tibet, Bhutan and Nepal. The State is connected to People's Republic of China by the mountain pass of Nathu La.

2.2 As per 2011 census, population of Sikkim is on a path of stabilization now with a population of 607,688 (6.1 Lakhs). With this Sikkim is the least populated State in India, though the population is higher than the Union Territories of Andaman and Nicobar Islands, Dadra and Nagar Haveli, Daman & Diu and the Lakshadweep islands. It covers 0.05 % of India's total population. Large areas of Sikkim are restricted to public access; one needs permits from the Army to travel to certain areas of Sikkim as this small area is surrounded by three countries namely Nepal, China and Bhutan. The terrain of this region is uneven and landslides occur very often. For these reasons the population distribution is uneven. Large parts of the State territory are unoccupied and few areas are moderately populated. The Northern District of Sikkim has a density of just 10 people per square kilometer. The overall population density of Sikkim is 86 persons per sq km. It has 3,21,659 males and 2,86,027 females making the sex ratio of the State 889. The literacy rate of Sikkim is estimated more than 82.32%. The total population of Sikkim grew by 12.36 % in the last decade. This is a substantial drop from the 33.07 % growth that it recorded in the 2001 census. The 0 – 6 age group population of Sikkim is 61,077 of which the number of males are 29,659 and females are 31,418. The age group of 0 – 6 consists of 10 % of Sikkim's total population. The higher number of females compared to males in the 0 – 6 age group indicate that the sex ratio of the State is going to improve. The State capital, Gangtok recorded a population of 98,658 having 51,820 males and 46,838 females.

Table 1: District wise distribution of Population of Sikkim

	Total Population	No. of Males	No. of Females	Literacy rate	Sex Ratio	Population Density
SIKKIM	607688	321659	286027	73.94	889	86
NORTH District	43354	24513	18841	69.39	769	10
EAST District	281293	150259	131033	76.67	872	295
SOUTH District	146742	76663	70079	73.64	914	196
WEST District	136299	70224	66074	70.05	941	120

Table 2 : Major Towns of Sikkim

Towns	Total Population	MALE	FEMALE
Gangtok	98658	51820	46838
Singtam	5874	3166	2708

Rangpo	10326	5501	4825
Rhenock	5892	3162	2730
Namchi	12194	6178	6016
Jorethang Nagar	8895	4595	4300
Nayabazar	1230	650	580
Gyalshing	4009	2053	1956

Selected socio-economic indicators of Sikkim are given in Annexure-I.

3 ECOLOGY

3.1 The State of Sikkim has not only been endowed with a peculiar topography but it is ecologically sensitive and prone to earthquakes. It has fragile ecology being the steepest and the highest State in the country, and the third highest landscape on the globe. It is a mountainous State crisscrossed by narrow valleys and steep cliffs. The young fold mountains are characterized by a weak geology, comprising sedimentary and low grade metamorphic rocks which are susceptible to weathering and erosion. This, combined with the State's heavy rain fall (average annual rainfall being 2800 mm) cause extensive soil erosion and the loss of nutrients through leaching. As a result, landslides are frequent, often isolating rural towns and villages from the major urban centers. Frequent occurrence of landslides causes damage to property and connectivity in the landlocked State. The magnitude of damages caused every year due to sudden earth movements in many parts of the State is quite large due to the complex geological setup and extensive rainfall in the terrain. Connectivity in the National Highway 31A, the only life line of Sikkim, is frequently disrupted for long spells during the monsoons, causing shortages in supply of essential commodities.

4 EARTHQUAKE OF 18TH SEPTEMBER, 2011

4.1 As mentioned earlier, on September 18, 2011 an earthquake of the magnitude of 6.8 on Richter scale struck Sikkim at 6.10 PM. The epicenter of the quake was centered about 64 kms north-west of Gangtok, the State capital along the junction point of Teesta lineament and Kanchenjunga fault in the North District at a shallow depth of 19.7 km. The strongest impact was in Sikkim, with tremors in Nepal, Bhutan, Bangladesh and China. In India the tremors were felt in Assam, Meghalaya, Tripura, parts of West Bengal, Bihar, Jharkhand and as far away as Uttar Pradesh, Rajasthan, Chandigarh and Delhi as well. The preliminary hypo-central parameters of this earthquake, as estimated by the Seismic Monitoring Network of India Meteorological Department (IMD) are as follows:

Date of occurrence : 18.09.2011, Sunday
 Time : 18:10 hrs (IST)
 Magnitude : 6.8
 Depth : 19.7 Km (shallow depth)
 Duration : 30-40 Seconds
 Location : 27.72° N, 88.06° E
 Epicenter Region : Sikkim-Nepal Border region
 Extent : Nepal, Bhutan, Bangladesh and China
 In India, in Sikkim and northeast, West Bengal, Bihar,
 Jharkhand, UP, Rajasthan, Chandigarh and Delhi

4.2 This earthquake was followed by several aftershocks. A list of aftershocks of magnitude 3.0 and above recorded till 09.30 hours IST of 19th September, 2011, is given below:-

Sl. No.	Date	Time of aftershocks Hr: Min (IST)	Magnitude
1	18.09.2011	18:42	5.3
2	18.09.2011	19:24	4.6
3	18.09.2011	20:35	3.0
4	19.09.2011	00:57	3.4
5	19.09.2011	03:21	3.8

The magnitude of aftershocks got reduced with the passage of time. It may be mentioned here that this region was not devoid of seismicity in the past.

5 PAST HISTORY OF THE SEISMICITY OF THE REGION

5.1 Historically and instrumentally recorded data on earthquakes show that Sikkim and adjoining area lie in a region prone to moderate to great earthquakes in the past. Some notable earthquakes which had affected the region in the past are mentioned below:

- (i) Cachar earthquake of 10.01.1869 (M: 7.5)
- (ii) Shillong plateau earthquake of 12.06.1897 (M: 8.7)
- (iii) Dhubri earthquake of 02.07.1930 (M: 7.1)
- (iv) Bihar-Nepal Border earthquake of 15.01.1934 (M: 8.3)
- (v) Arunachal Pradesh-China Border earthquake of 15.08.1950 (M: 8.5)
- (vi) Nepal- India Border earthquake of 21.08.1988 (M:6.4)
- (vii) Sikkim earthquake of 14.02.2006 (M:5.7)
- (viii) Bhutan earthquake of 21.09.2009 (M:6.2)

5.2 It is worthwhile to mention here that Sikkim and adjoining regions are known to be part of the seismically active region of the 'Alpine-Himalayan global seismic belt', with four great earthquakes of the world of magnitude 8.0 and above occurring in this region.

6 IMMEDIATE ACTION TAKEN BY THE STATE & ASSESSMENT OF DAMAGES

6.1 The Government of Sikkim came into the action immediately and activated all the resources i.e. Manpower and financial. No effort was left to save the lives of our beloved people and immediately Rs.70.38 crores was released to support the relief, search, rescue and for ex-gratia. A massive rescue, relief and coordination operation was launched by the civil administration in all the four districts. The support of Army, ITBP, NRDF and SSB was also taken. A crisis management group was set up in the State Government under the chairmanship of the Chief Secretary and all senior officials of the State Government.

6.1.1 The Chief Minister supervised and monitored the entire relief and rescue operations and took several review meetings and sanctioned ex-gratia payments to the families of the deceased and also who were injured and hospitalized. He also visited all the four Districts to meet the injured and members of the bereaved families.

6.1.2 Immediate Control Rooms were set up in all the four districts along with the Army, ITBP and SSB. The NDRF team was flown in from Delhi and designated to the areas that were most affected by the earthquake for casualty evacuation. Ministers and Senior Secretaries/ Officers were immediately deputed to all areas. Most of the roads were open within a week's time except for some roads of the North Sikkim. Rescue operation was well planned and no casualty was reported due to lack of rescue operation.

6.1.3 All essential services like food, drinking water, medical aid and deployment of doctors, paramedics, personnel from the infrastructure sectors were distributed across the State. Regular updates of the dead, rescue and rehabilitation and essential services details were gathered in Gangtok through the Police Control Room located at the Police Headquarters PHQ.

6.1.4 214 sorties of Helicopters were conducted for supply of relief materials, essential commodities and transportation of the injured and dead.

6.1.5 204 relief camps had been opened where 14,360 people were accommodated and provided food, and in addition to this, the Government sanctioned more funds to these relief camps to augment further supply of food and essential items etc. There was full support from the public, Panchayats and NGOs. Everybody came forward for support.

6.2 The loss and damages to public infrastructures by the recent earthquake adversely affected the economy of the State, thereby leading to reduction in employment activities, loss in revenue generation and slow down in investment in the industrial sector. Some of the important facts about the losses to life and properties are as follows:

Human life: 63 human lives lost. Many people lost their limbs and eyes, 597 people were injured and hospitalized with grievous injuries

Social infrastructure: Total schools damaged: 759 nos., Hospitals / PHCs damaged: 377 nos ; ICDS (*Anganwadi*) damaged : 875 nos; Other Government Buildings damaged: 1255 nos.

Transportation infrastructure: Total Roads damaged : 3230 kms; Village footpaths (cement concrete) damaged : 1596 nos; Bridges / Culverts damaged : 8135 nos.

Energy infrastructure: Power infrastructure: Major damage to generation plants, electrical grid, substations, transformers and local distribution network

Water management infrastructure: Water supply schemes damaged: 1529 nos; Minor Irrigation works damaged: 204 nos; Flood Control Management works damaged: 533 nos.

Community infrastructure: Gram Panchayats offices damaged: 60 nos.; Community toilets damaged: 155 nos. ; Village level cooperatives (MPCS) damaged: 49 nos. Rural Product Marketing Centers (RPMC) damaged: 8 nos.

Cultural heritage institutions: Damage to 259 nos of religious institutions, monuments and various heritage monasteries, temples and churches. Along with this valuable artifacts have also been destroyed which also included historic manuscripts

7 LOSS AND EXTENSIVE DAMAGE TO PUBLIC INFRASTRUCTURE

7.1 The earthquake caused extensive damages to transportation infrastructure (roads and highways networks, bridges, tunnels, culverts, protective works, and village approaches and foot paths), Power and Energy infrastructure (Power generation plants, transmission systems, electrical grid, substations, transformers and local distribution), water management and distribution infrastructure (of drinking water supply, drainage systems, irrigation systems and flood control systems) and governance infrastructure (at village, district and State level, Civil, Para forces and Military infrastructure along with residential buildings). Other life line infrastructures like health care systems (hospitals, Primary Health Centers) were also affected. Many educational infrastructures like school, college, universities and research institutions were damaged. Economic infrastructures like marketing hubs, tourism, manufacturing centers, agriculture, horticulture, animal husbandry, forestry and fisheries infrastructure sustained huge damages. This brought income generating activities of the people to a grinding halt. Other infrastructures which were not spared by the quake were play grounds, stadiums, sports complexes, historic monasteries, pilgrimage places, archaeological sites, temples, churches etc. Loss and damages were also caused to the privately owned infrastructures like houses, toilets, cattle sheds, stores, lodges, hotels, commercial establishments etc. in both the rural and urban areas.

7.2 The loss and damages to public infrastructures by the September 2011 earthquake adversely affected the economy of the State, leading thereby to

reduction in employment activities, loss in revenue generation and slow down in investment in industrial sector.

8. BRIEF LIST OF LOSSES AND DAMAGES CAUSED BY THE EARTHQUAKE

8.1 Losses and damages on the basis of immediate assessment were as under:

- 63 human lives were lost in Sikkim (44 in North, 14 in East, 1 in South and 4 in West Districts) since 18th September, 2011.
- 3 persons lost their limbs or eyes, 60 persons injured and hospitalized for more than a week, 537 others got injured and hospitalized for less than a week. As many as 174 persons were injured and were hospitalized for more than 7 days. List of such victims is given in Annexure-II.
- 34159 nos. of houses were damaged.
- 1255 nos. of govt. buildings were damaged.
- Many structures were rendered unstable and unfit for occupation.
- 525 nos. of cattle were lost.
- 808 nos. of sheep, goats and pigs were lost.
- 7500 hectares of agricultural crops were damaged.
- 3230 kms of roads got damaged.
- 1596 nos. of village footpaths (cement concrete) got damaged.
- 8135 nos. of bridges/culverts were damaged.
- 1529 nos. of water supply schemes damaged.
- 204 nos. of minor irrigation works damaged.
- 533 nos. of flood control management works damaged.
- Major damage caused to power infrastructure.
- 759 nos. of schools damaged.
- 377 nos. of hospitals damaged.
- 875 nos. of ICDS (Anganwadi centers) damaged.
- 259 nos. of historic monuments, monasteries and religious institutions damaged. A list of selected religious institutions damaged by the earthquake is given in Annexure-III.
- 60 nos. of Gram Panchayats offices damaged.
- 155 nos. of community toilets damaged.
- 49 nos. of village level cooperatives damaged.
- 8 nos. of Rural Product Marketing Centers (RPMC) damaged.

9. ACTION TAKEN BY THE LAND REVENUE & DISASTER MANAGEMENT DEPARTMENT

9.1 Realizing the gravity of the situation, an emergency meeting was held on 18th September at 7.15 PM at the official residence of Honourable Chief Minister to take

stock of the situation. Again on the next day morning, at 9.30 AM, another meeting of the SSDMA (Sikkim State Disaster Management Authority) was held under the Chairmanship of the Honourable Chief Minister where in all the Heads of Department attended. Hon'ble Chief Minister instructed all the officials to carryout rescue and relief operations on war footing basis. They were also asked to carryout assessment of damages caused by the recent earth quake. Some important decisions taken in the meeting were: Secretaries of Departments of Forest, Industries, Urban Development & HD and Relief Commissioner were made Nodal Officers for the North District, the South District, the West District and the East District respectively for overseeing relief and rescue operations. The Ministers and MLAs were also directed to involve themselves in the relief operations along with the Secretaries. As the Tashiling Secretariat complex was affected by earthquake, a decision was taken to shift the concerned Departments to alternate safer places. Decision was also taken for payment of ex-gratia amount to the victims who were seriously injured, for damaged houses, dead/lost domestic animals etc.

9.2 It was also decided in the above meeting to close all the Government and private schools with immediate effect till 10th October, 2011. About 900 schools (government. + private) were closed. Concerned Govt. officials were instructed to assess the damages caused to various schools. They were also asked to help get minor repair works carried out wherever necessary.

9.3 The second meeting of the Sikkim State Disaster Management Authority (SSDMA) was held on 20th September, at 10.00 AM under the Chairmanship of Hon'ble Chief Minister wherein Hon'ble Speaker, State Legislative Assembly, Hon'ble Minister, (Rural Management & Development Department (RMDD), Hon'ble M.P Lok Sabha, Chief Secretary, Addl. CS-cum- Development Commissioner, Pr. Secretary to C.M., Secretary Roads & Bridges, Secretary IPR, Special Secretary to Hon'ble C.M. and other officers concerned were present. After a detailed discussion about the crisis caused by the earthquake, the district authorities were instructed to be ready with the list of the deceased, damaged houses and property latest by 10.30 AM on 22nd September, 2011. The HCM impressed upon the district authorities that he would visit the districts to take stock of the first hand information report on disbursement of ex-gratia and relief to the relatives of the deceased and other affected victims.

9.4 Besides the above, Hon'ble Chief Minister held a series of meetings with the Government officials and instructed the latter over phone (as and when required) to expedite relief and rescue operations in a time bound and transparent manner. He also supervised and monitored the entire relief and rescue operation and took many review meetings and sanctioned ex-gratia payments to the families of the deceased. All essential commodities like food, drinking water, medicines etc. were dispatched and doctors, paramedics and personnel deployed to the districts.

9.5 Post 18th September 2011, the Chief Minister of Sikkim immediately undertook several tours of all the affected areas in the State to personally assess the damage and supervise relief operations. One of the first sites he visited was the Tashiling Secretariat, which had been severely damaged. Among others, he also visited Lumsey , Nandok, Rumtek and Rawtey in the East district. In the West district, he visited Geyzing and Richenpong among others where he met the affected public and assured them immediate relief and assistance. In the South district he began his tour from Namchi. A detailed assessment of the damage caused at various sites like Solophok and Samdruptse was also undertaken and relief distributed immediately. The Chief Minister undertook a tour of the North District on the 23rd September, 2011. He inspected the Ringhem Monastery in Mangan and sanctioned funds on the spot for rebuilding of the monastery. Thereafter, he visited the district hospital at Mangan where he distributed relief to the persons injured in the earthquake. He also inspected Dikchu Bazaar, Rang Rang school and the Believers Church during this tour. He visited the West District on 25th September, 2011. At first he visited the historic Pemayangtse monastery, located at Pelling and made a detailed inspection of the damages and interacted with the monks. He also visited the district hospital at Gyalshing and interacted with the affected victims of the earthquake and distributed ex-gratia and relief to them. On 25th October, 2011, after the restoration of road communications to Lachen and Lachung, the Chief Minister undertook a second intensive tour of the district. He also visited the quake affected areas of Jorethang and inspected the ill fated building which collapsed and killed one woman.

10 ACTION TAKEN BY THE DISTRICT ADMINISTRATION

10.1 The first responders to face the challenge of the unforeseen calamity were the local people and the district administration. Despite hostile situation at the ground level and other constraints, the rescue and relief operations taken up by each of the district authorities was highly commendable. The district authorities immediately opened relief camps for the affected people. Number of relief camps opened in various districts were as under:

Name of the District	Families/Persons affected*	Relief Camps Opened
East	735	34
West	396	62
North	6319* plus floating population	35
South	630	73
Total		204

Let us briefly discuss how the district authorities faced the challenge caused by the earthquake.

East District

10.2 The District administration of East Sikkim started taking immediate rescue and relief measures to mitigate the effects of the earthquake on the life and property of the people. Though the epicenter of the earthquake was at North Sikkim, its consequences were spread across the State and no district was spared. East District being the most populated district of the State and Gangtok being the biggest city of the State, the damages to property was also proportionately huge. The following are the major rescue and relief measures taken by the District administration of East Sikkim post-earthquake.

Activating the Control Room

10.3 The District Collector, East, had set up a District Control Room in the year 2007-08, at MG Marg, Gangtok, to serve as a focal point to manage any emergency situation. Fortunately, the Control Room had seen no major incident requiring its activation till 18th September 2011. Immediately after the earthquake that occurred at around 6.11 PM, the Control Room was activated by the District Collector at about 6.30 PM. The District Collector, East, took charge of the Control Room. He was joined by the Additional District Collectors, Sub-Divisional Magistrates, Members of Civil Defense, Volunteers, NGOs, Associations and Disaster Management Officials.

10.4 The location of the Control Room at MG Marg, Gangtok, was crucial, since MG Marg is located at the main and the busiest part of the town. Fearing after-shocks, the panic stricken people had gathered around MG Marg. They were not willing to stay in their houses. Announcements were made from the Control Room asking people to go back to their respective homes. Assurance was also given to assuage their fears. People started moving back to their respective homes slowly and hesitatingly. At around 1 AM, most of them had gone back. So, the first and the foremost duty of the Control Room was to dispel panic from the minds of the people. Immediate activation of the control room which was visible to the public also assured them of the prompt response of the District administration and convinced them to get back to normalcy.

10.5 Thereafter, the Control Room was the focal point for all the post-earthquake rescue and relief operations. Meetings with the rescue teams, field level officials, media, NGOs, the Government of India organizations, etc. were conducted in the Control Room. Receiving calls for help and responding to them, assessment of the damages to life and property, compilation of data, dissemination of the compiled data to the public and the press as well as serving as a help desk were some of the crucial functions that were performed from the Control Room.

Rescue Measures

10.6 Besides other functions, the first priority and responsibility of the District administration was to find out whether anyone had been trapped under debris of collapsed structures and needed to be rescued. The first call for assistance was received on the same night, from Burtuk, at Gangtok, where a young couple travelling in a car was trapped under the debris of a huge boulder along with the compound wall of a building. While the husband managed to escape, the wife got stuck below the boulder and the crashed window pane of the vehicle. Men and machinery were immediately deployed to rescue the woman. After 3 hours of struggle, the woman was finally rescued and shifted to the hospital for treatment.

10.7 All the Block Development Officers (BDOs) were contacted on the same night and were asked to conduct a massive search and rescue operation in their respective blocks to ensure that no one was trapped under any collapsed structure. By the evening of 19th September 2011, it was ensured that no one was trapped to be rescued. However, reports started pouring in that many people had been admitted in the nearby hospitals due to injury. Reports of death due to earthquake also started coming from different parts of the State. However, these deaths and injury were more due to shock and falling down while trying to escape during the tremor.

10.8 Though it was ensured by the evening of 19th September 2011 that there was none who needed to be rescued from any collapsed building, on 23rd September 2011, at around 7.30 PM, the Control Room got information about a building at Baluakhani, Gangtok, had collapsed and a few people had been trapped under the debris. It was found that a seven storied building had collapsed totally and due to the impact, an adjacent five storied building was also damaged and its ground floor had come down. Immediately, the Police Rescue Team arrived at the spot. The assistance of the Army was sought and a fleet of army men were deployed immediately along with rescue machinery. While the rescue teams were assessing the situation and planning the mode of rescue operation, some brave men dared to get inside the collapsed building and brought out three trapped persons. In about two hours, it was ensured that none was left trapped inside the collapsed building.

10.9 However, it was informed that in the adjacent building where the entire ground floor had gone down due to the impact of the crash, the store keeper of a go down was trapped in the ground floor. In order to rescue him, a massive rescue effort was initiated immediately. But the impact of the crash was so huge that the rescue team could not identify the location of the trapped person. After much struggle, they could identify the location of the victim, only to find out that he was unfortunately dead. It took almost 72 hours to cut open the steel frame of the building after which the dead body was pulled out from the debris. Basic rescue equipments were purchased immediately and given to the rescue teams to keep them prepared for any call for help.

Relief Measures

10.10 Though it was ensured that there was none who required to be rescued, reports were coming that a number of houses were damaged due to the earthquake, making them uninhabitable. This required the residents of such houses to be shifted to a safer location immediately. Relief camps were therefore set up all across the districts. The BDOs were instructed to open as many relief camps as were required to help such people. There were cases where people fearing another earthquake, were unwilling to sleep inside their houses and wanted to stay at the relief camps especially during nights. In order to cater to all such requirements, more than 50 relief camps were set up in the district initially. Some of the relief camps were set up in Government buildings like sports stadium, schools, community halls, etc. Also, make shift camps were set up using bamboo and tarpaulin to help the needy.

10.11 All basic essential items like food grains, water tanks, water pipes, cooking utensils, crockery, candles, blankets, bed sheets, buckets, etc. were provided at these relief camps. It was also ensured that there were sufficient stock of these essential

items in all the relief camps. NGOs were also roped in to assist in operating the camps. A Government official was appointed as Camp In-charge for each relief camp to coordinate with the Control Room and ensure smooth functioning of these camps. Adequate food grains were purchased from the food godowns and supplied to the camps while some other essential items were supplied from nearby fair price shops.

10.12 In addition to the relief camps, there was a huge demand for tarpaulin sheets from house owners whose courtyards had cracked. There was also a fear of land slide and damage to their houses. They required these tarpaulin sheets to cover the cracked portion of the building and thereby prevent seepage of water. Tarpaulin sheets were also demanded by those who wanted to have their own make-shift arrangements for the stay. As they were staying quite far away from the relief camps, they wanted to make such arrangements in the open field and, therefore, wanted the tarpaulin sheets. All these requirements were fulfilled promptly by the District administration. Tarpaulin sheets were also required to cover up cracked roads to prevent landslides and road blocks. The SDMs and Disaster Management officials were asked to go around the district, identify such vulnerable spots and cover them up with tarpaulin for preventing any land slide. This matter needed immediate attention as it was raining continuously, immediately after the earthquake.

10.13 Similarly, there was a huge demand for poly pipes by the villagers where the water supply had been disrupted. These pipes were required to tap local water sources till the main line water supply was restored. These poly pipes were provided to the needy by the District administration both in the urban and rural areas of the district. Water tanks were provided to the relief camps as well as to other needy habitations. Poly pipes were also given to the farmers where water supply to the farms got disrupted due to earthquake.

10.14 Gangtok town's water supply got disrupted due to damage to the main trunk line through which water was being supplied to the town. Drinking water was distributed to the residents through water filled in water tanks till water supply got restored. An amount of Rs. 5 lakhs was kept at the disposal of each BDO for enabling him to arrange necessary relief materials for the affected people. In addition, they were also given Rs 5 lakhs each to restore the damaged water supply pipelines in the rural areas immediately.

Assessment of damages and payment of ex-gratia

10.15 The assessment of damages to the houses which were damaged due to the earthquake was a massive operation carried out by the District administration. Immediately after ensuring that there was no one who needed to be rescued and that all the needy had been shifted to the relief camps, the BDOs were asked to form teams to identify the damaged houses, assess the extent of damage and the amount of ex-gratia that needed to be granted to victims, as per the Government norms. A similar exercise was carried out for the Gangtok Municipal Corporation (GMC) area. As many as 15 official teams were formed and each team was allotted a Municipal Ward for identifying and assessing the damages to the houses.

10.16 On 26th September, 2011, at a programme conducted at Chintan Bhawan, Gangtok, the Hon'ble Chief Minister of Sikkim disbursed ex-gratia to the kith and kin of the deceased, at the rate of Rs 5 lakhs (Rs 2 lakhs from the Hon'ble Prime Minister's

Relief Fund+ Rs 2 lakhs from the Hon'ble Chief Minister's Relief Fund + Rs 1 lakh from SDRF/NDRF) per person who had died due to the earthquake. As a token distribution, around 400 families whose houses were damaged due to the earthquake were provided with ex-gratia. This was called Phase I distribution of ex-gratia.

10.17 Meanwhile, the inspecting teams for the GMC area and the BDOs for the rural areas submitted the preliminary figures of house damages within their respective jurisdiction and worked out the amount of funds required to be paid as ex-gratia. These details were compiled in the Control Room and the total fund required by the districts assessed. Thereafter, necessary demand was placed before the Relief Commissioner. On receipt of the funds from the Relief Commissioner, the same was immediately transferred to the BDOs and the Municipal Commissioner for further distribution among the victims. This was Phase II of ex-gratia distribution. Within a fortnight of the earthquake, majority of the victims were given the ex-gratia due to them.

10.18 During Phase II of ex-gratia distribution, complaints were received from some people who alleged that their houses got damaged during the earthquake, but were not included in the list of damaged houses. Likewise, there were complaints from some people that their damaged houses were under-assessed for compensation by the inspecting teams for which they deserved more ex-gratia than what was given to them. To sort out these issues, the BDOs and the inspecting teams of GMC were asked to re-assess the damaged houses and to prepare a list of such genuine cases left out. This exercise was completed in January 2012 and this was Phase III of ex-gratia distribution. In total, approximately an expenditure of Rs. 27.06 crores was incurred on the earthquake victims of East Sikkim as per the details given below.

10.19 Ex-gratia expenditure incurred for the earthquake victims in East District

Date	Amount	Sl.No	Particulars	Amount (Rs.)
19.9.2011	5000000	1	Distribution during Phase I for House Damage & EX- Gratia	18540000
24.09.2011	19000000	2	Expenditure on fund transferred to BDO'S	4833812
25.09.2011	10600000	3	Distribution during Phase II & Phase III for House Damage	239244500
		4	Expenditure on Relief Camps	1045549
30.9.2011	5000000	5	Ex-Gratia to Injured	72500
		6	Supply of Poly pipes	2325035
28.9.2011	5000000	7	Supply of Tarpauline	1261250
		8	Expenditure in Control Room	565906
29.9.2011	10000000	9	Expenditure on NDRF personnel	144000
		10	Incidental charges for inspection of house damage, Phase III	34000
03.10.2011	140000000	11	Crop damage claimed by H&CCD	1292922
		12	Pol for officers	109945
31.3.2012	80244000	13	Miscellaneous	74202
23.09.2011	1000000	14	SDM Pakyong	610959
23.09.2011	1000000	15	SDM Rongli	440118
Total	27,68,44,000		Total	27,05,94,698

West District

10.20 After occurrence of the earthquake, the District Collector, West alerted the Police Stations immediately and instructed them to stay alert to respond to any emergency call. The district hospital was informed to be ready with adequate paramedical support to combat emergency cases. The team of QRT from Disaster Management Cell along with police personnel patrolled the Gyalshing town. The people were asked to check the damages caused to their houses and were advised to avoid staying in the unsafe buildings. They were also advised to stay in open grounds and be alert of any aftershocks. The Emergency Operation Centre was made functional round the clock and it was realized that road network had been disrupted badly in the whole district. The road connecting Jorethang to Gyalshing was cut-off due to several major landslides. Four lives were lost due to the catastrophe while twelve persons sustained grievous injuries. They were admitted to the district hospital, Gyalshing and were later referred to a Siliguri hospital for further treatment.

10.21 On 19th September, 2011, the District Collector, West called a meeting of the district officials and instructed the concerned departments to restore normalcy in all spheres. They were assigned the task of taking up immediate relief measures in the areas with major damages. The Emergency Operation Centre was identified as Incident Command Centre and put under the charge of Additional District Collector for mobilization of entire relief operation in the district. The Block Development Officers were instructed to operate an emergency centre at Block Administrative Centers to facilitate timely response in coordination with the Panchayats. They were asked to provide all possible relief aid to the families in distress. The relief camps were made functional with adequate supply of rations for the families whose houses were not fit for habitation. These families were also provided with necessary medical assistance.

10.22 The villagers were provided with basic tools to remove the delicate structures which were posing threat to their life. The entire relief and rescue operation in the district was being monitored and the progress report disseminated to the higher authority timely. The first priority was to get the road network restored for which private power developers were engaged. With the combined efforts of the Roads & Bridges Department and power developers, temporary road connectivity was restored. The damages caused to the Government assets and other public utilities were assessed in a meeting held under the Chairmanship of Secretary, Urban Development & Housing Department, who was the designated Officer for the West District. The district departments prepared a comprehensive report on the extent of loss and the details were submitted to the State Government. The loss in financial terms was estimated at Rs.50959.94 Lakhs. In order to get their daily activity resumed, makeshift shelters were built for the schools and monasteries which were badly affected. After completion of the relief operation, the management was able to restore a certain degree of normalcy and it started taking stock of the damages caused to the public property. In the follow up meeting, the District Collector, West District constituted a group of Village Level Supervisors consisting of teachers and district officials who were asked to check the authenticity of the claims to be honored by the State Government within admissible norms. The Block Development Officer's were asked to release relief payments accordingly.

10.23 The Hon'ble Minister Shri. Dawcho Lepcha was appointed as the State Government representative for the West District to monitor the entire relief operation. Under his Chairmanship the district level disaster management authority met a couple of times to evaluate the process of relief work. After State Disaster Relief Fund (SDRF) from the head office was released, distribution of ex-gratia and gratuitous relief to the distressed families were made. The Hon'ble Chief Minister Shri. Pawan Chamling made a visit to the district, met the people in distress and distributed first hand cash relief to them. It was followed by the visit of the Central Level Monitoring Team who visited the district and took stock of the relief operations, visited relief camps and met the people. Several teams from the Central Government comprising officials from Archaeological Survey of India (ASI) and other Geo-technical experts visited the district and held meetings with the district officials. Work of permanent nature are being executed in the district on war footing basis and the SDRF amounting to a sum of Rs.12.87 crores was distributed among the quake victims as shown in the following statement.

10.24 Total funds disbursed to quake victims in West Sikkim

Sl. No.	Block Administrative Centre (BAC)	Total Amount Disbursed (Rs.)	Balance Amount (Rs.)
1	Daramdin BAC	90,24,104	
2	Kaluk BAC	101,15,542	
3	Gyalshing BAC	167,66,590	
4	Yuksum BAC	250,98,500	
5	Hee-Martam	62,33,500	
6	Dentam	185,36,284	
7	Soreng	288,00,000	
8	Gyalshing Nagar Pachayat	33,90,000	
9	HCM	50,54,610	
10	DC West	18,53,695.00	
11	Yangtey GPU Hailstorm Relief	37,78,132	
Total Received : 13,40,12,311		12,86,50,957	53,61,354.00

North District

10.25 The earthquake rattled the entire State of Sikkim. With power and communication lines down in the State, reports were in sketchy form even many hours after the quake. Tremors were felt between 30 seconds to one minute in North Sikkim and other parts of eastern India. Three aftershocks of 5.7, 5.3 and 4.6 magnitude were felt in the region almost at an interval of 30 minutes. Several houses collapsed and thousands of panicked people began their prayer immediately on the streets and in the playgrounds. On being trapped under the debris, the victims were killed at various places in the North Sikkim and many were injured. The major affected places in the North Sikkim were Chungthang, Saffo, Pegong, Shipgyer, Ramom and Theng, Lachen, Lachung, Mangan, Sakyong, Pentong, Bey Mantam. and Bey and areas beyond these were disconnected from rest of the State as North Sikkim Highway was severely

damaged by the quake. The rescue operations were interrupted by landslides frequently.

10.26 Many houses developed cracks and clipped off concretes appeared on almost all the houses in the affected areas. As their houses were damaged, the people were panic stricken and preferred to take shelter in the relief camps. These camps were being run under the supervision of local volunteers and area Panchayats and with medical support team from the Health Department. With assistance from the Central Government ten pre-fabricated bamboo houses were also provided to the needy persons in the North District.

10.27 In order to mitigate the problem of the victims, the District administration started providing assistance to the people who travelled from the affected areas (Lachen, Lachung, Chungthang and many locations of Upper Dzongu like Saffo, Shipgyer etc.) to their home town and district headquarter. Relief camps were set up by the District administration with support and cooperation of the Panchayat, Zilla Parishad Members and local people of the area. For almost 10 days, there was a large flow of affected people especially labourers and technicians working at the power project sites or were engaged with the defence forces or construction work of private builders. Cooked food was also being provided in the relief camps. In addition to food, clothes were also provided in some relief camps.

10.28 Owing to disruption in the road network, the State Government immediately engaged helicopter service to evacuate affected persons and hospitalised those who were seriously injured. Stranded workers in power project sites were also evacuated. Essential commodities were air lifted and distributed among the needy in various locations. Teesta Urja Ltd. also provided its helicopter service for this noble cause. Despite non-availability of adequate resources, the District administration carried out rescue and relief operations with unconditional support and co-operation of the Panchayats and the general public. Keeping in view the inaccessibility of some areas, helicopter services were operational on emergency basis to the locations like Ringhim Helipad – Mangan, Naga Public Ground, ITBP Football Ground, Chungthang, Tourism Helipad, Lachung. Army Helipad, Lachen. Emergency landing of helicopter was also operated at Tholung. Owing to inaccessibility of some areas and the pressing need of the people, food articles were air dropped at various locations of Dzongu.

10.29 In order to carry out rescue operations, a large number of volunteers along with Sikkim Police, Army and NDRF were engaged. They worked tirelessly at very difficult locations and were successful in retrieving all the dead bodies. A large number of affected families in remote locations such as Shipgyer, Bey and Mantam were also provided with Government land to enable them to build new houses. In fact, the Hon'ble Chief Minister visited all the locations during his tour and supervised relief operations. As the epicentre of the earthquake was near the North Sikkim and its road network was disrupted in many areas, such locations remained cut off for many days.

10.30 Realising the gravity of the situation, the State Government immediately appointed some officers to assist the District administration for carrying out relief and rehabilitation operations smoothly:- They were, Shri. T. N Kazi, Director, Human Resource Development (HRD) as special officer for North Sikkim, Shri. Gozing

Lachenpa, S.E, Public Health Engineering Department (PHED) as in charge of Lachen, Shri. Lobzang Lachungpa, Jt. Director, AH&VS as in-charge of Lachung and Shri. Sonam Lepcha, Dy. Director, HRDD as in-charge of Dzongu. Though North Sikkim was the worst hit region by the earthquake, the people and the affected locations limped back to normalcy gradually. This was possible with the immediate intervention of the Central and the State Government, and the support of the local public, Panchayats, Government officials, NGOs as well as other well wishers. The District administration thanked all of them for their support and good will gesture, through local dailies. Total ex-gratia expenditure incurred by the North District was Rs.16.88 crores as indicated in the statement given below:

10.31 EX-gratia expenditure incurred for the earthquake victims in the North District

(Rs.)				
Sl. No.	Block Administrative Centre	Mode of Expenditure	Amount	Total Amount
1	DZONGU	Houses Damaged	2,51,47,000	3,08,13,000
2	DZONGU	Loss of Livestock	56,66,000	
3	KABI	Houses Damaged	2,27,72,000	2,27,72,000
4	MANGAN	Houses Damaged	5,28,68,000	6,17,08,240
5	MANGAN	Ex-gratia for loss of life, major/minor injuries and other expenditure	48,12,240	
6	MANGAN	Loss of Livestock	40,28,000	
7	CHUNGTHANG	Houses Damaged	4,11,43,000	5,35,51,000
8	CHUNGTHANG	Ex-gratia for loss of life, major/minor injuries and other expenditure	1,24,08,000	
	GRAND TOTAL			16,88,44,240

Say, Rs.16,88,44,000/- (Rupees sixteen crores eighty eight lakhs forty four thousand only).

South District

10.32 Within minutes of occurrence of the earthquake on 18th September, DC, South managed to contact DPO/ LR&DMD/ South and directed him to contact all the officers asking them to assemble at his residence, and within two hours SP, South visited DC, South's residence and discussed the situation. It was decided that SP, South would

immediately take stock of the situation through WT from Police Stations/outposts and check posts and report the same to DC, South immediately. He was asked to instruct all the Police Stations/outposts and check posts for starting rescue operation in their areas immediately, with the help of locally available resources. Connectivity to the Head Office and Relief Commissioner was tried but could not be established. On the same day at 6.30 PM, DC, South along with a team reached Namchi Bazaar to take stock of the situation as this thickly populated place was extremely vulnerable. Two buildings were found severely damaged at Namchi Bazaar near the Fountain Park. At 6.40 PM, SDM, HQ was directed to inspect the district hospital and instruct the hospital personnel to get ready for any emergency situation. He was also instructed to visit nearby crucial resources. Immediate orders were given for the following:

- Rescue operations to be carried out in all the areas by the local administration, police and Panchayats.
- People were to be evacuated from unsafe buildings and shifted to safer locations since high intensity aftershocks were still expected.
- Liquor shops to be shut down and no liquor to be sold until further orders.
- Those having emergency power to keep them on to enable rescue operations.
- Emergency lamps to be provided and
- General public to be advised not to pay heed to rumours.

10.33 At 6.40 PM, DC, South inspected Nayuma LPG Indane distribution point to assess its safety, since it is located in the heart of the town. DC, South visited the Emergency & Fire Service Office and instructed the personnel to be prepared for rescue operations. Two Control Rooms were set up; one at DC, South's residence and the other at SDM, HQ's Office in the District Collectorate. Namchi hospital was inspected and it was seen that only one doctor was available at that time for emergency duty. Terrified patients were found running helter-skelter outside the hospital. At that time, there was no cardiologist in the hospital and the SP (South) flashed a message to Gangtok to send one cardiologist. DC, South contacted the power project developers to enquire about the safety of the dam sites. Power project developers were asked to clear road blockages near their projects within 24 hours. The Bharat Sanchar Nigam Limited (BSNL) was requested to restore emergency telecommunication lines as soon as possible. Total funds disbursed by the DC, South district to the quake victims was Rs.13.36 crore as shown in the statement as follows:

10.34 Consolidated statement of receipt and expenditure of the earthquake relief fund for the South District

				(In Rs.)	
	RECEIPTS			PAYMENTS	
Sl.No.	Particulars	Amount	Sl.No.	Particulars	Amount
	D.C. South	90,00,000	A.	Payment made from DC Office, South	
	D.C. South	1,00,00,000	1	Disbursement of ex-gratia by HCM for collapsed houses	9,1,10,000

	SDM Ravangla	10,00,000	2	Payment of ex-gratia for death	5,00,000
	D.C. South	25,00,000	3	Payment of ex-gratia for major injuries	3,50,000
	D.C. South	50,00,000	4	Payment of ex-gratia for injuries	92,500
	D.C. South	10,03,78,000	5	Procurement of relief materials	12,66,542
	D.C. South	10,00,00,000	6	Procurement of relief materials	87,2,640
	D.C. South	40,00,000	7	Procurement of relief materials	3405
	Namchi Municipal Council	5,00,000	8	Procurement of relief materials and ration	8400
	Jorethang Nagar Panchayat	1,00,000	9	Payment towards POL for district officials	5,65,530
	D.C. South	4,00,00,000	10	Procurement of stationeries	18,323
			11	Procurement of stationeries	18,828
			12	Procurement of materials for EOC/ICP	16,718
			13	Procurement of materials for EOC/ICP	1,60,376
			14	Procurement of relief materials & ration	1,52,902
			15	Procurement of stationeries	58,774
			16	Procurement of relief materials & medicines	1,22,844
			17	Procurement of relief materials	14,360
			18	Relief camps construction bill	50,000
			19	Providing food packets to Police Personnel	3,46,20
			20	Payment of Incidental expenses for various work	1,64,400
	RECEIPTS			PAYMENTS	
	Sl.No.	Particulars		Sl.No.	Particulars
		Amount			Amount
			21	Providing food packets for overtime work to EOC/ICP	1,38,260

			22	Providing food packets for overtime work to EOC/ICP	2186
			23	Procurement of stationeries	11,296
			24	Payment for transportation of materials & equipments	40,000
				Total (A)	1,40,84,804
			B.	Payment made by BDOs , NMC & JNP	
			24	BDO Jorethang	8,8,80,667
			25	BDO Yangyang	1,98,08,000
			26	BDO Namchi	1,35,86,823
			27	BDO Ravanga	1,47,94,000
			28	BDO Sumbuk	98,61,000
			29	BDO Sikkip	43,70,573
			30	BDO Temi	1,87,05,520
			31	BDO Namthang	1,81,07,769
			32	Namchi Municipal Council(NMC)	55,50,500
			33	Jorethang Nagar Panchayat (JNP)	48,78,000
				Total (B)	11,85,42,852
			C.	Unutilised fund returned by BDOs NMC	
			D.	Detailed accounts awaited from SDM, Ravangla	
	Total Receipts	18,24,78,000		Total Payments (A + B+C+D)	13,36,27,656

11 HOME MINISTER OF INDIA'S VISIT TO SIKKIM AFTER THE EARTHQUAKE

11.1 The Union Home Minister Shri P. Chidambaram arrived in Gangtok on 22.09.2011 and met the quake hit victims at the STNM hospital in the capital city. The

Hon'ble Minister held discussion with the State Government and announced a Central assistance of Rs.50.00 crores to the Government of Sikkim for immediate rescue and relief operation and also assured all the support and help to fight the devastation caused by the earthquake.

PRIME MINISTER'S VISIT TO SIKKIM & ANNOUNCEMENT OF POST-EARTHQUAKE PACKAGE

11.2 The Government of Sikkim requested the Government of India to strengthen the former's hands to fight the unforeseen earthquake which created havoc in the State. The 18th September earthquake spread a message of agony and sorrow throughout the country. The Central Government realized the gravity of the situation. Within two weeks of the occurrence of the quake, i.e. on September 29, 2011, the Hon'ble Prime Minister Dr. Man Mohan Singh visited Sikkim and consoled the quake hit victims. Hon'ble Prime Minister also announced a Relief Package of Rs. 1000.00 crores for Post-Earthquake Rebuilding and Reconstruction of damaged infrastructure. The Hon'ble Prime Minister also appreciated the work done by the State Government, particularly the Chief Minister whom he called a true nationalist.

11.3 Vide Ministry of Home Affairs letter No.47-32/2011-DM-III dated 2nd November, 2011, it was informed that the Hon'ble Prime Minister during his visit to Sikkim had made the following commitments:

- (i) ".....work on restoration of drinking water supply sources, reconstruction of irrigation channels, and construction of flood protection works will also be taken up under Central schemes. Damaged national monuments will be restored by the Ministry of Culture.
- (ii) "..... Keeping in view the extensive and unprecedented damage the Central Government is ready to provide assistance of Rs.1000.00 crores for relief, restoration and reconstruction work."

11.4 As the reconstruction and restoration work involved inter-ministerial coordination, Ministry of Water Resources, Ministry of Culture etc. were requested to get the proposals falling in their area/jurisdiction from the Government of Sikkim, obtain the approval of the competent authority in consultation with the Ministry of Finance and get the works completed on priority basis under intimation to the Ministry of Home Affairs, Government of India.

12 DAMAGES CAUSED BY THE EARTHQUAKE

12.1 As mentioned in the previous paras, the earthquake caused severe damages to life and property throughout the State. The high density tremor triggered other natural

calamities in the form of landslides, road blocks, falling boulders, lake bursts, flash floods etc. After the tremor, incessant heavy rain also continued for more than a week. This caused extensive damage to human life, property and infrastructure. Maximum damage occurred in Sikkim than in any other seismic areas adjoining the State. As the roads breached at several places, many remote villages remained cut off for days together.

12.2 As the earthquake occurred in the monsoon season, heavy rain and landslides rendered rescue operations extremely difficult. North District which was the closest to the epicenter was the worst hit. It may be mentioned here that about 95% of the population of the North District belong to tribal community (excluding armed forces) and as ill luck would have it, they bore the severe brunt of the quake.

12.3 In this context, immediate help from the Army was sought to manage the rescue operations. The Army responded immediately and it deployed about 5000 troops for carrying out relief and rescue operations. It also provided shelter to over 1500 quake-hit victims. Several cook houses were organized by the Army teams to provide food to the affected people. For catering to the needs of the civilians, as many as 204 relief camps were opened in different parts of Sikkim.

12.4 In order to understand the severity of the earthquake prone ecology of the State, it may be worthwhile to mention a few lines about the seismic zoning of India vis-a-vis Sikkim.

13 SEISMIC ZONING OF INDIA & SIKKIM

13.1 Based on scientific inputs available with various agencies, Bureau of Indian Standards [IS-1893 (Part-1): 2002] has grouped the country into four seismic zones, viz, Zone-II to Zone-V. Of these, Zone-V with Modified Mercalli (MM) 9 and above is seismically the most earthquake prone region whereas zone-II with MM intensity of 6 or less is the least prone region. Sikkim falls under Zone-IV with MM 8 (severe intensity zone) along with some areas of Jammu & Kashmir and Himachal Pradesh, Union Territory of Delhi, northern parts of Uttar Pradesh, Bihar and West Bengal, parts of Gujarat and some portions of Maharashtra near the west coast and Rajasthan.

13.2 In view of the facts mentioned above, the earthquake in Sikkim was not entirely unanticipated. Areas falling under Zone-IV witness frequent low intensity shallow focus micro-earthquakes. In fact, the State lies on an earthquake fault line. The Indian tectonic plane here is gradually pushing up the Eurasian plane for last many years. This tectonic movement can cause earthquakes of even larger intensity in future.

13.3 After occurrence of the earthquake, the Government of Sikkim submitted a Memorandum to the Government of India requesting the latter to provide liberal Central

assistance to help Sikkim come back to normalcy. The State Government has projected the extent of damages caused to various infrastructure by the earthquake and also worked out cost estimates for carrying out rescue and relief operations as well as reconstruction and restoration of infrastructure. Given the peculiar feature of the State, i.e, smallness of the State in terms of geographical size and population, the disadvantage due to location and its economic backwardness, the Government of India had bestowed a special status to Sikkim for the purpose of development. Accordingly, Sikkim has been put under the list of Special Category States. As the Government of Sikkim does not have adequate resources of its own to take up reconstruction and restoration of infrastructure of gigantic scale necessitated by the havoc played by the earthquake, it has also sought financial assistance over and above CRF/NCCF admissible under the existing norms.

14 MEMORANDUM SUBMITTED BY GOVERNMENT OF SIKKIM TO THE GOVT OF INDIA

14.1 As the high intensity earthquake caused extensive damages in the State, the Government of Sikkim submitted three Memoranda to the Government of India, one in September and two in October, 2011.

Memorandum -1

14.2 The Government of Sikkim submitted a preliminary Memorandum to the Government of India in September, 2011 and sought an assistance of Rs.6890.50 crores under National Calamity Contingency Fund (NCCF), (Ref. Annexure-VI).

14.3 Preliminary report covered the assessment of loss and extensive damage to public infrastructure like transportation infrastructure, energy infrastructure, water management infrastructure, governance infrastructure, social infrastructure, economic infrastructure, recreation infrastructure, cultural heritage infrastructure and privately owned infrastructure. Tourism sector was also reported to have been badly affected.

14.4 In the Memorandum submitted to the Government of India, the State Government projected the extent of damages to various infrastructures, rescue and relief measures as also the quantum of financial assistance sought for repair and restoration of these damaged infrastructures. Since the State Government has very limited resources of its own to take up restoration and reconstruction of infrastructure of this huge magnitude, it has also sought financial assistance for permanent restoration and reconstruction of infrastructures. While seeking financial package, the State Government has also sought, technical support with regard to modern/scientific reconstruction and retrofitting technology for making the entire infrastructure of the State earthquake resistant .

Memorandum-2

14.5 The first Memorandum was followed by a supplementary Memorandum submitted in October, 2011 seeking an additional assistance of Rs.3492.13 crores over and above the amount sought vide the preliminary Memorandum. (Ref. Annexure-VII).

14.6 The first Memorandum submitted by the State Government before the Hon'ble Prime Minister of India when he visited Sikkim on the 29th of September 2011 was based on the initial assessment carried out by the officials despite being involved in relief and rescue operations. The damage in many areas which were inaccessible could not be assessed. Hence, a clear picture of the extent of damage in the State could not be projected in the initial assessment. Considering the financial position of the State, the requirement of fund to meet the expenditure connected with relief and immediate repair and restoration work needed to be financed with the financial assistance from the Government of India. Accordingly, the Supplementary Memorandum was submitted to the Government of India with the request to release funds under NCCF to enable the State Government to proceed with relief work and also to carry out immediate repair and restoration work of physical and social infrastructure.

Memorandum-3

14.7 The Government of Sikkim submitted third supplementary Memorandum to the Govt. of India in October, 2011 seeking another assistance of Rs. 2811.99 crores (Ref. Annexure-VIII). The two memoranda submitted earlier could not capture fully the losses and damages caused by the earthquake. In many of the structures which had undergone a preliminary survey, it was found that major protective works such as retaining walls were immediately required to be erected to prevent a further sinking of the structure. Initially, it had not been possible to survey all the structures, as many of these surroundings were still not approachable by roads and other communication net works. Hence, the need for further survey and submission of the third Memorandum had arisen.

14.8 Thus, the total financial assistance sought under NCCF (submitted vide the above three memoranda) worked out to Rs.13,194.62 crores.

15 IMMEDIATE RELEASE OF FUNDS BY THE GOVERNMENT OF INDIA

15.1 The Ministry of Home Affairs, Government of India through the Ministry of Finance's letter No.F.23(3) FCD/2010 dated 23.09.2011 got an amount of Rs.50.00 crores released as payment in advance grant-in-aid to Government of Sikkim for immediate relief and rescue operation from National Disaster Response Fund (NDRF) on account of earthquake-2011.

15.2 The Prime Minister's Office vide its letter No.82(18464)/2011-PMF dated 20.09.2011 sanctioned an ex-gratia of Rs.2 lakh each to the next of kin of the persons deceased and Rs.1 lakh each to the persons who were seriously injured in the earthquake. Vide its letter No.82 (18464)/2011-PME dated 12th December, 2011, the Prime Minister's Office released demand drafts of Rs.118 lakhs for next of kin of the 59 deceased persons @ Rs.2 lakhs each. The amount of Rs.2 lakh on account of ex-gratia in respect of one missing person (location Chungthang) was withheld. The Government of Sikkim had submitted details list of 63 persons of the eligible beneficiaries for getting

the ex-gratia to the Prime Minister's Office. The Prime Minister's Office released ex-gratia for total of 62 persons except one missing.

15.3 The details of the deceased persons in the recent earthquake in Sikkim finally totaling to 63 are given in Annexure-IX.

16 VISIT OF THE CENTRAL TEAM TO SIKKIM TO ASSESS THE EARTHQUAKE DAMAGES

16.1 Pursuant to submission of the Memorandum by the Government of Sikkim, an Inter-Ministerial Central Team comprising Joint Secretary, MHA (North East), Government of India as the team leader and officers of Ministry of Health, Central Electricity Authority, Ministry of Finance, Ministry of Agriculture, Ministry of Drinking Water & Sanitation, Ministry of Roads & Transport and Central Water Commission as members visited Sikkim from 27th to 29th of September, 2011 to make assessment of the damages caused by the earthquake and to recommend quantum of financial assistance for relief and rehabilitation.

16.2 During its whirlwind tour, the team visited Gangtok and nearby areas on 27.09.2011. Sub-Team A visited and observed cracks developed in the Tashiling Secretariat building, Human Resource Development Department, Police HQ, Forest Secretariat, Primary School building at Lumsey, relief camp housing 70 families at Lumsey, Senior Secondary building at Tadong and Secondary School at Sichey.

16.3 Sub-Team B visited damaged water pipe network which was hitherto carrying raw water from Rateychhu River. It also saw the damaged water treatment plant which was earlier supplying water to Gangtok .

16.4 On 28.09.2011, Sub-Team A visited damaged houses at Lachen. Seventy houses were reported to be damaged, a similar number of houses were reported to have been damaged at Lachung, 4 houses were damaged at Dongne Thong, 8 houses in Faka village, 40 houses and two primary school buildings were reported damaged in Chungthang. Food packets were being dropped in the areas; relief camps were also seen operating in the region.

16.5 Sub-Team B visited damaged water supply scheme at Nandok village in Ranipool of East District.

16.6 On 29.09.2011, while visiting South Sikkim District, the Central Team saw 21 damaged houses, cattle sheds fully damaged in Lumsey, electric insulators, conductors and electric poles damaged in Lower Martam in East Sikkim and number of houses damaged in Singtam area. Relief camp housing 105 families was seen operating in Singtam, It also saw that the district hospital had developed cracks and required

immediate repairs as also water reservoir of 10,000 litre capacity was damaged which required immediate repairs to restore water supply in Namchi area. Other structures which were reported damaged were Junior High School in lower Tarku and haat shed in Temi area. Cracks had also developed in Temi Tea Garden. It was reported that heavy boulder fell from the hill and damaged water reservoir tank of 30,000 liter capacity at Damthang bazaar. In Namchi, District Jail Complex and 12 houses were reported to have developed cracks.

16.7 In the second spell of its visit from 07.10.2011 to 12.10.2011, the Central Team visited Gangtok and nearby areas, North, South and West Districts. The Team saw cracks in STNM hospital. It also saw relief camp and damaged agricultural fields in village Nandok of Ranipool in East District. On 8th October, Sub-Team A visited some villages of Saffo block and took a stock of availability of blankets, food, medicines, shelters and fuel in the area. The team also visited the relief camp of Bey village which was housing 16 families at Lynza village under GP-Sakyong-Pentong. Sub-Team B visited Mangan (District headquarter of North District) and inspected the damages caused to PMGSY roads.

16.8 On 9th October, 2011 the members visited Manglay where transmission line was damaged. The PMGSY road was also seen damaged at Pabang bridge (up to upper Sripatam) for a stretch of 5.5 km. Due to fall of debris from hills, PHCs, roads, drinking water reservoirs, bridges and roads were reported to be badly damaged in Yangang block.

16.9 On 10th October, 2011 the Team visited 300 year old Duchi Pemayangtse monastery at Pelling (West Sikkim). It had developed cracks due to tremors. There were also cracks in the block administration building. Kalejkhola hydel project stopped functioning due to cracks in the area. It was also reported that 43 houses were damaged at Sardu-Radu Khandu GP unit, 33 houses were fully damaged and 16 Government assets were damaged at Hee village. A relief camp was seen operating by accommodating 45 families in the Hee village. After detailed review of the situation, the Inter-Ministerial Central Team made its recommendations for consideration of the Ministry of Home Affairs, Government of India.

16.10 Besides the above inter-ministerial Central Team, other teams which visited quake hit Sikkim to study the impact of the earthquake on the State were teams from National Disaster Management Authority, Social Works Department., Delhi University, Geological Survey of India, Geo-environmental team from IIT Roorkee, Indian Institute of Science, Bangalore etc. They studied and analyzed the impact of recent earthquake in Sikkim. Their research work and its findings would certainly be of great help for the earthquake prone Sikkim and other such areas in future.

16.11 Besides the above, many technical teams visited quake affected areas of Sikkim. The list of various team members which visited Sikkim after the occurrence of the earthquake is given in Annexure-X.

17 NDRF (NATIONAL DISASTER RESPONSE FUND) FUNDS RELEASED BY GOVERNMENT OF INDIA and SDRF (STATE DISASTER RESPONSE FUND)

17.1 The High Level Committee (HLC), in its meeting held on 15th December, 2011, considered the recommendations of the Inter-Ministerial Group (IMG) on the report of the Inter-Ministerial Central Team (IMCT) for Central assistance to the State of Sikkim for management of the situation caused by the earthquake of 18th September, 2011. The HLC did not consider the projections of long term/permanent nature which were outside the purview of the NDRF/SDRF norms. They opined that the works of permanent nature would be met separately out of Rs.1000.00 crores Special Package announced by the Hon'ble Prime Minister for Central assistance.

17.2 The HLC approved the following assistance to the State Government:-

- Rs.227.51 crores from NDRF, subject to the adjustment of 75% of balance available in the SDRF account for instant calamity,
- Rs..41.64 crores from Special Component of the National Rural Drinking Water Programme (NRDWP) for repair of damaged water supply works and
- Payment of air bills for airdropping of essential supplies, based on actual.

17.3 With reference to letter No.32-7/2011-NDM-I, dated 27/12/2011 from Ministry of Home Affairs, Government of India, vide letter no. F 23 (3) FCD/2010 dated 17.01.2012, the Ministry of Finance released a grant-in-aid of Rs. 150.38 crores from the National Disaster Response Fund to Sikkim during 2011-12 towards immediate relief necessitated by natural calamities of severe nature and Rs. 50.00 crores was already released after Hon'ble Home Minister's visit, making a total of Rs 200.38 Crores from NDRF

17. 4 NDRF work relating to immediate restoration works is underway and despite several limitations of hostile climate and hilly terrain, the work will be completed within the current financial year. Progress of expenditure of NDRF package of Rs 200.38 crores (A:Rs.150.38 crores for immediate restoration works and B: Rs 50.00 Crores for relief & rescue operation) is as under:

17.5 A: Progress of Utilization of NDRF of Rs.150.38 crores:

Financial progress of works sanctioned under NDRF release of
₹150.38 crores as on 31/12/2012

(₹ crore)

Sl. No	Name of department	Sanction Amount	Payment Released	Remarks
1	Agriculture	10.80	2.82	Works in Progress
2	Animal Husbandry	5.00	1.70	Works in Progress
3	Building & Housing	8.00	7.84	Works in Progress
4	Culture	1.00	1.00	Work completed
5	Ecclesiastical	5.00	5.00	Works in Progress
6	Energy & Power	5.00	5.00	Work completed
7	Fire & Emergency Services	1.00	0.79	Works in Progress
8	Health	5.00	2.92	Works in Progress
9	HRDD	5.00	4.96	Work completed
10	IPR/PRESS	0.50	0.48	Work completed
11	Irrigation	1.00	1.00	Work completed
12	Land Revenue	40.98	35.47	Works in Progress
13	PHED	3.00	3.00	Work completed
14	RMDD	4.00	0.50	Works in Progress
15	Roads	30.00	26.06	Works in Progress
16	Sikkim Milk Union	0.10	0.10	Work completed
17	Sikkim Police	5.00	2.52	Works in Progress
18	SNT	5.00	0.01	Works in Progress
19	Social Justice	2.00	0.20	Works in Progress
20	Tourism	5.00	2.98	Works in Progress
21	UD & HD	8.00	7.26	Works in Progress
	Total	150.38	113.10	Works in Progress

Note: All works under progress may be completed by 31st March 2013.

B: Progress of Utilization of NDRF of Rs.50.00 crores including Progress of Utilization of SDRF of Rs. 20.35 crores released for Immediate Relief & Rescue Operation:

(In Rs)

Sl No.	Districts	Amount	Remarks
1.	East District	27,05,94,698	Detail at Para 10.19
2.	West District	12,86,50,957	Detail at Para 10.24
3.	North District	16,88,44,240	Detail at Para 10.31
4.	South District	13,36,27,656	Detail at Para 10.34
5.	Head Quarter, Nagar Panchayats & Control room etc.	17,82,449	Operational expenses for Head Quarter and Interlinked Departments
	Total	70,35,00,000	

17. 6 The Payment of air bills for airdropping of essential supplies, rescue, relief and search is based on actual with the details as approved, sanctioned and released payments for Helicopter Services utilized during the Post-Earthquake period under the National Disaster Response Fund from the Union Ministry of Home Affairs, is as under:

Sl. No.	Particulars	Bill Amount (Rs.)	Amount released (Rs)
1.	Air Head Quarter, Air Force, GOI	86,68,583.00	86,68,583.00
2.	MHA & Sikkim Tourism (STDC), Government of Sikkim (Pawan Hans Helicopter Ltd.)	1,06,83,979.00	1,06,83,979.00
3.	Abir Infrastructure Gurgaon	3,09,41,781.00	3,09,41,781.00
	Total	5,02,94,343.00	5,02,94,343.00

The helicopter operations during the post-earthquake period did very good search and rescue operations to the people and State and hence, the payment has been released and the bills have been forwarded for reimbursement to the Ministry of Home Affairs, Government of India under the NDRF fund for Search and Rescue Operations/ airdropping of essential supplies, based on actual as per the approval already accorded by the Ministry of Home Affairs, Government of India.

17.8 The immediate relief and restoration works under NDRF/SDRF have been taken up in a very planned manner and wherever it has been possible earthquake resistance technology has been applied. All the Departments and sectors have taken action in time and as per the need of the area and situation. The works are still in progress due to very less working season and may be completed by the end of March 2013.

17.9 The funds received by the State Government from the Government of India is not in consonance with the amount of damages occurred due to the earthquake and hence all restoration and repairing works could not be taken up. The State Government is putting all efforts to recover the losses at the earliest.

18 ESTIMATED COST FOR REHABILITATION/RECONSTRUCTION OF EARTHQUAKE AFFECTED INFRASTRUCTURE

18.1 As mentioned in previous paras, the Hon'ble Prime Minister visited Sikkim and announced a post-earthquake Special Relief Package of Rs.1000.00 crores for carrying out the Long term Reconstruction and Re-building of Sikkim after the Earthquake of 18th September , 2011. However, on the basis of a Preliminary Feasibility Study Report prepared by Engineering Projects (India) Ltd, New Delhi, for "Prime Minister's Package for Sikkim restoration post September 2011 earthquake" the reconstruction works of infrastructure works out to Rs.1471 crores, as under:-

Sl. No.	Name of the Project	Amount (Rs. crores)
1	Re-construction of State Civil Secretariat(Tashiling)	193.00
2	Re-construction of 13 Departmental State Headquarters (Sokeythang)	324.40
3	Construction of 7972 Rural Houses	453.60
4	Roads & Bridges	200.00
5	Retrofitting of State Buildings, schools, Health Centers, Power Projects etc.	100.00
6	Drinking Water	200.00
Total Estimated Cost		1471.00

This preliminary report with an estimated cost of Rs.1471.00 crores was submitted by the Government of Sikkim to the Government of India for consideration.

18.2 Sikkim has a precipitous terrain clubbed with a weak geology and fragile ecology. These, coupled with heavy rainfall created a multiplier effect amplifying the earthquake impact several times, resulting in many collateral natural calamities in the form of landslides and slips, boulder falls, lake bursts and flash floods thereby magnifying the damage to human life and property many times. Upon the impact, thousands of residents were evacuated from their homes, and many areas suffered from communication and power disruption. The heavy magnitude caused significant building collapse and mudslides, 63 people were confirmed killed by the effects of the earthquake within Sikkim, and hundreds of others sustained injuries. In the Memorandum, damages were listed out based on preliminary survey. As mentioned

earlier, loss and extensive damage was reported to public infrastructure comprising transportation infrastructure, energy infrastructure, water management infrastructure, governance infrastructure, social infrastructure, economic infrastructure, etc. Privately owned infrastructure like houses, lodges, hotels, commercial establishments, toilets, cattle sheds, stores, etc were also badly hit. The loss and damages are listed out in the previous paras.

19. PRIME MINISTER'S SPECIAL PACKAGE TO SIKKIM FOR POST-EARTHQUAKE RECONSTRUCTION & REBUILDING INFRASTRUCTURE PROJECTS IN SIKKIM

19.1 Now that the first phase of relief/rescue operation and immediate restoration work is over, the next phase of rehabilitation/reconstruction and re-building of earthquake affected areas and infrastructure has been taken up on a priority basis. The Chief Secretary personally handed over two sets of Preliminary Feasibility Report (PFR) to Shri T.K.A. Nair, Advisor to Hon'ble Prime Minister and Shri R.K. Singh Union Home Secretary, prepared by the Engineering Project (India) Ltd (EPIL) , New Delhi for earthquake specific reconstruction works to be undertaken in the State. Shri T. K. A. Nair, the Adviser to Prime Minister chaired a meeting in the PMO on 15.11.2011 to review the post-earthquake relief, restoration and reconstruction works in Sikkim. In pursuance with the discussions in the above meeting, the Ministry of Home Affairs and Planning Commission, Government of India were directed to examine the proposal of Govt. of Sikkim and help release Rs.200 crores as advance SPA to enable commencement of restoration works as per the PFR prioritized by the State of Sikkim.

19.2 Accordingly, during the financial year 2011-12 an additional amount of Rs.200 crores was released by the Ministry of Finance, Department. of Expenditure, Government of India vide its letter No.44 (3) Sikkim-SPA/PF-I/2011-1308 dated 18.01.2012 on account of payment of Special Plan Assistance (SPA) (Grant portion) for the State's Annual Plan 2011-2012 as under:

- (a) Reconstruction of State Civil Secretariat, Tashiling (Rs.100.00 crores) and
- (b) Reconstruction of 13 Departmental State Headquarters at Sokeythang, Gangtok (Rs.100.00 crores)

19.3 The amount was released as per Planning Commission's recommendation subject to the following conditions:

- (i) The Planning/Finance Department would ensure monitorable targets (physical and financial) against each project before release of allocated funds to the line departments,
- (ii) The State Government would ensure setting up of monitoring mechanism to check the progress of utilization at regular intervals,

- (iii) The State Government would ensure that funding from alternative sources or through existing schemes of Government of India is not availed for the projects for which SPA Grant has been sought and overlapping of projects or duplication of funding does not occur,
- (iv) The SPA Grant will be utilized by the Government of Sikkim only for the purpose for which it is approved for and it stands earmarked for the same, and
- (v) The SPA Grant payment will be adjusted against the total size of the Prime Minister's Special Package for Sikkim, as per the scheme wise allocation.

19.4 After this, the State Government of Sikkim has since reviewed the earlier decision of construction of 13 Departmental Headquarters at Sokeythang, Gangtok and has requested the Central Government to exclude the same from the list of the prioritized projects; instead, enlarge the extent and scope of the retrofitting/major repair works pertaining to School Buildings, ICDS centers; Primary Health Centers, State Sector Power Projects, etc. as these are required to be taken up immediately.

19.5 The State Government of Sikkim vide letter No. SH/6(162)/PEQ, dated 24/03/2012 requested for release of Rs.1000.00 crores of SPA under PM's Package against five categories of projects for the period 2011-14 as recommended by Ministry of Home Affairs. These proposals have been examined in the light of decisions taken in the meeting of the Committees of Secretaries (CoS) held on 09/11/2011, meeting held in the Prime Minister's Office on 15/11/2011 and the meeting held on 06/09/2012 in the Planning Commission. The Planning Commission vide letters dated 16/01/2012 and 02/03/2012 recommended release of Rs.200.00 Crores (grant) for (1) reconstruction of State Civil Secretariat, Tashiling and (2) Construction of 7972 earthquake safe rural houses.

19.6 The draft proposal submitted by the Government of Sikkim was considered by the Ministry of Home Affairs in an inter-ministerial meeting and recommended to consider and approve release of assistance of Rs.1000.00 crores (including Rs.200.00 crores as advance) to the State Govt. in three installments in three financial years in view of the absorption capacity of the State for its effective utilization and availability of SPA as per the following details:-

Sl. No.	Name of the Project	Proposed by the State	Project-wise SPA recommended during the financial year			Total
			2011-12	2012-13	2013-14	
1	Re-construction of State Civil Secretariat, (Tashiling)	193	100*	93	-	193
2	Re-construction of 13 Departmental State Headquarters (Sokeythang)	324	100**	-	-	-
3	Construction of 7972 rural houses	454	196	195	-	391
4	Roads and Bridges	200	24	117	75	216
5	Retrofitting of State buildings, schools, Health Centers, Power Projects etc.	100	50	100	20	170

6	Drinking Water	200	10	20	-	30
Total		1471	380	525	95	1000

* Already approved as advance

** Although approved as advance, now no longer required by the State and hence to be considered as advance for construction of 7972 rural houses at Sl. No.3 above

19.7 Accordingly, the State Government discussed the proposal in the Cabinet and the following sector wise allocation of amount was approved in the Cabinet meeting held on 9th February 2012:

Sl. No	Projects prioritized by the State	Initially proposed	Revised allocation
1	Reconstruction of State Civil Secretariat Building at Tashiling, Gangtok.	193	193
2	Reconstruction of 13 Departmental State Headquarters at Gangtok. (now sought deletion from the list of prioritized projects)	324	Nil
3	Reconstruction of 7972 Rural Houses	454	391
4	Renovation and Re-building of State Roads & Bridges and Rural Roads: a. PWD Roads & Bridges – Rs. 200 Crore. b. Rural Roads & Bridges – Rs. 16 crore	200	216
5	Retrofitting of State Government Buildings, Schools, ICDS Centres, Rural Health Centres, Dispensaries, and State Power Projects – a. Rs.20 crore - PHQ, Sikkim Legislative Assembly, State Human Resource Development HQ, State Health and Family Welfare HQ, State Archives Building, State Forest Secretariat Complex, Gangtok Working Women Hostel, Class I Quarter at Namnang, Girls Hostel at Deorali and Govt Institute of Cottage Industries and other damaged buildings, . b. Rs.50 crore – State School Buildings. c. Rs. 5 Crore – ICDS buildings.	100	170

	d. Rs. 20 crore – PHSCs (Health) e. Rs. 5 crore – Animal Husbandry & VS Buildings. f. Rs.10 crore – RMDD Buildings. g. Rs.0.70 crore – Paljor Stadium Complex, Gangtok. h. Rs.0.50crore - Food Preservation Factory, Singtam i. Rs. 6 crore – UD & HD Projects j. Rs. 52.80 Crore - State Power Projects.		
6	Renovation of Drinking Water & Sewerage Schemes	200	30
TOTAL		1471	1000

19.8 The Major components of the Package are:

1. Re-construction of State Civil Secretariat at Tashiling- Rs 193.00 crores. The Work is under progress and may be completed by the end of next year 2013-14.
2. Reconstruction of 7972 numbers of Rural Houses – Rs 391.00 crores. The work is in progress and about half of the works will be completed in current year and the rest by the end of next year 2013-14.
3. Renovation and re-building of State Roads and Rural roads-Rs 216.00 crores. The work is in progress and will be completed by the end of next year 2013-14.
4. Retrofitting of various State buildings, schools, ICDS, PHSCs and Power Project etc- Rs 170.00 crores. The work is in progress and will be completed by the end of next year 2013-14.
5. Drinking Water and Sewerage Schemes - Rs 30.00 crores. The work is in progress and will be completed by the end of next year 2013-14.

19.9 Till 31st December 2012, the State Government of Sikkim has received only Rs. 280.00 crores (Rs 200.00 crores in the year 2011-12 and Rs 80.00 crores in the year 2012-13) from the Government of India and all the works have been taken up and are under progress. The balance of the funds is yet to be received from the Government of India and works on some projects were delayed due to delay in approval of DPRs and late release of fund in the year 2012-13 from the Government of India. The matter is being pursued on regular basis with the Government of India for early release of funds.

19.10 The Planning Commission, Government of India vide Letter No.13040/37/2011-SP NE, dated 12/10/2012 recommended for release of Rs 200.00 crores (grant) as SPA during 2012-13 with details as follows:

Details of Projects Approved and SPA funds recommended (Rs. crore) under Prime Minister's Package for post-earthquake reconstruction/rehabilitation works in Sikkim for 2012-13

Sl. No.	Categories of Projects	No. of Projects	Total Project Cost	SPA(grant) recommended so far	SPA (grant) Recommended for 2012-13
1.	Reconstruction of State Civil Secretariat at Tashiling, Gangtok	1	193.00	100.00	-
2.	Reconstruction of 7972 Rural Houses	7972	389.83	100	20.00
3.	Renovation and Re-building of State Roads & Bridges and Rural Roads	381 (including 180 PMGSY Roads)	216.00 (including 16.00 for PMGSY)	-	120.00
4.	Retrofitting of State Government Buildings, Schools, ICDS Centers, Rural Health Centers, Dispensaries, and State Power Projects	1535 (project-wise breakup is given below)	196.17 (project-wise breakup is given below)	-	55.00 (project-wise breakup is given below)
	a.PHQ, Sikkim Legislative Assembly, State Human Resource Development HQ, State Health and Family Welfare HQ, State Archives Building, State Forest Secretariat Complex, Gangtok Working Women Hostel, Class I Quarter at Namnang, Girls Hostel at Deorali and Government Institute of Cottage Industries and other damaged buildings etc	593	68.37	-	12.50
	b. State School Buildings.	771	50.00	-	10.00
	c. State Power Projects	10	52.80	-	20.00
	d. PHSCs (Health)	27	20.00	-	10.00

	e. ICDS buildings (Aaganbari)	134	5.00	-	02.50
5.	Sewerage schemes	25	5.00	-	5.00
	Total		1000.00	200.00	200.00

19.10.1 Out of five broad categories of projects, two have already been approved at an estimate of Rs 582.83 crores, against which Rs 200.00 Crores has been recommended for release in 2011-12

19.10.2 The remaining three categories include projects relating to roads & bridges, retrofitting of schools, ICDS, health centers, power projects, drinking water, sewerage system etc. These proposals have been examined in consultation with the subject divisions of the Planning Commission who in turn have consulted the concerned Ministries and clarifications received from the State Government wherever required.

19.10.3 Keeping in view the above, Planning Commission conveyed its approval of these three categories of projects at an estimated cost of Rs. 417.17 crores and recommended release of an amount of Rs. 200.00 crores SPA (grant) for 2012-13 as prioritized by the State Government.

19.10.4 Detailed list of above projects are as per the proposals submitted by the State government vide letter No. 74/NC/LR&DMD/GOS/134, dated 20/03/2012, letter no. 144/LR&DM/GOS, dated 12/04/2012, letter No. 9/SSDMA/ LR&DM/GOS, dated 21/4/2012 and Letter No. 61/SSDMA/LR&DMD/NC/GOS/107/NC, dated 26/05/2012.

The progress till 31st December 2012 is as follows:-

LAND REVENUE AND DISASTERMANAGEMNT DEPARTMENT
Details of Receipt & Payment under SPA up to 31/12/2012 (Rs crores)

Sl. No	Categories of Projects	No. of Projects	Total Project Cost	Receipt			Payment		
				SPA 2011-12	SPA 2012-13	Total	Expenditure 2011-12	Expenditure 2012-13	Total
1	Reconstruction of State Civil Secretariat at Tashiling, Gangtok.	1	193.00	100.00		100.00	0.00	32.14	32.140
2	Reconstruction of Rural Houses	7972	389.83	100.00	20.00	120.00	20.00	50.00	70.00
3	Renovation and Re-building of State Roads & Bridges and Rural Roads:	381 /180 PMGSY	216.00		120.00	120.00		44.09	44.09

4	Retrofitting of State Government Buildings, Schools, ICDS Centers, Rural Health Centers, Dispensaries, and State Power Projects -	1535	196.17		55.00	55.00		0.74	0.74
a.	PHQ, Sikkim Legislative Assembly, State Human Resource Development HQ, State Health and Family Welfare HQ State Archives Building, State Forest Secretariat Complex, Gangtok Working Women Hostel, Class 1 Quarter at Namnang, etc.	593	68.37		12.50	12.50			0.00
I	Building		20.00			0.00			0.00
II	Water Supply		25.00			0.00			0.00
III	Horticulture		5.00			0.00			0.00
IV	Paljor Stadium		0.70			0.00			0.00
V	Food Preservation Factory		0.50			0.00			0.00
VI	UD& HD Project		6.00			0.00		0.53	0.53
VII	RMDD		10.00			0.00		0.01	0.01
b	State School Buildings	771	50.00		10.00	10.00			0.00
c	State Power Projects	10	52.80		20.00	20.00		0.20	0.20
d	PHSCs (Health)	27	20.00		10.00	10.00			0.00
e	ICDS buildings (Aanganbari)	134	5.00		2.50	2.50			0.00
5	Sewerage schemes	25	5.00		5.00	5.00			0.00
	Total		1000.00	200.00	200.00	400.00	20.00	126.97	146.97

20 MONITORING AND EVALUATION

20.1 In order to complete the work in a time bound manner, all programmes are being taken up with full participation of the people and the Panchayats, co-operative societies and affected people as well. Each and every Department has its own Multi-Disciplinary Internal Monitoring Committee which supervises each and every work and submits reports before release of payments. The Land Revenue & Disaster

Management Department also has a team at Headquarter Level and District Levels which inspect and monitor work and activities. The Chief Secretary, Government of Sikkim along with the Heads of Departments, senior officials and technical team has been regularly reviewing, monitoring and inspecting important areas for recovery and rebuilding. The Hon'ble Chief Minister is regularly reviewing the progress and getting feedback from officials and public on quality and progress of all work and also making field visits.

20.2 The State Government has also constituted a Committee under the Finance Revenue and Expenditure Department for monitoring and evaluation of all work being undertaken under post- earthquake activities.

20.3 Meanwhile, vide its letter No.32-7/2011-NDM-I dated 16.01.2012, the Ministry of Home Affairs, Government of India has issued a revised list of items and norms of assistance admissible from the State Disaster Response Fund (SDRF) and the National Disaster Response Fund (NDRF) for the period 2010-2015, in the wake of natural calamities. A copy of the revised items and norms which is a useful reference material for the State Government is given in Annexure-XI.

20.4 The mid- term evaluation of the entire programme will be taken up in 2013-14 by a multidisciplinary committee of all relevant sectors with a report on output and all aspect of works on all the projects with at least 50% completion. The full evaluation and output report will be put forward in the year 2014-15, subject to timely receipt of funds from the Government of India.

21 TRADITIONAL STRUCTURES/HOUSES IN EARTHQUAKE ZONES

21.1 There is a consensus in the scientific world that Sikkim and its surrounding areas are likely to witness major earthquake in future. Presently, there is no scientific technique available anywhere in the world to predict occurrence of earthquakes with reasonable degree of accuracy with regard to space, time and magnitude. Loss of lives during an earthquake is mostly due to damage or collapse of houses/structures. It is, therefore, pertinent that appropriate steps are taken to construct dwellings houses and other structures in the region as per the guidelines laid down by the Bureau of Indian Standards to minimize the losses caused by earthquakes. The choice of seismic factor to be adopted for designing and engineering the structures depends on horizontal ground acceleration and various other factors including type of structures, ground conditions and also importance of structures. For important and critical structures, site specific spectral studies have to be carried out before assessing the seismic design parameters. Suitable seismic design parameters may be adopted as per the recommendations of National Committee on Seismic Design Parameters for designing and engineering hydroelectric projects.

21.2 There is very high level of seismic vulnerability of the region. The damage is primarily attributed to poor design and construction practices and lack of quality control. Poor construction practices prevalent in the area spell tremendous risk for the population of this region. The solution lies in opting for safer construction through choice of appropriate construction systems in corporation with earthquake resistant technology, use of good construction materials and their quality control, and involvement of competent manpower for design construction and supervision. There is an urgent need for creation of a system for checks and balances to ensure safe construction practices in the State. Each district needs to develop cadre of trained masons, contractors and engineers and provide information and guidance on developing quake resistant structures to the community. Masons may be trained in constructing seismic resistant constructions, whom the people can hire for constructing their houses.

21.3 Furthermore, it will require sensitizing the common people about the seismic hazard and the tangible risks that the community is facing on account of using unsafe construction practices. Awareness and capacity building of human resources at all levels and the creation of suitable mechanism are integral components of the road map for steering the State towards seismic safety. Since public awareness is at the heart of preparedness, an intensive campaign will be waged from door to door and village to village, involving students and teachers and using the network of Panchayats in the State to sensitize communities and to enable them to meaningfully participate in the process of ensuring seismic safety. If need be, SMSs on new technology will be sent to sensitize people to respond to unforeseen natural calamity. Also, community based participatory monitoring system to track the progress of implementation of technical guidelines; grievance redressal etc. will be developed.

21.4 The critical structures viz., power plants and dams in the area are required to be designed taking into consideration the past seismicity and the expected ground motions in the region. They should be estimated through a detailed site specific analysis using probable and deterministic approaches carried out by earthquake engineers.

21.5 The task is enormous and must perforce, involvement of all sections of the society, the Government, NGOs, professionals, industries, common man etc.

22 SEISMIC RETROFITTING OF STRUCTURES

22.1 One of the options for reducing vulnerability of structures of earthquake rehabilitation is seismic retrofitting. It is, in fact, a relatively new concept in India. It was perhaps, after Latur earthquake of 1993 that retrofitting was taken up on a substantial scale as a part of the earthquake rehabilitation programme under which many public buildings were retrofitted. But, retrofitting as a technique and a profession is still in its infancy. Information on retrofitting is hard to find. It is, therefore, beyond the reach of an ordinary person. It has been reported that over 80% buildings that consist of non-engineered masonry in India are vulnerable against the hazard of future earthquake. Efforts have, therefore, to be made to evolve solutions to tackle the area specific

problems peculiar to an area. This would call for taking into consideration different building technologies, different materials, problem of accessibility, erratic electric supply, unavailability of basic as well as special materials needed for retrofitting etc. The challenge/adversity posed by the earthquake in Sikkim perhaps could be turned into an opportunity and the State Government is looking to switch over to retrofitting technique as far as possible. The Government is making concerted efforts to take steps in such a right direction.

22.2 The earthquake may indeed be termed as a wakeup call. It is to be ensured that human lives and infrastructure are safeguarded against extensive damage in future earthquakes. It is time earthquake resistant house construction techniques were adopted thereby improving the preparedness of the State to handle such disasters thereby reducing damages and significantly cutting down public expenditure in construction of new houses in future.

22.3 The post-earthquake strategy of the State will be to help construct earthquake resistant, new and improved RC frame houses for those whose houses have been totally damaged and cannot be repaired and retrofitted. Above all, massive IEC (information, education and communication) activities will have to be taken up to educate all the stake holders on earthquake safe house construction practices. Mass training of masons and orientation of the local community will have to be taken up to make earthquake proof house construction a standard practice in future.

23 PROBLEMS & CONSTRAINTS IN RESCUE OPERATION

23.1 As mentioned earlier, in the beginning of the relief operation, transport and communication were badly affected due to landslides and continuous rains. The road linking Siliguri and Gangtok, as well as most of the other main routes were frequently blocked by recurrent landslides, falling of loose rocks and boulders. Communication links (telephones and any other communication) with many villages in North Sikkim were disrupted. This posed a major problem as it prevented smooth and regular communication with some of the worst affected villages. As such, despite best efforts of the State Government, relief material could be dispatched very late in certain inaccessible areas.

24 EXPERIENCES & LESSONS LEARNT

24.1 Sikkim had not faced any natural calamity of this magnitude in its recent history. Other events like landslides, flash floods, outbreak of fire etc. occur in a particular area of the State from time to time and cause loss of life and damage to property. Under such a situation, support is provided by the locals nearby and the local administration and the process of response, rehabilitation and reconstruction go on thereby bringing normalcy without inordinate delay. Contrary to all such events, the impact of the 6.8 magnitude earthquake with its epicentre along the junction of Teesta lineament and Kanchenjunga fault in Sikkim-Nepal border was perceptible. It was around 18:10 to 18:11 hrs IST and the day was Sunday when almost all the families were in their homes and some were moving in the down town areas that a sudden jolt lasting for about 30-40 seconds made all to experience a disastrous event of abnormal nature. People came out of their houses panic stricken and started gathering in the open

ground or safer places. The members of the family staying away tried to contact their kith and kin frantically but failed as the telecommunication system was out of order. Immediately, the earthquake was followed by aftershocks which made the people fear that similar situation would occur again. Meanwhile, a rumour spread that another earthquake of higher magnitude would follow. Therefore, people ran helter-skelter and gathered in the open areas.

24.2 The State Control Room of Sikkim State Disaster Management Department located at Tashiling Secretariat was damaged. Under such a situation, the State Control Room was immediately shifted to Police Head Quarters. Emergency meetings were held and message flashed to all concerned. Emergency Operation Centres of the districts immediately started mission mode response and swung into action to carry out rescue and relief operations.

24.3 Community volunteers are often the first responders to a disaster in real-time. In this case also, community volunteers along with the district administration and the Army personnel in the North District and others were the first to respond to the unforeseen situation. Search and rescue operations were started in the troubled areas. The most affected district was North Sikkim and other districts and this was revealed through police W.T. system which reached the State Control Room. Road network was totally disrupted in this district though it was also damaged in the other districts. Chopper services were requisitioned from National Disaster Management Authority (NDMA) and the Ministry of Home Affairs, Government of India. Air force and army helicopters swung into action immediately but were obstructed due to bad weather condition. Services of Sikkim Tourism Helicopter Services, Government of Sikkim and other private companies like Abir Enterprise (Teesta Urja) were also utilised. As soon as the weather condition improved, all involved started recovering/retrieving the victims trapped under the debris. They also started rescuing the injured who were immediately flown to hospitals for ensuring medical care to them. Affected people were kept in the relief camps and were provided with food, drinking water, medicines etc. Simultaneously, damages to houses and property were being assessed by the district authorities. Food and relief materials were air dropped in difficult and inaccessible areas.

24.4 The Hon'ble Prime Minister, the Union Home Minister and senior officers from the National Disaster Management Authority and Government of India, other State Governments, NGO, Associations and many others visited the earthquake affected areas to get a first hand information about the condition of the quake victims and to redress the latter's grievances. They held several meetings with the officials of the State Government. The officials of the Government of Sikkim started assessing the damages caused by the earth quake and submitted three Memoranda (one in September and two in October, 2011) to the Government of India seeking financial assistance for reconstruction of damaged infrastructure and bringing back normalcy in the State. Inter-ministerial Central team members visited the affected areas of the State, inspected the damages and recommended financial assistance for the State. Later, on the basis of their assessment and recommendation, financial package was given to the State for

immediate relief and temporary construction work. Thereafter, detailed project reports relating to various sectors were prepared and submitted to the Central Government seeking financial assistance for carrying out earth quake-resistant reconstruction activities of permanent nature. As mentioned elsewhere, financial assistance was released immediately to help the State carry out relief and rescue operations. Proposal for release other required funds for various priority sectors is under consideration by the Government of India. However, with available funds, restoration work of various sectors has already started.

24.5 The havoc caused to the State of Sikkim by the earthquake may be termed as a wakeup call. It is high time that the State Government is making awareness campaign among the common masses and strengthening preparedness for facing such an unforeseen natural calamity. The State Government has learned from experience and taking up corrective measures to lessen/avoid such damages in future. In this context, the State Government has been taking a number of initiatives.

24.6 Multi Hazards Risk Vulnerability Assessment (MHRVA) of Sikkim has been carried out and it shows that in this Himalayan region there are possible hazards with regard to earthquake, landslides, fire, flood/flash floods, snow avalanches, drought, hail storm, thunder, lightening etc.

24.7 Some of the comprehensive Action Plans/steps that have been planned for the future are as under:

Construction of Quake Resistant Buildings

- Formulation of building bye-laws and their strict implementation and tougher legislation for highly seismic areas
- Compulsory soil testing while constructing multi storied buildings
- Adherence to architectural planning
- Incorporating earthquake resistant features in all buildings at high risk zones
- Making all public utilities like water supply, supply systems, communication network, electricity lines etc. earthquake resistant
- Constructing earthquake resistant community buildings and buildings (used to gather large groups during or after an earthquake) like schools, dharmashalas, hospitals, prayer halls etc. especially in seismic zones
- Maintenance of quality construction/masonry training
- Approval of building lay out plan by UD & HD Department, keeping in view the seismic consideration
- Promotion/advocacy of light weight construction
- Strengthen existing masonry vernaculars/heritage buildings
- Establishment of retrofitting clinics in every district

Topographical Analysis

- Dividing the State into micro zones to ensure appropriate scale and its compliance while taking up construction activity at the field level

- Multi-Hazard Risk Vulnerability Assessment (MHRVA) profile of various districts
- Supporting Research & Development in various aspects of disaster mitigation, preparedness and prevention and also post-disaster management

Urban Planning

- Decongestion of urban density
- Development of master plan along with Disaster Management considerations
- Urban planning and development according to Multi Hazards Risk Vulnerability Assessment (MHRVA) of the cities

Rural Housing Planning

- Advocacy of earthquake resistant light weight vernacular construction
- Rural planning and development along with disaster management consideration

Inventory/Resource Planning

- Inventory/resource mapping of all the assets related to disaster management
- Inventory of disaster management equipments in all the departments ensuring their regular functional status
- Inventory/updating of telephone/mobile network of all the departments
- Identification and inventory of all the physical assets GIS based
- Stocking and review of availability of essential commodities at regular intervals
- Arrangements for safe drinking water and its transportation during crisis period
- List of temporary shelters/Relief Camps
- Updated information on availability of hospital, blood banks, water resources, power stations etc. GIS based
- Training of women SHGs to give psychosocial care at primary level
- Availability of psychiatrists at district hospitals for critical trauma care.
- List of Community Based Organizations (CBOs) and NGOs in various areas

Emergency Response Plans/Duties Defined for the Bodies

- Setting up of Rapid Damage Assessment Mechanism
- State Executive Committee
- District Executive Committees
- Nodal Officers of all the Departments/Agencies
- Standard Operating Procedure (SOP) for all the Departments
- Assessment Teams & their capacity building
- State Inter-departmental Co-coordinators
- Evacuation Plan
- Transparency in Relief Operations

Information, Education and Communication Dissemination

- Website (regular updating and keeping it functional)

- Short-term sensitization programmes for elected representatives, community leaders and government officials
- Emergency phone numbers
- List of local/national print and electronic media
- Innovative steps such as extensive use of Ham radio stations in every district to respond to crisis where normal telecommunications are knocked out, including mobile phone networks
- Evolving educational curricula in architecture and engineering institutions and technical training in polytechnic and schools to include disaster related topics
- Dissemination of warning system

State of the Art Monitoring

- Emergency Operation Centers with all necessary/functional equipments and task force working round the clock (24x7)

Rapid Action/Task Force

- Well equipped and well trained SDRF rescue force (to face any difficult situation) to be deputed at short notice for search & rescue operations
- Peace Keeping Volunteer Groups (NGOs, senior citizens, school/college students, other volunteers)
- List of rescue force from Police, Army, CBOs, NGOs, IRB, Fire Service etc.

Regular Advocacy of Awareness with Mock Drills

- Safe construction
- Rescue and first aid
- Response during earthquake
- Mock drills in all fields
- Pre-preparedness methods to cope with disaster
- Preparation of disaster related literature in local languages with 'do's and 'don't's for construction
- During emergencies, affected people to be involved to create a feeling of self-reliance; the sooner they are integrated, the shorter will be the period of relief.

25 PLANS & MEASURES FOR FUTURE MANAGEMENT

25.1 In India, an institutional mechanism has been put in place at the national level with the establishment of the National Disaster Management Authority, with the Hon'ble Prime Minister of India as the Chairman. Similar authorities have been set up at the State and local levels.

25.2 The Land Revenue and Disaster Management Department, Government of Sikkim was earlier primarily concerned with revenue administration in the State which

encompasses survey and settlement operation, maintenance and up-gradation of land records and enforcement of land laws of the State. With new nomenclature of the Land Revenue & Disaster Management Department, there has been a paradigm shift in the management of disasters at all levels, from a relief centric response to disaster preparedness, mitigation and prevention. The enactment of National Disaster Management Act, 2005 by the Government of India and its enforcement in the State provides greater impetus to the institutionalization of disaster management at State and the district levels. Sikkim State Disaster Management Authority (SSDMA) is a part of the State Government and it is the nodal institution for planning, co-ordination and monitoring for disaster prevention, mitigation, preparedness and management. SSDMA lays down policies on disaster management for the State. It approves disaster management plan in accordance with the guidelines laid down by National Authority and co-ordinates its implementation. It provides guidelines and reviews the measures being taken for disaster mitigation, capacity building and preparedness by the Government and issues necessary guidelines. SSDMA also recommends provision of funds for calamity mitigation and for ensuring preparedness measures.

25.3 The objectives of Sikkim State Disaster Management Authority (SSDMA) are as follows:

- To prevent the loss of lives and property due to natural and man-made calamities by way of planning, assessment and implementation of disaster management programmes in the State.
- To act as the nodal agency for all disaster management related functions and activities in Sikkim and coordinate with other stake holders and institutions,
- To research vital information and knowledge on new techniques, processes and technology on disaster management in partnership with concerned institutions and State departments and dissemination of the same to the public and raise public awareness,
- To create a unified command, control and co-ordination structure for disaster management in Sikkim, integrating various wings and agencies of Government that are necessary for emergency response, as well as for preparedness, mitigation and preventive activities,
- To provide relief to the people for the loss incurred due to natural calamity and to undertake rehabilitation and reconstruction as also social and economic activities or restoration of the situation.

Establishment of Himalayan Institute of Disaster Management and Climate Change

25.4 The Government of Sikkim has decided to establish a centre of excellence named “Himalayan Institute of Disaster Management and Climate Change” at Pakyong, East District under the Chairmanship of Hon'ble Chief Minister. An eminent disaster management expert has been appointed as Executive Vice-Chairman of the Institute. The institute will impart training courses in disaster management programmes and cater to the needs not only of Sikkim but also of other states of the North- East.

Role of Members of the Civil Defence

25.5 Under Section 4(1) for Civil Defence Act 1968, the area within the Gangtok town of Sikkim has been categorized as a body of persons to be called as Civil Defence Corps. Over the years, the Civil Defence members have been actively involved in mitigating crisis in the State. There are eight sectors which is headed by a Sector Warden who commands the Sector Officers. The District Collector also holds the ex-officio post of Controller of Civil Defence. The Director General of Police, Government of Sikkim has been appointed as the Director of Civil Defence and the District Magistrate as the Controller.

25.6 The District Administration had to use all its resources to combat the ravages caused by the earthquake in the State. The Civil Defence members also actively participated in relief and rescue operation. The Sector Wardens headed by Sector Officer were helping the district administration right from the very beginning. The Civil Defence members took turns to guard and monitor the district control room, along with officials from the District Collectorate and coordinated with the NGOs to distribute relief materials to the affected people.

25.7 It has now been realized that the Civil Defence members be trained in Disaster Management courses to make them understand their roles and responsibilities to face any natural calamity. Under Section 4(1) of Civil Defence Act, 1968 the vulnerable areas prone to natural disasters which were then categorized as Civil Defence town of Gangtok have now been categorized as Civil Defence Districts (corps) on the basis of identification of all the districts of Sikkim as Multi Hazard Districts as per the Hazard Risk Vulnerability Assessment (HRVA) studies carried out.

25.8 As per the provisions of Civil Defence, all the four districts have been declared as the Civil Defence Districts for better response.

Sikkim State Disaster Response Force (SSDRF)

25.9 In the absence of a State Disaster Response Force (SDRF), the support of National Disaster Response Force (NDRF) based at Kolkata, West Bengal was sought for supporting the State in the aftermath of the 18th September, 2011 earthquake. The NDRF team took 3 to 4 precious and crucial days to reach the most affected areas of North Sikkim. They were also not familiar with the hilly terrain of the district for effecting smooth operation of the rescue work. Based on the lessons learnt from the last earthquake, the State realizes the urgent need for setting up of a SDRF consisting of 16 personnel of the State Armed Police (SAP), 30 IRB and 30 personnel from the Home Guard & Civil Defence (Rescue Team). It has been approved by the State Government and has been notified.

25.10 Natural disasters exists everywhere and Sikkim is quite sensitive and vulnerable to earthquakes, landslides, avalanches, cloud burst & hailstorms, flash floods, forest fires and many more other natural calamities. All these natural disasters pose great threats to lives, property and economy of the State. Therefore, the State of Sikkim is committed to aggressive Disaster Loss Reduction Policy to build a safer and disaster resilient Sikkim by developing a holistic, pro-active, multi-disaster and technology-driven strategy for disaster management through collective efforts of all Government Agencies,

Non-Governmental Organizations and our public. The lives and properties in Sikkim will be made safer by the implementation of an effective, long term seismic safety policy with the followings principles:

-Effective preparedness, immediate emergency response, rescue and recovery operations

-Earthquake resistance structures, design, construction and retrofitting

-Information, education, communication and awareness & regulations

-Sikkim Earthquake Rehabilitation and Management Fund

Earthquake risk reduction may be defined as a sustained action to reduce or eliminate long-term risk to human life, property and the economy from earthquakes. Earthquake risk reduction is a complex affair involving people of many vocations, information, opinions, decisions and actions.

25.11 The State has learned important lessons from the September 2011 earthquake. By continuing to support new and ongoing efforts to protect its people and built the environment, the State can be more effective in reducing damages and injury from succeeding earthquakes. Emphasizing the role of common citizens, SSDMA will outline the manner in which the State Disaster Management Authority will facilitate the inclusion of all citizen groups across the state through public awareness and local action initiatives. Of particular importance will be the Sikkim School Safety Programme, aiming at ensuring safety of each school and each child in the State. The State Disaster Management arrangements are based upon partnerships between State and local governments. These partnerships recognize that each level of the disaster management arrangements must work collaboratively to ensure the effective coordination of planning, services, information and resources necessary for comprehensive disaster management. The disaster management arrangements are based on bottom to top approach i.e. local, district and state level. Emergency Operation Centres (EOCs) at local, district and state level support disaster management groups while coordinating information, resources, and services necessary for disaster operations.

25.12 A number of initiatives have already been taken by the SSDMA. A noted initiative will be the establishment of a centre of excellence in the form of a Himalayan Institute of Disaster Management and Climate Change, with modern rescue facilities, which will make available cutting edge approaches and technologies through research and training programmes. Capacity development of administrators, the construction sector, educators and disaster responders will be carried out in a planned and sustained manner by the institute. It will also collaborate with other national and international institutes.

25.13 The Sikkim State Disaster Management Authority, under the Chairmanship of Mr Pawan Chamling, Hon'ble. Chief Minister of Sikkim, has initiated concerted efforts to plan and implement a long term action agenda for disaster safe Sikkim. Prof. Vinod K Sharma, Professor of Indian Institute of Public Administration (IIPA), new Delhi who is world known expert on disaster management has been recently appointed as Executive Vice Chairman of the Sikkim State Disaster Management Authority.

25.14 Besides the above, a number of initiatives have already been taken and the proposed road map for strengthening of Sikkim State Disaster Management Authority (SSDMA) has been also planned as under:

1. Sikkim State Disaster Management Policy is being formulated along with Sikkim State Disaster Management Act.
2. Sikkim Earthquake Management and Rehabilitation Fund and Sikkim Land Policy for Private Sector Development 2012 has been passed by the Sikkim Legislative Assembly and is being enforced.
3. Sikkim State Disaster Management Plan has been prepared
4. District Disaster Management Plans for four districts have been prepared
5. Gangtok Urban Disaster Management Plan is under preparation.
6. City Disaster Management Plans for all cities, using the Gangtok Urban Disaster Management Plan as a model are being prepared. Setting up an effective “fire safety system” will also be completed within a year.
7. Building Byelaws for the entire State including urban and rural areas are under formulation.
8. Model Village Disaster Management Plans, subsequently to be implemented across all villages of the State along with the earthquake resistance technology for houses.
9. Formation of Sikkim State Disaster Response Force (SDRF) has been initiated on the line of NDRF. SDRF has been created within the existing police force along with the Civil Defence and Home Guards.
10. All the four Districts have been notified as Civil Defence districts for Disaster Management.
11. Institute of Civil Defence is being established at Pakyong, East District
12. Establishment of a Himalayan Institute of Disaster Management and Climate Change- at Pakyong East District as a model institute for capacity building for Disaster Preparedness, Mitigation and Response. Training facility for State Disaster response force, civil defence and fire services can be availed under one roof.. This facility may be utilized by all NE states for their capacity building.
13. State School Safety Programme, making all schools disaster safe structurally as well as through capacity building activities is under implementation.
14. State wide programme for making hospitals and health facilities safe from disasters and prepared to manage mass casualties is being taken up.
15. Retrofitting of lifeline buildings has been taken up and the State is looking for appropriate retrofitting technology.
16. Model monastery retrofitting and conservation project are being implemented.
17. Training of architects, engineers and construction workers in disaster resilient construction techniques has been taken up.
18. Strategic plan for transportation access, rapid damage assessment, search and rescue, and relief distribution in post disaster situation in remote areas are to be prepared.
19. Public awareness campaigns on disaster risk reduction and preparedness has been started.
20. Financial resource mobilization plan for disaster risk reduction activities has been sought from various funding agencies.

26 NATIONAL CONFERENCE ON DISASTER MANGEMENT PREPAREDNESS & DISASTER MITIGATION

26.1 In order to carry forward its preparedness for facing any natural calamity, the Government of Sikkim held a two days' National Conference on Disaster Management from 17th to 18th September, 2012 at Gangtok. The objectives of the conference was to review the preparedness of the State for managing disasters, to learn from the best practices of other States which have faced similar disasters in the past, to create a platform for sharing of experiences and creation of mass awareness among the public and the participants of the programme and more importantly to reassure the people of this State and the country that Sikkim would make all out efforts to mitigate the effects of any disaster in future by developing a holistic, pro-active, technology driven and community supported disaster management system.

26.2 Experts from various Government organizations of the Government of India and various States as well as NGOs working in the field of disaster mitigation took part in the conference and shared their valuable ideas/experience for the benefit of all concerned. In order to maintain brevity of the deliberations of the experts and professionals we are constrained to mention in brief the ideas of some of the participants.

26.3 The National Conference was inaugurated by the Hon'ble Speaker, Sikkim Legislative Assembly, Shri K.T. Gyaltsen at Chintan Bhawan, Gangtok. The Speaker during his inaugural address conveyed his sympathies and condolences to the families of the victims of the earthquake and expressed his gratitude to the members of the civil society, the Central Government, various State Governments, NGOs who came to help during the hour of crisis. While underlining the need to systematize the disaster mitigation plan to cope up with such type of catastrophe, the Speaker urged the delegates and experts from other parts of the country to help, assist and guide the State which is in the process of preparation of future programmes. The Speaker also acknowledged the pro-activeness shown by the society during the post earthquake situation which he said was exemplary. He also highlighted on the activities undertaken by the Government to provide relief and comfort to the people during the hour of crisis.

26.4 Shri Anil Kumar Sinha, Vice-Chairman, Bihar State Disaster Management Authority (BSDMA), Patna started his presentation by mentioning about the hazard profile of the State of Bihar like flood, earthquake, fire, high speed wind, drought etc. Awareness activities of the State with regard to its preparedness for disaster mitigation included painting and slogan writing competition, Republic Day Jhanki in 2011 and 2012, conducting mock drills in office premises, public awareness activities on safe construction (Bihar Diwas 2011 and 2012), Safety Week - earthquake safety week (15th-22nd January every year), Flood Safety Week (1st week of every June), training of staff (June 2012- first aid, fire fighting skills) etc. Some of the important initiatives of the BSDMA are an innovative approach to mainstream DRR in construction of safe houses. It was executed by a group of structural engineers under the guidance of Padmshree Dr. A. Arya, member BSDMA. It was conceived for general public, builders and architects to solve their query on earthquake resistant houses. Other pioneering initiatives taken were development policies on mainstreaming DRR in various government. projects in different departments, implementation of Office Disaster Management Plan, initiating multi-hazard vulnerability mapping system in coordination with and support from National Disaster Management Authority (NDMA), review of

school curriculum with SCERT and suggestion for inclusion of topics on disaster management in various forms at different levels. IEC material prepared and propagated in the State were guidelines on earthquake resistant construction, guidelines on safe construction in Zone IV and V for masonry buildings, guidelines on construction of bamboo houses, comic books and book marks for children, technical research document on flood management, awareness material on flood and earthquake in perspective of Bihar, Aapada Mitra Geet, BSDMA Calendars and posters and leaflets on Do's and Don'ts.

26.5 Member, National Disaster Management Authority (NDMA), Shri K. M. Singh in his address complimented state Government of Sikkim for enormous work and large number of measures adopted in disaster management. He also appreciated the publication of booklet on the training of masons which he said would be very effective in construction of earthquake resistance houses and should be circulated around the country. Shri Singh also highlighted on the importance of fire services and civil defense during the hour of crisis and said that it has a major role and responsibility to play during disaster. He cited a startling fact when he mentioned that human lives lost in earthquakes and resultant tsunamis in the last 11 years of the 21st Century, had exceeded the total lives lost in the 20th Century. He highlighted the response and national vision of the authority. Regarding National Disaster Response Force (NDRF) he said that it was a specialist response force under the command and supervision with DG, NDRF and with 10 battalions (3 each from BSF & CRPF and 2 each from CISF and ITBP stationed at Patna, Bhubaneswar, Guwahati, Kolkata, Guntur, Chennai, Bhatinda, Ghaziabad, Vadodara and Pune). It is a multi-disciplinary, multi-skilled high-tech force capable of responding to all natural disasters and emergencies. It consists of professionals like doctors, engineers, paramedics, technicians, electricians, dog squads etc. While focusing on the role of the NDRF, he stressed that NDRF was acquiring and continually upgrading its own training and skills. For the benefit of the States, it was training the SDRF to promote and spread community awareness, capacity building programme and mock drills in the States. He also informed that 13th Finance Commission had allotted Rs.23, 110 crores for up gradation of fire services in the next five years out of which Sikkim was allocated an amount of Rs.2.59 crores. He hoped that the proposed scheme of community capacity building through Civil Defence infrastructure was implemented at the grass root level, which would save lives and property in recurring disaster..

26.6 Prof. Chandan Ghosh, National Institute of Disaster Management (NIDM), Ministry of Home Affairs, Govt. of India, New Delhi visited Sikkim from 22nd to 26th September, 2011 in the aftermath of the 18th September earthquake. He had a first hand information on the damages caused by the earthquake. He emphasized the need for microzonation of Sikkim and also for professional treatment of landslides of the State. He stressed that earthquake monitoring and information dissemination required streamlining of all the agencies working in India and bringing out post earthquake information through national media and the internet. He opined that more emphasis was required to be focused on forecasting scenarios and active fault mapping. He further stressed the need for ensuring earthquake safety in the new design and construction, continuation of training and capacity building, advanced data collection and research facilities. While concluding his presentation he cited S. Dasgupta's quotation by saying that "knowledge driven awareness, technology driven mitigation measures and community driven preparedness when integrated with development

activity would continue to be the ways and means for disaster mitigation. This would also narrow down the communication gap between the developer and beneficiaries, which is necessary to reduce time and cost overrun for infrastructural projects in geopolitically sensitive areas”.

26.7 Shri Amod Mani Dixit, Executive Director, National Society For Earthquake Technology- Nepal, highlighted that they were promoting Public Private Partnership for earthquake risk management and building code implementation programme for municipalities of Nepal. Five flagship programmes under Nepal Risk Reduction Consortium (NRRC) were related to school and hospitals, emergency response capacity enhancement, Kosi flood, CBDRM and policy. Other programme being taken up are urban regeneration in city, school earthquake safety programme, seismic retrofitting and non-structural vulnerability reduction. Their Institute is also undertaking state preparedness planning, drills, risk sensitive land use planning and urban disaster vulnerability of Nepal. Programme for Enhancement of Emergency Response (PEER) Statge 3 (2009-2014) covers Bangladesh, India, Indonesia, Nepal, Pakistan, Philippines, Laos, Cambodia and Vietnam. He also made presentations on prevalent building typology, building damage, modes of failure in masonry buildings (by surveying 421 affected masonry buildings in Nepal), causes of injury, actions that led to injury etc. He is of the view that capacity for emergency response has to be enhanced. He has published a book on Stone Masonry building. He is optimistic that collaboration and cooperation especially among neighboring countries will do wonders to mitigate disasters.

26.8 Shri Anshu Sharma, Sustainable Environment & Ecological Development Society (SEEDS), New Delhi shared his experience about the last natural disaster that occurred in Leh in 2010. He said that on August 5th, 2010 there was 12.8 mm rainfall in Leh in one night, which was almost 90% of the normal annual rainfall and this caused devastating natural calamity there. Shri Sharma made presentation that community based rapid response was put in place to mitigate the disaster. Immediate appropriate shelters were constructed based on local materials. They were safe (traditional structures and strengthening features, walls made of stabilized compressed earth blocks, insulated and trombe walls to improve heat retention, seismic bands at plinth, sill and lintel levels, traditional roof made with local poplar and willow, floors insulated with layers of mud and straw), comfortable, environmentally sustainable, culturally appropriate and cost effective. Above all, they were based on local skills. He also added that the approach to disaster reduction was to maintain ecological balance while constructing schools, seeking livelihoods, maintaining heritage and reviving local knowledge.

26.9 Shri T.N. Gupta, Former Executive Director, BMTPC pointed out that as a follow up action to Yokohama Declaration, Ministry of Urban Affairs and Employment, Government of India has identified areas which were vulnerable. Referring to the Vulnerability Atlas of India he mentioned that the atlas aimed at providing information base to support risk and emergency decision-making in disaster reduction. This atlas is for the benefit of government institutions, administrative bodies, business, public organizations, educational institutions and individuals. It can also be used to develop hazard reducing measures and plan preparedness and emergency activities. He further mentioned that major causes for lack of safety causing damage during natural hazards were based on architectural planning, structural features, construction technologies and

building materials. In this context, he recommended techno-legal, techno-financial and techno-managerial regimes. His recommendations for land use zoning regulations covered land use zoning, comprehensive listing (of large, medium and small settlements). This would be applicable to areas planned under State Perspective Plan/Regional Plan/Master Plan/Development Plan etc. For areas not covered under Master Plan, technical help could be required by some of the local bodies for implementing the recommendations and for interpretation of the guidelines. In his presentation, Shri Gupta also made certain recommendations for amendment in development control regulations (requirement of site, requirement of site plan etc.) and for amendments in building byelaws (structural design- certification regarding structural safety in design, constructional safety, quality control & inspection, requirement of low cost housing, inspection, registration of professionals etc.).

26.10 Helping Hands, Sikkim is an umbrella organization for earthquake relief and rehabilitation. Representative of Helping Hands, Sikkim made a presentation and showed how it coordinated relief activities of various charities and NGOs in the State after the earthquake. He pointed out that there was a shortfall in the coordination of various organizations resulting in duplication of efforts and activities. So, it was decided to form an umbrella organisation under the banner of Helping Hands, Sikkim and the State and National Level NGOs work together. Helping hand had rushed supplies and services to the required places systematically. It also ensured that relief camps all over Sikkim were sustainable and replenished without any delay relief materials on regular intervals. It escorted evacuees from the helipads (both civil and army) and ensured that they were looked after by arranging hospital care, accommodation, food and by providing all other assistance required. It was further informed that through proper planning and team work of Helping Hands, Sikkim achieved success in building coordination between the State Government, Army, Helicopter Pilots, District Level NGOs, Panchayats, Relief Camp Organisers, donors and its members smoothly.

26.11 Regarding the role of Panchayati Raj Institutions (PRI) Members in Disaster Management, Ms Markit Lepcha, Panchayat President of Gyaten Karmatar, GPU, West Sikkim cited the problems faced at the grass root level in times of disaster. Most villagers are not fully prepared. People living in the isolated places are disconnected; poor transport and communication facilities also stand as a hurdle. Also houses of the villages are not earthquake resistant. Built on steep slopes they are also prone to landslides. Without any rescue items, people have to lay their hands on the basic tools available in the village. Above all proper guidelines for disaster management lacked in the villages. Key players in disaster management are the community members, PRIs, the Government, NGOs, academicians, corporate sectors, banks/insurance agencies etc. Mentioning about the roles of the PRIs the President said that the PRIs can create awareness, disseminate early warning and promote capacity building at different levels. It can also mobilize resources for relief and rehabilitation, promote alternative technology for housing/agriculture sectors etc. and act as a linkage between service providers and end users. As the villagers are more prone to any natural hazard, it has been recommended that there should be regular and timely training on disaster

management. A rescue centre which can also act as a control room need to be established at the gram panchayat level to facilitate prompt support in times of disaster. A fully equipped task force needed to be created at the local level. Some fund can be made available at the disposal of the PRI in order to deal with any emergency. A vulnerability and disaster mapping and village level disaster management plan need to be prepared at the village level..

26.12 Shri Rajendra Desai, Joint Director, National Centre for Peoples' Action in Disaster Preparedness (NCPDP), Ahmedabad made his presentation based on his weeklong tour to the affected areas in November 2011, study of the damaged buildings and the interaction with many affected individuals. He shared his disaster related personal experience of the last 20 years. Regarding the type of buildings he observed that there are ekra buildings (predominant in older buildings, houses and infrastructure buildings like schools), RC buildings (predominant in newer buildings- houses, schools, offices etc. and pre-dominantly non-engineered), load bearing masonry buildings (stone/random rubble, concrete blocks), Government infrastructure and heritage buildings like monasteries. As regards ekra buildings the traditional Assam style house, being inherently safe is responsible for the low fatality count in this earthquake. However, people, it seemed have much confidence in such buildings. The damage is limited mainly to the random rubble support walls because they are built poorly. He further observed that RC buildings (non-structural damage) extensive non-structural damage had occurred in some locations. He also highlighted about the occurrence of extensive structural damage in some locations, damage in various degrees including cracks, large deformation such as bending, buckling of bar etc. He mentioned that in case of load-bearing masonry buildings, damages included cracks of different sizes at various locations, partial collapse of walls etc. all due to violation of basic (age-old) construction rules, absence of earthquake resistant features, too many openings, absence of strong connection between roof framing and walls, absence of diaphragm action etc. Possible corrective measures in ekra buildings suggested by him was that support walls could be easily re-built better with earthquake resistant features by propping up the upper structure and RC support frame could be repaired correctly only after artisans were suitably trained. Non structural damage could be properly repaired only after training of contractors and building artisans. Summarizing his presentation, Shri Desai mentioned that in future capacity of the people should be improved including engineers, contractors and artisans by disseminating information, rigorous training, good construction practice, promoting retrofitting option of the existing life-line buildings and by promoting ekra construction.

26.13 Society for Application of Telemedicine & Healthcare Informatics (SATHI), New Delhi:- It was informed that SATHI implemented telemedicine by a multi-disciplinary core team of professionals from the field of medicine, social science and management. It is committed to promoting telemedicine through a people centered, need based, sustainable and innovative approach. The basics of telemedicine is provision of healthcare from a distance through benefits like cutting travel time for health services, decreasing the time in making decisions and data collection for future healthcare strategy. It allows better healthcare at lower costs overcoming geographical barriers. Telemedicine is medicine with tele as add-on. Though it has same laws as in medical care, it is not better than the next door doctor. In this system of medical care, people are rated higher than the technology. Some of the post disaster healthcare

concerns focused are the need for mental health support, stress and fatigue among relief workers. The representative of SATHI was of the view that because of involvement of the community, there is greater awareness among the people about the project and its utility in Sikkim. Training as well as mock exercises/simulation of real life scenarios and running systems work better in emergencies.

26.14 The Chief Secretary, Government of Sikkim, Shri Karma Gyatso during his key note address gave a brief account of the post earthquake relief and rescue operations and placed on record the service rendered by every individual, civil society, NGOs, Para Military forces, State and the Central Government organizations immediately after the disaster and acknowledged their role during the hour of crisis. He added that it was only due to the collective effort of everyone that normalcy was restored in a short span of time. He assured the delegates that the State Government was on the way to preparing the best disaster management plan in the country. Giving an overview of the activities undertaken by the State Government after the earthquake, he impressed upon the delegates that (given the weather condition of the State) they had only about seven working months during which works could to be implemented in the field.

26.15 The Chief Secretary hoped that training a team of officials of the State and providing them with equipment support to improve in- situ preparedness and capacity to manage future disasters would be very useful. He also opined for the necessity of stationing NDRF zone wise with all equipment support for ensuring their quick arrival without delay and more importantly to be fully equipped and self contained. He also expected the need for delegating more authority to the State Governments to requisition helicopters from the Army and the Air Force. Short term training courses to engineers and masons on earthquake resistance construction practices need to be made a norm in future infrastructure to be developed in the State to ensure that the State does not rebuild vulnerability. Based on the felt need of the State, institutional and equipment support should be provided by the Centre. Satellite phones are needed at district and sub divisional headquarters, as this is the only communication link which can possibly withstand a severe earthquake. Adequate corpus fund is needed for immediate restoration activities and its immediate release cannot be overemphasized. The officers of the Government of India were apprised of future requirements of the State of Sikkim which were appreciated by all concerned.

26.16 Prof. S.K. Deb, Department of Civil Engineering, IIT, Guwahati started his presentation by saying that seismic risk is the probability that social or economic consequence of earthquakes will equal or exceed specified values in an area during a specified exposure time. Seismic hazard is physical phenomenon. Regarding the damages caused by 18th September 2011 earthquake in Sikkim he pointed out that it was difficult to restore power in Mangan, Lachung, Chungthang and Lachen immediately. It also took a couple of days to restore landline/mobile communication in Lachen and Lachung (North Sikkim) after the earthquake. Regarding reinforced concrete building design, he pointed out that the beams are the weakest links and not the columns which could be achieved by appropriately sizing them and providing correct amount of steel reinforcement in them. With regard to seismic retrofit strategy, he mentioned that a retrofit strategy was a technical intervention for improving the strength and other attributes of resistance of a building to seismic forces. The retrofit strategies can be classified under global and local strategies. A global retrofit strategy targets the

performance of the entire building under seismic lateral loads. A local retrofit strategy targets the seismic resistance of a part without significantly affecting the overall resistance of the building. Materials for conventional seismic retrofitting are steel, reinforced concrete and fiber reinforced polymers. In his concluding remarks, Prof. Deb observed that the extent of damage and damage pattern in RC buildings were not commensurate with the intensity of earthquake. Most damages could be attributed to poor quality of construction materials, improper design and detailing/workmanship, irregular structural configurations, non-compliance of codal provisions etc.. In his view reinforced masonry should replace unreinforced masonry in wall claddings of new buildings. In case of Sikkim, he suggested to explore the possibility of constructing tunnels in important land-slide prone zones along with other site-specific solution for mitigation of landslide related problem. He also felt the need for creating equipment bank in different zones to facilitate faster rescue operation.

26.17 Prof. Jayanta Pathak (IIT, Guwahati) emphasized the need for having a road map for earthquake risk management in the northeast by effecting an appropriate micro hazard mapping (microzonation of NE urban centers to appropriate scale), by understanding and reducing vulnerability (development control/retrofitting of critical facilities by Government./ mainstreaming disaster mitigation to development) and by capacity building (training/awareness/technology transfer). He showed his experience about the micro-zonation initiative of Guwahati (phase-I), vulnerability of critical infrastructure to earthquake of Aizawl, Gangtok and Kohima and the implementation issues including inter-departmental coordination (of which State Disaster Management Authority has to be the nodal agency). He dwelt upon the challenges on specifying code(s) for seismic vulnerability assessment, analysis and design of life line structures. He cautioned that incorrectly retrofitted structure might become more vulnerable after retrofitting. He opined that retrofitting was a cost intensive project and good retrofitting project had to be demonstrated to the public. He suggested that disaster management needed to be mainstreamed to the developmental projects.

26.18 South Sikkim Disaster Management Experience (Shri Anjaney Kumar Singh, Collector):- The DC, South Sikkim shared his experience with regard to the actions taken with the help of the power developers and private companies, line departments, police personnel, Panchayats and communities to mitigate the disaster. He empowered the BDOs with magisterial powers. People were evacuated and shifted from vulnerable places to relief camps immediately. Water and power supply was restored within 48 hours in all the prominent areas. Temporary shelters and structures were made for schools and PHCs. He pointed out that management of relief material with too many volunteers was problematic. Some of the long term goals he has suggested are:- community communication system, developing an early warning system, stationing a fully trained DRF, formulating a comprehensive legal framework, developing a digital mapping and remote sensing, strengthening construction methods and improving the standard, developing institutional capacity, land zoning etc.

26.19 While making his presentation, Shri Prafful Rao, representative of the NGO 'Save The Hills' (STH) requested all to save the hills. The STH is a group of concerned citizens who are working towards raising awareness about the severity of the landslide situation in the sub-Himalayan West Bengal and Sikkim. The organization feels that many landslides are the direct or indirect result of some form of human activity and they can be prevented if adequate action/care is taken. The STH urges the

government, community and other NGOs to work together on a sustained programme towards landslide prevention and mitigation urgently. While suggesting action plans for the future the representative of the STH opined that capacity building and training of the communities should be more resilient. According to him, more proactive effort has to be made towards prevention and management of landslides. He suggested that people should plan and work for the coming monsoon season in advance.

26.20 Shri Ray Kancharla, Vice Chairman of the NGO “Save the Children International, Sikkim” mentioned that their organization had twin objectives to restore/retrofit damaged school in the earthquake affected area along with PRIs and to develop school safety plans in 5 schools (in a cluster) along with local self governance (PRIs). Shri Kancharla suggested that all disaster management efforts should be in the best interest of the children.

26.21 Prof. V. K. Sharma, Executive Vice Chairman, Sikkim State Disaster Management Authority (SSDMA) in his address said that the subject of disaster management could be learned from each other through interaction and sharing of experience. This is because everyone has his own experience and knowledge in this field. In order to cope with the disaster, he emphasized that plans should be formulated from the grass root level like the Panchayats and block level. Prof. V.K. Sharma, dwelt on the detailed road map of the Authority for the next five years. He appreciated the enthusiasm of the Government of Sikkim to make the State earthquake resilient in letter and spirit. He informed that necessary action was underway for establishment of the centre of excellence titled “Himalayan Institute of Disaster Management” under the Chairmanship of the Hon’ble Chief Minister of Sikkim. He was very optimistic that the institute would impart training courses in disaster management programmes and cater to the needs not only of Sikkim but the entire Himalayan region.

27 WORKSHOP-CUM-TRAINING PROGRAMME

27.1 National Institute of Disaster Management (NIDM), Ministry of Home Affairs, Government of India New Delhi conducted a three day Conference-cum-Workshop (from 19th to 21st September, 2012) programme at Gangtok. The workshop was held under Prof. Chandan Ghosh of NIDM. A total of 22 Engineers, Architects and Town planners from various line Departments of the State, who have been actively involved with the post earthquake response relief and damage assessments attended the workshop. Besides Prof. Chandan Ghosh, Shri Dinker Gurung, Town Planner, Urban Development & Housing Department, Government of Sikkim addressed the participants of the workshop. The training programme consisted of lectures and field visits and interactive sessions on building methodologies, assessment of earthquake damaged structures and reconstruction methods.

27.2 Field visits were conducted on the second and third day of the training programme. The participants were taken for an on-site assessment of various ongoing works upon which necessary inputs were given by Prof. Ghosh. The areas visited on 20th September were:- Retrofitted Government Quarters at Syari, restoration works at Police Headquarters, Ladhaki Building under Health Department (being demolished and the Khelgaon area under construction taken up by NBCC). On 21st September, the participants along with Prof. Ghosh visited the landslide area at Second Mile, Chandmari, construction of the Namnang Walk-way, the geo-grid road construction site

at Tashiling and reconstruction of Tashiling Secretariat area. Pursuant to field visits, an interactive session on suggestions and inputs from the resource persons and the participants was also held .

28 THANKS AND GRATITUDE FROM THE GOVERNMENT OF SIKKIM

28.1 The Government of Sikkim would like to convey special thanks and gratitude for providing support during the hour of crisis to:

- The PMO, MHA, Planning Commission and All the Ministries/Departments of the Government of India for their proactive support at the highest level
- The Army, ITBP, NDRF, SSB, BRO for untiring efforts in the rescue and relief operations
- Sikkim Police (SAP, IRB, SHG) for the prompt rescue and relief operations under trying conditions
- All State Government Departments for commendable work and rising to the occasion in tiding over the calamity
- Panchayats, Urban local bodies, Civil Society Organizations and NGOs for support in rescue and relief
- All agencies, organizations, States and individuals who provided financial support
- All agencies, organizations, States, Steel Authority of India and individuals who provided support in kind and cash and
- Press and media for dissemination of factual information from difficult areas, to mention a few.

29 CONCLUSION

29.1 Funds received by the State Government from the Government of India to tide over the crisis are being utilized judiciously. Reconstruction work with regard to damaged infrastructure has already been prioritized. Quake victims are being rehabilitated according to their genuine needs.

29.2 The strength of the State's economy based on the endowed natural resources are tourism, horticulture, floriculture, hydel generation etc. The earthquake affected the growing trend of these sectors badly. However, the State Government faced the natural calamity firmly. Immediate rescue and rehabilitation operations are now almost over. The path ahead is to reconstruct, revive and restore the affected areas and infrastructure in a time bound manner and put the economy on track. Despite the State's minimal industrial infrastructure, Sikkim's economy has been among the fastest growing in the country since 2000. All out efforts are being made to restore the above growth trajectory.

29.3 With the help and cooperation of the Government of India backed by aspiration of the hard working people of the State, the adversity caused by the earthquake will have to be converted into progress and prosperity. As the people move forward to create better lives, they can not afford to ignore fundamental rules that sustain them.

Practicing construction of earthquake resistant houses and taking needful precautions can go a long way in saving many lives and reducing other damages in future.

29.4 Sikkim experiences landslides year after year especially during the monsoons and periods of intense rain. This hazard affects the economy of the State very badly. Traditional methods like clearing the debris in the rainy season to give passage to the traffic cost the State exchequer heavily. Since no two landslides are identical in any given area, it is not always easy to know the ground realities of mechanism that triggers off landslides. This menace, therefore, needs to be tackled permanently with a well laid area-specific scientific procedure developed by professionals.

29.5 The State Government has prioritized its action plan to reconstruct housing and other infrastructure projects in various earthquake ravaged areas. Tangible results will be seen in due course of time

29.6 There is no denying the fact that Sikkim is an earthquake prone State and natural disasters cannot be prevented or avoided. What can be done is their impact can be reduced. People will have to live with preparedness to face the same and with resilience to endure them. Efforts are being made by the Government of Sikkim to make the people of the State more resilient by strengthening their coping capacity, by building up their confidence and by facilitating their preparedness. Now the State is better prepared to face disasters of a similar magnitude. In view of above, the earthquake risk management policy of the country has become proactive to motivate earthquake-prone community by devising social, technical, administrative, political, techno-legal, techno-financial forces for a concerted, long-term effort to change, improve, and accelerate the enactment and implementation of cost-effective public policies for mitigation, preparedness, emergency response, and recovery and reconstruction.

29.7 It is also heartening to note here that Sikkim is now heading towards a safer and disaster resilient State. The programme on disaster preparedness and mitigation are being taken up to all Panchayat and village levels.

29.8 The community is the first responder of any disaster and develops some traditional coping mechanism to reduce their vulnerabilities. Communities know well from past history as to when the hazards may strike and which areas would be probably affected. Hence, the entire disaster management in the State will be community based. Communities are being empowered and trained to help them improve their problem solving skills.

30 ANNEXURE (I to XII)

Socio-economic Indicators of Sikkim

Sl. No	Name of the Indicator	Sikkim	All India
I	General		
1	Area (Sq. Km.)- 2001	7,096	31,66,414
2	No. of Districts- 2001	4	593
3	No. of Blocks-2001	8	5,550
4	No. of Towns & Cities-2001	9	5,161
5	No. of Villages-2001	452	6,38,588
II	Socio-economic Indicator (demography)		
	Population (lakh persons)		
	Rural Population	4.80	74,16.60
	Urban Population	0.60	28,53.54
	(a) Total Population -2001	5.40	102,70.15
	(b)SC Population-2001	0.27	16,66..35
	(c)ST Population-2001	1.11	8,43.26
	(d)Population density (per sq. Km.)- 2001	76.22	324.85
	(e) Sex Ratio (females per 1000 males)-2001	875.00	933.00
	(f) Total Fertility Rate	NA	NA
	(g)Infant Mortality Rate	32.00	58.00
	(h) Maternal Mortality Ratio	NA	301.00
	(i) Crude Birth Rate	21.60	26.00
	(j) Crude Death Rate	5.80	8.70
	(k) Population Below Poverty Line (%) (1999-2000)		
	Rural	40.04	27.01
	Urban	7.47	23.62
	Combined	36.55	26.02
III	Education		
1	Literacy Rate (Total)	82.20	64.8
	Male	76.0	75.3
	Female	60.4	53.7
2	Gross Enrolment Ratio ((Class I to VIII) 6-14 years- 2001	97.72	82.35
3	Drop Out Ratio (1-5)-2001-02 (boys and girls)	62.41	54.65
IV	Other Economic Indicators		
1	No. of districts with access to safe drinking water -2001	4.00	593
	(a) 100% access	0.00	
	(b) 90% access	0.00	
	(c) 80% access	3.00	
	(d)Less than 20% access	0.00	
2	Rail Density as on 31.03.2003 Route Kms/1000 Sq.Kms.	-	19.22
3	Road per 100 Sq. Kms. of area (Kms.)	26.10	76.80
4	Credit-deposit Ratio of Scheduled Banks- March, 2002		
	(a) As per sanction	16.00	58.40
	(b) As per utilisation	22.50	58.40

ANNEXURE- II**Injured Persons Who were Hospitalized for More than 7 Days**

Sl. No.	Name	Age & Gender	Address	Ward
1	Sanu Tamang	20 F	Burtuk	FSW
2	Tashi Ongmu	19 F	Phatak	FSW
3	Zangpo Choppel	18 M	Takchaey	ENT
4	Kiden Lepcha	52 F	Nabek	EYE
5	Kima Sherpa	56 F	Vajra	ORTHO
6	Neepum Verma	40 M	Pakyong Airport	ORTHO
7	Md. Zahir	18 M	Mangan	ORTHO
8	Geeta Devi	35 F	Mangan	ORTHO
9	Tshering Doma Sherpa	42 F	Dikchu	ORTHO
10	T S Kotwal	70 F	Daragaon	ORTHO
11	Sonam Tobgay Bhutia	45 M	Chungthang	ORTHO
12	Zigmi Dorje Tamang	6 M	14 th Mile	FSW
13	Krishna Maya	41 F	Lingee	FSW
14	Pema Choden Bhutia	18 F	Phodong	EYE
15	Passang Vangjee Sherpa	14 F	14 th Mile	Head injuri
16	Abir Chettri	10 M	Bojoghari	ORTHO
17	Yasoda Luintel	30 F	Tumin	FSW
18	Sanha Luintel	30 F	Tumin	FSW
19	Anil Kr. Rai	18 M	Gayzing	Emergency
20	Sonam	43 M	Assam Lingey	Emergency
21	Sheela	18 F	Dev Area	Emergency
22	Mingma Sherpa	38 M	Bojoghari	ORTHO
23	Sujit	26 M	Vajra	Emergency
24	Sona	25 M	Vajra	Emergency
25	Gopi Chettri	28M	Vajra	Emergency
26	Darmit Lepcha	20 F	Lachung	Emergency
27	Darkit Lepcha	70 F	Upper Dzongu	Emergency
28	`Anit Chettri	20 F	Chungthang	P Unit
29	Subarjeet	26 M	Vajra	Emergency
30	Manisha Chettri	4 F	Naga	Injured
31	Binod Chettri	11M	Naga	Injured
32	Jivan Subba	20 M	Mangshila	External Injury
33	Dil Kr Subba	25 M	Mangshila	External Injury
34	Amrit Thapa	24 M	Jaigaon	External Injury
35	Ongdup Lepcha	51 M	Barfok	Injured

36	Manita Subba	24 F	Toong	Injured
37	Rephuti Sherpa	50 F	Toong	Chest Injury
38	Tenzing Sherpa	13 M	Toong	Trauma
39	Samjhana Subba	35 F	Toong	Trauma
40	Krishna Kr. Subba	46 F	Darjeeling	Trauma
41	Naina Rai	19 F	Ambithang	External Injury
42	Purnima Shera	26 F	Toong	Multiple Injury
43	Nitish Kr Sharman	29 M		Ankle Injured
44	Nanda Showmik	27 M	WB	External Injury
45	Lakpa Tenzing	5 M	Toong	External Injury
46	Anand Sewa	20 M	Majhitar	Minor Injury
47	Prakash Cintury	55 M	Singtam	Minor Injury
48	Hamu Jo	30 M	Singtam	Minor Injury
49	Subradho Sarker	34 M	Manpari	Minor Injury
50	Prasad Chettri	30 M	Singtam	Minor Injury
51	Ravindra Singh	18 M	Majhitar	Minor Injury
52	Pranjyal Roy	19 M	Majhitar	Minor Injury
53	Sambhu Darjee	31 M	Golitar	Minor Injury
54	Jaikam Alam	1 M	Singtam	Minor Injury
55	Gaurav Sahu	61 M	Kumrek	Minor Injury
56	Shuman	22 M	Majitar	Major Injury
57	Ravi Sharma	42 M	Majitar	Major Head Injury
58	Govind Kumar	48 M	Singtam	Minor Injury
59	Nita Deokota	43 F	Singtam	Minor Injury
60	Harshad Kumar	2 M	Singtam	Minor Injury
61	Navodid Rairam	20 M	Majitar	Major Injury
62	Jeva Wara	49 M	Singtam	Minor Injury
63	Sunita Sharma	19 M	Smit Majitar	Minor Injury
64	Bijoy Prashad	40 M	Singtam	Emergency
65	Thinthe Shaha	28 M	Singtam	Emergency
66	Shyandra Kaari	22 M	Singtam	Emergency
67	Neeraj Chettri	22 M	Singtam	Emergency
68	Dilip Giri	18 M	Singtam	Emergency
69	Rajiv Kumar	28 M	Singtam	Emergency
70	Batsha Md	27 M	Malbazaar	Emergency
71	Tong Kr. Gupta	17 F	Singtam	Minor Injury
72	Ziwashi Devi	60 F	Golitar	Minor Injury
73	Yashoda Devi	80 F	Singtam	Major Injury

74	Md Zabbia	15 M	Bihar	Minor Injury
75	Neha Gurung	14 F	Singtam	Major Injury
76	Shyam Chettri	22 M	Singtam	Minor Injury
77	Kokila Sharma	37 F	Singtam	Minor Injury
78	Manita Devi	20 F	Golitar	Minor Injury
79	DB Sharma	49 M	Singtam	Minor Injury
80	Sanjay Singh	20 M	Bardang	Major Injury
81	Prangash Roy	19 M	Majitar	Minor Injury
82	Sivan Kumar	22 M	Majitar	Minor Injury
83	Dev Kr Sharma	34 M	Singtam	Minor Injury
84	Bikash Tamang	41 M	Singtam	Minor Injury
85	Nanda Kishore	40 M	Singtam	OPD
86	Kyeram Darje	3 F	West Pandam	Minor Injury
87	Mivaram Shah	32 M	Berdang	Minor Injury
88	Biblal Shah	28 M	Kumrek	Minor Injury
89	Beveken Shah	19 M	Berdang	Minor Injury
90	Rajesh Pradhan	25 M	Singtam	Minor Injury
91	Yashoda Devi	52 F	Singtam	Minor Injury
92	Bijay	22 M	Singtam	Minor Injury
93	Arjun Chettri	20 M	Namphok	Sprain
94	Maluk Maji	20 F	Singtam	Sprain
95	Kumari Rai	42 F	Khamdong	Sprain
96	Jagarya	10 F	Singtam	Sprain
97	Neelam Rawat	32 F	Majitar	Sprain
98	Milan Chettri	14 M	Ralak	Sprain
99	Kartik BK	24 M	Pandam	Sprain
100	PB Nayak	26 M	Rangpu	Minor Injury
101	Bhim Kr Dahal	32 M	Ralap	Minor Injury
102	Sushma Chettri	36 F	Rangpu	Minor Injury
103	Rebita Rai	33 F	Bardang	Minor Injury
104	Bandana Devi	60 F	Singtam	Minor Injury
105	Santa Bdr. Thapa	57 M	Singbel	Minor Injury
106	Sunita Shah	30 F	Tarkhola	Minor Injury
107	Doma Bhutia	54 F	Singtam	Minor Injury
108	Arparna Pradhan	30 F	Singtam	Minor Injury
109	Phurba Sherpa	47 M	Khamdong	Minor Injury
110	Lakpa Sherpa	35 M	Khamdong	Minor Injury
111	Devika Dahal	38 F	West Pandam	Sprain
112	Manoj Khati	24 M	Singtam	Sprain
113	Kharlal Singh	24 M	Sirwani	Minor Injury
114	Sandeep Singh	25 M	Sirwani	Minor Injury

115	Munna Bardeva	21 F	Adarsh Goan	Minor Injury
116	Sukmani Rai	48 M	Majitar	Minor Injury
117	Dawdea Bhutia	85 M	Gyalsing	Minor Injury
118	Renuka Darjee	35 F	Lingmoo	Minor Injury
119	Solita Rai	40 F	Rangpu	Minor Injury
120	Shiva Prashad	45 M	Singtam	Minor Injury
121	Mohan Singh Pathak	39 M	Singtam	Sprain
122	Anil Sharma	25 M	Singtam	Minor Injury
123	Rohit Kr Singh	24 m	Lanco, Sirwani	Minor Injury
124	Sujan Ror	28 M	Siliguri	Minor Injury
125	Renuka Chettri	26 F	Bardang	Minor Injury
126	Sushant Chaudary	25 M	Cipla, Rangpu	Minor Injury
127	Krishna Psd Sapkota	27 M	West Pandam	Minor Injury
128	Ram Maya Subba	60 F	Amalay	Minor Injury
129	Jery Gobin	50 M	Singtam	Minor Injury
130	Robin Darjee	10 M	C. Pandam	Minor Injury
131	Sapna Gurung	29 F	Mining	Minor Injury
132	Prabash Gurung	55 M	Singtam	Minor Injury
133	Mingma Bhutia	42 M	Rangpu	Minor Injury
134	Pravesh Kr. Pradhan	40 M	Kumrek	Minor Injury
135	Satish Kr. Singh	27 M	Kumrek	Minor Injury
136	Dhananjay	26 M	Kumrek	Sprain
137	Raju Mandal	28 M	Kumrek	Sprain
138	Silendra Singh	41 M	Kumrek	Sprain
139	Awadesh Pratap	31 M	Kumrek	Sprain
140	Subroto Das	54 M	Kumrek	Sprain
141	Nandan Chettri	22 M	Kumrek	Minor Injury
142	Khagendra Pradhan	22 M	Kumrek	Minor Injury
143	Birendra Kumar	30 M	Kumrek	Minor Injury
144	Loknath Luitel	53 M	Tumin	Minor Injury
145	Agan Psd. Bahun	58 M	Kumrek	Minor Injury
146	Rakesh Prashad	19 M	Singtam	Sprain
147	Bikash Chettri	32 M	Singtam	Sprain
148	Hari Maya Gurung	50 F	Tumin	Minor Injury
149	Suresh Psd.	34 M	Maji Goan	Pelvis frastrucure
150	Bajanti Devi	35 F	Maji Goan	Fracture Cervical
151	Umit Lepcha	40 M	Khechoperi	Hips fracture

152	Roshni	15 F	Ravitar	Blunt trauma
153	Sunita Subba	52 F	Reshi	Head Injury
154	Sujata Rai	57 F	Namchi	Polytrauma
155	Passang Phuti Sherpa	24 F	Sombaria	Dislocation of Elbow
156	Taphyur	24 M	32 No.	Head Injury
157	Habir	26 M	32 No.	Head Injury
158	Sachin Rai	26 M	Lower Burtuk	Rupture liver and gall bladder
159	Rupan Mandal	22 M	5 th Mile, Tadong	Blunt injury in Abdomen
160	Pharchaman Ropal	45 M	Singtam	SingtamCrush Injury
161	Ravi Sharma	42 M	6 th Mile	Fracture (Right pelvis)
162	Sanjay Singh	20 M	Singtam	Lumber 2 wedge Fracture
163	Badri Kr. Chaudhary	25 M	Rongli	Fracture Femour (left side)
164	Shivam Kumar	22 M	Majitar	Patellar fracture, right side
165	Kabita Chettri	29 F	Mangan	Hairline fracture
166	Nim Lhamu Sherpa	22 F	Chongay	Shoulder injury
167	Abhi Maya Darjee	70 F	5 th Mile Todong	Trochanteric Fracture
168	R.B. Chettri	80 M	Pakyong	Injury due to fall
169	Navodid Ranjan	M	Jharkhand	Shoulder Dislocation
170	Raju Dhadka	M	Udalguri	Both knees swelled due to jump from second floor
171	Sonam Lepcha	46 M	Assamlinzey	Head injury
172	Anil Rai	18 M	Gyalzing	Head injury
173	Pandegya Bhutia	85 M	Chandmari	Subdural Haemorrhage
174	Rekha Pradhan	31 F	Jali Pool	Sprain in right ankle joint

List of Religious Institutions Damaged by Earthquake of 18th September, 2011 in Sikkim

Sl. No.	Name of the Buddhist Institutions Damaged in East Sikkim
1	Choten Gonpa, Deorali
2	Martam Chankhar Gonpa Martam
3	Taktse Anil Gonpa, Taktse
4	Karmae Sri Nalanda Institution, Dharma Chakra Centre, Ramtek
5	Kathok Gonpa
6	Enchey Gonpa
7	Burtuk Manilhakhang
8	Merung Gonpa
9	Lower Syari, Gonpa
10	Dechencholing, Tathangchen
11	Dikling Gonpa, Pakyong
12	Tumin Gonpa
13	Machong Gonpa
14	Machong Gonpa
15	Rongli Manilhakang
16	Pal Karma Zurmang, Lingdum
17	Khachoe Padma Woeling Nunnery Ranka
18	Old Rumtek Gonpa
19	Rey Mindu Tenpen Mangyaling Gonpa
20	Chaksam Gonpa, Upper Lingdum
21	Badong Manilhakang
22	Gangtok Manilhakang
23	Pabyuk Gonpa
24	Rapen Tharpa Ling Manilhakang
25	Pabyuk Gonpa
26	Bri Gonpa Upper Shyari
27	Dharma ChakraCentre Rumtek
Sl. No.	Name of the Buddhist Institutions Damaged in North Sikkim
1	Tholung Gonpa
2	Shgipgyer & Monastic Building
3	Chungthang Gonpa
4	Lachung Gonpa
5	Kabi Gonpa
6	Ringhem Gonpa
7	Lachen Gonpa
8	Thangu Gonpa
9	Lingdok Chankar Gonpa

10	Tashi Choling Hee Gyathang
11	Mon Rongong
12	Nadey Gonpa Singhik
13	Phamtam Gonpa
14	Lachen Nyamu Lhakang
15	Ramthang Yangyal Gonpa
16	Phensong Gonpa
17	Chedup Targaythang Gonpa Lower Dzongu
18	Chewang Ani Gonpa
19	Labrang Gonpa
20	Tumblong Gonpa
21	Phodong Gonpa & Manilhakang
Sl. No.	Name of the Buddhist Institutions Damaged in West Sikkim
1	Sanga Choling Monastery
2	Silnon Monastery
3	Khechoplari Monastery
4	Melli Gonpa
5	Resum Gonpa, Sanga Dorjee
6	Phuntsok Choling, Srbadam
7	Lanche Gonpa, Parengoan
8	Pao Hongri Gonpa
9	Tashiding Gonpa
10	Pemayangtse Gonpa
11	Dupdi Gonpa
12	Gangyap Gonpa
13	Dokothing Manilhakang
Sl. No.	Name of the Buddhist Institutions Damaged in South Sikkim
1	Palchen Choling, Ralang
2	Namthang Nagi Narcholing Gonpa
3	Tashi Choling Gonpa
4	Yangang Gurung Gonpa
5	Yangang Guru Rinpoche Statue
6	Samdupse, Guru rinpoche Statue
7	Norbu Yangcholing Gonpa
Sl. No.	Mandirs & Churches Damaged in East Sikkim
1	Rongli Shivalaya Mandir
Sl. No.	Name of the Church Damaged in North Sikkim
1	Mangang Church
Sl. No.	Name of the Mandirs and Churches Damaged in West Sikkim
1	Sai Mandir, Daramdin
2	Tashiding Shivalaya Mandir
3	Shiva Mandir, Kaluk Rinchenpong

4	Bethlem Church of Samdong
5	Ramidham
6	EPCS Church, Reshi
7	Berbesa Church, Sreebadam
8	Indra Dham Mandir Deythang
9	Devi Mandir, Dhankutay
10	UIPCS Church, Parengoan
11	EPCS Church, Deythang
12	Gari Dham, Churchen
Sl. No.	Name of the Mandir Damaged in South Sikkim
1	Siddhi sai Mandir, Assangthang

ANNEXURE-IV

Account of Earthquake Relief Materials Received -Miscellaneous Items

Sl.No.	PARTICULARS	QUANTITY
1	Blankets	215 Nos
		10 Pkts
		8 Sacks
		108 Bundles
		2 Bags
		2 cartons
2	Mineral water	148 Cartons
3	Tarpaulins	60 Nos
		28 packets
4	Gumboots	1368 pairs
5	Torch light	390 Nos
6	Candles	20 Pkts
7	Match box	2 Pkts
8	Mattresses	98 bundles
9	Hand Gloves	250 Pairs
10	Slipper	1 pair
11	PVC pipes 20mm	5 coils
12	Shoes	1 Bag
13	Quilts	1 Bag
14	Bed sheets	1 bag
15	Carry bags	12 nos
16	Sleeping bags	25 bundles

COTTON

1	Cotton	3 Pkts
2	Cotton gauges	105 Nos
3	Cotton rolls 20 g	220 Nos

CLOTHES

1	Clothes	4 sacks
2	Ladies clothes	1 carton
3	Readymade garments	17 Pkts
4	Clothes	1 carton
5	Clothes (sweater)	1 carton
6	Clothes (children)	1 carton
7	Clothes (mix)	1 carton
8	Mixed cloths	1 Bag
9	Old clothes	2 carton
10	Kids Wear	7 Bag
11	Ladies Wear	13 Bags
12	Warm Clothes	18 Bag
13	Gents Wear	10 Bag
14	Mixed Clothes	1 Bag
15	Shirt piece	1 nos
16	Saree	3 Bags
17	Second hand clothes	14 cartons

MEDICINE

1	Medicines	9 cartons
2	Cefo-Pro x 200.10s	1Pkt
3	Wovamox - 500	1Pkt
4	Ciplox - 500	1Pkt
5	IBU GESIC PLUS - 155	1Pkt
6	Levo Flox Infusion	1Pkt
7	Worflox (With LAC)	1Pkt
8	Norflox 400(W)	1Pkt
9	Oflox Inf 100	1Pkt
10	Painil Plus PR Tablets	1Pkt
11	Voltanec PR Tablets	1Pkt
12	Disposable Syringe + Needle	250 Nos.
13	Band Aid	250 Nos.
14	Nose Mask	250 Nos.
15	PAN-D CAPSULES (10 S)	800 Tablets
16	SUMO Tablets (10 s) (PVC Blister)	600 Tablets
17	ENZOFLAN TAB. (10 s)	600 Tablets
18	Aleov-250 Cab. (10 s)	400 Tablets

LADIES KITS & TOILETRIES

1	Ladies kit	124 cartons
		96 bundles
2	Ladies kit(toiletries)	119 bundles

FOOD ITEMS

1	Fruity	2 cartons
2	Potato	1 sack
3	Maggi	352 cartons
4	Salt	5 Pkts
5	Edible oil	4 Nos
6	Rice	5 sacks
7	Biscuits	24 carton
8	Baby food	5 carton
9	Wai wai	2 carton

Dispatch Sheet of Relief Material for Earthquake Victims					
Sl. No	Date	Destination	Item	Quantity	Received by
1		Lachung	Clothes	20 Nos	Through Chopper Burtuk Helipad
			Medicines	1 Large Pkts	
			Baby Food	1 Cartoon	
			Biscuits	4 Cartoon	
			Maggi	1 Cartoon	
			Candles	5 Pkts	
			Tarpaulin Sheet (Blue)	2 Nos	
2		Lachen	Cotton	1 Pkt	Through Chopper Burtuk Helipad
			Clothes	20 Nos	
			Medicines	1 Large Pkts	
			Baby Food	1 Cartoon	
			Biscuits	4 Cartoon	
			Maggi	1 Cartoon	
			Candles	5 Pkts	
			Tarpaulin Sheet (Blue)	2 Nos	
			Salt	5 Pkts	
			Cotton	1 Pkt	
3		Dzongu	Clothes	20 Nos	Through Chopper Burtuk Helipad
			Medicines	1 Large Pkts	
			Cotton	1 Pkt	
			Candles	1 Pkt	
			Baby Food	1 Cartoon	
			Fruity	2 Cartoons	
			Buiscuits	6 Cartoon	
			Tarpaulin Sheet	1 Nos.	
4		Lachung	Rice	4 Small Sack	Through Chopper Burtuk Helipad
			Edible Oil	1 Jar	
			Potato	15 Kg	
5		Lachen	Rice	4 Small Sack	
			Edible Oil	1 Jar	
			Potato	15 Kg	
6		Dzongu	Rice	4 Small Sack	
			Edible Oil	2 Jar	
			Potato	15 Kg	
7	30 / 09 / 11	Lachen	Clothes	3 Cartoons	S Nangckuk

			Tarpaulin	12 Nos	
			Water Pipe	1 Coil	
			Torch	2 Cartoon	
8	30 / 09 / 11	SDM Chungthang	Torch	3 Cartoon	Helping Hands
9	30 / 09 / 11	Lachung	Tarpaulin Sheet	11 Nos	Karma Norden Lachungpa
			Torch Light	3 Cartoon.	
			Candles	1 Cartoon	
			Pipes	2 Coil	
10	30 / 09 / 11	Dzongu	Torch	2 Cartoons	Helping Hands
			Tarpaulin Sheet	15 Nos	
			Pipes	2 Coils	
			Clothes	5 Bags	
			Buiscuits	1 Cartoon	
			Footwear / Shoes	1 Bag	
11	1/10/2011	Mangan	Blanket	140 Nos	D C North
			Tarpaulin Sheet	100 Nos.	
			Buiscuits	8 Cartoons	
			Baby Food	2 Cartoons	
			Torch	20 Nos	
			Maggi Noodles	100 Cartoons	
12	1/10/2011	Dzongu	Tarpaulin Sheet	40 Cartoons	D C North
			Waiwai	2 Cartoons	
			Blanket	70 Nos.	
13	1/10/2011	Lachen	Blanket	45 Nos	Jula Lachen 9476366955
			Tarpaulin Sheet	40 Nos	
			ORS (Orange Flavoured)	8 Pkts	
			Water Purifier	6 Nos	
			Torch	60 Nos	
			Buiscuits	1 Cartoons	
			Noodles (Ready to eat)	50 Cartoons	
14	1/10/2011	Lachung	Blanket	35 Nos.	Chewang N Lachungpa
			Tarpaulin Sheet	40 Nos.	
			Noodles (Ready to eat)	50 Cartoon.	Amish R Lepcha
15	1/10/2011	Lingdong (Dzongu)	Blanket	35 Nos.	
			Tarpaulin Sheet	10 Nos	

			Torch Light	18 Nos	
			Water Purifier	10 Nos	
			Mineral Water	3 Cartoon	
16	2/10/2011	Lachung	Blanket	10 Bundle.	Chewang N Lachungpa Unit 20 Lachu (Pipon) Dzongu
			Gumboots	72 Pairs	
			T - Shirts	26 Nos	
			Leggies	40 Nos	
			Tarpaulin Sheet	10 Nos	
17	2/10/2011	Lachen	Blanket	10 Bundle.	C. K. Lachenpa (Lachen Pipon)
			Blanket for Thangu	5 Bundle.	
			Gumboots	72 Pairs	
			T - Shirts	40 Nos	
			Leggies	40 Nos	
			Tarpaulin Sheet	20 NB	
18	2/10/2011	Dzongu	Blanket	250 Nos	T. T Lepcha 9474348824 Editor Lepch IPR
			Tarpaulin	45 Nos	
			Readymade Garments	223 Nos	
			Gumboots	144 Pairs	
			Noodle	50 Cartoon	
			Ladies Kit (Toileteries)	35 Bundles	
			Mineral Water	2 Cartoon	
19	4/10/2011	Chungthang through SDM Mangan	Readymade Garments (New)	1 Cartoon	SDM Mangan
			Old Garments for Labours	4 Cartoon	
			Ladies Kit (Toileteries)	23 Bundles	
			Blanket	26 Bundles	
			Gumboots	35 Pairs	
20	30/9/11	Namchi (DC South)	Maggi Noodles (Ready to eat)	25 Cartoon	SDM Namchi Representative
			Masala Maggi Noodles	25 Cartoon	
21	30/9/11	Mamring GPU	Ladies Kit (Toileteries)	20 Bundle	CCS LR & DMD
			Gumboots	6 Pairs	
			Blanket	1 Bundle	
22	3/10/2011	Lingey Payong	Blanket	4 Bundle.	Representative of

			Ladies Kit (Toileteries)	4 Bundle.	Chief Whip Govt of Sikkim
			Mineral Water	4 Cartoon	
			Gumboots	15 Pairs	
23	3/10/2011	Namchi	Ladies Kit	15 Bundle	Received by Abhisek Kharel T.O South LR & DMD
			Blanket	8 Bundle	
			Mineral Water	10 Cartoon	
			T - Shirts	20 Nos	
			Leggies	15 Nos.	
24	3/10/2011	Turuk	Blanket	2 Bundle	Durga Tamang Panchayat Member Tarak Ramthang GPU
			Ladies Kit	5 Bundle	
			Mineral Water	5 Cartoon	
			T - Shirts	25 Nos	
			Leggies	17 Nos	
25	3/10/2011	Ravongla	Blanket	2 Bundle	Ringzing Wangyal HA, SDM Office Ravongla
			Ladies Kit	5 Bundle	
			Mineral Water	5 Cartoon	
			Gumboots	12 Pairs	
			T - Shirts	20 Nos	
			Leggies	20 Nos	Smt. Bishnu Maya Sherpa Councilor- 03 Mandir line ward Singtam Nagar Panchayat
26	3/10/2011	Singtam & Khamdong	Blanket	4 Bundle	
			Ladies Kit	12 Bundle	
			Garments (Old)	1 Sack	
			Mineral Water	5 Cartoon	
			Readymade Garments (New)	1 Cartoon	
			Black Plstics (Tarpauin)	2 Coils	
27	3/10/2011	Gyalshing	Readymade Garments	1 Cartoon	SMD Gyalshing
			Blanket	18 Bundles	
			Ladies Kit	17 Bundles	
			Mineral Water	10 Cartoon	
28	4/10/2011	Luing	Blanket	2 Bundle	AS LR & DMD
29	4/10/2011	Luing	Blanket	1 Bundle	Disdistributed among labour & C-IV Staff of the Dept
30	7/10/2011	SDM Chungthang	Gumboots	216 Pairs	SDM Mangan
			Maggi	50 Cartoons	
31	10/10/2011	Shapu Shipgyar Liching	Plastic Sheets	2 Bundle	Khayen RS Under Direction of DS - II LR & DMD
			Gumboots	20 Pairs	
			Mineral Water	2 Cartoon	

32	10/10/2011	Central Medical Store, Convoy Ground Gangtok	Medicines	20 Cartoon.	S.I.C.H.S.C Central Store Deptt. Govt of Sikkim
33	10/10/2011	distributed among Sweepers and Coolies at STCS Godown, Deorali Gtk.	Old Clothes Readymade Garments	2 Cartoon	
34	10/10/2011	Kabi	Gumboots	2 Bundle	Kabi (Hon'ble MLA)
35	10/10/2011	Lachung (Through Pipon)	Gumboots	3 Bundle	Chewang N Lachungpa Unit 20 Lachung (Pipon) Dzongu
36	10/10/2011	Lachen (Through Pipon)	Gumboots	3 Bundle	Dorjee Namgyal Lachenpa
37	10/10/2011	Dzongu (Through Pipon)	Gumboots	3 Bundle	
38	Lachen		Ladies Kit (Toileteries)	50 Bundle	C Lachenpa (Pipon)
39	19/10/11	Dzongu	Ladies Kit (Toileteries)	32 BUNDLES	TASHI TSHERING 9775404098
40	12/10/2011	MAMTALAYA	KIDS WEAR (OLD) WARM WE LADIES WEAR MURAI RICE LADIES KIT FOOD GRAIN	25 BAGS	MANGALMIT IEPCHA
41	14/10/11	SAMDUR	KIDS WEAR (OLD) WARM WE LADIES WEAR MURAI RICE LADIES KIT FOOD GRAIN	30 bags	DK LIMBOO
42	14/10/11	MAYALMU SANG	KIDS WEAR (OLD) WARM WE LADIES WEAR MURAI RICE LADIES KIT FOOD GRAIN	15 BAGS	BINDHYA GURUNG

43	15/10/11	SAMDUR BUSTY	Ladies Kit (Toileteries)	5 BUNDLES	RAJU CHETTRI
44	19/10/11	SAHAYATA SAMIT	RATION	25 SACKS	SEEMA GHIMARAY
45	21/10/11	SAMDUR	RATION	5 SACKS	RAJU CHETTRI
46	22/10/11	SIKKIM VIKLANG SAMITE	Ladies Kit (Toileteries)	5 BUNDLES	SEEMA GHIMARAY
47	24/10/11	PANCHAYAT RAWTEY RUMTEK GPU	KIDS WEAR (OLD) WARM WE LADIES WEAR LADIES KIT	8 BUNDLES	MR ARUN TAMANG
48	24/10/11	NATIONAL ASSOCIATION FOR THE BLIND	KIDS WEAR (OLD) WARM WE LADIES WEAR LADIES KIT	7 BUNDLE	KARMA YUGLE
49	24/10/11	CHUNGTHANG SD	L ADIES KIT & GUM BOOT	27 BUNDLES	DC North
50	25/10/11	LACHEN LACHUNG DZONGU	KIDS WEAR (OLD) WARM WE LADIES WEAR MURAI RICE LADIES KIT FOOD GRAIN	180 PAIRS OF GUMBOOT & LADIES KIT 18 BUNDLES	DC North
51	26/01/12 & 27/01/12	South District NAMCHI	6 TRUKS OF CLOTHES & MATRESSES	CLOTHES & MATRESSES	DC (South)

ANNEXURE-VI

Memorandum No.1 Assistance Sought by the Govt. of Sikkim under NCCF

Sl. No.	Particulars	Amount (Rs. crore)
1	Gratuitous Relief (a)Ex-gratia payment for deceased persons (60 nos.) (b)Ex-gratia payment for injured (600 nos.)	3.00 3.00
2	Assistance for small and marginal farmers	8.45
3	Assistance under animal husbandry sector	1.18
4	Assistance for repair/restoration of damaged houses	21.68
5	Assistance for emergency supply of drinking water	46.70
6	Provision of medicines, disinfectants, insecticides for prevention of outbreak of epidemics	1.20
7	Evacuation of people affected/likely to be affected	2.00
8	Operation of relief camps	7.76
9	Repair/restoration of immediate nature of the damaged infrastructure in eligible sectors (1) Roads and bridges (2) Drinking water supply works (3) Irrigation (4) Power (5) Education (6) Health (7) Other Vital Government infrastructure (8) Community assets owned by panchayats (9) Sports infrastructure	2546.90 558.06 1244.61 260.32 472.67 30.43 1269.32 68.01 1.80
10	Religious Institutions	328.45
11	Replacement of damaged medical equipment	4.45
12	Operational costs for ambulance services, mobile medical teams and temporary dispensaries	0.18
13	Cost of clearance of debris	10.00
14	Cost of search and rescue measures	0.305
Total		6890.50

ANNEXURE-VII

**Supplementary Memorandum No2 : Assistance Sought by Govt. of
Sikkim under NCCF**

Sl. No.	Particulars	Amount (Rs. crore)
1	Assistance for small and marginal farmers	8.45
2	Assistance under animal husbandry sector	1.87
3	Provision of medicines, disinfectants, insecticides for prevention of outbreak of epidemics	0.26
4	Roads and bridges department	1191.63
5	Repair/restoration of immediate nature of the damaged infrastructure in eligible sectors (i) Drinking water supply works (ii) Power (iii) Education (iv) Health (v) Urban Dev. & Housing Deptt. (vi) Animal Husbandry & VS (vii) Culture & Heritage (viii) Buildings and Housings (ix) Water Security & PHE (x) Land Revenue & Disaster Management (xi) Agriculture & Horticulture (xii) Food & Civil Supplies	 187.94 244.67 210.54 44.67 16.63 29.16 60.00 657.85 440.00 3.65 19.34 13.56
6	Irrigation & Flood Control	310.30
7	Relief Items & Food	8.50
8	Provisions of Medicines	6.25
9	Cost of research and study	35.50
10	Repair and Road Machinery	1.36
Total		3492.13

ANNEXURE-VIII

Supplementary Memorandum No.3: Assistance Sought by Govt. of Sikkim under NCCF

Sl. No.	Particulars	Rs.crore
1	Assistance for small and marginal farmers	8.45
2	Assistance for Animal Husbandry Sector	1.87
3	Provision of medicines, disinfectants, insecticides for prevention of outbreak of epidemics Animal husbandry sector- 0.26 cr. Health sector -6.25 cr.	6.51
4	Relief Materials & Food Packets	8.50
5	Appropriate mitigation measures under Mines, Minerals & Geology Deptt.	35.50
6	Immediate repairs of infrastructures in eligible sectors	
	Drinking water supply works Urban- 105.19 cr. Rural-82.50 cr.	187.69
	Roads & bridges	980.26
	Power	169.00
	Education	253.17
	Health	44.67
	Urban Development & Housing Deptt.	16.63
	Animal Husbandry & VS	29.40
	Community Centres under culture & heritage deptt.	60.00
	Buildings	662.91
	Land revenue & disaster management	3.65
	Agriculture & horticulture	19.34
	Food & civil supplies	14.30
	Irrigation & FC Urban- 8.15 cr. Rural- (under I & FC)-302 cr.	310.15
Total		2811.99

ANNEXURE-IX

The details of the deceased persons in the recent earthquake in Sikkim

District	Location	Name of the deceased	Age	Gender
North	Mangan	Mrs. Nirmala Tamang	28	F
	Salim-Pokyel	Mr. Bishnu Lamba, A/P Teesta Urja, Saffu P/R Jaigoan (WB)	27	M
		Sita Biswakarma, W/O Deceased Bishnu Lamba	28	F
		Mr. Tek Bdr Subba	-	M
		Mr. Ranjan Nath, Abir Infrastructure	-	M
		Mr. Santosh Kr. Singh, Abir Infrastructure	-	M
		Mr. Narayan Darjee, Abir Infrastructure	-	M
		Mr. Bhupal Gurung, Abir Infrastructure	-	M
		Mr. Damber Subedi, Abir Infrastructure	-	M
		Mr. Dinesh Rai, Abir Infrastructure	-	M
		Mr. Saibu Halder	35	M
	Barfok dzongu	Nirjaymu Lepecha	30	F
		Tak Tshering Lepecha		M
	Toong	Ganga Rai, A/P Lachung, Thaka North Sikkim P/R Nepal	18	F
		Samar Pal Singh (GS-176882P JE (CIV)	39	M
		Vijay Kumar of 107 RCC (GREF)	54	M
	Shipgyer	Subrata Ranjan Nath (Chief Project Advisor), Abir		M
	Saffu	Tashi Tshering Lepecha	35	M
		Passang Namgyal Lepcha	36	M
	Chungthang	Phurba Lepcha, R/O Chungthang	20	M
		Jwala Singh, R/O Gorakhpur, UP	35	M
		Pabrita Manna, R/O West Bengal	32	F
		Mukesh Kumar, R/O Bihar	19	M
		Tankay Rai, R/O Chungthang	50	M
		Ash Bdr. Rai, Chungthang, North Sikkim	45	M
		CHV Prashad, R/O Andhra Pradesh	35	M
		Deen Dayal Gupta, AGM of AIPL	60	M

		Chunghang		
		Akhil Roy, R/O New Bungaigaon, Assam		M
		Tapan Biswas		M
		Rakesh Thakuri, Hazitar	29	M
	Lachen	Sepoy Jitendra Singh, 16 Jat Regiment		M
		NK Pankaj Singh, 22 Field Regiment (Zema-I)		M
	Lachung	Suresh Kumar Biswakarma	60	M
	Ramom	M.S. Mohan Reddy, Adit V, Saffu R/O Balukavari Palli Mandal Thanballapalli Chihhor		M
	Bay (Dzongu)	Dokmit Lepecha, W/O Tshering Lepecha	13	F
		Sonam Tsh, Lepecha, S/O Tashi Lepecha	23	M
		Nakit Lepecha, W/O Sangay Lepecha	30	F
		Gonlam Lepecha, S/O Sungchok Lepcha	3	M
		Lhakit Lepcha, D/O Karma Lepcha	18	F
		Topgay Lepcha, S/O Lt. Sonam Lepcha		M
		Bhumi Raj Rai	30	M
		Tharchok Lachungpa		M
		Popi Lachenpa		M
		Danen Lachenpa		M
East	Thathangchen	Phurba Sherpa		M
		Suk Maya Sherpa		F
		Kunzang D Sherpa		M
		Bikash Pradhan		M
		Sandeep Kr. Bhagat		M
	Gnathang	Doma Sherpa, D/O Sangay Sherpa		F
		Wangdi Sherpa		M
		Kesang W Sherpa		F
		Amit Baral		M
	Sichey	Lobzang Jimba		M
	Beyong Phegong	Sonam Ongmu Bhutia, R/O Beyong Sang		F
	Rangpu	Shanti Mangar		F
		Sandipan Banerjee		M
	Vajra, Baluwakha	Ramakant Singh		M
South	Jorethang	Munni Sharma, W/O Santosh Sharma, R/O Majhi Goan, Jorethang	22	F

West	Mangalbaria	Sujal Gurung, S/O JK Gurung	10	M
		Chandra Kala Rai, W/O Subash Rai	30	F
		Ash Bdr Rai, S/O Lt JB Rai, R/O Kyongsa	75	M
	Kaluk	Shekhar Rai, S/O Jhlam Singh Rai, R/O Tharbu Kaman, WB (Mirik)	35	M

Various Team Members Who Visited Sikkim after 18TH September 2011 Earthquake

(Central Government and other members who visited the State)

1) Central Team led by :-

Shri Sambhu Singh Joint Secretary MHA,GOI

- a) Shri Ashok Kr Rajput , Deputy Central Electricity, GOI
- b) Shri Y.C Sharma , Deputy Secretary Finance, GOI
- c) Shri A Nanda Kumar Director , Ministry of Agriculture
- d) Dr Swasti Charan Member (CMO)
- e) Mr Amarendra kumar , Regional Officer , Ministry of Roads and Transport .
- f) Mr Bhupesh Kumar

2) Central Team

- a) Shri Ajay Kumar -Mission Coordinator
- b) Shri Mahapatra -NDMA
- c) Shri Bansal -HUDCO
- d) Col Sexena -HPCC
- e) Mr M K Sharma - Hinda P

3) Delhi University Team led by:

- a) Dr. Neera Agnimitra, Associate Prof, Delhi School of Social Works, University of Delhi
- b) Dr. Manoj Kr. Jha, Associate Prof, Delhi School of Social Works, University of Delhi
- c) Sanjay Ingole, Associate Prof, Delhi School of Social Works, University of Delhi

4) FIRST MEETING WITH TEAM FROM GEOLOGICAL SURVEY OF INDIA .

- 1) Shri P.B Sarkar, Director (SG) N.E Regional , Shillong
- 2) Shri K Premchand, Director (SG)
- 3) Shri A.K Talwar, Senior Geologist
- 4) Shri V Chandramanli, Geologist

It was mentioned that two of their teams were working on the seismicity and impact due to earthquake of 18th September 2011 .

5) TEAM FROM NDMA

- 1) Brig. Dr B.K Khanna
- 2) Shri Kalpesh Prajapati

(For survey and assessment of damages and to put the programmes tied up with local NGOs) .

6) TEAM FROM ROORKEE

The team from IIT Rorkee with local Scientist who visited areas around Gangtok Lachung Lachen Chungthang to have Geo – Environmental and Structural Survey of structures caused due to the impact of earthquake of 18/09/2011 on 25&26/09/2011.

1. Shri T Tashi –Mtec (IIT) MS (COLORADO UNIVERSITY) (Geology)EX Principal Director of GOS
2. Smt Devika Sharma Chettri – Additional Chief Town Planning UD&HD
3. Mr Raju Tamang – AE (CIVIL) Government of Sikkim
4. Dr Mrs Amita Sinvhal -Seismologist IIT Rorkee
5. Dr DK Maheswari Geo Technical Engineer IIT Rorkee
6. Dr Yogendra Sing Structural Engineer IIT Rorkee

Another Team From Rorkee IIT No RSAR Norway With Local Scientist WHO VISITED SOME TOWNS VILLAGES OF East South & West Sikkim and carried out damage assessment .

- 1 Prof . ML Sharma IIT Rorkee
- 2 Dr Emrah Erduran NORSAR, Norway
- 3 Shri K K Luitel Geologist , Department of Mines ,Minerals and Geology,GOS

7) Team From Indian Institute of Science Bangalore Who carried out Studies in some parts of Sikkim for earthquake impact .

1. Dr Kusala Rajendran , Associate Professor , Centre for Earthquake ,IIS Bangalore
2. Dr L.P Rajendran Ramanujan Fellow centre For Earthquake Science ,IIS Bangalore

8)TEAM FROM NDMA FOR PSYCO-SOCIAL SUPPORT

1. Dr Jaya Kumar C, Sr Specialist
2. Dr NImesh G Dasai, Director IHBAS New Delhi
3. Dr K shaker , HOD, NIMHNS, Bangalore

9)Team from NIDM, New Delhi for preliminary damage assessment

1. Dr Surya Prakash , Prof
2. Dr Chandan Gosh , Prof

10)Team from ADRA , Germany for immediate requirements

1. Shri Prakash Thakur , Project coordinator , New Delhi
2. Shri Rakesh Kumar , Programme assistant , BR

11) Inter- Ministerial Committee's Visit on 7th oct 2011

- Shri Sambhu Singh ,Joint Secretary MHA ,N/E
- Shri D.K Singh, US M/RD Rural Development
- Shri C.Y Barapatre, Asst. Conp. Mini of Agriculture
- Shri P.P Nagrath, Dy Secretary M/O DWS
- Shri Sukhdev Raj, Comdt. NDRF Kol
- Shri A Rajput , Director , CEA, Delhi, Power
- Dr L.Swasticharan, CMO(EMR) OHFW
- Shri Y.C Sharma, Jt. Director Deptt of Exp M/o Finance
- Shri A. Nandakumar, Director, Animal Husbandry

12) PERT (team of structural engineers)

- 1) Shri Ravi Sinha , Prof, IIT Mumbai .
- 2) Mandeep Singh , Prof, & HOD Urban Devpt. School of Planning & Architecture
- 3) Debasis Roy , IIT Guwahati .

13) PERT (Team of Earthquake Engineering Experts)

- 1) Prof. C.V.R Murthy, IIT Madras.
- 2) Prof. D. K. Paul, IIT Roorkee, Uttarakhand
- 3) Prof. S.K. Deb, IIT Guwahati
- 4) Shri. Ajay Chaurasia, CBRI Roorkee, Uttarakhand
- 5) Smt. Alpa R. Sheth, Consulting Engineer and Expert, Mumbai
- 6) Shri. Indrajit Barua, Consulting Engineer and Expert, Guwahati
- 7) Col. Sashi Bhusan, Joint Advisor (Ops) NDMa, New Delhi.

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ANNEXURE-XI

**Revised Items and Norms of Assistance from the SDRF & NDRF for
the period 2010-15**

(Period 2010-15, MHA Letter No.32-7/2011-NDM-I- Dated 16th January, 2012)

Sl. No.	Item	Norms of Assistance
1	2	3
1	Gratuitous Relief	
	(a) Ex-Gratia payment to families of deceased persons	<p>Rs.1.50 lakh per deceased person including those involved in preparedness activities, subject to certification regarding cause of death from appropriate authority.</p> <ul style="list-style-type: none"> In the case of an Indian citizen who loses his life due to a notified natural calamity in a foreign country, his family would not be paid this relief. In the case of foreign citizen who loses his life due to a notified natural calamity within the territory of India, his family would also not be paid this relief.
	(b) Ex-Gratia payment for loss of a limb or eye (s)	<ul style="list-style-type: none"> Rs.43,500/- per person, when the disability is between 40% and 80%. Rs.62,000/- per person, when the disability is more than 80%. Subject to certification by a doctor from a hospital or dispensary of Government, regarding extent and cause of disability
	(c) Grievous injury requiring hospitalization	<ul style="list-style-type: none"> Rs.9300/- per person requiring hospitalization for more than a week Rs.3100/- per person requiring hospitalization for less than a week.
	(d) Clothing and utensils/house-hold goods for families whose houses have been washed away/fully damaged/severely inundated for more than a week due to a natural calamity.	<ul style="list-style-type: none"> Rs.1300/- per family, for loss of clothing Rs.1400/- per family, for loss of utensils/household goods.
	(e) Gratuitous relief for families in need of immediate sustenance after	<ul style="list-style-type: none"> Rs.30 per adult and Rs.25 per child, not housed in relief camps. State Govt. will

	<p>calamity.</p> <p>GR to be provided to those who have no food reserves, or whose food reserves have been wiped out in a calamity, and who have no other immediate means of support.</p>	<p>certify that (i) these persons have no food reserve, or their food reserves have been wiped out in the calamity, and (ii) identified beneficiaries are not housed in relief camps, Further State Govt. will provide the basis and process for arriving such beneficiaries district-wise.</p> <ul style="list-style-type: none"> Period for providing gratuitous relief will be as per assessment of the State Executive Committee (SEC) and the Central Team (in case of NDRF). The default period of assistance will be upto 30 days in the first instance, if required, and subsequently upto 90 days in case drought/ pest attack.
2	Search & Rescue Operations	
	<p>(a) Cost of search and rescue measures/evacuation people affected/likely to affected</p>	<ul style="list-style-type: none"> As per actual cost incurred, assessed by SEC and recommended by the Central Team (in case of NDRF). By the time the Central Team visits the affected area, these activities are already over, the State Level Committee and the Central Team can recommend actual/near-actual costs.
	<p>(b)Hiring of boats for carrying immediate relief and saving lives.</p>	<ul style="list-style-type: none"> As per actual cost incurred, assessed by SEC and recommended by the Central Team (in case of NDRF). The quantum of assistance will be limited to the actual expenditure incurred on hiring boats and essential equipment required for rescuing stranded people and thereby saving human lives during a notified natural calamity.
3	Relief Measures	
	<p>(a)Provision for temporary accommodation, food, clothing, medical care, etc. for people affected/evacuated and sheltered in relief camps.</p>	<ul style="list-style-type: none"> As per assessment of need by SEC and recommendation of the Central Team (in case of NDRF), for a period of upto 30 days. The SEC would need to specify the number of camps, their duration and the number of persons in camps. In case of continuation of a calamity like drought, or widespread devastation caused by earthquake or flood etc., this period may be extended to 60 days, and upto 90 days in cases of severe drought.

		<ul style="list-style-type: none"> Medical care may be provided from National Rural Health Mission (NRHM).
	(b) Air dropping of essential supplies	<ul style="list-style-type: none"> As per actual, based on assessment of need by SEC and recommendation of the Central Team (in case of NDRF). The quantum of assistance will be limited to actual amount raised in the bills by the Ministry of Defence for airdropping of essential supplies and rescue operations only.
	(b) Provision of emergency supply drinking water in rural areas and urban areas	<ul style="list-style-type: none"> As per actual, based on assessment of need by SEC and recommended by the Central Team (in case of NDRF), upto 30 days and may be extended upto 90 days in case of drought.
4	Clearance of affected areas	
	(a) Clearance of debris in public areas	As per actual cost within 30 days from the date of start of the work based on assessment of need by SEC for the assistance to be provided under SDRF and as per assessment of the Central team for assistance to be provided under NDRF.
	(b) Draining off flood water in affected areas	As per actual cost within 30 days from the date of start of the work based on assessment of need by SEC for the assistance to be provided under SDRF and as per assessment of the Central team (in case of NDRF)
	(c) Disposal of dead bodies/Carcasses	As per actual, based on assessment of need SEC and recommendation of the Central Team (in case of NDRF).
5	Agriculture	
(i)	Assistance to small and marginal farmers	
A	Assistance for land and other loss	
	(a) Des-silting of agricultural land (where thickness of sand/silt deposit is more than 3", to be certified by the competent authority of the State Government)	Rs.8,100/- per hectare for each item.

	(b) Removal of debris on agricultural land in hill areas	(Subject to the condition that no other assistance/subsidy has been availed of by/is eligible to the beneficiary under any other Government scheme)
	(c) De-silting/restoration/repair of fish farms	
	(d) Loss of substantial portion of land caused by landslide, avalanche, change of course of rivers	Rs.25,000/- per hectare to only those small and marginal farmers whose ownership of the land is as per the revenue records.
B	Input subsidy (where crop loss is 50% and above)	
	(a) For agriculture crops, horticulture crops and annual plantation crops	Rs.3,000/- per ha. In rainfed areas Rs.6,000/- per ha. In assured irrigated areas, subject to minimum assistance not less than Rs.500/- and restricted to sown areas.
	(b) Perennial crops	Rs.8,000/- ha. for all types of perennial crops subject to areas being sown and subject to minimum assistance not less than Rs.1000/-.
	(c) Sericulture	Rs.3,200/- per ha. for eri, mulberry, tusser Rs.4,000/- per ha. for muga
(ii)	Input subsidy to farmers other than small and marginal farmers	Rs.3,000/- per hectare in rainfed areas Rs.6,000/- per hectare for areas under assured irrigation Rs.8,000/- per hectare for all types of perennial crops Assistance may be provided where crop loss is 50% and above, subject to a ceiling of 1 ha. per farmer and upto 2 ha. per farmer in case of successive calamities irrespective of the size of holding being large.
6	Animal Husbandry- Assistance to Small and Marginal Farmers	
	(i) Replacement of milch animals, draught animals or animals used for haulage.	Milch animals:- Rs.16,400/- Buffalo/cow/camel/yak etc. Rs.1,650/- Sheep/goat Draught animals:- Rs.15,000/- camel/horse/bullock, etc. Rs.10,000/- Calf/donkey/pony/mule The assistance may be restricted for the actual loss economically productive animals and will be subject to a ceiling of 1 large milch animal or 4 small milch animals or 1 large draught animal or 2 small draught animals per household irrespective of whether a household has lost a larger number of animals. (The loss is to be certified by the competent authority)

		<p>designated by the State Government).</p> <p>Poultry:- Poultry @Rs.37/- per bird subject to a ceiling of assistance of Rs.400/- per beneficiary household. The death of the poultry birds should be on account of a natural calamity.</p> <p>Note:- Relief under these norms is not eligible if the assistance is available from any other Government scheme, e.g. loss of birds due to Avian Influenza or any other diseases for which the Department of Animal Husbandry has a separate scheme for compensating the poultry owners.</p>
	(ii)Provision of fodder/feed concentrate cattle camps	<p>Large animals-Rs.32/- per day</p> <p>Small animals-Rs.16/- per day</p> <p>As per actual for 15 days, based on assessment of need by SEC and recommendation of the Central Team (in case of NDRF)</p>
	(iii)Water supply in cattle camps	As per actual for 15 days, based on assessment of need by SEC and recommendation of the Central Team (in case of NDRF).
	(iii) Additional cost of medicines and vaccine	As per actual cost, based on assessment of need by SEC and recommendation of the Central Team, (in case of NDRF) consistent with estimates of cattle as per Livestock Census and subject to the certificate by the competent authority about the requirement of medicine and vaccine being calamity related
	(v)Transport of fodder to cattle outside cattle camps	As per actual cost of transport, based on assessment need by SEC and recommendation of the Central Team (in case of NDRF) consistent with estimates of cattle as per Livestock Census.
7	Fishery	
	<p>(i)Assistance to fishermen repair/replacement of boats, nets-damaged or lost</p> <p>-Boat -Dugout-Canoe -Catamaran -net (This assistance will not be provided if the beneficiary is</p>	<p>Rs.3,000/- for repair of partially damaged boats only</p> <p>Rs.1,500/- for repair of partially damaged net</p> <p>Rs.7,000/- for replacement of fully damaged boats</p> <p>Rs.1,850/- for replacement of fully damaged net</p>

	eligible or has availed of any subsidy/assistance, for the instant calamity, under any other Government scheme.)	
	(ii) Input subsidy for fish seed farm	Rs.6,000/- per hectare (This assistance will not be provided if the beneficiary is eligible or has availed of any subsidy/assistance, for the instant calamity, under any other Government scheme, except the one time subsidy provided under the scheme of Deptt. of Animal Husbandry, Dairying and Fisheries, Min. of Agriculture.)
8	Handicrafts/Handloom- Assistance to Artisans	
	(i) For replacement of damaged tools/equipment	Rs.3000/- per artisan for equipment. - Subject to certification by the competent authority designated by the Government about damage and its replacement.
	(ii) For loss of raw material/goods in process/finished goods	Rs.3,000/- per artisan for raw material - Subject to certification by Competent Authority designated by the State Government about loss and its replacement.
9	Housing	
	(a) Fully damaged/destroyed houses	
	(i) Pucca house	Rs.35,000/- per house
	(ii) Kutcha house	Rs.15,000/- per house
	(b) Severely damaged houses	
	(i) Pucca house	Rs.6,300/- per house
	(ii) Kutcha house	Rs.3,200/- per house
	(c) Partially damaged houses- both pucca/kutcha (other than huts) where the damage is at least 15%	Rs.1,900/- per house
	(d) Damaged/destroyed huts	Rs.2,500/- per hut (Hut means temporary, make shit unit, inferior to Kutcha house, made of thatch, mud, plastic sheets etc. traditionally recognized as hut by the State/District authorities.) <i>Note:- The damaged house be an authorized construction duly certified by the Competent Authority of the State Govt.</i>
	(e) Cattle shed attached with house	Rs.1,250/- per shed.
10	Infrastructure	
	Repair/restoration (of immediate nature) of damaged infrastructure: (1) Roads & bridges, (2) Drinking water supply works, (3) Irrigation,	Activities of immediate nature: Illustrative list of activities which may be considered as works of immediate nature are given in the Appendix.

	<p>(4) Power (only limited to immediate restoration of electricity supply in the affected areas), (5) Schools, (6) Primary health centres, (7) Community assets owned by Panchayat.</p> <p>Sectors such as telecommunication and power (except immediate restoration of power supply), which generate their own revenues, and also undertake immediate repair/restoration works from their own funds/resources, are excluded.</p>	<p>Assessment of requirements:</p> <p>Based on assessment of need, as per State's costs/rates/ schedules for repair, by SEC and recommendation of the Central Team (in case of NDRF).</p> <p>- As regards repair of roads, due consideration shall Be given for norms for maintenance of roads in India, 2001, as amended from time to time, for repairs of roads affected by heavy rains/floods, cyclone, landsides, sand dunes, etc. to restore traffic. For reference these norms are:</p> <ul style="list-style-type: none"> - Normal and urban areas: upto 15% of the total of Ordinary Repair (OR) and Periodical Repair (PR) - Hills: upto 20% of total of OR and PR <p><i>Note:- States shall first use its provision under the budget for regular maintenance and repair.</i></p>
11	Procurement	
	Procurement of essential search, rescue and evaluation equipment including communication equipment, etc. for response to disaster.	<ul style="list-style-type: none"> - Expenditure is to be incurred from SDRF only - (and not from NDRF), as assessed by the - State Executive Committee (SEC). - The total expenditure on this item should not exceed - 5% of the annual allocation of the SDRF.
APPENDIX (Item No.10)		
Illustrative list of activities identified as of an Immediate Nature		
<p>1. Drinking Water Supply</p> <ul style="list-style-type: none"> (i) Repair of damaged platforms of hand pumps/ring wells/spring-tapped chambers/public (ii) stand posts, cisterns, (iii) Restoration of damaged stand posts including replacement of damaged pipe lengths with (iv) new pipe lengths, cleaning of clear water reservoir (to make it leak proof) (v) Repair of damaged pumping machines, leaking overhead reservoirs and water (vi) pumps including damaged intake-structure, approach gantries/jetties. <p>2. Roads</p> <ul style="list-style-type: none"> (i) Filling up of breaches and potholes, use of pipe for creating waterways, repair and stone pitching of embankments, (ii) Repair of breached culverts, (ii) Providing diversions to the damaged/washed out portions of bridges to restore (iii) immediate connectivity, (iv) Temporary repair of approaches to bridges/embankments of bridges, repair of damaged 		

railing bridges, repair of causeways to restore immediate connectivity, granular sub base, over damaged stretch of roads to restore traffic.

3. Irrigation

- (i) Immediate repair of damaged canal structures and earthen/masonry works and small reservoirs with the use of cement, and sand bags and stones,
- (ii) Repair of weak areas such as piping or rat holes in dam walls/embankments and
- (iii) Removal of vegetative material/building material/debris from canal and drainage system.

4. Health

Repair of damaged approach roads, buildings and electrical lines of PHCs/Community Health Centres.

5. Community assets of Panchayat

- (a) Repair of village internal roads
- (b) Removal of debris from drainage/sewerage lines
- (c) Repair of internal water supply lines,
- (d) Repair of street lights and
- (e) Temporary repair of primary schools, Panchayat ghars, community halls, anganwadi, etc.

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**DEPARTMENT OF LAND REVENUE AND DISASTER MANAGEMENT
GOVERNMENT OF SIKKIM
GANGTOK**

No:- 128/177/LR&DMD/GOS

Dated:-14/03/2012

A POLICY RESOLUTION-2012

**SUBJECT: SIKKIM EARTHQUAKE MANAGEMENT AND
REHABILITATION FUND AND SIKKIM LAND POLICY FOR
PRIVATE SECTOR DEVELOPMENT-2012**

Whereas, historically and instrumentally recorded data on earthquakes show that Sikkim and adjoining area lies in a region prone to moderate to very high intensity earthquakes and some of the notable earthquakes which had affected the region in the past are mentioned below:

- (i) 15th January 1934-Indo-Nepal Border Region, Moment Magnitude 8.0, Time 14:21:24 , 1st 08:43:25 UTC, 26:50 North- 86:50 East;
- (ii) 12th January 1965-West of Gangtok (Indo-Nepal Border Region, 6.1 (TS), Time 13:32:24 ITC, 27:60 North- 88:00 East;
- (iii) 19th November 1980-Near Gangtok (Sikkim-West Bengal Border Region, 6.1 Surface Wave Magnitude, Time 19:00:46.9 UTC, 27:39 North- 88:75 East, 17 Kms depth;
- (iv) 21st August 1988-Udaipur Gahri, Nepal (Indo-Nepal Border Region), Moment Magnitude 6.8 (NEIC), Time 23:09:09 UTC/ 04:39:09 1st , 26:755 North- 86:616 East ;
- (v) 14th February 2006-North Sikkim, Moment Magnitude 5.3, 27:377 North- 88:362East , Time 00:55:23 UTC, 06:25 1st , Depth 20.1 Kms ;
- (vi) 31st December 2006-An earthquake of low moderate intensity 2.1, Local time- 12:49 PM ;
- (vii) 20th May 2007- Moderate Intensity 5.0, West Sikkim, 17:48 Hrs (IST) ;
- (viii) 26th May 2007-The highest amplitude of 2.7 was recorded and with three shocks ;
- (ix) 25th December 2007-a mild earthquake approximately of 4.5 Richter scale high, Gangtok at 8:32 PM ;
- (x) 18th September 2011- 6.8 Richter scale, Epicenter at Sikkim-Nepal Border Region, hit at 6:11 PM.

And whereas, on September 18, 2011 an earthquake of the magnitude of 6.8 on Richter scale struck Sikkim at about 6.11 PM. The epicenter of the quake was centered about 64 kms North-West of Gangtok, located towards Mangan, the head quarter of North District. The high density tremor triggered of natural calamities in the form of House damages, landslides, road blocks, falling boulders, lake bursts, flash floods etc. and caused severe damage to the lives and properties in the State ;

And Whereas Sikkim and adjoining region are part of the seismically active region of the 'Alpide-Himalayan global seismic belt' and prone to earthquake, better earthquake resistant houses are required to be reconstructed to rehabilitate the quake victims. Because of the peculiar topography of Sikkim, retrofitting technique for construction of houses is required to be introduced. Above all, massive IEC (Information, Education and Communication) activities will have to be taken up to educate all the stake holders on earthquake safe house construction. Mass training of Officers, Engineers, Masons and Orientation of the local community will have to be taken up to make earthquake proof house construction a standard practice in the State. Better earthquake proof houses and a little precaution can go a long way in saving many lives and reducing other damages to properties;

And whereas, the recent earthquake has caused extensive damages to transportation infrastructure (roads and highways networks, bridges, tunnels, culverts, protective works, and village approaches and foot paths), Power and Energy infrastructure (Power generation plants, transmission systems, electrical grid, substations, transformers and local distribution), water management and distribution infrastructure (of drinking water supply, drainage systems, irrigation systems and flood control systems) and governance infrastructure (at village, district and State level, Civil, Para forces and Military infrastructure along with residential buildings). Also other life line infrastructures like health care systems (hospitals, Primary Health Centers) were affected. Many educational infrastructures like school, college, universities and research institutions were damaged. Besides above, economic infrastructures like marketing hubs, tourism, manufacturing centers, agriculture, horticulture, animal husbandry, forestry and fisheries infrastructure sustained damages. This brought income generating activities of the people to a grinding halt. Other infrastructures which were not spared by the quake were play grounds, stadiums, sports complexes, historic monasteries, pilgrimage places, archaeological sites, temples, churches etc. Loss and damages were also caused to the privately owned infrastructures like houses, toilets, cattle sheds, stores, lodges, hotels, commercial establishments etc. in rural and urban areas both ;

And whereas the loss and damages to public infrastructures by the recent earthquake had adversely affected the economy of the State, leading thereby to reduction in employment activities, loss in revenue generation and slow down in investment in industrial sector.

And whereas, after careful consideration, the State Government of Sikkim has decided to have a **“Sikkim Earthquake Management and Rehabilitation Fund**

and Sikkim Land Policy for Private Sector Development” with the following objectives namely:-

1. There is consensus in the scientific world that Sikkim and its surrounding areas will likely to witness major earthquake in the future. Presently, there is no scientific technique available anywhere in the world to predict occurrence of earthquakes with reasonable degree of accuracy with regard to space, time and magnitude.
2. Loss of lives during an earthquake is mostly due to damage or collapse of houses/structures. It is, therefore, pertinent that appropriate steps are to be taken up to construct the dwellings and other structures in the region as per guidelines laid down by the Bureau of Indian Standards to minimize the losses caused by earthquakes. The choice of seismic factor is to be adopted for designing and engineering the structures including type of structures, ground conditions and also importance of structures. For important and critical structures, site specific spectral studies have to be carried out before assessing the seismic design parameters.
3. Poor construction practices in the area spell tremendous risk for the population of this region. The solution lies in opting for safer construction through choice of appropriate construction systems incorporating with earthquake resistant technology, use of good construction materials and their quality control, and involvement of competent manpower for design construction and supervision.
4. Furthermore, it will require sensitizing the common people about the seismic hazard and the very real and tangible risks that the community is facing on account of using unsafe construction practices. Awareness and capacity building of human resources at all levels and the creation of suitable mechanism are integral components of the road map for steering the State towards seismic safety.
5. Involvements are required of all sections of the society, the Government, Non-Governmental Organizations, professionals, Industries and the common man. One of the options for reduction of vulnerability of structures of earthquake rehabilitation is seismic retrofitting but, retrofitting as a technique and a profession is still in its infancy. Neither Government agency includes seismic retrofitting nor do people at large have knowledge of the option of retrofitting. In other words, information on retrofitting is hard to find. As a result, retrofitting is beyond the reach of an ordinary person. Efforts have to be made to evolve solutions to tackle the area specific problems peculiar to the area. This would involve different building technologies, different materials, problem of accessibility, erratic electric supply, unavailability of basic as well as special materials needed for retrofitting etc. The challenge/adversity posed by the recent earthquake in Sikkim perhaps could be turned into opportunity and it is high time the State Government switched over to retrofitting technique as far as possible, and take serious steps in such a right direction.

6. The recent earthquake may indeed be called as a wakeup call to ensure that human lives and infrastructure are safeguarded against extensive damage in future earthquakes. It is high time earthquake resistant house construction techniques is adopted thereby improving the preparedness of the State to handle such disasters and reducing damages and significantly cutting down public expenditure in construction of new houses in future.
7. The post-earthquake strategy of the State would be to help construct earthquake proof, new and improved Reinforced Concrete frame houses for those whose houses have been totally damaged and cannot be repaired and retrofitted. Above all, massive IEC (Information, Education and Communication) activities will have to be taken up to educate all the stake holders on earthquake safe house construction. Mass training of masons and orientation of the local community will have to be taken up to make earthquake proof house construction a standard practice in future.
8. **Training of rural masons:** A programme to assist in training and certification of masons has to be formulated in consultation with expert agency. The training module for masons will include multi-hazard resistant construction also to be prepared by an expert committee, and curriculum may be introduced in the vocational training programme.
9. **Earthquake Engineering in Undergraduate Engineering/Architecture Curricula:** The role of engineers and architects is crucial in reducing earthquake risks by ensuring that the constructions adhere to the norms of seismically safety. In view of this, the elements of earthquake engineering are to be integrated into the undergraduate engineering and architecture courses.
10. **Hospital Preparedness and Emergency Health Management in Medical Education:** Hospital preparedness is crucial to any disaster response system. Each hospital should have an emergency preparedness plan to deal with mass casualty incidents and the hospital administration/ doctor trained for this emergency. Therefore capacity building through in-service training of the current health managers and medical personnel in Hospital Preparedness for emergencies or mass causality incident management is essential.
11. **Retrofitting of Lifeline buildings:** While the mitigation measures will take care of the new constructions, the problem of unsafe existing buildings stock would still remain. The State Government has decided to have these buildings assessed and where necessary retrofitted.
12. **Acceleration Urban Earthquake Vulnerability Reduction Programme:** An accelerated urban **earthquake vulnerability reduction programme** has to be taken up. Orientation programmes have to be organized for senior officers, enginners and representatives of the local planning and development bodies to sensitize them on earthquake preparedness and mitigation measures. The training programme for engineers and architects are to be organized to impart knowledge about seismically safe construction and implementation of Bureau of Indian Standard norms. Awareness generation programmes, community and

neighborhood organizations have to be started in all urban areas. All urban areas will have to review and amend their building bye-laws to incorporate multi hazard safety provisions. For all urban areas Disaster Management Plans are to be developed.

13. **Mainstreaming Mitigation in Rural Development:** Rural housing and community assets for vulnerable sections of the population are being created at a fairly large scale. Technology support is to be provided free of cost to rural areas for earthquake resistant all constructions. This initiative is expected to go a long way in popularization of seismically safe construction at village, Panchayat and block level.

And whereas, the State Government of Sikkim has decided to implement a comprehensive programme for earthquake risk mitigation and follow the Bureau of Indian Standards laid down standards for construction in the seismic zones for which there is certainly need of financial resources to implement this programme ;

Now, therefore, with the view to achieve the above objectives, the State Government is hereby pleased to adopt the policy being the “**Sikkim Earthquake Management and Rehabilitation Fund and Sikkim Land Policy for Private Sector Development**” combined with a new model of acquisition of land for industries and other ventures of private sectors.

1. The government has succeeded in creating a right atmosphere for investors." Under this policy, the Government has decided to address these issues and it is decided that the Individual or group of peoples, farmers, either individually or in group, willing to sell their individual or collective chunk of land would have to submit the details to the State Government through Land Revenue and Disaster Management Department or the District Magistrate concerned, who, in turn, would check the legal papers to ascertain that they are not disputed and initiate the process for acquisition as per the provisions of Law in this respect. All Laws, Acts, Rules. Notifications, Guidelines, Policies in this respect will be followed and observed.
2. **The State Government will create a Pool of Industrial Land Bank and all the investors/developers/industries require land for their ventures shall approach the State Government through Land Revenue and Disaster Management Department or the District Magistrate concerned.** The State Government may provide the land as per the Laws/Acts/Rules/Notifications in this respect and the Investors/ Developers/ Industries/ Power Developers/Hotels/distilleries/ breweries/ Pharmaceutical Units and other manufacturing and Production units wants to acquire the land to carry out their trade, commerce and industries in the State of Sikkim shall be guided by the following Policy:

Clause (I): The allotment land acquired under Pool of Industrial Land Bank to the Private Investors/Developers shall be permitted on the following conditions :(**The clauses (I) shall be applicable in cases where land is allotted from a Pool of Industrial Land Bank**)

- (i). Charging the Rate of land at which it was acquired
- (ii). Additional-Commercial Bank Interest Rate per annum for the period from the date of acquisition to the date of allotment/handing over of land
- (iii). Additional-12.5% supervision/ establishment charges per annum for the period from the date of acquisition to the date of allotment/handing over of land
- (iv). Development charges if any like boundary demarcation/fencing or others etc.
- (v). Adoption of one village decided by the State Government for development under the Corporate Social Responsibility.

3. The above entire amount shall go to Revenue Head and plough back to State Government Budget Head /Account/Organization from where the land was acquired.

Clause (II): The following sectors shall contribute and deposit the fixed amount in the “Sikkim Earthquake Management and Rehabilitation Fund” before the allotment of land and other permission/licenses etc. from the State Government: (**clause (II) above shall be applicable in for all the cases whether land is allotted from a Pool of Industrial Land Bank or acquired directly**)

Sectors/	Capacity/Earthquake Fund				
Hydel/Pow er Projects	>=25MW & <= 50 MW	>50 MW & <= 100 MW	>100 MW & <= 200 MW	>200 MW & < =300 MW	> 300 MW
Amount	5 Crores	15 Crores	25 Crores	35 Crores	50 Crores
Pharmaceu tical Units	Investment 25 to 50 Crores	Investment >50 to 100 Crores	Investment >100 to 200 Crores	Investment >200 to 300 Crores	Investment more than 300 Crores
Amount	5 Crores	10 crores	20 crores	30 Crore	40 Crores
Hotels	Three stars & less	Four Stars	Five Stars	Five Stars Deluxe	With Casino
Amount	Nil	5 Crores	15 Crores	20 Crores	+5 Crores
		Local exemption	Local 50% exemption	Local 50% exemption	
Other Industries	Investment 25 to 50 Crores	Investment >50 to 100 Crores	Investment >100 to 200 Crores	Investment >200 to 300 Crores	Investment more than 300 Crores
Amount	5 Crores	10 crores	20 crores	30 Crores	40 Crores
	Local	Local	Local 50%	Local 50%	Local 50%

	exemption	exemption	exemption	exemption	exemption
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Note:

1. The clauses (I) and (II) above both shall be applicable in cases where land is allotted from a Pool of Industrial Land Bank and clause (II) above shall be applicable in for all the cases whether land is allotted from a Pool of Industrial Land Bank or acquired directly.
2. Notwithstanding with the above Clause (II), in specific case the State Government may take Project specific decision in this respect and may provide special exemption to local applicant.
3. The State Government shall open a account for the purpose in the Department of Land Revenue and Disaster Management.
4. To facilitate the Industrial Development and to encourage the Private Investors the Lease deed/ Lease Agreement may be registered as per the norms and guidelines issued by the State Government time to time in this respect and as per Laws/Acts/Rules/Notifications in this respect.
5. The provision of Industrial Development or Infrastructure often requires the acquisition of private lands/ properties leading to additional responsibilities on the State Government. There is imperative need to recognize the issues as intrinsic development and additional support /technologies needs to be provided beyond the monetary compensation. This calls for broader concerted efforts on the part of the State Government. This holistic efforts aimed at improving the all round standards of infrastructures in the State.
6. **“Sikkim Earthquake Management and Rehabilitation Fund and Sikkim Land Policy for Private Sector Development” A POLICY DOCUMENT-2012 shall come into effect from the date of its publication in the official Gazette.**

(S.B.S. Bhadauria, IFS)
Secretary-cum-State Relief Commissioner
Government of Sikkim
Land Revenue & Disaster Management Department.



**DEPARTMENT OF LAND REVENUE AND DISASTER MANAGEMENT
GOVERNMENT OF SIKKIM, GANGTOK**

File No. 177/GOS/LRD/2011-12

Notification No. 56/177/LR&DMD/ACQ/GOS

Dated: 22 / 09/2012

NOTIFICATION

In partial amendment to Notification No. 128/177/LR&DMD/GOS, dated 14/03/2012 in connection with the Sikkim Earthquake Management and Rehabilitation Fund and Sikkim Land Policy for Private Sector Development 2012, the State Government hereby amends **Clause (II) of Para (3)** to promote the development in the State. The amended Clause (II) of Para (3) shall be read as under:

Sectors/	Capacity/Earthquake Fund				
	>=25MW & <= 50 MW	>50 MW & <= 100 MW	>100 MW & <= 200 MW	>200 MW & <=300 MW	> 300 MW
Hydel/Pow er Projects					
Amount	2.50 Crores	7.50 Crores	12.50 Crores	17.50 Crores	25.00 Crores
Pharmaceu tical Units	Investment 25 to 50 Crores	Investment >50 to 100 Crores	Investment >100 to 200 Crores	Investment >200 to 300 Crores	Investment more than 300 Crores
Amount	2.50 Crores	5.00 Crores	10.00 crores	15.00Crores	20.00Crores
Hotels	Three stars & less	Four Stars	Five Stars	Five Stars Deluxe	With Casino
Amount	Nil	2.50 Crores	7.50 Crores	10.00 Crores	+2.50 Crores
		Local exemption	Local 50% exemption	Local 50% exemption	
Other Industries	Investment 25 to 50 Crores	Investment >50 to 100 Crores	Investment >100 to 200 Crores	Investment >200 to 300 Crores	Investment more than 300 Crores
Amount	2.50 Crores	5.00 crores	10.00 crores	15.00 Crores	20.00 Crores
	Local exemption	Local exemption	Local 50% exemption	Local 50% exemption	Local 50% exemption

However, except the above amendment for reduction of rates under clause (II) of Para (3) all other provisions and conditions of the Policy Resolution 2012 No.128/177/L.R. & DM/GOS, dated:14/03/2012, shall remain the same.

(S. B. S. Bhadauria) IFS
Secretary-cum- State Relief Commissioner
Land Revenue & Disaster Management Department

31 PHOTOGRAPHS SHOWING DAMAGES CAUSED TO HUMAN LIFE & PUBLIC/PRIVATE INFRASTRUCTURE BY THE EARTHQUAKE

The earthquake of September 2011 had a devastating effect on the life and property of the people of Sikkim. Some of the photographs showing damages caused to public and private infrastructure by the earthquake, selected at random, are here for ready reference.



Motorable road damaged in the North District



Rescue Operation by the Army near Chungthang, North District



Landslide damaged the road network & vegetative cover badly in Bey Village in the North District



Cracked Buildings in Chungthang, North District- Unsafe for habitation



Quake affected housing structures converted into rubble within seconds, near Dikchu in the East District



High intensity tremor- houses falling down like pack of cards in the North District



Damaged Government Building at Chungthang, North District



First Aid Centre for the injured at Mangun in the North District



Rescue & Relief Operation Centre at Mangan in the North District



Emergency Medical Camp set up by the NDRF Team at Mangan in the North District



**Connectivity is very crucial in the hour of crisis-
Telecommunication Service Centre for the victims at Mangan in the North District**



Time is precious-injured persons being evacuated by helicopter in the North District



The dead on their last journey in the North District, Sikkim



Landslide and road damage caused by the earthquake at Chungthang, North District



Relief materials being stored for the victims at Mangan, North District



Quake frightened migrant labourers waiting to be transported to safer places



Relief materials being arranged for the quake victims at Mangan, North District



Community volunteers performing the last rites of the deceased in the North District



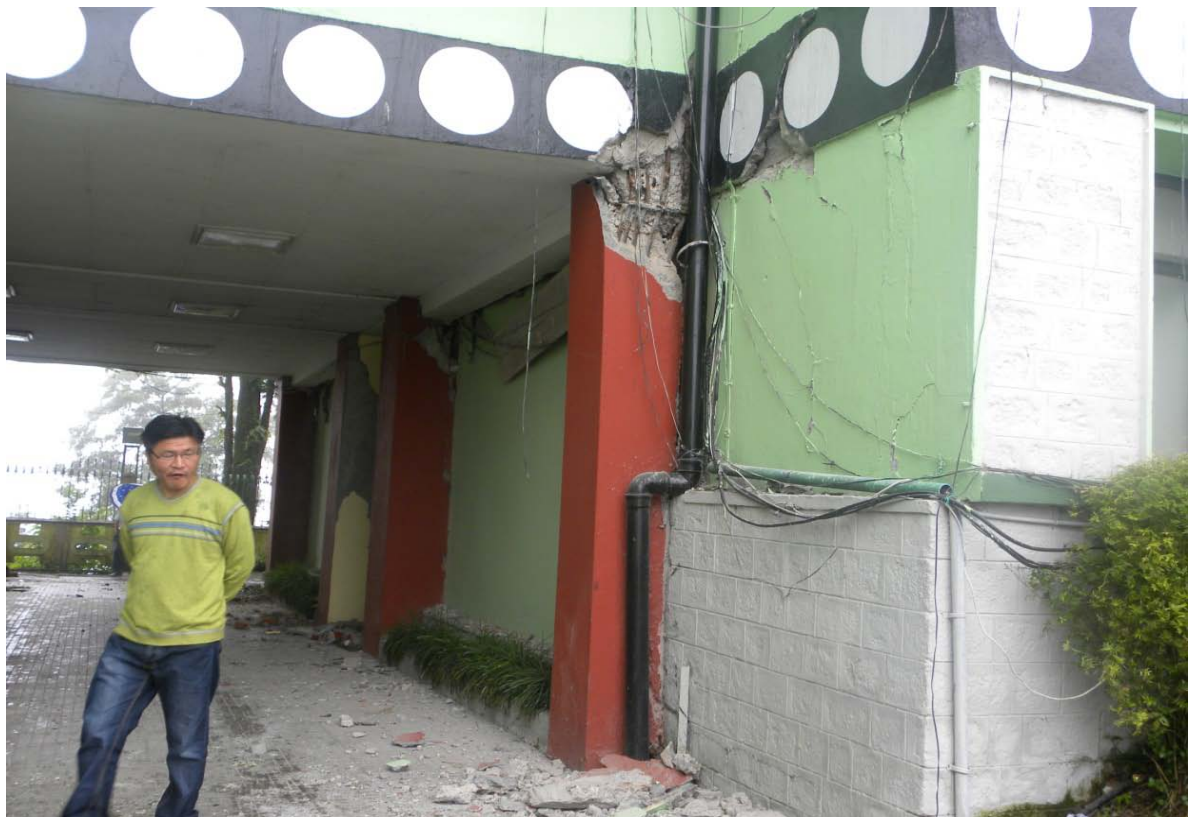
Damaged Ringhim Monastery at Mangan, North Sikkim



Damaged portion of Tashiling Secretariat building, Gangtok- demolished later



Chief Minister of Sikkim consoling the quake victims at Lumsey, East District



Damaged portion of the Tashiling Secretariat building in Gangtok



Injured lady being escorted for treatment to a Medical Centre, Dzongu, North District



Temporary propping support to a damaged building in Gangtok



Propped House at Development Area, Gangtok- demolished later



Village road washed away due to landslide at Nandok, East Sikkim



Damaged houses of North Sikkim after a landslide triggered by the earthquake.



People trying to get across the cliff at Tung, Chungthang, North Sikkim,



Damaged EPCS Church at Rangrang, North District



Collapsed building at Jorethang, South Sikkim



Landslide endangering houses at Naya Bazaar, West Sikkim



Damages incurred to Sai Mandir, South Sikkim



Hon'ble Chief Minister assessing damages at Lumsey, Tadong



H.E. The Governor Sri Balmiki Prasad Singh taking stock of the situation at the Police Control room, Gangtok



Hon'ble Chief Minister addressing the people at Ringhim Gumpa Complex, Mangan.



Hon'ble Chief Minister handing over ex-gratia relief to the injured



Hon'ble Chief Minister consoling a victim at Mangan hospital.



Hon'ble Chief Minister handing over ex-gratia assistance to the victims at Mangan.



Hon'ble Union Home Minister, Mr P. Chidambaram during his inspection at STNM hospital, Gangtok



Hon'ble Union Home Minister addressing the press and the officials at Raj Bhawan.



Hon'ble Prime Minister of India visiting Sikkim



Hon'ble Prime Minister of India consoling quake victims at STNM hospital, Gangtok



Hon'ble Prime Minister of India interacting with the injured at the STNM hospital, Gangtok



Arrival of Congress leader, Rahul Gandhi at Living Helipad, Sikkim



Congress leader Rahul Gandhi observing the damages at Lumsey, Gangtok



NDRF personnel carrying out relief and rescue operations in North Sikkim



Injured woman and child being rescued by the Army personnel in North Sikkim



NDRF team during its operation in North Sikkim

Photos of the works undertaken: East District



T. N. S. S. School- after execution

Photos of the works undertaken: NORTH DISTRICT



Reconstruction of Earthquake Damaged Rural Houses (REDRH)



Deliverables

- Construction of 7,972 rural houses with earthquake resistant features
- Completing the house construction without compromising on the design, construction quality, budgetary ceiling and time frame
- Following a transparent, fair and non-arbitrary process

Challenges

- **Social challenge:** Out of 12,548 fully/severely damaged houses, 7,972 houses will be taken up. This prioritization approach will result in non-coverage of 4,576 households.
- **Physical challenge:** Constructing these 7,972 houses which are scattered in the highest and steepest mountain terrain with existing manpower (who are already implementing ongoing programs) is a formidable task.
- **Economic challenge:** The unit cost of Rs 4.89 lakh per house is based on a standard unit cost as per SPWD SOR of 2006. While construction is being undertaken in 2012-13, and the standard unit cost is to the tune of Rs 7 lakh as per SPWD SOR of 2012.



Why many traditional houses got damaged?

- **Assessment of damage:** 54,000 of the total 92,000 rural houses suffered various degrees of damages there were very few casualties.
- **SWOT analysis:** Superstructure of wooden framed houses with *ekra* walling and light iron sheet roof was mostly intact. But, the stone masonry load-bearing walls laid on mud-mortar and not having any reinforcement suffered maximum damage to the shear forces. Private houses with RC-frame structure with brick masonry infill and iron-sheet roof performed well, showing only non-structural damage.



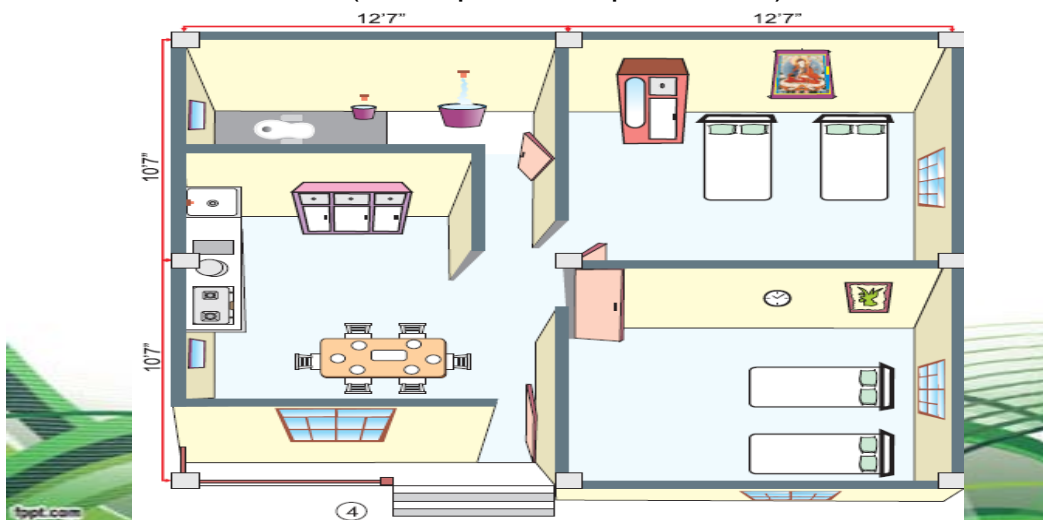
How to make the new houses earthquake resistant?

- **Earthquake resistant design:** RC frame structure with 9 columns, plinth beam, roof beam and sill beam.
- **Use of quality building material:** Cement and 500D TMT bars of prescribed brands only to be used.
- **Good workmanship:** Simplifying the technical aspects by preparing easy to use IEC materials with adequate supervision by technical staff
- **Concurrent monitoring:** Regular and concurrent monitoring of the houses under construction

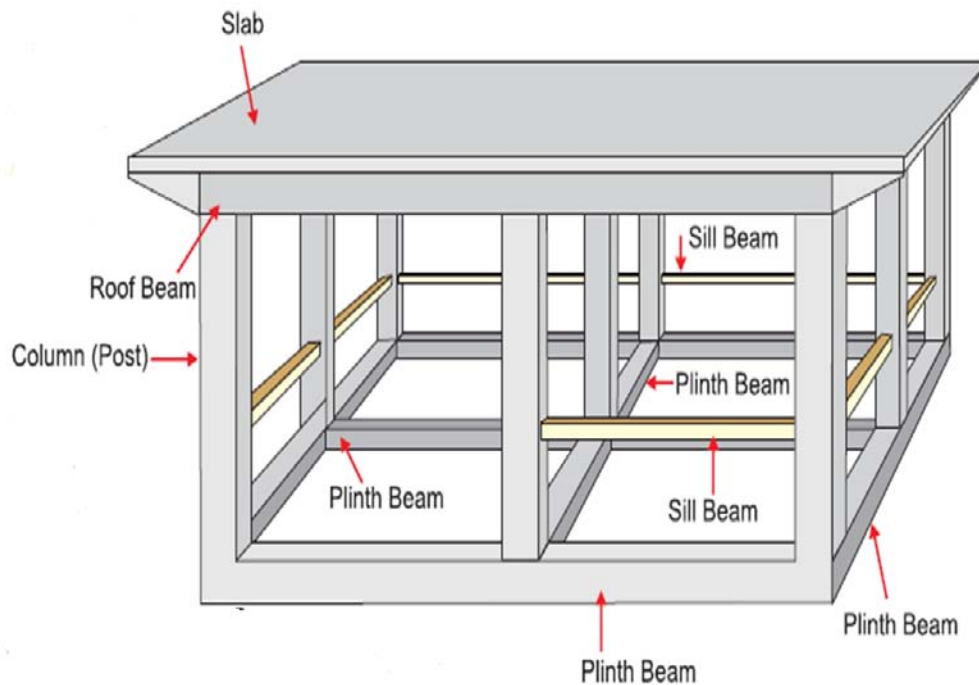


Top view of house

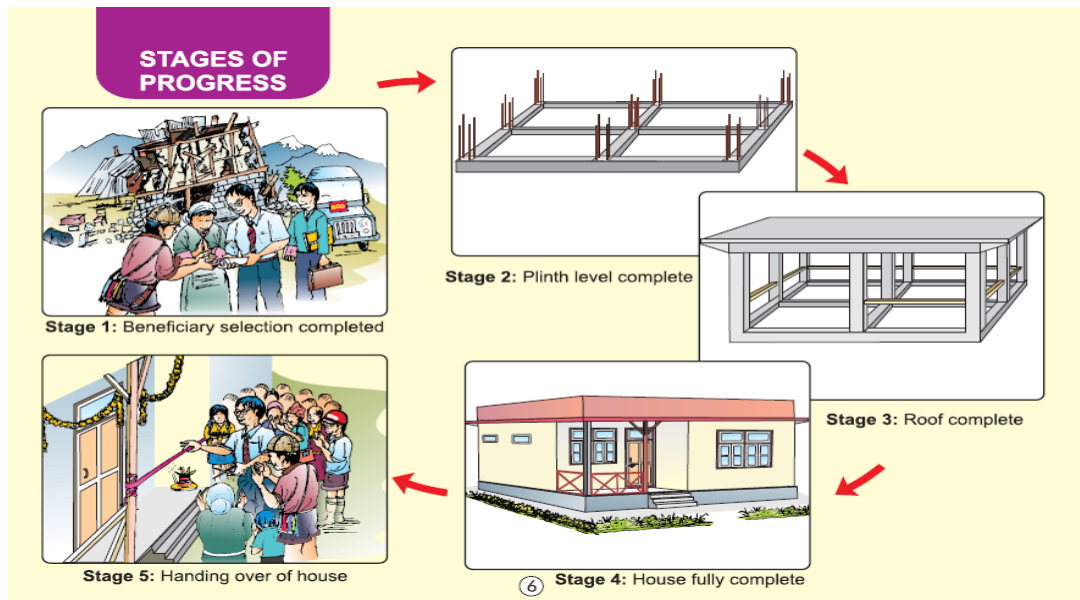
- 4 Rooms including two bedrooms, one dining –cum- kitchen and one bathroom (605 square feet plinth area)



Super-structure of house

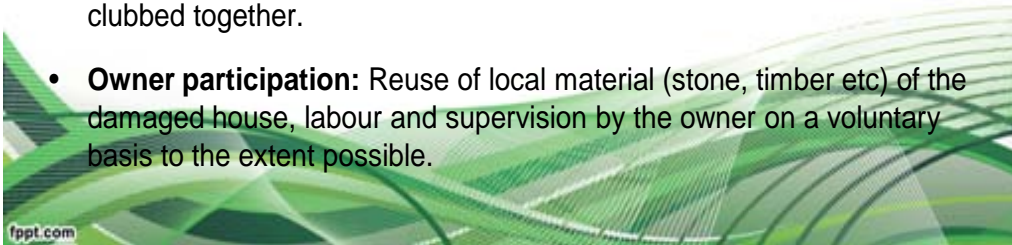


Stages of progress



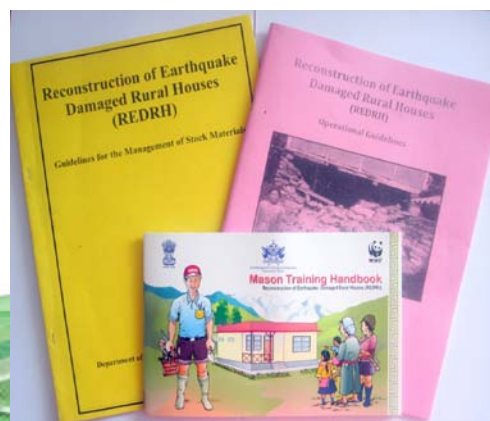
How to reduce cost of construction?

- **Exemptions in taxes, cess, royalty, commissions:** Exemptions of VAT, Environment cess, SNT supervision charges, Royalty on forest produce, STCS commission, etc. has been obtained.
- **Stock material strategy:** Centralized material purchase at institutional prices with decentralized management through Block Level Stores. Sizeable transportation costs will be saved by decentralizing material storage from the two Central Stores to the 29 Block Level Stores.
- **Cluster approach:** Economy of scale is being attempted by taking up house construction in clusters of 10 so that supervision by master mason, reuse of shuttering material, supply of stock material can be clubbed together.
- **Owner participation:** Reuse of local material (stone, timber etc) of the damaged house, labour and supervision by the owner on a voluntary basis to the extent possible.



Preparing the operational framework

- Operational Guidelines (47 pages) framed for the project
- Cabinet approval on the policy part obtained
- Guidelines for management of Block Level Stores framed
- Inspection report format of State Level Monitors notified



Operational framework being discussed in consultation meeting



Special Gram Sabhas to prioritize beneficiaries based on transparent criteria





**Special Gram Sabhas to prioritize beneficiaries
based on transparent criteria**

Capacity building and IEC

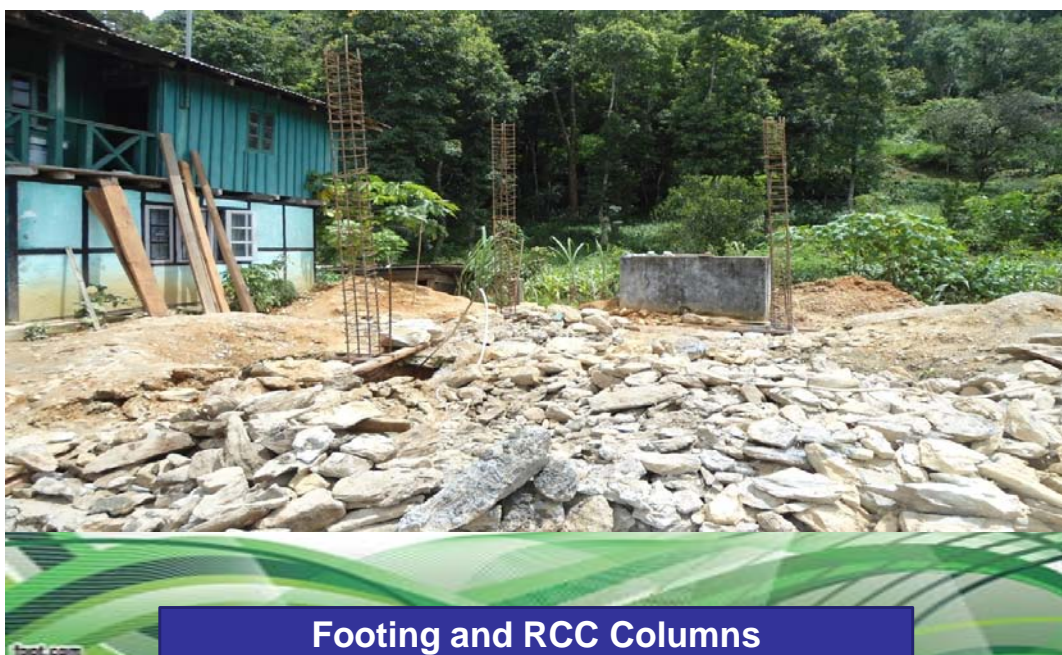
- **Training of technical staff:** The AE/JEs have been trained in the technical aspects of house construction and management of block level stores in various training workshops. Also the “Mason Training Handbook” has been prepared in both English and Nepali to simplify the technical aspects of house construction.
- **Training of accounts staff** to maintain accounts and management of block level stores by the store keepers has also been conducted.
- **Record keeping:** Record keeping at District, Block and Block Level Stores has been simplified by providing pre-printed registers and training has also been conducted

Mason Training Handbook

(English and Nepali)



Houses under construction



Houses under construction



Slab casting of RCC house under process

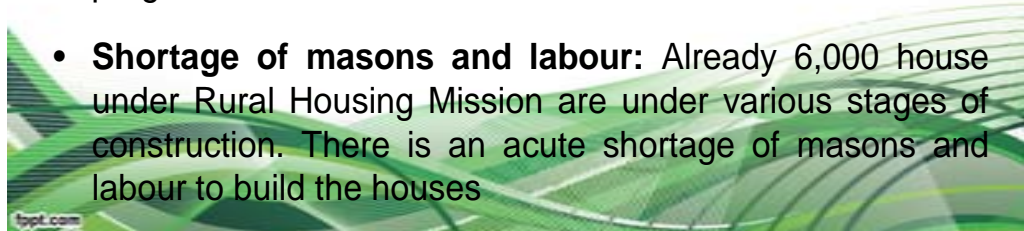
Why progress appears slow?

- **Finalizing the technical house design took time:** Consultation with experts and others
- **Finalizing the strategy for stock material purchase and management** which is transparent and fair. 23 lakh bags of cement and 2 lakh quintals of TMT bars need to be not only purchased transparently, but also provided to 7,972 destinations as per requirement without pilferages
- **Establishment of Block Level Stores for the first time**



Why progress appears slow?

- **Prioritization of beneficiaries:** Prioritization 7,972 of the total 12,548 beneficiaries following a transparent criteria in special gram sabhas
- **Inadequate staff at Block level:** Existing technical staff at the Block level (1AE and 3 JEs) are already constructing 6,000 houses under Rural Housing Mission and implementing flagship programs like MGNREGA, IAY, NRDWP, TSC, BRGF, NSAP and various other state programmes
- **Shortage of masons and labour:** Already 6,000 house under Rural Housing Mission are under various stages of construction. There is an acute shortage of masons and labour to build the houses



Newly established Block Level Stores



Monitoring and evaluation

- State Quality Monitors: 15 senior officers from RM&DD at the State Level have been assigned the task of concurrent monitoring of 2 Blocks each on a monthly basis
- District Level Monitoring: By District Level Committee headed by the District Collector
- Web based MIS: With the support from the Department of IT, Government of Sikkim a web-based MIS has been developed inhouse with a backend database which has modules like beneficiary selection, physical progress, financial progress and e-stores.



6. Demolition of Secretariat building taken up & completed

- ▶ Meanwhile the unsafe damaged structure has been demolished and the debris removed to safe locations.



DAMAGES OF RAW WATER MAINS FOR GANGTOK WATER SUPPLY SYSTEM



RETROFITTING WORKS AT WTP, SELEP



WORK UNDER EXECUTION ON RAW WATER TRACK LINE



WORK UNDER EXECUTION ON RAW WATER TRACK LINE





DAMAGED WATER CONDUCTOR



ROCK SLIDE IN APPROACH ROAD



DAMAGES TO NANDOK VILLAGE DUE TO PIPE BURST



INSPECTION BY THE STATE PLANNING COMMISSION



DAMAGED WATER CONDUCTOR



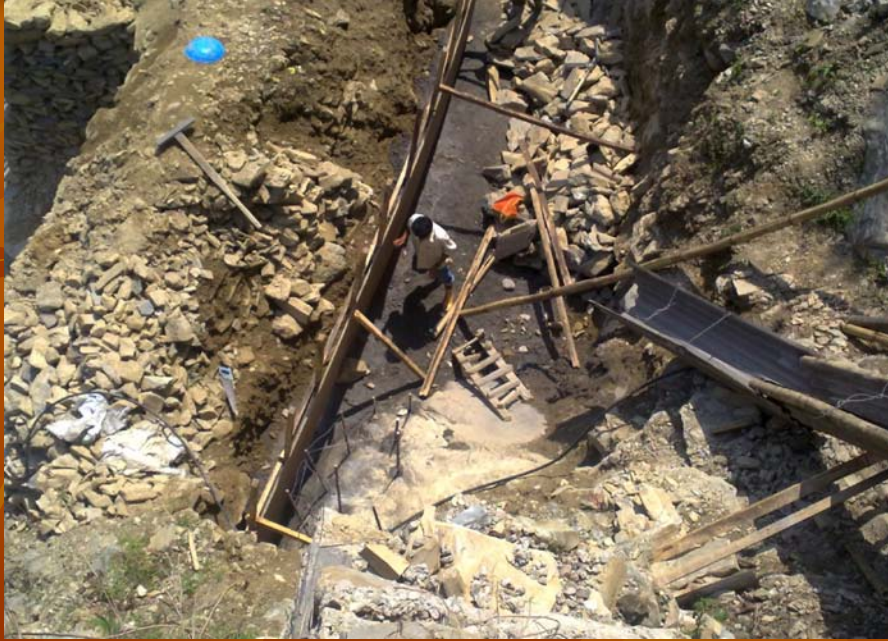
DAMAGED CL-IV QTRS MHEP



DAMAGED HIGH TENSION LINE



PENSTOCK REPAIR AT JALI P. H.



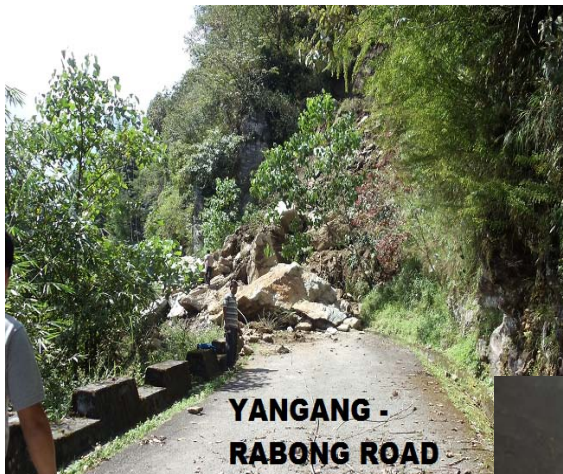
CHANNEL REPAIR AT KHALEZ KHOLA



HIGH TENSION RESTORATION WORKS



RELOCATION OF DISTRIBUTION SUB-STATION



**YANGANG -
RABONG ROAD**

Road blockage by Landslides
caused due to the earthquake



DUGA PACHEYKHANI ROAD



Chunk of land mass
giving way during
earthquake threatening
the bridge structure.

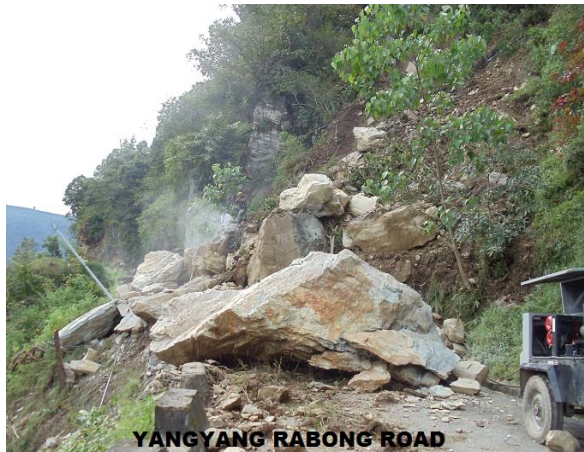
NAYA BAZAR AMAR
BRIDGE

The formation littered
with debris.



The entire slope extending
for nearly a kilometer has
been destabilized thereby
needing diversion.





Slide along Yangang Rabong Road

The old slide zone at Ghorlay Bhir which has become active after the earthquake.



JORETHANG-SOMBARIA ROAD



The damaged wing walls along the approaches.

River training works damaged



KALUK DENTAM ROAD



Road formations
washed out at
several places.

Temporary
restoration works
being taken up
immediately after the
earthquake



Temporary restoration
works being executed
along the damaged
formation.



BRIDGE INVESTIGATION –ASSESSMENT-TESTING WORK IN PROGRESS



Metallurgical Testing & Under
Deck Inv. Under Progress



PHAMRING KHOLA

WEST SIKKIM



SUDDEN ROCK FALL COMBINED
WITH VIBRATION OF ABUTMENT DUE
TO EARTHQUAKE FORCES MADE THE
BRIDGE UNSTABLE AND HENCE
UNSAFE- REQUIRE IMMEDIATE
REHABILITATION WORK

After Earthquake



During restoration



Post restoration



Road restoration works undertaken





POST
EARTHQUAKE

G R B A ROAD



DIVERSION ROAD CONSTRUCTED

THE BRIDGE IS TEMPORARILY SUPPORTED WITH PROPS.
REQUIRES MAJOR INTERVENTION AND REHABILITATION



MAJOR CRACK IN
WING WALL
AND JUNCTION OF
ABUTMENT

GOM KHOLA BRIDGE

**TEMPORARY SUPPORT ON BRIDGE TO
AVOID SUDDEN COLLAPSE**



**TRUSS GIRDER
DEFORMATION**

LIST OF ABBREVIATIONS

ASI	Archaeological Survey of India
BAC	Block Administrative Centre
BIS	Bureau of Indian Standards
BMTPC	Building Materials & Technology Promotion Council
BSDMA	Bihar State Disaster Management Authority
BSF	Border Security Force
BSNL	Bharat Sanchar Nigam Limited
CRF	Calamity Relief Fund
CRPF	Central Reserve Police Force
DPO	District Project Officer
DPR	Detailed Project Report
EOC	Emergency Operation Centre
HIDM	Himalayan Institute of Disaster Management
HRD	Human Resource Development
HLC	High Level Committee
ICDS	Integrated Child Development Service
IEC	Information, Education & Communication
IMCT	Inter-Ministerial Central Team
IMD	India Meteorological Department
IMG	Inter-Ministerial Group
ITBP	Indo-Tibetan Border Police
MHA	Ministry of Home Affairs
MHRVA	Multi Hazard Risk Vulnerability Assessment
MM	Modified Mercalli
NCCF	National Calamity Contingency Fund
NDMA	National Disaster Management Authority
NIDM	National Institute of Disaster Management
NCPDP	National Centre for Peoples' Action in Disaster Preparedness
NDRF	National Disaster Response Force
NDRF	National Disaster Response Fund
NGO	Non-Governmental Organisation
NRDWP	National Rural Drinking Water Programme
NRRC	Nepal Risk Reduction Consortium
PEER	Programme for Enhancement of Emergency Programme
PMO	Prime Minister's Office
PHC	Primary Health Centre
PHED	Public Health Engineering Department
SATH	Save the Hills
SAP	State Armed Police
SATHI	Society for Application of Telemedicine & Healthcare Informatics
SEEDS	Sustainable Environment & Ecological Development Society
SDMA	State Disaster Management Authority
SDRF	State Disaster Relief Fund
SPA	Special Plan Assistance
SSB	Sashastra Seema Bal
SSDMA	Sikkim State Disaster Management Authority
SSDRF	Sikkim State Disaster Response Force

UD & HD	Urban Development & Housing Development
R & B	Roads & Bridges
RPMC	Rural Product Marketing Centre

It is estimated that 50% of the population of developing countries is living in cities and eight out of ten largest cities of the World is in developing countries. Over three quarters of those cities are exposed to at least one natural hazard or the other. Yet, cities are ill-prepared to effectively respond to such events, and the collective effort to reduce risk from disasters continues to be meagre compared to the constant increase in risk caused by urbanization and aging infrastructure. Government of Sikkim would like to assure all of you that the State Government will take all possible steps and efforts in executing its disaster risk reduction plans to make Sikkim safe for all our people.



The State of Sikkim is committed to aggressive Disaster Loss Reduction Policy to build a Safer and Disaster Resilient Sikkim by developing a holistic, proactive, multi-disaster and technology-driven strategy for disaster management through collective efforts of all Government Agencies, Non-Governmental Organizations and our public. The lives and properties in Sikkim will be made safer by the implementation of an effective and long term seismic safety policy.