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INDIA
EARTHQUAKE 8TH OCTOBER 2005
JAMMU AND KASHMIR

PRELIMINARY DAMAGE AND NEEDS ASSESSMENT

PREPARED BY ASIAN DEVELOPMENT BANK, UNITED
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**INDIA: JAMMU AND KASHMIR
EARTHQUAKE 8TH OCTOBER 2005
PRELIMINARY DAMAGE AND NEEDS ASSESSMENT**

Preface

1. This report provides an assessment of damages and needs resulting from the earthquake that struck India on the 8th of October 2005. It provides a preliminary estimate of the total cost of damage, identifies the needs for reconstruction and discusses strategies and guiding principles for the implementation for a programme of reconstruction, the whole based on a need to mitigate future impact of natural disasters through the strengthening of disaster risk management.
2. The report was prepared in response to the Government of India, (Department of Economic Affairs) and was undertaken by the United Nations, World Bank and the Asian Development Bank. A team of experts drawn from the three institutions visited the worst affected areas of Jammu and Kashmir to undertake the assessment.
3. The assessment mission comprised experts and specialists drawn from all relevant disciplines so as to be able to prepare a multi-sectoral report of damage, loss, recovery and reconstruction options, as comprehensive as possible given the very limited amount of time able to conduct field visits.
4. The team was organized jointly by the three institutions, with mission coordinators being Shyamal Sarker (World Bank) and Jan Kellett (United Nations – UNDP). Other members of the team, responsible for analysis, assessment and drafting of sector reports were: United Nations: Abha Mishra, Rajesh Thadani, Anup Karanth (UNDP), Chetana Kohli, Srdjan Stojanovic (UNICEF), Pranay Dutta. (WHO); World Bank: George Tharaken, Toshiaki Keicho, Sudhir Jain; Asian Development Bank: Anil Matwani, H Mukhopadhyay.
5. As part of the process the assessment team met with a wide variety of government representatives, from both general administration and sectoral teams at Tehsil, District, Divisional and State levels. Meetings were also held with NGOs working in both the relief and reconstruction phase. Field visits were made to Uri town and Baramulla town and villages nearby to them (Baramulla district), as well Tangdhar town and nearby villages (Kupwara district). Here members of the team were able to talk to local residents and find out their own views on future reconstruction.
6. The assessment team expresses its appreciation to all authorities for their support and assistance in terms of access to information and availability for discussion. Particular thanks are expressed to the Divisional Commissioner and his team for facilitating logistics and security during our stay in Srinagar and for transportation to the affected areas, as well as to District Commissioners and their teams at a local level for providing information and support during the visits themselves.

7. The findings of the assessment, conducted between December 15th and 22nd are presented in this report. The analysis of the team is based on discussions with all relevant authorities and the limited visits to the worst-affected areas as well as analysis of figures provided by authorities on key pre-earthquake data. Given that not all information is even to date available to the assessment team members, and the limited amount of time present in the affected areas themselves, the figures for damage and needs are to be considered as the best estimate possible.

Guiding Principles of the Needs Assessment

1. The guiding principles for this assessment for this evaluation are to: a) identify the damage and losses incurred; b) show the inter-relationship amongst the effects in the different sectors, and highlighting the cross cutting elements between them; c) wherever appropriate suggest not only a return to existing standards but an improvement to a higher level, across each and every sector; d) ensure vulnerability and those groups most vulnerable are a key part of the assessment; e) provide recommendations for reconstruction.
2. A sector-by-sector analysis of the damage and losses was undertaken, using specifically designed templates to ensure correct gathering of information, consistency of information gathered and avoiding duplication. However it should be understood that due to the short time available in the field and the lack of data – both pre-earthquake and post-earthquake – available to the assessment team, has increased beyond usual the need to use estimations of scale in both damage and recommendations.
3. Sectoral teams were organized with members from the three institutions (Asian Development Bank, United Nations, World Bank) with the appropriate mix of sectoral expertise (disaster risk management, social impact, livelihoods, environment, fiscal impact, health, education, public buildings, urban and rural infrastructure, shelter, transportation). Visits were undertaken to the two worst-affected districts within Kashmir, to Uri and Baramulla towns and to several surrounding villages, as well as to Tangdhar and several of its surrounding villages. Meetings were held with the Chief Secretary, department principle secretaries and their divisional heads, as well as the Commissioners of both Kashmir and Jammu divisions. Very valuable cooperation was also extended to the teams during their visits by the district commissioners, relief commissioners and other administration officials working at a local level.

THE EXECUTIVE SUMMARY

INTRODUCTION

At the request of the Government of India, the United Nations, World Bank and Asian Development Bank undertook an assessment of the impact of the October 8, 2005 earthquake on the affected areas of Jammu and Kashmir. The mission, which comprised in total thirteen experts working across twelve sectors, was conducted the mission over an eight days in Jammu and Kashmir, with several days in Srinagar with Divisional authorities, three days in the worst-affected areas of the Kashmir and several days for meeting State officials in Jammu.

It should be noted therefore that much of the estimation of figures is based in part on existing pre-earthquake data for each sector as well as damage reports and assessments from various levels of government but at times this data was very difficult to obtain leaving some gaps in understanding both the pre and post earthquake situation.

DAMAGES, LOSSES

Based on these field visits, discussions with members of the community and meetings with non-governmental organisations and local experts, and consultations with government officials of all levels, the assessment team has made an analysis of the situation in terms of the impact of the earthquake in terms of damage and loss, which in turn lead to an estimation of the needs for each sector in the reconstruction phase.

Damage to Infrastructure/Buildings: The affect on infrastructure has been devastating with key roads, bridges, schools, hospitals, clinics destroyed or damaged, often beyond repair. For example over 600 kilometres of roads of varying levels has been damaged in the earthquake, over one thousand school buildings have been destroyed or suffered damage, whilst in the health sector 26 buildings have been completely destroyed and 77 will need substantial repairs.

Damage to Lives: Whilst there have thankfully been relatively few casualties compared to similar earthquakes in India – just over 1,000 killed and 6,000 wounded – it is clear the impact of the earthquake has been extensive on these communities, whom were already made vulnerable by geographic isolation and the political/security situation. Nearly 30,000 families have been left without permanent shelter but the number of families affected deeply by the earthquake number in several hundreds of thousands; education and health facilities have been destroyed, basic services disrupted, the minimal range of livelihoods in jeopardy. Now more than ever the communities are more dependent on government aid and to a lesser extent the NGO community.

Relief Operation and Current Situation: In general government response to the earthquake appears to have been very good after the first few days of confusion. Roads were opened, the injured evacuated and basic services to some extent restored, much of this work being done by the armed forces present in the region.

NEEDS

The table below reflects the needs across all sectors for the whole of the reconstruction phase.

Table: Overview of Needs by Sector

Sector	Needs (Rs. Million)	Needs (US\$ Million)	Percent of total Needs
HUMAN DEVELOPMENT			
Social Impact	46.1	1.0	0.3
Environment	90.0	2.0	0.6
Livelihoods	680.0	15.2	4.2
Health	557.5	12.5	3.5
Education	831.0	18.6	5.2
Sub-Total	2,204.6	49.3	13.7
HOUSING & INFRASTRUCTURE			
Private Housing	7,328.0	162.9	45.5
Roads & Bridges- State	416.0	9.3	2.6
Roads & Bridges- Border Roads	3,107.0	69.4	19.4
Municipal and Rural Infrastructure: General	1,163.0	26.0	7.3
Municipal and Rural Infrastructure: Energy and Power	385.0	8.6	2.4
Public Buildings and Historic Monuments	576.0	12.9	3.6
Sub-Total	12,975.0	289.1	80.7
DISASTER MANAGEMENT			
Sub-Total	895.6	20.0	5.6
Grand Total	16,075.2	358.4	100.0

The overall estimation of reconstruction costs are calculated to be \$358.4 million representing funds needed for the reconstruction period of three years.

The assessment mission does not supersede or disregard the ongoing efforts of government in assessing the damage sustained and reconstruction needs in Jammu and Kashmir. Rather it presents a consolidated view on the basis of all relevant information received and the expertise of the multi-institutional and interdisciplinary team.

Certain observation on the needs have become apparent during the assessment:

- **State Priorities:** Although government officials have voiced support for a wide range of investment in Jammu and Kashmir following the earthquake, priority

sectors for state authorities are the road and transport infrastructure, then health and education sectors and finally Disaster Risk Management.

- Reconstruction/Relief Connections: The recommended needs are for reconstruction purposes and not for relief but across each sector connections have been naturally made from the relief picture and continuing relief provision to the reconstruction recommendations
- Integrated Software/Hardware Approach: It is to be noted that the estimated costs of needs in some sectors includes both construction/reconstruction funds as well as supporting software, and these sectors include education, health, social impact, housing. It is important that the Government gives due attention to these supporting cost requirements, which, whilst much less in terms of dollar amount, add extensive value to the money spent on reconstruction.
- Disaster Risk Mainstreaming: It is important that all reconstruction work undertaken is viewed through the prism of future Disaster Risk, and that this risk is understood not just in terms of earthquakes but also the other natural events that affect Jammu and Kashmir regularly, such as flooding, severe snowfall, landslides, etc. Such risk mitigating reconstruction process can reduce vulnerability in the long term, increase resilience to specific local multi-hazards, and should be inserted into the whole of the state's reconstruction package.
- Building Back Better: In each sector the assessment of reconstruction needs has been conducted with a view to not only construct to previous levels but to take advantage and build back to a better level, upgrading both services and infrastructure to reduce previous inherent vulnerability and building development opportunities and promoting diversity.

It is important that building back better is not just thought of as an infrastructure issue but should be interpreted in the broadest sense so that the social and economic fabric of the region are rebuilt stronger and better. (It is at the same time important that build back better does not necessarily mean replacing everything that previously stood, and that the cultural heritage of the state is protected.)

- Diversification of Livelihoods: The earthquake has had relatively moderate impact on livelihoods in the affected region, with the population mostly sustained through agro-pastoral activities, and supplemented in poorer families by government/military paid manual labour. However it is clear that the area is depressed in terms of employment and economic activity, even before the earthquake. One key aspect of future development the government is recommended to pursue is diversification in livelihoods.
- Vulnerable Families and Reconstruction: A recommendation across many sectors is that those communities and families that have been made particularly vulnerable by the earthquake, through the death of key earner, injury to family members, village isolation from centres of reconstruction etc, be made a key part of reconstruction, with their special requirements integrated into all relevant work.

The figures assessed as needed in the reconstruction phase are recommendations for the Government of India. In some cases the government has already invested heavily in reconstruction, such as shelter.

Furthermore the needs identified by the international institutions are those recommended for government to consider for financing and do not suggest a commitment for funding from the institutions themselves.

The assessment analysis highlights the cross-cutting nature of the disaster's impact and thus the multi-sectoral, inter-institutional and multidisciplinary approach needed for the reconstruction process. The disaster points out the need to undertake cross-cutting interventions, with a participatory, equitable, flexible, decentralised, and transparent approach beyond livelihood restoration.

8TH OCTOBER EARTHQUAKE: IMPACT AND AFTERMATH

1. The Earthquake's Characteristics:

With an epicenter 19 kilometres North-East of Muzaffarabad, an earthquake measuring 7.6 on the Richter scale struck northern areas of Pakistan and India on 8th October 2005 at 9.20 in the morning. Its focal depth was 26 kilometres, and occurred in the known subduction zone of active thrust where the India subcontinent tectonic plate collides with the Eurasian plate, the collision which causes the uplift that has produced some of the highest mountain peaks in the world, including the Karakoram, Pamir, Hindu Kush and Himalayan ranges.

In intensity it was similar to the 1935 Quetta earthquake and the 2001 one that struck Gujarat, causing widespread damage and destruction in the state of Jammu and Kashmir, especially the districts of Baramulla, Kupwara (Kashmir Division), and Punch (Jammu Division). The earthquake also affected some parts of Punjab and Himachal Pradesh and its impact was felt in most parts of Northern India.

Following the main earthquake over 50 aftershocks of magnitude greater than 5 on the Richter scale have been felt in the affected area.

2. Overview of the Earthquake's Impact:

According to the most recent of government figures the earthquake killed 1216 people in Jammu in Kashmir with another 6240 reported injured. There has been however substantial damage to the infrastructure, basic services and the economic and social life of the population. Landslides and fissures have destroyed and badly damaged roads, well over 1,000 government buildings (health, education, administrative) have been affected, many completely lost along with their contents. (The most serious parts of the state have been the tehsils of Uri (Baramulla district) and Tangdhar (Kupwara district).

The greatest impact on human life has been in the destruction of homes; assessments put damage to buildings as high as 90% in some of the worst hit parts of affected districts, which are uniformly right next to the Line of Control between Pakistan and India and the epicentre beyond. Nearly thirty thousand families have thus been left without liveable permanent shelter whilst another 83,000 families have suffered significant damage that will need repair and the government estimates that over 570,000 residents of Jammu and Kashmir have been seriously affected by the earthquake.

The Relief Effort:

3. Government:

According to available reports it appears that although government authorities were at first caught unaware when the earthquake struck, the general response to the disaster was good. Emergency control rooms were opened up in Baramulla, Uri and Srinagar as focal points of administrative and security forces relief efforts. Though hampered in part by a lack of equipment, an efficient communication system, authorities were able to quickly restore basic supplies, clear key roads etc, much of this early work undertaken by the armed forces, who also played a key role in search and rescue and the evacuating of casualties with helicopters (320 individual sorties),

many roads having been blocked, thus saving life in many cases. The Crisis Management Committee with the Chief Minister as the chairperson at the State level with the Financial Commissioner (Revenue), Department of Revenue immediately placed relief commissioners in the worst affected areas.

The Ministry of Home Affairs operated a control room twenty-four hours a day following the disaster and an inter-ministerial team sent to the state by the 11th of October to assess damage and needs of the State Government.

Further relief efforts in J&K have naturally been focused on the three worst-hit districts of the state, i.e. Baramulla, Kupwara and Poonch. As well as food and non-food-items the government has also focused on provision of temporary shelter and the re-establishment of many basic services.

Shelter: The government at first made the decision to provide funds for permanent shelter to each and every family (100,000 Rs) with a home destroyed as well as those suffering substantial damage (30,000 Rs); of this 40,000 Rs for those suffering complete destruction to their home has already been granted in many cases. However as it was seen that permanent shelter construction would not be completed before winter arrived the government supplemented this decision with one to provide 30,000 to every family without liveable home to construct themselves a temporary shelter until permanent construction could begin. One positive outcome of the temporary shelter construction policy of the government is that, although in general expensive, the fact that families remain on or close to their own land, affects both their own lives less, and impacts less on the provision of basic services to the population.

The government provision of community shelters in the nearly 104 of the worst-affected villages has been largely unused by the population, although they may indeed be useful for education, health and other community purposes in the foreseeable future.

Health: In spite of lack of experience in disaster management, the immediate response and management by the State health machinery was well appreciated. The Army played a crucial role in the evacuation, and management of the earthquake victims. Relief Medical camps and mobile dispensaries were established which help to restore outreach services. Disease surveillance was intensified to prevent any outbreak of communicable diseases whilst injury surveillance was undertaken in collaboration with WHO. A Measles immunization and Vitamin 'A' supplementation dose was given to the children of affected area.

However routine primary health care remains disrupted and women and children are specifically at risk due to their special health needs.

Basic Services: The government is to be commended for what appears a quick and efficient response to the provision of basic services to the population. Where they existed before water supply and electricity have been restored to a reasonable level. Health services meanwhile, though suffering greatly due to lost buildings and equipment, have been re-established in some form across the worst-affected districts. The education system, in terms of buildings the worst hit of government infrastructure, has been largely reactivated through use of temporary buildings across the area, (although Anganwadi centres have not reopened in many cases, partly because in many cases these were parts of residential structures now destroyed.)

General Overview: Although limited by time, access and location limitations the assessment team has found no great proof of urgent relief not being met in the earthquake hit areas. It appears that there is food, temporary shelter and basic services for those that need them but some care will need to be taken that those made more vulnerable by the earthquake (the poor, single-parent families, those in remote communities) receive some priority attention as relief turns to reconstruction.¹

4. NGO and Civil Society:

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5. The United Nations:

Following the earthquake UNICEF was active in the provision of specialist supplies to the authorities to protect the lives of citizens and re-establish the education systems, a key part to recover. After providing high-energy protein biscuits to vulnerable groups, it presented to the government authorities over a 1000 water tanks and water-testing kits, tents and supplies for over 200 destroyed Anganwadi centres, as well 500 additional tents and 250 school-in-a-box kits for destroyed primary schools.

In collaboration the World Health Organisation and UNICEF provided emergency vaccines of Vitamin A/Measles to Jammu and Kashmir authorities whilst the World Health Organisation also dispatched two tons of emergency surgical kits to health authorities. WHO conducted a rapid needs assessment for the health sector in the first weeks of the earthquake which has helped guide government health relief efforts.²

UNDP extended technical support to the state government by deploying specialized disaster management staff to assist the state government in its efforts in the collection, compilation and dissemination of information on earthquake damage and on the distribution of relief materials and emergency reconstruction activities. The National Seismic Advisor appointed by UNDP under the GOI-UNDP Disaster Risk Management programme visited the affected areas to assess damages to buildings and subsequently, in collaboration with state departments, developed earthquake resistant designs for reconstruction of houses, and trained Government civil engineers prior to their posting to villages to guide residents in the construction of temporary shelters.

6. Bilateral Agencies:

Early commitments of the bilateral agencies to the relief operation were relatively small compared to other disasters. Contributions have been made to the Prime Minister's National Relief Fund by USAID, and to the Indian Red Cross Society by Chinese Government. Canadian International Development Agency (CIDA) financed partly the relief activities supported by the International Committee of the Red Cross (ICRC), Save the Children, Agha Khan Foundation; and USAID supported funding to the some of the relief organizations for emergency relief and supplies.

¹ See Social Impact sector for details of vulnerable groups.

² See www.whoindia.org for a copy of this report

PRELIMINARY DAMAGE AND NEEDS ASSESSMENT

This section provides a preliminary estimate of the damage and losses, and reconstruction needs, by evaluating the social, environmental and economic impact of the disaster and summarising the losses for each of the sectors: in human development (social impact, environment, livelihoods, health, education), in housing and infrastructure (roads and bridges, municipal and rural infrastructure, public buildings, housing) and disaster risk management. The damage figures here presented reflect the information available to the members of the assessment team, both pre-earthquake and post-earthquake data, and the very few days in the worst affected areas.

Summary

Damages and Losses

Overall damages are estimated to be \$---- million (*to be completed*) and losses are estimated to be \$---- million (*to be completed*). Whilst the largest proportion of the damages are concentrated in housing and roads, material private asset damages to a limited extent are related to livelihoods. Losses related to livelihoods are of particular significance, even though it is small, because it accentuates the already existing vulnerability to poverty among the people living along the geographically isolated area which is further aggravated by the prolonged period of political/military insecurity.

Table 1: Preliminary Summary of Damage and Losses (\$ million)

Sector	Damage and losses		
	Damage	Losses	Total
Human Development			
Social Development	n/a	n/a	n/a
Environment	n/a	n/a	n/a
Livelihoods	4.02	2.45	6.47
Health			
Education	15.34	n/a	15.34
Sub-Total			
Housing and Infrastructure			
Private Housing			
Roads - State	8.2	2.2	10.4
Roads - Border Roads	47.7	included above	47.7
Municipal and Rural Infrastructure	23.4		23.4
Public Buildings and Historic Monuments	7.2		7.2
Sub-Total			
Relief provided by local, state and central governments		n/a	
Grand Total			

Short and Medium Term Needs

Overall needs are estimated to be approximately \$----- million for the short term, (within one year) and approximately \$--- million for the medium term (up to 3 years) as indicated in Table 2 below. It does not include longer term reconstruction needs which are significant in areas such as roads communication. However, it includes disaster risk management as an additional item so as to reduce the impact of a natural disaster on the people, governments and enable the state to be in readiness to face future challenges.

Table 2: Preliminary Post-Earthquake Reconstruction Needs (\$ million)

Sector	Reconstruction needs		
	Short-term reconstruction	Medium term reconstruction	Total
Human Development			
Social Development			1.0
Environment			2.0
Livelihoods			15.2
Health			12.5
Education			18.6
Sub-Total			49.3
Housing and Infrastructure			
Private Housing			162.9
Roads - State	9.3	0.0	9.3
Roads - Border Roads	4.4	65.0	69.4
Municipal and Rural Infrastructure	12.4	22.2	34.6
Public Buildings and Historic Monuments	4.3	8.6	12.9
Sub-Total			289.1
Disaster Management			
Disaster risk management			20.0
Sub-Total			20.0
Grand Total			358.4

Fiscal Impact of Earthquake Reconstruction

1. GoJK's base line (scenario without earthquake related impact) medium term fiscal projections show that the revenue surplus to Gross State Domestic Product (GSDP) ratio will come down to 8.07% in FY 2005 to 6.43% in FY 2008. However, the fiscal deficit to GSDP ratio will hover around more than 4% leading to a closing debt stock figure of 58.46% of GSDP in FY 2008.

Table 1: Base Line Fiscal Parameters (Percentage of GSDP)

	2003-04 (Actual)	2004-05 (RE)	2005-06 (BE)	2006-07 (Proj.)	2007-08 (Proj.)	2008-09 (Proj.)
I. Total Revenue	41.22	43.77	43.98	43.28	43.42	43.56
II. Total non-Interest	32.68	31.43	30.71	32.26	32.26	32.26

Current Expenditure						
III. Interest Expenditure	6.25	5.27	5.20	5.21	5.05	4.87
IV. Revenue Surplus	2.28	7.07	8.07	5.81	6.11	6.43
V. Capital Outlay	9.76	11.59	13.53	10.72	10.72	10.72
VI. Fiscal Deficit	7.46	4.52	5.47	4.91	4.60	4.29
VII. Debt Stock	69.40	66.49	64.83	62.79	60.67	58.46
VIII. Memo: GSDP(Rs. Million)	199,000	223,000	250,000	280,000	313,000	351,000

Note: 1. GSDP figure for FY 2001 (Rs. 15881 crore) was obtained from the Central Statistical Organization website. Thereafter, a 12% nominal growth rate is assumed.

2. Own non tax revenue, central transfer, total non-interest current expenditure, and capital outlay are projected for FY 2006 and FY 2007 using past four years average share in GSDP (FY 2002 to FY 2005). Own tax revenue is projected assuming a buoyancy of 1.2 as suggested by the Twelfth Finance Commission.

3. Interest in any period is estimated as $I_t = r * D_{t-1}$. Where r is the average effective rate of interest and D_{t-1} is the closing debt stock in period $t-1$.

4. Closing debt stock in period t is $D_t = D_{t-1} + F_t$. F_t is the fiscal deficit in period t .

2. This scenario changes discernibly if the impact of the earthquake is factored in. Assuming that GoJK spends around Rs. 13,588 Million over FY 2005 to FY 2008 for rehabilitation and reconstruction activities, additional fiscal burden attributable to earthquake can be estimated by the incremental fiscal deficit that emerges as a percentage of GSDP.

3. Incremental fiscal deficit in any year will lead to higher closing debt stock in that year. Higher closing debt stock, in turn, will lead to higher interest payment in the next year and that leads to higher fiscal deficit and further addition to debt stock. This debt-deficit dynamics will cause a contemporaneous impact of earthquake on state's finances as well as a dynamic impact on state's finances, which will disappear after some years depending on the magnitude of initial fiscal impulse.

4. Thus, from the simulation below, a comparison of the fiscal deficit to GSDP ratio between the base line scenario and a plausible alternative scenario suggests a stream of fiscal burden arising out of additional expenditure of Rs. 13,588 Million.³ Thus, it may be noted that the fiscal burden in (say) FY 2006 is the total effect of direct expenditure of 1.5% of GSDP in FY 2006 as well as additional interest burden due to higher fiscal deficit and the consequent higher closing debt stock in FY 2005 attributable to direct expenditure of 1.6% of GSDP in FY 2005. These results are summarized in Table 2.

Table 2: Fiscal Cost of Earthquake Expenditure (Percentage of GSDP)

	2005-06	2006-07	2007-08	2008-09
Base Line Fiscal Deficit	5.47	4.91	4.60	4.29
Counterfactual Fiscal Deficit for Additional Earthquake Expenditure	7.07	6.54	5.71	5.36
Baseline Debt Stock	64.83	62.79	60.67	58.46
Counterfactual Debt Stock for Additional Earthquake Expenditure	66.43	65.85	64.51	62.96
Memo: Earthquake Expenditure (Rs. Million and Percentage of GSDP)	4,000 (1.60)	4,214 (1.50)	2,704 (0.86)	2,670 (0.76)

³ The simulation has not been carried forward beyond 2008-09.

5. Thus, it can be seen from table 2 that the impact of earthquake rehabilitation and reconstruction expenditure on GoJK's finances is quite substantial (-)1.60% of GSDP in 2005-06, (-)1.50% of GSDP in 2006-07, (-)0.86% of GSDP in 2007-08 and (-)0.76% of GSDP in 2008-09. Moreover, as explained above, the adverse impact on GoJK's finances will persist beyond the terminal year of reconstruction, i.e., 2008-09.

Social Impact

Pre-Existing Vulnerability of Affected Communities: The majority of the most-affected people live along the LoC; many of them are poor, geographically isolated, and have lived under prolonged stress of insecurity due to the security/political situation.

The Earthquake's Toll: The earthquake has devastated communities in the three most affected districts of J&K, with death and injury, this devastation of family networks compounded by destruction and damage to homes, loss of livelihoods, interference in basic utilities and damage to local health and education systems.

Other than immediate devastation and suffering, there will be also long-term consequences for those families who have experienced major losses, such as death or disability of a family member, which included widows and orphans. The elderly and disabled, already vulnerable, will face more difficulties to cope with life. The earthquake has most adversely affected the lives and livelihoods of those who suffered family losses or incurable injuries, but also those who were already poor and marginalised, for those who have least capacity to rehabilitate their families. The vulnerabilities of those people require specific programmes to address their plight.

Reconstruction Needs: Special attention needs to be paid to the permanent shelter, restoration and diversification of livelihoods, social security and legal requirements of particularly vulnerable groups, such as orphans, widows and single-headed families, the disabled and elderly without immediate family support, besides socially marginalised groups such as scheduled castes. A key need is the design and implementation of special programmes to meet the needs of these especially vulnerable groups, in essence to reduce present and future vulnerability.

Community Participation. As a key part of vulnerability identification and reduction local communities will need to be actively involved in planning, decision-making and implementation in reconstruction is to be successful and programmes sustainable. It will also be essential to set up a fair and accessible grievance redress system. The government should establish, promote, encourage and sustain such processes in collaboration with the communities and NGOs.

Livelihoods

The areas affected by the earthquake of October 8th are rural or semi-urban, and the majority of people are agro-pastoralists subsisting on small landholdings and a few animals. Wage labour is an important contributor to incomes. Among horticultural activities, walnut provides important cash supplements. In the semi-urban market towns, shopkeepers are common.

The impact of the earthquake has not in general been severe, though in pockets there is significant damage. Cattle mortality ranges from 1-5% in the affected areas. However, due to the collapse of cattle shelters, the ability to keep animals has been lowered. While a small amount of agricultural land has been affected by

landslide debris, more important is the damage to about 33km of irrigation canals which will adversely impact crop production until repaired. The importance of wage labour is likely to grow during the reconstruction phase at the cost of traditional agro-pastoral activities.

There is a need to develop new livelihood opportunities. In warmer areas, well connected to the Kashmir valley - such as the Uri belt - poultry and vegetable cultivation can increase income. A change in focus of sheep rearing from wool to mutton also has potential to increase revenues. Agricultural diversification and the introduction of horticultural activities are desirable in select areas. Vocational training, and training of craftspeople's can be piloted in remote areas if comprehensive packages can be designed. Improving linkages to markets is important. Vulnerable groups such as widows and people in villages to be relocated need the most attention.

Environment

Environmental degradation is a serious problem affecting the earthquake impacted areas. Forest quality is poor in the vicinity of settlements and management regimes are weak. Fodder shortages create severe hardships for pastoralists. Sanitation practices are limited. Clean drinking water is not universally available. The earthquake has somewhat exacerbated the environmental problems. Debris generated by landslides and fissures in hillsides are a pressing problem.

While there is a need to repair and rejuvenate ecosystems, equally important is the attention required for the immediate environment. Eco-friendly characteristics can be built into the design of new homes through energy efficient heating devices and the incorporation of features that promote better sanitation habits.

The participation of local people in managing their natural resources is the most sustainable way to promote better care of the environment. Pasture development programmes that aid livelihoods and reduce stress on the natural forest ecosystems should be prioritised. Slope stabilisation and watershed programmes should be priority areas for funding.

Health

Although the death and injury figures were relatively low when compared to other major earthquakes that have affected India the health sector itself has suffered greatly. It was to an extent already at a lower condition when compared to other Indian states, in terms of building quality, medical equipment, staff training, staff numbers, and the earthquake has widened the gap considerably.

Some key recommendations for the sector are thus as follows, the emphasis on building back all aspects of the sector to a better level:

- The urgent reconstruction of all health facilities at an improved level, (with better water-supply and heating).
- The replacement of key medical equipment and transportation and provision of mobile tele-medicine units
- The provision of specialist health and support facilities: injury rehabilitation centres, communications, disease surveillance, biomedical waste.

- The urgent training and capacity building in specialised health post-disaster management.
- The provision of special staff to support the state through the period of reconstruction, (gynaecologists, orthopaedic surgeons etc.
- The services for maternal care, emergency obstetric care, Family planning services and essential newborn care need more attention.

Education

Overview: The earthquake destroyed or badly damaged nearly 900 schools in the Srinagar division of Kashmir. For example 439 primary schools in Baramulla, and 225 in Kupwara, (the two worst hit districts) were completely destroyed. Meanwhile in Poonch district of Jammu division nearly 190 schools suffered destruction or major destruction.

Since schools were not operational when the earthquake struck, very few students were killed or disabled; many students were, however, injured as a result of the disaster in their homes and all have had their school books, materials, and clothes completely destroyed. But, to begin with, the educational status in both districts, Kupwara and Baramulla, is a cause of concern with at least 12% to 14% of children out of school in each district respectively⁴.

Recommendations: The interventions for the recovery and reconstruction of the educational system should be strategic in using this opportunity to "build back better" – to impact the educational infrastructure and systemic capacity in such a way that educational indicators for Kashmir improve from pre-earthquake conditions (which were low to begin with) with the creation of "child friendly schools".

Interventions should therefore include improved design and reconstruction of the damaged and destroyed schools (e.g. toilets for girls, water supply, inputs for *BALA-Building as Learning Aids*, etc.). Amongst other things the government should provide essential school supplies, classroom furniture, and setting up of school libraries. Also, technical support for development and production of localized teaching learning materials needs to be provided. Further, it is critical that teachers are equipped with skills to teach effectively (training in multi-grade multi-level teaching techniques, training through distance education, radio, etc.) and help children recover from the trauma left by the earthquake. Special emphasis needs to be given to empower adolescent girls who are most vulnerable in these times to exploitation by providing them life skills education and vocational training.

Housing

The earthquake had a severe impact on the housing stock. The collapse of the structures are associated with absence of earthquake resistant building technique, poor knowledge of hazard resistant construction, poor quality of building materials and weak institutional mechanism in the housing and construction sector. According to the preliminary estimates nearly 30,000 houses completely damaged and over 83,000 partially damaged. Additional impacts include social costs and assets losses.

⁴ Source: Sarva Shiksha Abhiyan, Annual Plan and District Aggregation, Jammu & Kashmir, 2004-2005 as reported in "An Assessment of Education in Jammu & Kashmir" published by Save the Children in April 2005.

It is estimated that the cost of reconstruction, repair and strengthening the private buildings to acceptable seismic standards would require Rs. 7.28 billion /\$162 million (the reconstruction cost excludes the replacement of assets). The immediate step required in the context of widespread damage to housing includes:

- The drawing up of appropriate policy guidelines and standards for reconstruction of housing before the start of permanent house construction under the owner driven model;
- The addressing and overcoming the immediate concerns such as discrepancies in damage assessment of the private buildings; issue of number of Chulhas; relocation of severely affected villages; technology transfer of multi-hazard resistant construction to various stakeholders; training and capacity building of various stakeholders to facilitate owner-driven construction; availability and fair wage of labour and shelter/settlements buildings located in heavy snowfall/avalanche prone areas. The government of Jammu and Kashmir have to undertake a detailed damage assessment of the housing sector in a technical and participatory manner to ensure transparency and ownership;
- The development of a framework and institutional mechanism for technical guidance and monitoring of physical construction of houses
- The adoption of region specific building technology in the reconstruction programme.

For this massive effort of technology transfer and rebuilding to higher standards, adequate institutional mechanism and monitoring arrangements will be required throughout the reconstruction programme. Supporting actors should be encouraged to collaborate with the entire reconstruction efforts as the efforts shall also cut across other sectors, especially livelihood recovery. The key to success in reconstruction lies in the participation of the local community and it is also important to draw upon accountability in the process.

Disaster Risk Management

Jammu and Kashmir was already in general an economically and socially isolated state, predominantly dependent on agriculture, with low degree of urbanization, inadequately developed infrastructure, widespread illiteracy, high birth rates and low levels of investment enhances the vulnerability of the community and economy from natural hazards. The state also has a long history of natural hazards like floods, drought, fires, earthquakes, high velocity winds and landslides besides the ongoing security/political issues. Earthquakes reoccur frequently in the state, flash floods hit the Kashmir valley, high velocity windstorms occur in Ladakh and the Kashmir Valley whilst landslides and avalanches are a widespread phenomenon in the hilly and mountainous areas.

Immediate Needs: Key requirements are the provision of risk reduction policies for the various sectors especially in respect to shelter and infrastructure, the improvement and strengthening of institutional mechanisms at all levels, create awareness amongst the affected community about the ongoing recovery activities besides making them aware about the risk reduction techniques and improving co-ordination amongst the various agencies.

Strategy: The strategy should be based on the following parameters: (i) government adopts an integrated approach for recovery and reconstruction process to ensure that risk is not rebuild and focus is on improving pre-disaster scenario (ii) An

institutional mechanism is established for disaster risk reduction programmes which focuses on planning and capacity building to enhance emergency response and disaster management for reducing risks through community & civil society participation. (iii) Appropriate legislation and infrastructure is set up to mainstreaming disaster risk in development planning and (iv) Appropriate coordination mechanism to ensure participatory and consultative approach to look different aspects of disaster management starting with immediate need of rehabilitation and recovery planning to ensure reducing future risk.

In the immediate and the medium term needs it is important to focus on key programmatic interventions: (i) support to institutional and legislative system with respect Multi-Hazard Risk Assessment and Plan for the state, Building bylaws, Sectoral guidelines for effective response and recovery (ii) capacity building programmes for all stake holders with a multi-hazard approach (iii) Assessment and Planning of Disaster Risk at all the levels with sustainable approach- DRM Committee and Teams at the village level.

For the long term it is important to strengthen the existing institutional and legislative system develop State DM Road Map, Policy, Act, appropriate techno legal regime for safe built environment, revisit the current provisions for the most vulnerable section of the community taking risk reduction approach and focus on capacity development at all levels.

Roads and Bridges

Earthquake damage to the roads in the area was primarily caused by (i) major landslides causing the loss of an entire section of the mountain slope and the road traversing it, or depositing a large amount of debris on the road where the mountainside is unstable; (ii) longitudinal deep fissures in the road itself; (iii) sinking of roads; (iv) damage and/or distress to bridges, culverts, retaining walls, breast walls, parapet walls, toe walls and crash barriers; (v) changes in hydrology at a few places affecting the drainage of the road section; (vi) unstable mountain slopes that may potentially become landslides, and (vii) damage caused by heavy equipment used to clear debris.

PWD and BRO have produced cost estimates of the works needed to restore and upgrade the road network. Many of the upgrading works proposed were already planned or have been partially implemented prior to the earthquake. In other cases, e.g. under-designed bridges, it would not be efficient to restore the facility to its original under-designed condition. Consequently, much of the upgrading proposed is a necessary complement to the restoration effort.

Public Works Department Roads: The Kashmir region suffered the largest damage in the earthquake, and the PWD provided the mission a list of about 30 roads affected. The Jammu region suffered fewer road damages, mostly in the Poonch District. The total rehabilitation cost for these PWD roads is estimated to be about Rs 722 million.

Border Roads Organization Roads: BRO has listed some 10 roads and four bridges that require major restoration/upgrading works. The road section that suffered most damage is the Uri-Salamabad-Kaman Post road (length 17.25 km), and while the road is now passable, permanent rehabilitation works are still to be carried out. Another important cross border link affected is the Chowkibal-Tangdhar-Chamkot-Sikh Bridge - Tithwal road (length 66.67 km). Among the bridges affected, the most important is Akhnoor Bridge on the Chenab River, and presently the bridge is operating with weight restrictions (9 tons). This bridge requires replacement and

upgrading to two lane 70 R (tons) standard to meet the requirements of the Indian Roads Congress. In addition, an alternate bridge location has been developed upstream from the Akhnoor Bridge and the bridge approaches and some piers had been constructed. (Completion of this alternate bridge will make the Akhnoor Bridge redundant.) Two other bridges damaged, the Red Bridge and Twin Bridge, on the river Jhellum are part of the Uri-Khaman Post itinerary, will also require upgrading to 70 R standards. The overall needs estimate for BRO roads and bridges are Rs. 3163 million.

The recommended reconstruction strategy for the road sector is a three phase approach: short-term measures which can be implemented within a year, medium-term measures which could take up to three years, and longer term measures. The expenditure estimates for short-term, medium-term and long-term measures are Rs. 613 million, Rs 2910 million and Rs 361 million, respectively.

Municipal and Rural Infrastructure

The earthquake significantly affected the infrastructure sector both in urban and rural areas. But the more severe damage was concentrated in rural areas of Baramulla and Kupwara Districts (Kashmir Division) and Poonch District (Jammu Division). Damage was reported for such infrastructure systems as water supply and sanitation, electricity, and drainage, but water supply was most affected. In Kashmir Division, for example, 336 rural water schemes and 9 urban water schemes suffered various damages while in Jammu Division 169 rural water schemes and 16 urban water schemes were affected. Electricity distribution was also disrupted by the earthquake. A total of 289 sub-stations and four receiving stations were damaged in Kashmir Division, and 41 sub-stations and five receiving stations were damaged in Jammu Division. The estimated total cost of the damage in municipal and rural infrastructure sector is Rs. 1,047 million, including Rs. 454 million for water supply and Rs. 350 million for power.

Following the earthquake disaster, GoJK has restored many damaged infrastructure systems with emergency repairs. In the worst-hit areas, for example, water supply has been restored in 98% of the damaged schemes in Uri area while 45% of the damaged water schemes have been restored in Tangdar area. Most of these repairs are, however, of a temporary nature, and GoJK is now facing the significant challenge of permanent reconstruction.

Short term measures for recovery and reconstruction should focus on: (i) continuation of emergency repairs for critical infrastructure systems, (in case of water supply, this should be supplemented by hand-pumps construction and tanker services); (ii) construction of latrines at schools and reconstruction of public toilets; and (iii) promotion of practices of safe drinking water, together with hygiene education. Medium term priorities should include: (i) reconstruction/upgrading of major works such as water treatment plants and overhead tanks; (ii) leak detection program of underground pipes for water and sewage in major cities; (iii) upgrading of community facilities/civic amenities. The total cost for reconstruction of municipal and rural infrastructure systems is estimated to be Rs. 1,548 million (including both short and medium terms).

Public Buildings and Historic Monuments

Damage: Damage to state public buildings is estimated at Rs. 324 million (US\$7.2 million). No assessment of damages for historic monuments and buildings was made. The spatial distribution of damage to public buildings and historic monuments and buildings followed closely the damages in housing. The buildings that collapsed were usually old, one or two storey high structures with masonry walls; damaged buildings were more geographically spread, but were also, for the most part, load bearing structures with light roofs. Damage to historic structures, and by extension the impact on J&K's cultural heritage, was significant.

Needs: The PWD is responsible for the repairing and rebuilding of most of the administrative buildings, and it has already started to do some minor repairs. Temporary office will be necessary, in some cases, while some buildings are repaired or reconstructed. Major repairs and strengthening of buildings, as well as design of new buildings with improved standards can be carried out for smaller structures in the next 12 months and reconstruction of fully collapsed and badly damaged buildings in the medium-term period of 2-3 years. In addition to these programs, it will be necessary to implement preservation/conservation of historic monuments and buildings protected by the state government. Total reconstruction needs of public buildings including five historic monuments under the responsibility of GoJK for the next three years have been estimated at Rs. 571 million (US\$12.8 million).

Reconstruction Strategy: The short-term program to be implemented in the next 12 months, which would include: provision of temporary office space; minor and major repairs and strengthening to damaged buildings, and preparation of designs for buildings to be reconstructed in the next two to three years. The conservation of the historic monuments is important for preservation of the heritage. But, the works will be a slow process and would take considerable time. The medium term program (12 months to 3 years) would include design and rebuilding of collapsed or badly damaged administrative buildings; and completion of the conservation/preservation of the monuments taken-up under the short-term program.

RECONSTRUCTION: ISSUES AND GUIDING PRINCIPLES

Though this needs assessment (along with other government assessments of Jammu and Kashmir reconstruction) presents a picture of the damage, losses and recommended needs sector-by-sector, thus providing a concrete framework for concrete action, it is also important to identify particular issues that the government should manage both in the lead up to and during reconstruction.

Related to this are recommended guiding principles that should underpin the entire reconstruction package, principles that in part answer the issues for reconstruction but in particular make linkages between sectors and strengthen the whole, adding value to the individual specific sectoral interventions.

Issues for Reconstruction

Jammu and Kashmir: A Picture of Vulnerability

Jammu and Kashmir is one of the most isolated areas of the country and the regions affected by the recent earthquake are amongst the most vulnerable in the state. The state is predominantly agricultural, with a low degree of urbanisation, an inadequately developed infrastructure, widespread illiteracy, high birth rates and low levels of investment. Added to the above socio-economic vulnerability its geographical location is in the northern extreme of the Country, distinct from rest of the states in terms of its topography, climate, economy, social and cultural background. The state has a long history of natural hazards like floods, famines, fires, earthquakes, high velocity winds and landslides. Earthquakes have a very high frequency of occurrence in whole of the State, flash floods also occurs frequently in the Kashmir valley, while high velocity windstorms occur in Ladakh and the Kashmir Valley but landslides / avalanches are a widespread phenomenon in the hilly areas of the State.

Dependency Culture & Isolation

The population of these, some of the most vulnerable communities of Jammu and Kashmir exist in somewhat of a dependency culture, with food and other services granted to them by the government often free of charge. Secondly a lot of employment is based on either government or armed forces projects in the area. Taken as a whole, though beneficial to the community in the short term, this provision acts as a deterrent from the entrepreneurial spirit and the creation of new opportunities, and goes some way to re-enforcing the area's isolation.

Weakness of Civil Society

One key aspect of community life development found in strength throughout India is civil society but in these badly affected parts of Jammu and Kashmir there is a distinct lack of civil society organisations, due in part to the geographical isolation, the general security/political situation, and the arbitrary nature of the Line of Control dividing communities. This is important in the reconstruction phase for many reasons, for such groups often play an important part in advocacy, beneficiary identification, as well as project design and implementation.

Institutional Capacity to Implement

It is very important for government to understand its own capacity to implement such a large, multi-sectoral programme of reconstruction activities in the state of Jammu and Kashmir, and in particular in the worst hit areas near the Line of Control. It is not clear to the needs assessment team that there is enough capacity to identify, design, implement and monitor individual programmes and projects to be undertaken, within each of the responsible departments, organisations etc.

Shelter Needs

There are some issues regarding the government's strategy for construction of permanent shelter that should be examined, especially in light of the already planned government investment and the needs assessments recommendations, which is close to half of total government investment.

These include the methodology used for damage assessment, number of families in each structure/house, relocation of villages, use of multi-hazard technology in reconstruction, clarity on who benefits from which locality etc. These may in part go to explain the 8,000 complaints regarding shelter support the government has so far received following the earthquake. A thorough and transparent management of these shelter issues is essential.

Construction: Practices, Enforcement, Professional Environment:

The assessment found that constructions in both government and private sector are not complying with seismic codes, even though the government sector constructions generally have at least lintel band and hence are safer. There is an obvious need to bring about substantial improvement in construction practices both in government and private sector. Secondly it is important that the Jammu and Kashmir authorities urgently review all building byelaws both passed and those in preparation to ensure they meet standards necessary. Furthermore the proper enforcement of these measures is crucial to prevent a recurrence of destruction and death should there be another earthquake in the near future. The picture of the professional environment is also poor: teaching establishments are in dire need of properly trained faculty, key government departments (such as Public Works) are not directing the need for proper construction, and most residential and commercial buildings are constructed without engineer or architect.⁵

NGO/Government Coordination Difficulties

There have been some problems between the Divisional authorities in Kashmir and NGOs working in the relief phase and these should be carefully considered.

NGOs have expressed their view that at times the government has not provided them with enough information about its own work, that there is a lack of clear authority between state and army officials (especially in the most sensitive LoC areas) and that their work has been impeded or diverted in some cases when close to beneficiary areas. Government authorities meanwhile remark that NGOs

⁵ See Annex for greater detail on this subject, Page 93.

themselves are not coming forward with information on their activities, that they are somewhat disorganized amongst themselves and that they don't always understand the special sensitivities of the region. These will become a particularly important issue come the when reconstruction activities begin in earnest, with some NGOs already committing to commencing or recommencing activities.

Relocation of Communities

State, divisional and district officials have discussed for the need to relocate certain villages within areas that are dangerously close to landslides and rock-falls and the assessment team was able to visit some of these villages in Tangdhar where (based on the visit alone) such a need was generally seen as correct.

However there is a degree of discussion that appears not to have yet happened, one that analyses each move in terms of impact on family, livelihoods, basic utilities, access to health and education, access to family land. It is also very unclear whether or not any detailed discussion has been made with communities to ensure their full participation and endorsement.

Protecting Cultural Heritage

Historic forts, palaces, temples, mosques, urban and rural vernacular structures as well as cultural landscapes have been substantially damaged as a result of the earthquake. In this light it is essential that reconstruction activities take on board the need to safeguard the cultural heritage of the country and that that reconstruction programming actively protects that heritage.⁶

Guiding Principles

Integrated Software/Hardware Approach:

Estimated costs of needs in some of the sectors assessed in some places includes both reconstruction/construction costs as well as the supporting software/technical assistance, (health, education, housing.) It is important that government give due attention to these cost/programmatic requirements, which, whilst much less in terms of dollar amount, add extensive value to the hard money spent on reconstruction.

Building Back Better/The Opportunity to change:

In each sector the assessment of reconstruction needs has been conducted with a view to not only construct to previous levels but to take advantage and build back to a better level, upgrading both services and infrastructure to reduce previous inherent vulnerability, build development opportunities and promoting diversity.

It is important that building back better is not just thought of as an infrastructure issue but should be interpreted in the broadest sense so that the social and economic fabric of the region are rebuilt stronger and better.

⁶ Note that UNESCO have planned an assessment of the damage sustained to the cultural heritage of Jammu and Kashmir (in partnership with the Centre for Environmental Planning and Technology, and Indian National Trust for Art and Cultural Heritage,) to be undertaken within the next months.

Building Self-Reliance/Diversification/Opportunities

As discussed before there is for various reasons an already isolated, marginalised community in the worst-hit areas of Kashmir division in particular and reliant on the government in many areas. One aspect of building back better is make the link between building of social/economic infrastructure to a general diversification of opportunities and a reduction of reliance on outside actors, whether government or NGOs. For example the earthquake has had a relatively moderate impact on livelihoods but this sector was already depressed before – with opportunities for income mostly limited to agro-pastoral activities supplemented to government or military paid labour. It is suggested that alternative livelihood opportunities – such as the expansion of possible industries such as horticulture, food-processing, vocational and skills training – will not only reduce vulnerability through diversification, it will reduce reliance and in the long term increase growth increase growth.

Vulnerable Families and Reconstruction:

A recommendation across many sectors is that those communities and families that have been made particularly vulnerable by the earthquake, through the death of key earner, injury to family members, village isolation from centres of reconstruction etc, be made a key part of reconstruction, with their special requirements integrated into all relevant work.

In essence not only should there be special programmes to directly reduce vulnerability but reconstruction on a large scale should understand vulnerability and actively take it in to programme development considerations.

Multi-Sectoral Approach to mitigating social and livelihood impact:

The social and livelihood impact of the earthquake should be seen as an intertwined topic. An immediate focus on reconstructing livelihoods is essential to both provide economic reconstruction and to counter the psychological and social impacts of the earthquake. For e.g., there is disruption of 'social network and services'. As such, the first step would be assessments and/or rapid appraisals to formulate plans and frameworks for each sector. The rehabilitation process needs not only vocational skills but also skills to cope with psychological and social stress relevant to the target groups, along with holistic package of services (pre-training services, skills training, need for multi-skilling, health and nutritional support, crèche facilities, awareness on working conditions and rights, access to available government schemes, social protection, collective actions, post-training services, etc.).

For a multi-sectoral approach, required structures/networks with government schemes and departments, members of the civil societies who have made some impact and other concerned agencies may be initiated.

Community Participation in Reconstruction:

A key part of reconstruction efforts and essential to successful and sustainable reconstruction is the full integration of communities into the work, which should be involved in many aspects of the work, from the ideas phase right through to decision-making and on to the actual implementation. This will be essential for

ensuring there is equity, transparency, accountability in the reconstruction programme, (see below.)

The construction and maintenance of houses, buildings, roads, heritage sites, infrastructure etc represent not only a vast range of business opportunities that should be channelled to the local communities, it is an opportunity for building skills in the community that ensures employability and sustainable maintenance of the assets.

Similarly the government could use this time until Spring construction to build a strong partnership between all actors – state and central government, CBOs, NGOs, communities – so as to deal with the complex activities in a holistic and collaborative manner.

Communications, Transparency, Monitoring, Grievance Redress:

The complexity and wide-ranging nature of the reconstruction operation necessitates that a methodical approach to communications, transparency and accountability at state, district and village level is a high priority. The injection of vast sums of money into local communities and the task of correctly identifying beneficiaries and assessing entitlements require that processes be put in place for public tracking of expenditures and monitoring of works.

It is important that these measures be incorporated from the very start of the recovery program if they are to be effective in facilitating implementation of the program, mobilizing and boosting the morale of affected communities, and minimizing risks of leakages and disputes.

It is of particular importance that the government take on board the need for an effective communication strategy for reaching the population, for incorporating their views in programme development and implementation, and continually updating them on the progress made.

Some systems the government may consider are:

- Community monitoring of beneficiary identification, cash disbursements and certification of housing milestones and other works with a clearly-identified role and responsibility within their present capacities for the elected panchayats.
- A web portal at state level, perhaps maintained jointly by the government and civil society partners, to track funds, report on activity progress, post beneficiary lists and other data, and serving as a coordination forum.

Connected to this is the need for government to establish a transparent and efficient mechanism to investigate complaints throughout the recovery process, with universal access to include also the marginalised and disadvantaged groups and individuals.

The Development of a Civil Society

As part of building self-reliance, improving community participation in the reconstruction process,

Civil society in general appears to be weak in the affected area. This is an opportunity to enhance its capacity, in parallel with promotion of micro-credit schemes, various self-help groups, and community-based organisations, which will

help both most vulnerable groups and communities at large. On the other hand, the positive experience - as well as lessons learned - in the Relief phase, should help the government and external community improve on dialogue and mechanisms of collaboration, which will lead towards harmonised policies, and smooth and efficient implementation of recovery and reconstruction programmes.

Disaster Risk Mainstreaming:

Of paramount importance is that all reconstruction activity is viewed through the prism of mitigating disaster risk in the future, and that this risk is understood not just in terms of earthquakes but also the other natural events that affect Jammu and Kashmir regularly, such as flooding, severe snowfall, landslides, etc. Such risk mitigating reconstruction process can reduce vulnerability in the long term, increase resilience to specific local multi-hazards, and should be inserted into the whole of the state's reconstruction package.

Seismic Hazard and Risk in Kashmir

The earthquake of October 8, 2005 has not been a surprise as far as its location and size are concerned. The entire Himalayan belt is well known for its seismic potential and some of the greatest earthquakes of the world have occurred in the Himalayas. More specifically, the earthquake occurred in an area where the Main Boundary Thrust (MBT) takes a turn: such reentrants are particularly prone to stress concentration.

Kashmir has had a long history of earthquakes. The earthquake of May 30, 1885, that killed about 3,000 persons. is well documented. Its epicentre may have been located about 20 km west of Srinagar. About 1900 sq km area suffered shaking intensity of IX on Modified Mercalli Scale. The Badgom earthquake of September 2, 1963 (magnitude 5.5) had its epicentre located near village Kolabug. Maximum intensity of shaking was VIII on Modified Mercalli Scale. About 2,000 houses were reported as collapsed, mostly in mud constructions. The Anantnag earthquake of February 20, 1967 (magnitude 5.7; maximum intensity of shaking VII on MM scale) occurred near village Sop. About 786 houses were reported as totally damaged in Anantnag district. Two earthquakes of magnitude 5.5 and 5.4 occurred at an interval of 12 minutes around Kathua (Jammu) on August 24, 1980. Maximum intensity of shaking on the MM Scale assigned to these two events was VIII and VII, respectively.

It is thus clear that the region is prone to seismic activity and will continue to be shaken by damaging earthquakes in the future as well. If the houses and other structures can withstand the ground shaking without collapse, most earthquake damage will be limited. As we know there may be substantial time interval between two damaging earthquakes in an area. However, such low probability but large consequences events do not leave any scope for complacency and recent reports have suggested this particular earthquake released only a minimal amount of energy accumulated. In any case, the current practices in earthquake resistant construction do account for the low probability wherein buildings are not aimed to remain undamaged in such events; instead, the objective is to allow some damage, but prevent collapse.

Despite known earthquake vulnerability, the region has so far not taken adequate steps to ensure that new constructions are earthquake resistant. With addition of

more unsafe constructions every day, and on account of population growth, the seismic risk to the area has been increasing at an alarming rate. The technology for earthquake resistant constructions is not difficult and it should be possible to adopt earthquake resistant features in both government and private constructions. An example of early earthquake resistant constructions in the Indian subcontinent is that of several earthquake resistant houses constructed for railway officers in Quetta after the 1931 Mach earthquake in Baluchistan. These were the only constructions in Quetta to survive the 1935 earthquake in which about 25,000 persons lost life.

Hence, not only should new houses be built in an earthquake resistant manner but also it is critically important to set up systems to regulate all future constructions. The human tragedy and economic losses will be manifold in the next major earthquake unless actions are taken now to ensure seismic construction is the norm in Jammu and Kashmir.

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It is thus clear that the region is prone to seismic activity and will continue to be marked by damaging earthquakes in the future as well. If the houses and other structures can withstand the ground shaking without collapse, most earthquakes caused will be limited. As we know there may be substantial time interval between two damaging earthquakes in an area. However, such low probability but large consequence events do not leave any scope for complacency and recent reports have suggested that particular earthquakes released only a minimal amount of energy accumulated. In any case, the current practice in earthquake resistant construction is to account for the low probability whereas codes are not aimed to remain undamaged in such events; instead, the objective is to allow some damage, but prevent collapse.

Despite the low earthquake vulnerability, the region has so far not taken adequate steps to ensure that new constructions are earthquake resistant. With addition of

THE SECTOR REPORTS

SOCIAL IMPACT

A. INTRODUCTION

This annex addresses the social impact of the 8th October earthquake in J&K, which caused massive destruction of infrastructure and property, as well as thousands of injured and casualties in the areas close to the Line of Control in J&K. It is based on field visits to the two worst hit blocks in J&K, i.e. Uri (Baramullah District) and Tangdhar (Kupwara District). Team members met with the government officials at state, division, district and block levels, as well as local and international NGOs operational in the area. Of particular importance were direct interactions with the affected communities, including children and most vulnerable. It should be noted, however, that due to exceptionally brief duration of the field visit, the time to assess the social impact and vulnerability issues had been rather limited. Furthermore, since the most affected areas are situated in highly politically and security-wise sensitive areas, the secondary sources of information about specifically vulnerable groups and their needs may not have been fully accurate and could not be independently verified.

B. OVERVIEW OF EARTHQUAKE IMPACT

The earthquake has shattered many people, and taken a toll in human lives, injuries, disabilities, destruction of houses and livelihoods, and disruption of social networks and services. Most people in the earthquake-affected areas of J&K – already marginalised by geography and political/security issues – are now more vulnerable than before, in effect the total population directly affected by the government (circa 620,000 people.)

The government structures, along with the Indian military forces and with the support of international NGO and UN aid community, responded promptly in a remarkable effort to save lives and provide immediate relief and restoring basic services, thus minimising the adverse impact of the disaster. This picture, however, is much more complex for particularly vulnerable groups and individuals, and those who have suffered irremediable losses – these people will need special attention in coming period.

Who Is Most vulnerable? Some segments of the population are by definition most vulnerable in a society which is not capable of fully understanding and meeting their specific needs, such as widows, single parents and their children, orphans, the elderly, and the disabled. Beside those groups, there may be other socially marginalised groups such as scheduled castes which are socially discriminated even in normal times, and whose vulnerability without external support can only be increased after a disaster. To adequately respond to their needs, the government (in parallel to the mainstream rehabilitation processes) should take into account the specific plight of the most vulnerable when designing rehabilitation and reconstruction projects in shelter, livelihood, health and education, social security and legal requirements.

The majority of the affected people are relatively poor by the country's standard, and it can be assumed that many of the affected are among the poorest, even in a very

poor societal environment. Women, who are in general traditionally deprived of certain rights if not outright discriminated, are likely to be further disadvantaged due to additional psychological, social and economic stress. It can well be assumed that the above groups are now at more acute risk than before the disaster.

Some 30,000 households will have to spend the winter in reinforced tin-sheet temporary shelters, not houses. In effect, they will be more vulnerable to the cold, heavy snows, snow storms, or avalanches, in effect diseases, fears, etc. Furthermore, people have gone through initial psychological shock, compounded with the fear endured through over 100 aftershocks in 2 months only. Basic services have been largely restored to the pre-earthquake level, but are still imperfect. Most affected people belong to rural communities, whose income is contingent upon agropastoralism and wage labour through the military or government structures – they have very limited livelihood alternatives. Consequently, many people are now more likely to feel insecure, weak, and often frustrated.

Drawbacks of Cash-Only Solution: Beyond a relative success of relief interventions there are, as discussed above, some worrying issues. The Mission has found little solid evidence, but has reasons for concerns about the lack of due attention given to the needs of particularly vulnerable segments of the population. For example this may include questions of how those elderly without family may rebuild, how will families cope with the serious and permanent injury of the leading earner, and those communities much further away from administrative and communication centres, which may need additional support in order not to be made more vulnerable due to the earthquake.

The government's current strategic vision does not appear to be reassuring enough that in subsequent rehabilitation and reconstruction phases it will adequately address the specific vulnerabilities. The Government's strategy in dealing with vulnerable groups has typically been small cash provision to cater for the special needs in the short-term perspective. This "cash only" or "cash first of all" approach is flawed both because of inadequacy of funds and lack of specially designed programmes to systematically address the specific plight of the most vulnerable. The very definition and knowledge about the status of the most vulnerable is somewhat vague, and the situation requires qualified surveys.

Orphans, Female-headed Households and Single Parents: Children who suffered a loss of one or both parents require special attention and protection both in the short and long term. J&K government has some provided financial and institutional support to 342 registered orphans. Some of these orphans have been adopted. That is a reason for concern, especially since some of the children being institutionalised are not 'real' orphans, but children from destitute families. In one critical example only, the 'adoption' of some 500 boys (app. 400 from Kashmir and 100 from Jammu Divisions, respectively) took place by the Jain group in Pune. The process appears to be completely voluntary, with the full consent of parents/guardians, and with the best intentions of providing good education to otherwise disadvantaged children. Nonetheless, such practices of taking children away from their natural communities, a form of institutionalisation, is a cause of deep concern and requires a proper expert analysis, which will determine whether the added value is worth the compromise, and whether alternative 'at home' support can be a better option.

Widows/Female-headed households present another particularly vulnerable segment of the population. Women, who are already disadvantaged in a traditional society, now have to deal with their own psycho-social distress, loss of livelihoods and care of their dependents. It is possible that some female-headed households are, due to ignorance or other reasons, not included in the relief and rehabilitation schemes. The loss of male head or income earner – as is traditionally the case in the affected areas – strongly decreases the family's social position, and at the same time increases the family's economic vulnerability and coping ability. Such households will therefore also need to be enumerated and provided special support. There are 96 registered post-earthquake widows in J&K – they received Rs 10,000 lump-sum assistance – that, however, will not stop, for instance, their eldest son to drop school in order to start earning money for the family, possibly as primary bread-winner. Some widows have reportedly been taken to institutions, which perhaps helps them cope and survive in the short-run, but entirely disrupts their socio-economic networks life in the long run. Alternative rehabilitation approaches have to be sought for this vulnerable group.

Legal Aspects: The issue may arise primarily related to relocation of households, which may complicate the process of housing rehabilitation. It is also unclear whether members of female-headed households, widows and orphaned children are at risk of losing property rights. Further studies need to be undertaken to clarify these issues and design programmes to address them if necessary.

Resettlement/Relocation: 15 villages and some 1,600 people are originally planned by the Government to be relocated – typically from hilly, erosion-prone areas toward the safer, valley land. It is not clear what is the villagers' view; the picture is apparently mixed: some prefer to stay where they are at all cost, while others prefer to move to more 'lucrative' locations. There are a few issues to be taken into consideration seriously: is the relocation totally voluntary and agreed upon by the concerned communities? How far will the villagers be relocated from original homes (the closer, the better); as they are mostly very poor and depend on their land and animals, will they be offered similar conditions or alternative livelihoods? Any relocation will have a significant environmental and livelihood impact, as well as possible impact on access to basic services, on the concerned villagers. Therefore, it must be implemented only upon due consideration, consultation, and agreement with the communities involved. There is also, importantly, not enough quality low-land available in proximity to the villages bound for relocation, and the land ownership issue may be complicated.

Anganwadi/ICDS: The ICDS system has been heavily affected by the earthquake and, as it was not among the first government's priorities for interventions - is only slowly recovering. The Government plans to build/rehabilitate a total of 358 ICDS in Tangdhar and Uri (212 old buildings + 141 complete new/non-existent before – the reason for new locations is to apply the topography and population criteria). ICDS are to begin operating fully in February/March in temporary shelters/tents/community halls. Out of 212 destroyed ICDS, only 10% were in separate "anganwadi-only buildings", while others were located in residential houses. More of the separate anganwadi buildings with modern facilities, and with some incentives (e.g. high-protein biscuits) for children in coming months are highly recommended.

C. RECONSTRUCTION AND RECOVERY STRATEGY

Early recovery efforts should begin concurrently with humanitarian assistance. Short and long-term recovery and reconstruction, particularly related to shelter, housing, livelihoods, legal aspects, protection for women and children, education, health, water and sanitation, civic services, community participation and safeguard issues will require incorporation of a number of social issues and needs. The special needs of particularly vulnerable groups should always, and systematically so, be given due consideration. The post-earthquake situation in J&K clearly offers a number of opportunities for building back better across the range of services, from which all affected communities, with the emphasis on the recognised, or possibly missed out marginalised and disadvantaged groups and individuals, should benefit.

Of particular importance to the delivery of aid to vulnerable groups are the monitoring of redress/transparency of continued support, community participation in reconstruction activities, and the partnerships between Government, civil society

Specific Recommendations

Shelter and Relocation of Affected: In the short term, households residing in temporary shelters should return to permanent housing, ideally at the original locations and in earthquake-resistant buildings. Relocation should be avoided unless it is clear that a) staying in the original place is unsafe; and b) the village residents listed for relocation clearly express their preference to shift to a new location. In any relocation, villagers/communities concerned should be consulted and livelihoods and access to basic services in new locations secured.

Particularly Vulnerable Groups: Among the most vulnerable groups, broadly speaking we can include women, children and disabled, as well as two scheduled castes, i.e. Bujari and Gujjars. More specifically, we should look at orphans, widows/single-headed families, permanently disabled. To start with, they should all be located and registered. Priority should be given to uniting families if still separated. Orphans need to be provided with culturally sensitive care options, as well as psycho-social support and legal protection. Awareness-raising on child rights and child protection should also be carried out with relevant stakeholders to the extent possible. Institutionalisation of children or other disadvantaged groups, such as widows, should be discouraged unless it is the last and well-justified resort.

Female-headed households and disabled persons should also be offered expert psycho-social support, opportunities for livelihood restoration, and legal protection on matters related to property and inheritance rights. Specifically vulnerable groups who may be unable or untrained to immediately undertake profitable economic activities need to be assisted through targeted social transfers and social protection measures. These groups should also be empowered so as to ensure their participation in the recovery process and to enjoy the benefits on an equitable basis. It is important to ensure mechanisms which will allow informed choices to the affected among the most vulnerable, which presume timely and adequate information on government plans, legal entitlements and opportunities to access them. They should be given a chance to have a voice in all decisions that affect their lives and their communities. A campaign should be launched against possible

gender-based or violence against children at the community level by civil servants working in public services and by law enforcement personnel and the judiciary.

It is important for the government personnel as well as to the people vulnerable concerned to be sensitised to those problems and how to jointly work on solutions in a participatory process. The government should be supported through capacity building initiatives, such as provision of essential equipment (e.g. computers), specialised training, seminars, experience sharing of lessons learned from other states, including field visits, etc. Creative and effective participation can be promoted through all media and mechanisms available, including support of youth groups, women's groups, community mobilisers, groups for the disabled, public debate mechanisms, etc. Contribution from external, non-government experts, and specialised NGOs would benefit the cause and could help reach the most isolated among vulnerable households and communities.

Livelihoods: Due to sensitive geo-political location of the affected area, livelihood patterns will be difficult to change in the short-run. Majority of people will continue to earn their living as in the past: work in agro-pastoralist field, or with military and government institutions. Nevertheless, in the poor area devastated by a disaster which increased vulnerabilities, alternative livelihoods should be sought out actively, particularly for the most vulnerable groups. Cash compensation is a necessary first step for vulnerable people to make it through the immediate post-disaster period, but in rehabilitation phase projects should be designed in such a manner as to lead toward more sustainable livelihoods. It can be a laborious process, but widows, single-headed families and other most destitute women, for instance, should be encouraged to undertake training for alternate income-generating activities. Other vulnerable groups may be offered different life-skills which will help them improve their capacities and enable them to earn additional income.

We need to address social and economic needs of vulnerable groups with specific strategies. Special emphasis will have to be given for assessing needs of diversification of skills in relation to separate target groups, i.e., male breadwinners, female heads of households, single parents, disabled, as also frustrated educated youth.

Psycho-social Programmes: Psycho-social programmes should be promoted to cover all among the most vulnerable groups, but also, through modified programmes, some of the non-traditional groups, such as middle-age male population. It should not be forgotten that the population in the affected area is poor, relatively isolated, traumatised not only by the recent natural disaster, but also by the many years of stressful living in insecurity and suffering as a consequence of the continuing violence and militancy in the region. Psycho-social interventions should also aim at instituting protection measures for the most vulnerable segments of the population, which include psychological and social care and counselling to those affected by trauma. For children, introduction of recreation and animation activities in school and anganwadis should be considered.

Sanitation and Hygiene: While water availability is not a major issue in the affected areas, except possibly the water quality control system. Hygiene and sanitation issues, however, are among the most prominently perceived deficiencies in the current service and social structure, and behavioural patterns among the affected

communities. This unfortunate situation can be rectified though: the post-earthquake rehabilitation phase offers an excellent opportunity to change the behaviour and improve the living conditions among the communities through promotion of building adequate sanitation facilities and carrying out hygiene awareness campaign on a large scale. The generally shared view is that priority should be given to children in schools and anganwadis. Each such institution should have toilet facilities, and in schools boys and girls should have separate units. Similarly, schools and institutions should be built on a 'model design' basis, with child/learning friendly spaces, access for children with disabilities, etc.

Anganwadi Centres: It is recommended that the government promotes more of ICDS-only (At least 30% ICDS in separate locations vs. ICDS in private houses) buildings to be built as modern model-structures, with proper equipment and toilet facilities, access for children with disabilities, etc. International community will help with design and possibly funding the building of toilet facilities, to be accompanied with major hygiene and sanitation campaign. To motivate children to return to and minimise drop out/absence from Anganwadi in the traumatic post-earthquake period, a 6-month distribution of HPB in Spring, to be provided by international community, is highly recommended. (Anganwadi centre building has been included in cost provision in the Municipal and Rural Infrastructure sector assessment report.)

2. Guiding Principles to the Recommended Programmes:

BUDGET ESTIMATE – SOCIAL IMPACT

- | | |
|--|---------------------|
| 1. Capacity Building of Govt & Civil Society/ Community Participation: | US\$ 300,000 |
| 2. Psycho-social Support (not include programmes under Education): | US\$ 110,000 |
| 3. Support to specifically vulnerable groups: | US\$ 150,000 |
| 4. Anganwadi Centres Restarting: | US\$ 320,000 |
| 5. Sanitation and Hygiene: in Anganwadis and Schools | US \$150,000 |

Total Cost = \$1.03 million, 46.12 million Rs

THE ENVIRONMENT

Introduction:

Environmental degradation has been a serious problem affecting the regions hit by the earthquake of October 8th 2005. Fifteen years of militancy have taken their toll on life in and around the Kashmir valley and management of natural resources was severely impacted. While inadvertently, the security restrictions may have resulted in the protection of some natural areas and helped preserve wildlife from poaching, overall this lack of security led to a breakdown of local governance and management systems, thereby leading to environmental degradation around populated areas. This degradation was evident in the areas visited and there is a need for environmental rehabilitation.

Forest quality around the earthquake affected villages is generally poor and many of the hillsides are completely denuded. The notion of community forestry is almost non-existent. Heavy grazing pressure is unlikely to allow either natural regeneration or plantations to survive. Fodder paucity is a major issue, in particular in the winter months. Environmental sanitation is also in poor shape with 5-10% of the people having access to latrines, and even fewer using garbage pits or having access to sewage systems.

Overview of the Earthquake Impact

The impact of the earthquake on the environment is largely limited to certain pockets. The debris generated by landslides, and rockfalls triggered by the earthquake are a hazard. Fissures have developed on some hillsides which may lead to landslides that impact human settlements. Also, silt loads in the streams and rivers may have increased, and downstream hydroelectric projects may be affected. However, potentially catastrophic impacts such as stream blockage and creation of large temporary lakes, as reported in Pakistan, do not appear to have occurred in India. Deforestation as a result of fuelwood use should not vary significantly from pre-earthquake rates. While there will be considerable demand for timber during the rebuilding phase, at present timber is being sourced largely from outside the area. For example in Tangdhar, of the approximately 70,000 cft made available post earthquake, over 65,000 cft was sourced from outside the region. In Uri almost all of the approximately 25,000 cft is from outside the region as per forest department estimates. At present deodar, kail and poplar are available, the former two being supplied from forests around Jammu. Legally it is not permissible to cut green trees in the mountain areas and hence dead and fallen trees are collected by the Forest department to fulfil timber requirements. This timber is supplied at highly subsidised rates, as low as one-tenth the market price in cities like Srinagar. This high subsidy in habitations close to forests discourages logging for local use. This trend of sourcing timber from outside the region is likely to continue. The reconstruction phase will impose considerable demand for wood and current plans are to import this from outside the state, possibly from Southeast Asia.

While some drying up of springs is reported, there are an equal number of reports of new springs emerging and the impact of the earthquake on water availability is not very high. Water supply pipelines and gravity schemes have been damaged, but temporary repairs are reportedly underway or have been completed in areas such as Tangdhar town.

Sanitation facilities were already poor in the region with less than 10% of homes having access to latrines. Garbage pits are even scarcer. As open defecation and dumping of garbage is already the norm, the earthquake has had little impact. However, there is a need and an opportunity to provide amenities during the reconstruction phase.

The disposal of debris from collapsed homes can have adverse environmental consequences in urban or semi-urban areas affected by the earthquake. Care must be taken to properly select sites for disposal of this debris so that it does not choke drains or streams. In rural areas however, the concentration of homes is sufficiently dispersed that after reuse of part of the debris from collapsed homes, the remainder will probably not have significant environmental impacts.

In villages where relocation is necessitated due to the threat of major landslips or rockfalls, the environmental consequences of relocation need to be carefully considered. Relocated villages will increase pressure on local forests, pasturelands and water sources, and can result in the degradation of these resources. Additionally, the creation of slum-like conditions can lead to issues of environmental sanitation. At present little information is available on relocation plans and strategies.

Reconstruction and Recovery needs:

There are limited specific needs related to the environment that require attention in the relief period. Access to clean drinking water is one area of priority. The building of clusters of latrines can lead to pollution of springs and groundwater sources if these are poorly located. Some of the recent landslides may require stabilisation. Several of the issues highlighted in the previous section need to be looked at in the medium and long term. During the reconstruction phase, environmental considerations should be looked at during the design of homes. Simultaneously, work needs to be started to repair the environmental damage caused due to poor management of natural resources.

Reconstruction and Recovery Strategy:

Design of homes and reconstruction:

- Plan home construction so as to make them suitable for the climate and minimize energy needs. Homes should be planned taking full cognisance of the social and climatic context of the region. For example a *bukhari* (wood stove) is likely to be installed and spaces should be designed taking into consideration winter heating needs. *Bukharis* with an energy efficient design, a slow burn rate of wood, and maximal surface area and length of chimney pipe within the house to optimise energy transfer can be promoted. Pre-warmed air can be brought into the house by designing an air inlet so that incoming air comes in contact with the surface of the chimney. Such design inputs can help reduce firewood use.
- Environmental sanitation should be given due importance during the design of homes. Toilets and garbage pits should be integrated in plans in a manner that is practical and socially acceptable.
- The design of animal shelters should be given attention. Shelters should be made in a manner that maximises animal comfort and minimises energy loss. In many hill areas, animal shelters are built under the main house so that the floor

of the human habitation is kept warm by the heat from the animals living below. While this was visible in some homes, in many others, shelters were built separated from the main house.

- As far as possible, materials traditionally used for construction should be used for building new shelters. This will help ensure reuse of construction debris and minimise environmental impacts. At present the focus of reconstruction seems to be on 'new shelters' rather than repair of existing structures. A greater focus on retro-fitting would reduce the need to demolish and rebuild. While use of pre-existing material is suggested, the need to build significantly stronger and more earthquake resistant structures through incorporation of new technologies and building techniques is imperative.

Initiate programmes to repair environmental damage and rehabilitate ecosystems:

- Methods to increase motivation and participation of local people in natural resource management should be devised and implemented. Giving people usufruct rights to forest produce can help reduce damage to forests. Facilitating the formation of user groups to manage common lands and empowering them to exclude outsiders is an important need. While increasing peoples control and a sense of ownership of natural resources is important, equally essential is capacity building of local communities to sustainably manage these resources.
- Attention needs to be paid to pasture development and increasing fodder production along village margins. Fodder programmes can look into the use of both native seasonal and perennial grasses such as white clover (*Trifolium repens*) or Perennial ryegrass (*Lolium perenne*). However, prior to any large scale introduction of exotic grasses, an ecological assessment needs to be carried out to ascertain that these will not become a weed, replacing natural species and changing the natural ecological communities of the area. Multipurpose bamboos such as *Bambusa nutans* and *Dendrocalamus strictus* which serve as a fodder and have high structural and economic value may also have potential, as would fodder-trees such as *Celtris* or *Grewia* which are far less likely to spread unchecked.
- Work can be initiated with local pastoralists and Gujjar communities to increase the productivity of grasslands. Seed sowing programmes for local grasses and sensitisation on the principles of pasture management can be carried out for these stakeholders whose livelihoods depend on these grasslands.
- Slope stabilisation through use of deep rooted shrubs and grasses will be effective in some of the landslide prone areas. Shrubs such as *Berberis* spp and *Rosa moschata* which are common across the Western Himalaya have good potential. Trees species such as *Robinia pseudoacacia* and *Ailanthus* are already being used by the forest department. Herbaceous plants such as *Iris* and various natural grasses are also effective. While revegetation of slopes is no guarantee against landslides, a good cover of forest and shrubs will help mitigate the impacts of rock-fall and certain kinds of slope failure.
- In the short term, stabilisation of landslips that occurred as a result of the earthquake may be required in some cases. Drought tolerant pioneers as well as species such as *Agave* might be suitable. In some extreme cases, physical measures such as retaining walls and geo-jute fabric may be required to stabilise the slips until the vegetation takes hold.

Existing governmental programmes, such as the Integrated Watershed Development Programme (IWDP) can be expanded into Uri and Tangdhar areas and the participatory approach embodied in this and similar projects used to mobilise communities to take better care of their natural resources. A plan has to be developed to monitor the effectiveness of these interventions and also to monitor the revival of local vegetation. Once the local vegetation has revived and the slope stabilised, the non-native species like *Agave* should be removed.

While the region has been fortunate to have escaped severe environmental damage due to the earthquake, the pre-existing degradation cannot be escaped. Landslides and slope failures were, in some cases, exacerbated by the lack of vegetal cover on the slopes. The focus on these earthquake affected areas presents an opportunity to initiate action to repair and regenerate these ecosystems.

Recommended Government Interventions in Environment Sector:

Slope Stabilisation and Watershed Work⁷ = 60 Rs (mill).

Cleaning of rubble and debris from towns⁸ = 20 Rs (mill)

Sanitation and Hygiene Awareness Programmes⁹ = 10 Rs (mill)

Total Programme = 90 Rs (mill)

= \$2 million

⁷ Based on pilot projects in 10 microwatersheds/catchments, each about 1000 hectare in size. Total 10,000ha (100 sq m) x Rs 6,000 per hectare cost of treatment and slope stabilization. If programme is successful, additional funding can be sourced from projects such as IWDP (Integrated Watershed Development Programme) which have funds earmarked for the purpose.

⁸ Based on estimate of 2.5 million for debris removal for Poonch town where issue is most evident.

⁹ Infrastructure issues related to clean water supply and sanitation are being incorporated under Municipal and Urban Infrastructure, see Page *MUNICIPAL AND URBAN INFRASTRUCTURE*81.

LIVELIHOODS

Introduction:

The people of the Uri and Tangdhar belt are primarily agro-pastoralists. In the towns of Uri, Tangdhar and Poonch, there is a degree of urbanisation as these are the main market centres for the area. The remaining settlements are largely rural and the farmers have small landholdings, typically around 0.1 ha, and a few animals. While in some parts goats and sheep are more commonly kept, in others cows are the livestock of choice. Many households keep some poultry or ducks. In the Tangdhar area, much of the livestock is sent up to high altitude pastures in the summer. Agricultural production is for subsistence purposes and the food-grain produced is sufficient for only two months or less of consumption. Walnut production, is an important source of revenue for some families. The contribution of wage labour has been increasing, in particular in the border areas near the LoC. The armed forces are an important employer and contributor to the local economy. In some families a member may be employed in a permanent position in the Government. In the Baramulla area, horticulture is the main livelihood option and a large part of the population is involved in apple cultivation, often as labour.

The major Government backed schemes that help generate employment that are operating in the region include *Sampoorna Grameen Rozgar Yojana (SGRY)* for the provision of employment and food grain against labour, the national Food for Work programme, and *Swarna Jayanthi Gram Swarajgar Yojana (SGSY)* a holistic programme for promoting self employment in rural areas through the formation of self help groups. (Three Districts in the State have already been chosen for implementation of the National Rural Employment Guarantee Act - Doda, Kupwara and Poonch.)

Overview of Earthquake Impact:

The impact of the earthquake on livelihoods has been moderate. Damage to shops and infrastructure has impacted small businesses in market towns. Agro-pastoralists typically do not have expensive machines or implements that can get damaged. The timing of the earthquake ensured that most animals would have been out in the fields and hence the impact of collapsing shelters was lower. Attention will need to be prioritised for families where the main income earner, or key members of the family, were killed or injured.

Livestock are an important source of wealth for agro-pastoralists. Government reports indicate 5% mortality of cattle in the Uri area and less than 1% cattle mortality in the Tangdhar area. While these numbers are not very high, it must be considered that some families have lost half or more of their livestock. Local people in the severely affected villages of Tangdhar area estimated over 10% mortality of animals. More important has been the decrease in livestock populations as a result of selling or culling. The lack of shelters for animals is driving this process. Many of the animals were consumed during the period after the earthquake and during the festival season. This reduction in animal population as well as damage to infrastructure, including veterinary centres and other Government infrastructure, may affect animal husbandry patterns in the short to medium term.

Agriculture was not severely affected, in part because the crop had been harvested and there was not much growing on the ground. In addition, agriculture is largely

manual and no high-value machinery is used which could have been damaged. Some agricultural land, estimated to be upto 240ha, has been damaged or destroyed due to slippage or being covered by landslide debris. More important may be the damage to irrigation channels, particularly in the Uri area. Overall, more than 33km of irrigation canals are estimated to be damaged. Disruption of irrigation facilities will greatly lower yields and remedial measures need to be taken to repair this infrastructure. Temporary shelters have been constructed in agricultural fields in many areas. Given the small land holdings, these can significantly reduce the area sown particularly in the case of the poorest families.

The indirect effects of the earthquake need to be considered. The focus of people is on reconstructing their habitations and claiming compensation from the Government. Sowing of the crop next spring may be impacted as a result. Also, there has been damage to supporting infrastructure – market channels for purchase of fertilizers, for example, may not be in place in time. The infrastructure of the line departments for agriculture, animal husbandry or finance has been disrupted. A study is needed to determine aspects of external linkages that have been disrupted as their renewal is important for livelihoods to recover.

The importance of wage labour is likely to grow in the short and medium term. During the reconstruction phase that will last for a few years, the demand for labour – and possibly labour rates – will increase. Unlike the valley areas, at present Uri and Tangdhar do not get large influxes of migrant labour. While this may change in the coming years, at present a labour shortage can be anticipated in the region.

Over the coming few years therefore, there may be a reduction in the importance of traditional livelihood means – viz. agriculture and animal husbandry, and an increase in wage labour related activity. This would have important long term consequences as unemployment will increase once the reconstruction phase ends.

There already appears to exist a sense of frustration as a result of limited livelihood options. Educated youth in particular complain of a lack of employment opportunities. Other than agro-pastoral activities and wage labour, employment opportunities are severely restricted with very few openings in government jobs. Industry and other productive enterprise is almost non-existent. The recovery and reconstruction phase provides an opportunity to look at existing livelihood patterns and bring about more options and opportunities. The relief phase has focussed largely on shelters and homes. These were admittedly an urgent need given the imminent onset of winter. More attention needs to be paid to livelihoods in the rehabilitation phase and special focus on families who have lost their livelihood means is recommended.

Vulnerable Groups and Livelihoods: There needs to be special attention paid to the more vulnerable groups and those most impacted by the earthquake. These include:

- *Widows and the handicapped:* The present system calls for providing the most vulnerable with a one-time compensation rather than a means of livelihood. This needs to be addressed. At present for example, while widows are provided with lump-sum cash of Rs 10,000, limited action is taken to enable them to develop sustainable livelihoods.
- *Villages earmarked for relocation:* Over a dozen villages or hamlets in the earthquake hit areas have been marked for relocation due to their vulnerability to landslides. Communities from those villages that eventually do get relocated will be among the most hard-hit by this natural tragedy. While the plans of the

Government have not as yet have been fully formulated, villages relocated to distant areas from their current location are likely to have little or no cultivable land and a reduced opportunity for animal husbandry related activities. This could necessitate re-equipping entire communities with new skill sets that are practical, socially acceptable and can provide sustainable income.

Damage and Losses:

Accurate estimates of the damage and losses from the impact of the earthquake are made difficult by the paucity of data. However, a rough estimate is possible, given below in millions:

	Damage	Losses
Animal Husbandry	146 ¹⁰	50 ¹¹
Agriculture and Horticulture ¹²	34 ¹³	55 ¹⁴
Shops and Small Businesses		5
Totals	180 Rs	110 Rs

Reconstruction and Recovery Needs:

- Survey and documentation of existing skills and conduct feasibility study to identify alternate occupations; Assessment of neighbourhood markets and networks;
- Diversification of livelihood base through development of alternate employment strategies acceptable to the local people.
- Diversification of agriculture and animal husbandry through improved technology options and better cultivars and breeds. Development of infrastructure for supporting this process.
- Easy access to credit facilities for building up micro enterprise.
- There is a need for strong community based institutions – such as self help groups – that can initiate micro-finance. Once local people, in particular women, are comfortable with saving and interloaning, then bank linkages need to be developed.
- Sensitising banks to rural credit. Poor experiences with rural loans during the militancy-affected-years has dampened the desires of banks to participate in poverty alleviation programmes. While there appears to be sufficient capital in the system, the relationship between banks and the rural poor needs to be developed. Strengthening community based institutions so as to be able to assure banks of good recovery rates is essential if rural credit schemes are to work.

¹⁰ Govt estimates of damage to Govt buildings (Rs 25 million) and animal shelters (121 million)

¹¹ Govt estimate of livestock death revised upwards to account for greater loss reported in later surveys

¹² No official values for horticulture available.

¹³ Govt estimates of damage to irrigation canals

¹⁴ Rough estimate of Value of land and produce lost, line department buildings lost.

- Development of market linkages for better financial returns and to cut out middleman trade.

Reconstruction and Recovery Strategy:

Since the earthquake area was a fairly poor region prior to the earthquake, the reconstruction of livelihoods will not be easy. Creating concrete business opportunities and physical access to markets need to be given utmost attention immediately. The (anticipated) large amounts of funds be directed to this purpose and should be guided by the policy of using the investments in local assets for creating business opportunities that allow large number of employment opportunities to be created and for local skills to be upgraded and applied so that maximum employability is obtained.

Alternative employment opportunities need to be developed even though the proximity to the line of control imposes restrictions on what is possible. Some attractive options, such as eco-tourism should be investigated, but may not be viable due to the geo-political constraints. There is a strong need to develop and mobilise local communities. Bringing in expertise from outside the region may be suggested if required. Groups such as the Aga Khan Foundation have done commendable work in social mobilisation in similar terrain and socio-cultural situations. Work can be done in connection with the National Rural Employment Guarantee Act.

Proposed livelihood strategies may differ between the various areas. However, what is needed is a framework that develops self-sufficiency and sustainability. An enterprise model for rural livelihoods can be examined. Again, several NGOs across the country, such as Pradan and Basix, have done excellent work in developing enterprise in rural areas and their experience can be used to catalyse these processes. Suggested programmatic interventions are below:

1) Development of the Agricultural and Horticultural Sectors: Possible alternatives will have to be considered both by geographical area and sector. The Uri area, for example, lends itself suitable for some particular strategies. The region is warmer than much of the valley area and well connected by road to Srinagar. Two areas with excellent potential include:

- **Poultry:** At present there is a market estimated at Rs 300 crore (US\$ 60 million) for poultry in the state (as per Department of Animal Husbandry). Much of this is imported from outside the state. In Uri, the temperature is suitable for poultry raising for 8 months of the year and day-old chicks can be raised for their meat. The State Government has plans for locally establishing a hatchery for day old chicks.
- **Vegetable cultivation:** The warmer climate allows for vegetables to be ready for harvest one to two months before they are harvestable in most of the valley areas. This allows vegetables to command premium prices. As an estimated one-third of agricultural area is irrigated, the yield and profitability of vegetable cultivation should be high. Greenhouses can be built to further advance the yield, and benefit from a larger part of the off-season.

While the Tangdhar area has less potential as a horticulture belt, the market within the region is not insignificant, particularly given the presence of the armed forces. Vegetable cultivation could be promoted in the lower tracts of Karnah tehsil to provide fresh vegetables in the colder months and generate employment during this

period. In the Poonch area also new livelihood opportunities are expected after the opening of the 'Mugul Road' – a road that will connect Jammu to Sringar via Poonch. New access to market and a very significant increase in commercial traffic will have huge impacts on this area which need to be factored in while considering livelihood strategies.

Similarly livelihood development should be pursued through the improved and diversified use of existing resources:

- *Non Timber forest products (NTFPs)*: Connecting livelihoods with natural areas can, if done in a planned manner, help increase protection of forests. Training on sustainable use, as well as usufruct rights to NTFPs would need to be developed. Products such as wild honey, morels (Gucchi), meadow saffron (*Colchicum luteum*), aconitum and other aromatic and medicinal plants are already collected from forests of the area. At present, management systems are often weak to non-existent. Strengthening these systems and research to improve yields in a sustainable manner can make NTFPs a significant source of livelihood for communities.
- *Sheep farming*: The earthquake affected areas all have potential for sheep farming. At present the Kashmir Merino is the dominant breed. However, given the poor prices for Merino wool in the World Market since 1991, it may be advisable to look at alternate breeds of sheep more suitable for mutton. The introduction of such meat-breeds, such as Corriedale and Karakul are already being considered by the State Government.
- *Animal product based enterprise*: Given the importance of pastoral activities, enterprise could be developed around products such as wool, or niche products such as goat cheese. Alternatives to current livestock – such as rabbit rearing for meat may have some potential but the low social acceptability of rabbit meat is likely to be a hindrance.
- *Diversification of agriculture*: High value crops – such as certain aromatic plants may be suitable for cultivation. These would need to be identified and then cultivated on a trial basis. Successful examples could then be taken up on a commercial scale and efforts made to process these further. For example the setting up of distillation plants would be a good micro enterprise to link to aromatic plant cultivation. Some horticulture crops such as walnut are suitable for the region and an important source of revenue in some pockets. Direct marketing to increase the revenue of the walnut sellers would benefit a large number of families.

While the various line departments possess considerable expertise, collaboration with local universities as well as other research institutions in the Himalayan states may benefit the introduction of innovative techniques and expertise in managing available resources.

2) The Creation of New Livelihood Opportunities: Overall, all the earthquake affected areas are in dire need of diversification of the livelihood base and creation of alternate employment opportunities. Some strategies that are suitable include:

- *Vocational training*: A variety of skills appears to be in short supply and this opportunity can be used for training. For example, masons can be trained during the reconstruction phase. Training could focus not only on good quality masonry work but also to incorporate earthquake resistant standards into buildings.

- *Training of craftspeople:* Traditional Kashmiri crafts for which a market exists both nationally and internationally are carried out largely around the Srinagar area. These skills can be imparted to people living in the 'pahari' parts of Kashmir. Design inputs and more importantly market linkages are critical if any programme to train craftspeople is to succeed.

The underutilised community halls, built post earthquake, (now mostly under-utilised) are a perfect venue for the nucleus for community development and mobilisation activities including training.

- *Micro-Credit for Community Groups:* An important input into the livelihood development is micro-credit that can be extended to women's groups, community-based organisations and group enterprises. As mentioned earlier, the rural banks need to be sensitised to rural credit. While this is essential and will need some sensitisation and exposure visits for rural banking staff, micro-credit can serve as a critical input for strengthening existing livelihoods and for enabling affected households to experiment with livelihood diversification in the different sectors outlined above. Access to capital will also contribute to energising the groups towards identifying possible livelihood options, assessing the feasibility and monitoring. After the groups acquire maturity in terms of managing micro-credit and using it, linkages with formal banking systems can be explored for scaling up livelihood development activities and accessing mainstream government programmes and schemes. In addition, experience in India has shown that micro-credit alone is not adequate for enable groups to experiment with alternative and diversified livelihood option. Micro-credit 'plus' support in the form of implements, multipurpose infrastructure for storage, processing, training and meetings as well as for strengthening is equally critical.

- *Micro-Enterprise Development:* Micro-credit cannot be effective if individuals lack the skills to succeed in the businesses in which the credit is invested. Since the effect of natural disasters for some can be to make it impossible for them to return to former means of income generation, they may have to think about business in a much more structured way than earlier. Also, many of the new livelihood opportunities mentioned above will only generate income if people not only produce the products in the necessary quality and quantity but can market, cost and sell them effectively. A number of elements will be required:

Participative planning through Local Economic Development techniques should involve communities from the beginning in assessing their market opportunities, their skill and resource assets and deficits in exploiting these opportunities, and the supply and marketing chains of which they may need to be a part.

Enterprise skills training should be made available in local languages, if required. This training should be integrated with appropriate technical skills training and microfinance management training, as well as business training that has been especially designed for the needs of women, youth and where, necessary, for the needs of disabled persons.

Association and cooperative formation : many of the enterprises will operate as family businesses, or as groups of artisans or producers. Socially effective business management structures, such as cooperatives, should be explored in the initial consultations, and as enterprises grow they should be assisted to work together in member-driver small business associations, both to provide services to their members and to advocate their collective needs (e.g., in relation to infrastructure to government, commercial interests, donors and NGOs).

Overview:

Further studies are needed to develop feasible options.¹⁵ The affected areas have a unique set of opportunities and constraints. The region has the advantage of getting rapid attention and adequate funds given their geopolitical situation. The easy availability of wage labour employment and access to Government funds may be a deterrent to involve people in enterprise that requires high levels of initiative, taking of risk, and hard work before payoffs occur. Wage rates are also high compared to other parts of the country which is also a deterrent. However, alternate employment opportunities are very important in the long run and must be a focus of any rehabilitation plan. The earthquake can be seen as an opportunity to take these much needed steps in livelihood diversification.

Recommended Government Interventions (mill Rs):

Replacement of Damages and Losses:

- Funds needed to replace destroyed animal shelters and purchase livestock: 200
- Funds needed to restore agricultural land and line department buildings: 40

Development of the Agricultural and Horticultural Sectors: 100

Creation of New Livelihood Opportunities:

- Training and Capacity Building: 150
- Micro-Credit for Community Groups 90
- Micro-Enterprise Development 100

680 million Rs - \$15.2 million

¹⁵ For example it is recommended that thorough market assessments and existing skills profile be assessed before embarking on concrete activities. This is also essential in order to address the specific and concrete challenges linked to the youth and women that seem to lack employment opportunities. Also, a thorough insight to potential market opportunities and the peoples' present profile and their aspirations is essential to understand the role of men and women, particularly youth, in the social and economic reconstruction and local development with collective actions.

HEALTH

Introduction:

Health care in Jammu and Kashmir is mainly provided through well-organized curative and preventive health care networks. In rural areas services are provided through government hospitals and a network of NTPHCs (New type PHCs, Subcentres and PHCs.) The ICDS centres provide services like counselling of mothers and children for nutrition, pre-school education, immunization, and care of minor ailments to the 0-6 year age-group of children. In urban areas Government Hospitals and private providers are the main health care providers.

The earthquake has damaged a high percentage of Health-related infrastructure including equipment and amenities, and disrupted routine health services in the affected areas. many health centres are providing services in the make-shift arrangements or partially damaged health facilities which is not practically good for longer term.

The need assessment team held consultation with state and district government personnel, numerous affected people, NGOS and donors assisting the management of temporary shelters. The team visited Srinagar, Uri, Tangdar and Jammu.

The Pre-earthquake Situation:

In Jammu and Kashmir, with its average 1800 meters above sea level, long winters and snow covered valleys, the health of the people is far better than most other states in India. As per the 1998-99 survey, the data shows that both in urban and rural areas, the number of persons per 100,000 suffering from Asthma, TB, jaundice, malaria, are far above the national average. There is a greater percentage of children – in comparison to the rest of the country – who receive basic vaccination but also a much greater number of children regularly suffer from acute respiratory infection and diarrhoea. Similarly a greater number of women and children suffer from anaemia compared to other parts of the country.

In spite of, or perhaps because of the insurgency, the health care services are far better developed than most of the other states in North, Central, Eastern, and North Eastern India. For example the Apex Institute and the Sher-e-Kashmir Institute of Medical Sciences, are renowned for clinical, teaching and research.

Health Indicators:¹⁶

Life Expectancy at birth:	59.4 Male, 64.2 female.
Infant Mortality Rate (per 1000 live births):	47
Under 5 Mortality Rate (per 1000 live births):	80.1
Maternal mortality rate (per 1000 live births):	4
Neonatal mortality rate (per 1000 live births):	40

¹⁶ Sources, SRS 1999 Registrar General of India, NFHS 1998-99, IIPS & ORC Macro, 2002.

Vulnerability Assessment: Jammu and Kashmir and in particular is already, in comparison to other parts of the country, vulnerable to situations where health is at particular risk:

- ◆ Difficult geographic terrain, which is mostly mountainous, harsh inclement winters, where temperature is sub-zero for at least 4 months.
- ◆ Bad conditions of roads hampering different preventive & promotive health care activities
- ◆ Extreme proneness of the area to earthquakes (the State, Especially Kashmir and Jammu division lies in the seismic zone IV and V).
- ◆ Because of the slopes, during an earthquake, the underlying slopes give way which adds to damages and injuries.
- ◆ Because of the difficult terrain, rescue & relief work is slowed or stalled.
- ◆ Because of proximity to the border (LOC), the area suffers from the obvious consequences of cross-border hostilities.

The Impact of the earthquake:

1. The recent earthquake disrupted normal life, affected a large number of people, caused loss to lives, livelihoods, property and also disturbed environmental sanitation. To summarize it can be seen as follows.
2. **Mortality:** All the deaths that occurred were the direct result of the earthquake. No mortality occurred because of any outbreak or due to lack of medical care post earthquake. Government figures have varied during the recent months. Recent figures give the death figure at 1485 across the state.
3. **Morbidity status:** Due to hostile climate and habitation in temporary shelters Cases of Acute Respiratory infections are showing increasing trend. Disease surveillance is at intensified level to prevent and control any outbreak. A list of health risks that could still become prevalent include:
 - A) *Communicable Diseases:* ARI, TB, Waterborne Infections, e.g Cholera, Acute Diarrhoea & Vomiting, Helminthiasis, Reproductive Tract Infections, Measles
 - B) *Non-Communicable Diseases :* Hypertension, COPD, Diabetes, CV Diseases, Gastro-oesophageal cancers
 - C) *Nutritional Problems:* Anaemia, Protein Calorie Malnutrition
 - D) *Psychiatric Disorder:* Turmoil-related depression, Post-earthquake Mental Health Problems:

On verifying the records from various medical teams working in peripheries and at SDH itself it was observed that there has been no alarming increase of any communicable diseases so far. There have been sporadic cases of upper respiratory tract infections.

It was observed that there have been no reports of outbreak of any epidemic prone diseases.

4. **Disability:** The number of injured persons who will require rehabilitation is approximately 491. 59% of these injured were male and the majority of injured suffered either head and neck or chest injuries.

Planning to rehabilitate the injured persons should be a priority.

5. **Damage to Health Infrastructure:** Many Health infrastructures like Sub-district hospitals, PHCs have been either destroyed or damaged leading to disruption in provision of routine health services and preventive activities.

In total some 26 health facilities were destroyed and 83 damaged.

The facilities of cold chain, delivery, Immunizations, X-rays, ECGs, laboratories in Subcentres, PHCs, CHCs and District hospital were also badly affected by the earthquake.

6. **Water and Sanitation:** Our teams visited water sources of Tangdar Town and its adjacent areas as well as in various peripheral villages and it was observed that water supply of these areas is affected. In Tangdar and other villages, water is reserved in reservoir from springs and adjacent streams and latter on is supplied to the community without being treated properly. It is not being chlorinated and filtered at all. In other areas it is the spring water, which is main source of water, but again it is not being chlorinated. The water was tested for chlorine estimation by Chloroscope, and for any bacterial contamination by H2S strip method and it was found that water is not chlorinated but was bacteriologically free.

There is no good system of drainage anywhere in the affected area. Hospital waste is also disposed of unscientifically

7. **Post-earthquake Mental Health Problems:** The earthquake has affected the psychological and social behaviour of the community. Generalized panic, paralyzing trauma, depression and anxiety disorders were quite evident among the affected people and much will need to be done in the future.

8. **Nutritional disorders:** Currently due to well managed food distribution system and Vitamin 'A' supplementation campaign there is no evidence of malnutrition or deficiency disorders in the community.

9. **Human Resources:** Two issues have become clear, firstly that there is an urgent need for training in health disaster management, secondly that there is a shortage of specialist staff as we move to reconstruction, in particular gynaecologists, paediatricians, orthopaedic specialists etc.

Government response:

Results of the timely action taken by the Health Department were that very few people are believed to have died after the disaster because of the lack of medical care. The vast majority of patients recovered fully; and are ambulatory. It was also ensured that no outbreak occurred in the affected areas despite complete breakdown of water supplies and destruction of sanitary facilities.¹⁷

¹⁷ Experts from WHO & UNICEF visited the affected areas between 14 Oct & 21 November 2005 & toured the areas extensively. These teams assessed the situation, assessed the sufficiency & efficacy of health care provided to the affected population, provided on spot training and supported intensification of activities for prevention of outbreaks of communicable diseases.

Currently, health care is being provided by the Health Department in make-shift centres with the help of equipment diverted from the nearby health centres

To tackle the mental health problems, teams from AIIMS (Delhi), PGIMER (Chandigarh) & NIMHANS (Bangalore) visited the affected areas. These teams assessed the mental & psychological health status of the affected populations, deployed teams for diagnosis & treatment & provided capacity building training to doctors & paramedics for 7 days.

IEC activities viz. Health Education, Distribution of printed material, the conducting of group meetings & mass meetings are going on in different areas. People were made aware about the consequences of unsafe water especially due to the aftermath of earthquake, which has caused massive destruction as well as human and livestock loss. Awareness was also generated about the proper disposal of excreta, which is an impending threat as people go for open defecation.

Some details of immediate government response include:

- over 25,000 immunised for measles and given vitamin a supplement.
- Special health units present in the region post-earthquake treated over 38,000 patients in the 6 weeks afterwards, over 26,000 by specialised mobile teams, most of these treated as a part of normal health care rather than affects of the earthquake.
- Nearly two million chlorine tablets were distributed to affected communities to reduce infection possibilities, water samples taken and analysed and health education pamphlets given out in many areas.

Recommendations:

Effective recovery and rehabilitation should lead to better health care facility than pre disaster condition. This Phase is also time for thinking about the lessons learned from the recent disaster that could assist in improving current health situation. This phase actually should represent the beginning of a new Inter disaster phase and the development should take place to achieve the best probable outcome.

There should be a full time Public Health Coordinator either from the Government or any other organization, designated for the important task of coordination. The job of this coordinator should be to facilitate a strategy for the overall response for the health sector, pool in resources, monitor the programmes regularly, provide feedback to the implementers, and document experiences

The health department especially the emergency response team should be equipped and trained with an independent communication system like the army and the police.

Since the timeline for reconstruction of damaged houses is uncertain, the affected population will be residing in temporary shelters for an extended period. The need, therefore, is to strengthen provision of basic healthcare services, including RCH and immunization services, to the communities. This could be provided through the regular health system and by restarting outreach services. Provision of basic sanitation, vector control, water quality monitoring, surveillance for epidemic prone illnesses and psycho-social support are also crucial.

1. Morbidity: For intensification of disease surveillance capabilities, district laboratories need to be upgraded to perform microbiological and serological tests by

provision of equipment and training of staff. Since the Directorate of Health Services, Kashmir Division - catering to more than 62 lakh population - does not have a Regional Public Health Laboratory, adequate funds need to be provided for establishing one to enable the health department to perform relevant tests for prevention and control of outbreaks during routine and emergency situations.

For the prevention of outbreaks of waterborne infections, regular supply of safe drinking water is an essential. Since during the outbreaks, most systems of water supply breakdown it is beneficial to have alternate supplies through tankers. The health department will require at least 3 water tankers for routine and emergency outbreak response activities. To ensure supply of chlorinated water, the department will need 2 mini-treatment plants which can be taken easily to an affected area.

For quick dissemination of information the Disease Surveillance & Epidemic Section of the Directorate requires VSAT uplinking through Dish & Server.

2. Disability: There should be comprehensive rehabilitation programmes planned for the disabled, which cover all their needs- psychosocial, medical, and occupational. This clearly calls for a multi-department partnerships and partnerships across agencies. The earthquake has provided a good opportunity to plan long-term sustainable programmes for the thousands of disabled, which may not be the consequence of any disaster.

There should be effective partnerships of the various departments of the government such as health and social justice and empowerment and local NGO groups to give comprehensive services to the injured.

Occupational and vocational rehabilitation is another area, which needs long term planning and vision. All the efforts towards vocational rehabilitation should be to provide equipments of the long-term utility or the willingness of the beneficiary to make it a full time profession. For effective vocational planning the departments of health and social justice and empowerment need to work closely. There is lack of coordination though they deal with the same set of beneficiaries.

Costs will undoubtedly include physiotherapy, the provision of artificial limbs and tricycles (though the latter may be of little use in the worst-affected areas), paraplegic care and mental health provision.

3. Restoration of health hardware a) infrastructure: Obviously a key priority for government authorities there is clearly an urgent need for re-construction of the destroyed health facilities with replacement of the destroyed equipment and machinery. A key part of the reconstruction (details of which is given in the budgetary recommendations) is that all health facilities be built back to a better level than previously existed.

In addition, new establishments like Physiotherapy rehabilitation centre for the disabled can be constructed as a new initiative. Physiotherapy unit can be an additional unit which can be added to the existing health facilities.

b) equipment: Key equipment needs to be replaced at all levels of the health system. Secondly additional specialised equipment needs to be procured, including support to emergency health services such as emergency health vehicles, air and land ambulances etc, as well as telecommunication facilities at Uri and Tangdhar.

4. Human Resources:

- **General Shortage of Staff:** Analysis reveals there is a general shortage of trained staff within Jammu and Kashmir health facilities, particularly as we go

closer to the Line of Control. This should be properly assessed and special provision made by health authorities for the proper staffing at all levels.

- **Shortage of Female Medical Staff:** One particular aspect which needs urgent attention is the lack of female trained medical staff, where in some areas of the affected area there are no trained female staff of any kind, whilst in others they come to the health facility only infrequently. A serious study should be undertaken to examine this issue and make amends for the future.
- **Specialised Training needs:** Experience during management of the recent earthquake has revealed that the doctors working in the field are not well-versed with disease surveillance during emergencies, trauma care, disaster mitigation and diagnosis and management of different types of physical & psychological disorders arising during and after disasters. There is urgent need to train, on priority, at least 30% of doctors & paramedics in all the following areas:
 - Disease Surveillance during emergencies (3 days)
 - Outbreak prevention & management during emergencies (3 days)
 - Disaster preparedness & response (3 days each)
 - Emergency medical & surgical care during emergencies (6 days)
 - Diagnosis & Management of Post-disaster physical & mental health problems (3 days)

5. **Psychosocial support:** Management of thousands of cases of disaster-related mental health problems & their follow-up for at least 1 year is required, for which psychologists, psychiatrists and medical/psychological social workers will have to be invited from outside the State for providing training for the management of stress related problems. Additional funds to cover their travel & stay & transport will be needed.

Department of Health, Department of Social Welfare and Department of Education of the State Government should identify a nodal officer for PSS in the State. This apex coordinating group consisting of nodal officers from the three departments should conduct a meeting of all the stakeholders (NGOs, academic institutions, UN agencies, multilateral agencies and development partners) along with responsible persons in the affected districts from the corresponding departments. The meeting can develop an action plan for training, identification of service delivery mechanisms and monitoring.

Selection of Community level workers (CLWs) is one of the critical areas in PSS and from the experience of PSS in Tsunami areas in India, it is felt that personnel who are under an existing department or agency will be the best suited. The suggested groups are teachers, Anganwadi workers, health workers, Literacy mission staff and members of reputed NGOs in the field.

The first six months would require close supervision and strong referral linkages. From 6 months to one year, the intensity can be scaled down and by end of two years the formal arrangements should be over.

6. **Water and Environmental sanitation:** The most severely affected districts in Jammu and Kashmir are Srinagar, Baramulla, Kupwara and Poonch where spring waters have been blocked or contaminated by the impact of rolling boulders or debris. Since Pipe water supply systems have been The most challenging activities concerning water would be ensuring Chlorination of water. Recommendations are:

- To create awareness on Environmental Sanitation both at the shelter level and affected villages. For this IEC material should be widely used. Regular awareness camps should be organized in the shelters as well as in the affected villages by health workers and community health workers.
- To ensure supply and quality of water regular monitoring of availability of water in the local reservoir and checking of residual chlorine should be done with the support of the community workers.
- To stop accumulation of waste water areas around water sources distribution tanks should be properly paved and proper drainage facilities should be provided. The drains should be connected to the Soak pits. Community friendly toilets should also be introduced in selected areas.
- For improving household solid waste management, apart from awareness camps, refuses collection arrangement should be initiated with the support from the community. Construction of soak pits, distilling of drains and occasional spraying.
- To improve personal hygiene for the women, Bathroom facilities along with disposal of sanitation napkins by small-scale incineration should be introduced in the shelters.

7. Restoration of Reproductive and child Health Services: The services for maternal care, emergency obstetric care, Family planning services and essential newborn care need more attention. A catch-up round of ante natal mothers for check-up should be carried out. Position of Specialists and female health workers should be filled up on contractual basis if vacancy is there. Availability of Condoms and drugs for the syndromic management at all the level of health facilities should be ensured. Counselling to mothers about nutrition and immunizations should be routine activities.

Long Term recommendations:

Improved blood bank and CT scan facilities are recommended as a very important future investment of authorities.

Budget Requirements¹⁸:

Kashmir Division:

Infrastructure		Funds Rs Million	Funds £ Million
Reconstruction Destroyed Health Facilities (inc better water supply/heating)	Fully destroyed: SDH-1, PHCs 7, SC 17; Partially destroyed: SDH 1, PHCs 5, SC 14.	173.5	3.87
Communication facilities: V-Sat, fax, Internet etc.	Both general health facilities as well as disease surveillance & outbreak monitoring.	2	0.04
Disease Surveillance Laboratory	Regional level and 2 district labs	9.9	0.22

¹⁸ Building and equipment budgetary recommendations are based on Directorate of Health Services, Jammu and Kashmir.

Biomedical Waste Disposal Facility	Uri and Tangdhar (1 each)	8	0.18
Rehabilitation Centre Construction	Tangdar (1 centre)	10	0.22
Sub-Total		203.4	4.54

Equipment			
Replaced Destroyed Hospital Equipment		23	0.51
Replacement Vehicles	6 ambulances, 6 supervisory	5	0.11
Mobile Tele-Medicine Units	3 required	4.5	0.10
Sub-Total		32.5	0.73

Human Resources			
Specialist Health Workers	Support staff for rehab phase: Gynaecologist, paediatrician, orthopaedic surgeons, physicians, paramedics.	5	0.11
Capacity Building and Training	Specialised post-disaster health risk management training	10.38	0.23
Sub Total		15.38	0.34

Total Cost Kashmir Division 5.61

Jammu Division

Infrastructure		Funds Rs Million	Funds £ Million
Reconstruction Destroyed Health Facilities (inc better water supply/heating)	Fully destroyed DH 1, Partially destroyed DH 3, SDH 10, PHC 15, AD 3 SC 26, & 6 Hospitals in Jammu Town	239.3	5.34
Communication facilities	Both general health facilities as well as disease surveillance & outbreak monitoring.	2	0.04
Disease Surveillance Laboratory	Regional level and 2 district labs	9.9	0.22
Biomedical Waste Disposal Facility	Poonch and Rajouri	6	0.13
Rehabilitation Centre Construction	Poonch and Rajouri	8	0.18
Sub-Total		265.2	5.92

Equipment			
Replaced Destroyed Hospital Equipment		22.5	0.50
Replacement Vehicles	3 ambulances, one supervisory	1.5	0.03
Mobile Tele-Medicine Units	2 required	3	0.07
Sub-Total		27	0.60

Human Resources			
Specialist Health Workers	Support staff for rehab phase: Gynaecologists, paediatricians, orthopaedic surgeons, physicians, paramedics.	5	0.11
Capacity Building and Training	Specialised post-disaster health risk management training	9	0.20
Sub Total		14	0.31
Total Cost Jammu Division			6.84
Total Jammu and Kashmir			12.45

Total Cost Kashmir Division			
Sub Total	12.38	0.34	0.34
Capacity Building and Training	10.38	0.33	0.33
Specialist Health Workers	2	0.11	0.11

Jammu Division		Kashmir Division	
Infrastructure	Funds Rs Million	Infrastructure	Funds Rs Million
Reconstruction Destroyed Hospital factories for better water supply/irrigation Communication facilities	339.3	200.5	8.92
5000 general health facilities as well as disease surveillance & outbreak monitoring	5	0.04	0.04
Upgrade Surveillance Laboratory Regional level and 2 district level	9.9	0.52	0.52
Medical Waste Disposal Facility	6	0.15	0.15
Rehabilitation Centre Construction	8	0.18	0.18
Rehabilitation Centre Recovery and Relocation	202.5	8.92	8.92
Sub-Total	368.7	8.92	8.92
Equipment	23.5	0.51	0.51
Repaired Destroyed Hospital Equipment	1.5	0.03	0.03
Replacement Vehicles	3	0.07	0.07
Mobile Tele-Health Units 3 required	3	0.03	0.03
Sub-Total	27	0.64	0.64

EDUCATION

I. Introduction

¹⁹ The literacy rate of J&K, according to the 2001 census, is a dismal 54% overall (66% male, 42% female) compared with India's at 65%. Further, the districts of Baramullah and Kupwara have one of the lowest literacy rates in the state with literacy rates of 44.6% and 40.8% respectively. This is despite the fact that the state has been officially providing free education up to the university level to students in 11,334 primary schools, 4,000 upper primary schools, and 1,509 high and higher secondary schools.

The reasons for this are many: high drop-out rates due to economic constraints faced by parents in purchasing books, uniforms, etc., leading to child labour and children retained to do household chores. Further, issues of access, gender and caste bias, emotional stress due to the impact of conflict/ militancy, and school quality - poor infrastructure, lack of furniture, teaching-learning materials, poor teacher education and motivation, etc. - remain to be resolved.

II. Overview of Earthquake Impact

The earthquake destroyed or badly damaged 846 schools in the *Srinagar* division of *Kashmir*. Some 439 primary schools in *Baramulla* District, and 225 in *Kupwara* District, were completely destroyed. Some 109 middle schools, 20 high schools, and 6 higher secondary schools were also destroyed, and an additional 100 schools sustained major damages in these areas. Two Zonal Education Offices in Kupwara also sustained damages and are in need of repair.

Since schools were not operational when the earthquake struck, very few students were killed or disabled as a result; many students were, however, injured as a result of the disaster in their homes and all have had their school books, materials, and clothes completely destroyed.

Baramulla and Kupwara districts are quite distinct in geographic make-up and the issues that emerge for reconstruction and rehabilitation as a result. Kupwara is an area that is very hard to access because of the distance from Srinagar, mountainous terrain, and proximity to Line of Control. These factors clubbed with the fact that passes completely close off during the severe winter makes access to these interior areas almost impossible. Further, lack of land for construction of schools is also a problem here because of the high population density in the area. Baramulla, on the other hand, is easier to reach by road (neither is it far nor are the roads in bad condition) but accessibility is still an issue because people live in villages that have huge distance between them making planning for rehabilitation difficult. For example, a village may have 3 hamlets with the trek from one hamlet to another taking at least 4 hours!

Although people have experienced huge losses of agricultural land and property, very few want to leave their "area" to relocate. This coupled with the fact that access will

¹⁹ Source: Sarva Shiksha Abhiyan, Annual Plan and District Aggregation, Jammu & Kashmir, 2004-2005

further be hampered during winter, support for survival will be most critical during the months of January to March.

III. Reconstruction and Recovery Needs

The interventions for the recovery and reconstruction of the educational system should be strategic in using this opportunity to "build back better" – to impact the educational infrastructure and systemic capacity in such a way that educational indicators for Kashmir improve from pre-earthquake conditions (which were low to begin with) with the creation of "child friendly schools".

In order to build back better, the following needs must be addressed with the interventions recommended:

1. Creation of an Information Base (short term need)

Systematic and up to date data for the education sector in J&K is lacking. A reliable data base is needed for effective planning of need based interventions. Thus, there is a need to conduct a series of desk reviews and studies to fill this lacuna. Studies need to be commissioned on topics such as the nature and functioning of educational institutions (schools, ALC's and EGS centres), their management structures, teacher education programs, the status of girls' education and children engaged in labour, etc. ²⁰Assuming that 2-3 desk reviews will be conducted to substantiate the recommendations, the estimated cost is USD 6,700.

2. Infrastructure (planning & design = short term, repair & reconstruction, long)

It is recommended that interventions include support to the government in the design and reconstruction of the damaged and destroyed schools. All new building plans should include the essentials for a quality school – adequate space (commensurate to the number of students in the school), proper light and ventilation, separate toilets for both boys and girls, drinking water supply, garbage pits, a playground, provisions for children with disabilities, etc. Further, inputs from the concept of *BALA- Building as Learning Aids*, could be incorporated in the design of new building as well as those which are to be repaired. For Tangdar, since available land for construction is an issue, alternative designs should be considered. Suitable locations for the schools should also be selected with the help of the community so that access to school does not become a problem for the children²¹.

Inputs for school design, can be provided through the concept of *BALA- Building as Learning Aids*, adding to the cost of reconstruction and repair of primary schools by 10%. Since about 927 primary schools were affected by the earthquake, an estimated USD 900,000 will be needed.

Separate toilets for girls and boys with water facilities can be constructed in the affected schools within a budget of USD 1.3 million; adding a drinking water facility will cost another USD 0.5 million.

²⁰ See attached budget.

²¹ The total number of schools damaged or destroyed in the 3 districts is 1094, (Baramulla 589, Kupwara 312, & Poonch 193); the estimated reconstruction and repair costs for the schools is taken from figures supplied by the government.

It is important to create child-friendly spaces for children in school. On such initiative for classes 1-2 is the painting of walls with blackboard paint to create blackboards for children to use at their level. Garbage pits and playgrounds are also essential components in a school. Both these interventions are estimated to cost about USD 0.5 million.

3. **School Supplies**²² (short term, for winter camps and when school resumes)

We recommend that the government provide essential school supplies, classroom furniture, and setting up of school libraries. School furniture should have a child-friendly design and be suitable in size for both the teachers and students. Blackboards, shelves to store materials, stationery for students and teachers, recreation/ sports kits (indoor and outdoor play materials), school bags, and winter uniforms, etc., should be part of the essential school supplies.

Supplementary reading materials in both English and Urdu are also of great need in the schools. Books should be selected by the government in cooperation with the National Book Trust, Scholastic, etc. and quantities procured as per need to set up school libraries. Teachers should be trained on how to effectively use these libraries for optimal development of children's language skills. If required, UNICEF could supply *Meena* print materials to the schools to help promote education for girls and their social development. Further, the government should provide technical support to the teachers for development and production of localized teaching learning materials.

4. **Trauma Counselling**²³ (short term)

Teachers need counselling support to deal with the trauma of the loss felt by the earthquake and skills on how to work in the stressful post-earthquake conditions. Teachers also need to be equipped with the skills to identify children in distress and provide them psycho-social support and, if required, refer them to other available resources. It is recommended that these training for teachers be organized by the government as a priority because the teachers and children need this support now, rather than later. Further, it is urgent since it will get harder and harder to reach them once the severe weather sets in and limits access to certain areas (e.g. Karna).

Attendance in schools is poor despite community mobilization activities conducted by GoK. Announcements were made via public radio and mobile vans in villages and mosques to motivate parents to send their children to school. This is a clear indication that parents and children are in distress and would benefit from psycho-social counselling and support. "Winter camps" should be run between January and March while schools are closed to provide some informal learning, psychosocial

²² Furniture will cost approximately USD 450,000 for affected schools assuming 20,000 students and 500 teachers have been affected. Supplying classroom equipment such as mobile blackboards, display boards, gardening tools, and school stationery for teachers and students will cost about USD 400,000. Four sets of early readers for classes 1-2, and 2 sets of supplementary readers for classes 3-4 of the 927 primary schools will cost USD 125,000 and supplying school bags and water bottles will cost USD 140,000. All supplies will only be necessary if not already available; a pre-assessment of quantities will be necessary before making a purchase.

²³ A 2-day residential training will prepare teachers to work with students affected emotionally by the earthquake and also deal with their own anxieties of returning to school. To train about 500 teachers, several interactive trainings will need to be conducted costing about USD 15,000.

support, and at the same time act as safe play areas for children while their parents focus on the rebuilding their homes etc. This activity will help to restore the daily routine that the children are used to, which will contribute to the reduction in the trauma felt from the earthquake. Perhaps then, when school reopen in March, parents will be more willing to send their children to school, and children will be more willing to attend school.

5. Capacity Building for Teachers²⁴ (short term need)

It is critical that teachers are equipped with skills to teach effectively. Many teachers need training in special skills such as multi-grade multi-level teaching (MGML). Others need training in peace education so that this can be made part of the regular teaching-learning process. Training for teachers through distance education modes such as through the radio, etc. also needs to be explored by the government so that teachers working in remote areas can be reached.

Exposure visits for teachers and administrators to successful education programmes should be organized so that they are able to interact with models that are innovative and can be accomplished in their settings. For example, a trip to study the innovations Bhuj post-earthquake can serve as a source of motivation for the teachers and give them hope to improve their working conditions.

6. Programmes for Adolescent Girls & Boys (short term)

In the aftermath of the disaster, adolescent girls are finding the lack of privacy from living in a tent very distressing. As the sanitation system has broken down they must wait until after dark to be able to go to the toilet and this leads to an increased risk of abuse as young girls are moving around alone after dark. Special emphasis should be given to empower adolescent girls who are most vulnerable in these times to exploitation by providing them life skills education; the life skills education package could include knowledge of first aid, hygiene, and karate to help build the self confidence of the girls and provide them emotional support.

Further, both adolescent boys and girls will benefit from career counselling and vocational training in schools so that they are better aware of the opportunities that await them after school. If a resource base is created among the adolescents, a much larger audience can be reached in a shorter span of time. For example, if five adolescents are trained from each middle, high, and higher secondary school (total of 835 adolescents), they will be able to reach out to all their classmates.²⁵

7. Nutrition (short term)

A need was expressed for nutritional supplements for children in schools to supplement the existing midday meal programme. A request has been sent by the state government to the Government of India to modify the norms in the scheme temporarily (for the months of March and April) for the children in earthquake affected areas. It is proposed that children in all classes (1-12) can get a complete meal in school—a meal consisting of more than just *rice and dal*. If the proposal is

²⁴ Such exposure visits can be planned for candidates, e.g. 20 teachers and administrators and cost about USD 5,000. Other trainings for teachers such as in multi-grade multi-level teaching and peace education will cost about USD 55,000.

²⁵ The cost is estimated at USD 20,000.

not accepted by GoI, it will be imperative for GoK to provide nutritional supplements for all children attending schools regardless of their class, so that they have a complete well-balanced diet at least once a day.

8. Systemic Capacity Building²⁶ (short term)

There is clear indication from the government that there is need to build capacity of the system to do effective monitoring and management of the schools. Educational officials will benefit from a series of trainings in effective management and monitoring of enrolment and retention, student achievement, distribution and use of supplies, and overall quality of their schools.

IV. Reconstruction and Recovery Strategy

With the goals to ensure that all school-age children in the earthquake affected areas return to school in a protective environment, interventions must be planned and implemented strategically for maximum impact. The Reconstruction and Recovery strategy should have 2 phases.

Phase I

1. Information Gathering - In Jan-Mar.2006, while the schools are still closed for winter break, some essential groundwork be completed so that implementation can be initiated in April 2006.

The first step would be for the government to review, with district counterparts, the level of implementation, budget, etc. of existing educational schemes initiated by the central and state governments. Programmes/ schemes that should be reviewed include the Sarva Shiksha Abhiyan, Mid-day Meals Scheme, Total Sanitation Campaign, NPEGEL, KGBV, etc. The second step would be to review of resources available, both human and material.

2. Planning - After the review process, it is recommended that the government prepare a draft Plan of Action specifying key areas for intervention with inputs from local partners and the community. The Plan of Action should define the role of partners (agencies specializing in education of children, NGOs, institutions, panchayats and other government sectors) in the field.

This note should be discussed in an open forum with all partner agencies, where priorities and areas for support can be jointly identified.

3. Budget - Detailed Budget (including a plan for supplies and their distribution) should be prepared in consultation with the district education officials. Funds available from other sectors like rural development, social welfare etc should be factored into the budget.

Phase II

1. Implementation - it is imperative that certain recommendations such as exposure visits for the teachers, winter camps for children, selection of supplies, and desk

²⁶ A training for district and block level officials of the education system will cost about USD 10,000.

reviews, begin immediately while the aforementioned review and planning process is under way.

2. District level resource groups should be constituted to advise implementation and build capacity of education officials programme delivery and management.

3. Multi-media communication campaigns to address issues of children out of school, child labour, education of girls and regular attendance in school should be designed and implemented.

4. Area specific strategies should be developed in partnership with communities for special focus groups of children such as those living in remote areas, belonging to specific caste groups and orphans.

5. Monitoring should be an integral part of Phase II. Monitoring formats and review mechanisms will need to be developed based on the plan. Community based monitoring systems could be an effective strategy in this context.

		Estimated Unit Cost		Total
		INR	USD	USD
I	INFRASTRUCTURE: Primary, middle and high schools plus ZEO offices damaged and destroyed: 1094 buildings			
	TOTAL I	17,600,000	391,111	14,364,444
II	SCHOOL ENVIRONMENT: Improvements in design, water-sanitation, drinking water, waste management, play areas etc.			
	TOTAL II	90,900	2,020	3,097,207
III	SCHOOL SUPPLIES: Furniture, class equipment, stationary, tools, etc.			
	TOTAL III	16,920	376	975,864
IV				
	TOTAL IV			78,940
V	OTHER RECOMMENDATIONS: Information base, life skills development for children etc.			
	TOTAL V			52,344
	GRAND TOTAL			18,568,800
	That is to say, approximately:			
	Construction & Repair Costs	USD	14.4 Mill	
	All other costs	USD	4.2 Mill	

²⁷ Fully itemized and detailed budget available upon request.

HOUSING/SHELTER

A. Introduction

1. The October 8, 2005 earthquake of magnitude 7.4 epicentred in Muzaffarabad region of POK caused massive destruction to houses and public buildings in Pakistan and Jammu and Kashmir. The initial reports indicate that about 29679 houses were fully damaged and 83189 partially damaged in the state of Jammu and Kashmir. The area affected in the state was predominantly rural. The affected districts in Jammu and Kashmir are Srinagar, Baramulla, Kupwara, Anantnag, Pulwama, Budgam, Jammu, Kathua, Udhampur, Doda, Rajouri and Poonch.

2. Most building types in the state of J&K were constructed of random rubble masonry packed in clay or weak sand mortar with sloping corrugated galvanized iron sheet roofing. At Uri, most of the structures suffered substantial damage or were completely destroyed. The damage to buildings was equally severe in the Kamalkot region. In Baramulla town some of the buildings showed sign of distress. In Poonch district the worst affected villages are in the Haveli and Mandi Tehsil. In Srinagar town, damage to buildings was not significant except for partial collapses of few old/weak walls. In Kashmir region traditional timber-brick masonry construction consists of burnt clay bricks filling in a framework of timber to create a patch of masonry (locally referred as *dhajji-diwari*), which gets confined in small panels by the surrounding timber elements. The performance of such structures has been excellent with 'low' or 'no' damage but such construction is rarely undertaken in these days. The houses in the affected regions are scattered across the landscape along with the agricultural land. The overall damage to housing sector is attributed to the poor quality of construction material and inadequate construction practices for building in an earthquake prone area.

B. Government Response and Assessment of damage

3. **Damage Overview:** Assessment of damage to housing units poses a greater challenge, because of the complexity and geographical spread. The task of damage assessment has been commenced by a team of Govt officials in the affected areas. A preliminary assessment indicate that about 27497 dwelling units collapsed and about 65111 were partially damaged in the Srinagar division. The details are given in Table 1.

Table 1: Summary of damage to housing units in Srinagar division

Sl No	Districts	No of Villages affected	Persons Killed	Persons Injured	Property Fully Damaged	Property Partially Damaged	Total property Damaged
1	Srinagar	-	02	237	16	4256	4272
2	Baramulla	95	675	4499	15663	24597	40260
3	Kupwara	42	272	1369	11696	25905	37288
4	Anantnag	-	-	13	22	390	412
5	Pulwama	-	-	21	20	641	661
6	Budgam	-	01	10	80	9322	9402
Total		137	950	6149	27497	65111	92608

Similar assessment report of Jammu Division indicates that about 20260 dwelling units were damaged. The summary of the damage details are given in Table 2.

Table 2: Summary of damage to housing units in Jammu division

Sl No	Districts	Persons Killed	Persons Injured	Total property damaged
1	Jammu	01	06	2608
2	Kathua	-	-	858
3	Udhampur	04	07	3463
4	Doda	02	03	1319
5	Rajouri	-	03	4216
6	Poonch	10	72	7796
Total		17	91	20260*

* 2182 houses fully damaged and 18078 houses partially damaged.

4. The reconstruction costs are calculated on the basis of rebuilding to earthquake resistant standards and suitable to local conditions. The total value for reconstruction of the affected housing stock is given in Table 3. The cost estimate is Rs.500 per sq ft for completely destroyed homes and for major repairs as Rs.100 per sq ft (the average value of repair is taken as 20% cost of new construction). The reconstruction cost is estimated at Rs. 7.28 billion/\$161.8 million (of which Rs. 4.67 billion for new houses) if *replacement houses*²⁸ are built of 300 sq ft with seismic resistant features. An additional 5% is kept aside as contingency owing to unforeseen expenses and non-uniformity in existing damage assessment. However, the assessment of the household asset damages and other needs was beyond the scope of the work of the present team and would require further work and visits to the affected areas in order to estimate total exposed value.

Table 3: Estimates for Reconstruction

Region	Damage State		Reconstruction Cost		
	Fully Damaged	Partially Damaged	New (300sqft)	Repair	Total
Srinagar	27497	65111			
Jammu	2182	18078			
Both regions	29679	83189	4.45	2.49	6.94
Total including 5% contingencies (Rs Billion)			4.67	2.61	7.28

²⁹Cost estimate for reconstruction = Rs. 500 sq.ft and for repair = Rs. 100 sq.ft

²⁸ Assumptions: House Size: 1) The average perception of the housing unit size in the region lies in a range of 500-600 sq.ft, however the basis of estimating the size for reconstruction of the damaged houses has been on the information received from the survey being conducted by the Government in the earthquake affected areas: the average plinth area of the house in the survey was reported to be 300 sq.ft. 2) These recommendations reflect construction needs for the Core Unit of the house – 2 rooms plus kitchen plus bathroom - though necessary provision will have to be made in the initial design for future extension of the house.

²⁹ Assumptions: Cost: 1) The average cost of the construction as per the discussions with the technical experts and the NGOs involved in the construction of temporary shelters in the earthquake affected region vary from Rs.350 sq.ft to about Rs.750 sq.ft. This is again based on housing unit design, use of construction materials and the transportation charges of the raw materials on site. As the approach decided is owner driven it is assumed that the beneficiary would be involved in the construction work and this would result in engaging only key masons and less labour support in construction. A significant portion of the construction materials can be used from the damaged structure. Use of non-local materials will have a direct impact on the expenditure of construction.

5. **Immediate Government Emergency Response re Housing:** What was quickly clear was that people had to be quickly re-housed before winter set in. Various forms of relief assistance have been provided to the affected population, including the building of community shelters (initiative by Ministry of Urban Development; 66-URI, 38-Tangdhar, 26-Poonch), and the provision of financial packages for both temporary and permanent reconstruction. The Government of J&K has sanctioned Rs.1Lakh for each fully damaged house for its reconstruction (this package will be released in two instalments. First disbursement of Rs.40,000 has already commenced). Rs.30,000 is sanctioned for building of temporary shelters in view of imminent winter with an incentive of Rs.5000 for families which construct shelters by or before 10th of December 2005. The Govt of J&K chose to opt for owner-driven approach for the construction of temporary shelter. Rs.30,000 has been sanctioned per affected family for rebuilding partially damaged houses. In order to ensure disbursement of sanctions to the affected house owners, the compensation amount was disbursed through individual bank accounts.³⁰

6. **Emerging issues:** The strategy for rehabilitation may be influenced by a series of impediments. Key issues include: the damage assessment methodology of the private buildings; issue of number of Chulhas, relocation of severely affected villages; Training and Capacity Building a) technology transfer of multi-hazard resistant construction to various stakeholders, b) capacity building of engineers and skilled/semiskilled/unskilled artisans is very important to facilitate owner driven construction; availability and fair wage of labour and shelter/settlements buildings located in heavy snowfall/avalanche prone areas. These constraints need to be attended for facilitating effective shelter reconstruction programme.

- **Assessment of private buildings:** This is an extremely difficult task, especially in rural and inaccessible areas, and the complexity of the problem has been further compounded with non-uniformity in approach and methodology to categorize building damage. Resurveys have been conducted in several villages. In some cases there are attempts to take undue benefits so that they can get the maximum benefit. There are also a large number of claims seeking assistance for more than one house. It is felt very necessary to complete the assessment of damage with detailed methodology and provide proper briefing and orientation to the damage assessment teams for completing this task. The broad criterion of G1-G5 damage classification is suggested. As the issue involves technical, factual and legal aspects, the task of damage assessment need to be accomplished with reasonable degree of objectivity and promptness.
- **Number of Chulhas:** The practice of independent households living under one house is not adequately addressed. During the construction of temporary shelters the compensation was based on the number of houses and not Chulahs. Many large size family now live in temporary sheds. The cost of the construction for a large family size cannot be met with the current compensation package as it seems to be inadequate for reconstructing the house with disaster resistant features. A number of disputes/grievances in the Lok Adalat belong to this

Many individuals are replacing stone by bricks and replacing mud mortar by cement mortar. The cost of the key raw materials is on a higher side as it includes transportation charges. Keeping all these factors in mind it is assumed that the cost of construction built of seismically accepted standards can be kept at Rs 500 sq.ft. (2) The cost for retrofitting is assumed to be 20% of the cost of pucca house and hence it is kept as Rs.100 sq.ft. The assistance is at the rate of Rs.100 per sq.ft for up to 300 sq.ft. (i.e., up to a total of Rs.30000)

³⁰ A parallel system of Lok Adalat was instituted to address complaints and assistance entitlements. The Lok Adalat gave their judgment and the Revenue Department was instructed to implement the judgment.

category. Many complaints have been pending and this can have a significant impact and cause delay in the reconstruction programme.

- **Relocation of Villages:** This issue is a pressing concern in few villages from safety point of view. A few villages are threatened by the unstable geological condition and this needs to be closely monitored. In case sites are identified for relocation the administration should initiate a dialogue with the community and discuss in developing a plan for resettlement. A suitable option for the community would be to choose an area close to the existing settlement provided conditions for safety is perceived from technical grounds/geological hazard assessment. However relocation of the villages/settlements will have other significant impacts.
- **Repair of Damaged Urban Infrastructure:** It is suggested this be addressed as a separate package as it involves redevelopment of the existing municipal and environment infrastructure along with provision of shelters. Severe damage has been reported from three towns namely, Uri, Tangdhar and Poonch. The economy of the towns and the surrounding region has been severely affected. Urban areas/severely damaged settlements may need a reconstruction policy different from that required for the rural areas.
- **Technical coordination and Capacity Building of engineers and artisans:** It is very important to facilitate the know how of earthquake resistant design and construction during the permanent rehabilitation of the affected households. The approach of owner-driven construction allows people to construct the houses themselves with the assistance and facilitation of the Government. In order to add value to the owner-driven approach it is very essential to build the capacity of the local engineers/masons/artisans and rope in the local construction industry for creating a safe habitat. The local engineers expressed their need for continued training in the areas of earthquake resistant construction, damage assessment and retrofitting of buildings in the winter months before gearing up for speedy and effective housing reconstruction programme.
- **Fair wage of artisans:** The issues of over-inflated wage rates for construction artisans needs to be addressed as the reconstruction process begins in earnest in the spring.

C. Repair and Reconstruction Needs, Specific Strategies/Interventions

7. Housing is the sector most seriously affected by the earthquake. The immediate needs of temporary shelter were a top priority for the affected communities and the Government. The provision of temporary shelter has been adequately addressed and it is time to develop the strategy for drawing up a holistic reconstruction programme. Immediately after the earthquake the GoJ&K began considering the options for rebuilding of the affected sectors. Packages of financial assistance were developed according to the two general damage categories: completely destroyed and other partially damaged. The objective of the current assistance package is to assist the above two categories of damage. The current assistance package for reconstruction can be further streamlined and standardized by incorporating specific clauses to address market instruments for risk reduction measures.

8. **Approach to recovery strategy:** The specifications for shelter need to be precise and should be in lines with the local context. International and Indian experience from Gujarat, suggests that owner driven in-situ construction is likely to lead to fast reconstruction and acceptance of the beneficiaries and such empowering

the individuals/communities would avoid potential creation of risks arising out of unsafe construction. Appropriate guidelines and standards for reconstruction of housing will have to be laid down before actual reconstruction period starts. The implementation of the programme can be decentralized and quality control/quality assurance, technical assistance/support, financial management can be coordinated by the respective state department. Based on past experience and with reference to the existing guidelines for shelter assistance, key policy guideline has been suggested in Annex 2, found on page 97.

Under the current arrangements, existing financial assistance and capital infusion model (Owner Driven Construction) for post disaster housing recovery, the following recovery strategy is suggested for implementation of the reconstruction programme. -The GoJ&K/District Administration can partner with organizations and NGOs with good capacity and outreach to facilitate the implementation in partnership with the Government. A large number of NGOs has submitted their proposal for their association with the Government in the reconstruction programme. Arrangements outlining the Memorandum of Understanding with the Village Level Reconstruction Committees, District Level Reconstruction Committees, partner organization/NGO selected by the panel of the Government to facilitate reconstruction and the Technical Advisory Group/Revenue Department/Finance Department of GoJ&K shall guide the technical and financial arrangements. The common design standards and quality control standards will have to be packaged with respect to existing construction technology in the affected region. In case of relocation of villages and reconstruction in the extremely damaged regions demand based grant assistance will have to be worked out after conducting a detailed survey.

9. The overall strategy for repair and reconstruction is influenced by a large number of constraints and this need further work to lessen the impact in the long-term recovery of the state. Keeping in mind the key constraints, the recovery strategy has therefore been put under the three broad reconstruction needs: *Phase 1 - Immediate needs, Phase 2 - Medium Term needs, Phase 3 - Long Term needs.*

Immediate Needs: The GoJ&K have already carried out emergency steps to providing temporary housing and financial assistance to the affected people. Several round of damage assessment, setting up of Lok Adalat, construction of community shelters, assistance for housing damage and temporary shelters, training of Government engineering staff and other efforts has been going on since the day of the earthquake. As the construction activity would be minimal in the winter season a door of opportunity exists to take up large number of initiatives in the next three months through specific programme interventions.

Medium Term Needs: The key to success of owner-driven construction is to cater to capacity building programme of the community for early recovery in this sector. The primary task is to sensitize the people in earthquake resistant construction through a sustained awareness campaign, and distribution of IEC material and construction of a two Technology Demonstration Unit (TDU) in every affected village (one TDU on new construction and the other TDU on retrofitting). One of the key suggestive immediate measures before the spring is to ensure transparency and wide scale information dissemination through the formation of the state level Housing Reconstruction Programme Management Unit, Technical Advisory Group, District Level Reconstruction Committees and Village Level Reconstruction Committees. The Joint Assessment Team would like to draw the attention for intervention in the following areas in the immediate future:

- Critical need is to conduct a detailed and transparent damage assessment in rural and urban areas of the affected region
- Necessary arrangements for establishing supporting institutional facilities for achieving the training for damage assessment in housing sector
- Set up a Task force and appointment of a State Level Seismic Advisor
- Prepare schemes/packages for housing and overall reconstruction
- Initiate intensive awareness campaign for seismic safety and other IEC Activities/programmes
- Initiate the process of community consultation and participation to chalk out medium to long term recovery requirements.
- Setting up institutional arrangements/linkages for appropriate construction of disaster-resistant construction.
- Retrofitting programme for damaged structures in rural and urban/town areas.
- Debris removal (salvaging, recycling and disposal of unusable rubble) in damaged urban and rural areas.
- Immediate training needs has to be met by organizing training and capacity building programmes with on-site demonstration training on construction of earthquake resistant structures and repair/restoration of damaged houses for Government Engineers, participating NGOs and construction artisans.
- Prepare standard design options with respect to existing building technology in different effected regions. Resource mapping studies of existing/available building materials and availability of construction artisans along with their skill assessment can be useful in developing local strategies for implementation of the programme.
- Prioritize and carefully phase the investment for the Housing Reconstruction Programme.
- Development of effective monitoring arrangements with technical and financial audit at all stages.
- Development of panel of partner organizations and NGOs after conducting capacity assessment of the organizations involvement in past reconstruction programmes.
- Initiate efforts towards long term seismic risk reduction and mitigation.
- Consideration should also be given to key market instruments such as mandatory house insurance for all new construction.

Long Term Needs: The construction of the permanent shelter is expected only after the winter season gets over and continue till December 2006. The most important step of rigorous evaluation of the existing damage and associated vulnerability to future earthquake events must begin now followed by extensive training programmes and certification programme for skill development of the professionals and the construction artisans.

Engineered and non-engineered buildings in the zone of less impact will have to be addressed as part of the continued efforts of earthquake risk mitigation and preparedness in the state of J&K. One noted step on the mitigation front is introduce relevance of building byelaws to regulate land use and building construction by the Department of Housing and Urban Development, GoJ&K.

In general a large portion of the building stock in the country including the state of J&K is vulnerable to earthquakes. During the reconstruction phase, repair of both damaged and vulnerable buildings needs to include seismic strengthening. A possible replication strategy of seismic resistant construction and retrofitting demonstration can be taken into consideration in the programme design for the

lesser/non earthquake affected areas of the state. Therefore the feasibility for a seismic retrofitting programme should be examined in the J&K state. Appropriate incentive/financial packages will have to be explored to support retrofitting. A state specific road map can be drawn with set strategies and fixed time lines/work plan for implementation to minimize the effects of earthquake in the near future.

10. Recommended interventions for Emergency Housing Reconstruction

Although interventions based on the needs have been discussed in the above paragraphs, the following key programme interventions have been summarized for immediate action plan.

Reform in Housing sector -The earthquake has given an ideal opportunity to introduce reforms in the housing and development planning sector. The GoJ&K has to conduct intense campaigns and develop a capacity within the system to teach new technology. Earthquake mitigation has to be centered with the community development programmes in order to reduce future loss. Housing insurance programme should be introduced in the reconstruction programme and this can also be tied up as an incentive to the houses built with disaster resistant features. Mandatory insurance coverage should be brought in for the fully damaged buildings and the premium can be made as part of the installment given to the beneficiary. The programme can be further taken to the houses which suffered partial/no damage by means of awareness programme and insurance *melas*.

Technical guidance and monitoring of physical construction of houses - The shelter sector demands improvement of construction practices and procedures. Initiatives such as the owner-driven reconstruction programme, role and involvement of the local community, transparency and equity procedure and various capacity-building initiatives need to be taken up. A doubtful point is whether there is sufficient awareness of the seismic hazards and the earthquake-resistant design & construction practices among the stakeholders in these areas. Earthquake resistant design & construction, technical support and capacity building programme for all stakeholders in the subject of earthquake engineering and promoting earthquake-safe construction will be a cornerstone for the reconstruction program. Public Information kit will have to be made available to the entire beneficiary group along with constant support for technical advice during the stages of construction. The programme design should ensure that realistic measures are put in place to achieve development progress in the state and avoid future disaster risks in the region.

Building technology adoption in the reconstruction programme - Traditional non-engineered structures in the zone of destruction featured a wide use of construction materials and local technology with no disaster resistant features. The main focus will have to be on the technology and the use of local available construction materials for reconstruction. Earthquakes in the past have demonstrated, the initial promise of the new material has not been realized by many because of the failures of the entire building delivery system. Building technology and design options will have to be made region specific depending on the parameters of availability of local materials and functionality aspect of the houses. Adequate thermal comfort provision needs to be factored in the design stage.

D. Estimated cost for programme interventions in the Shelter sector

11. Table 4 presents the estimated total cost of proposed interventions/programmes in the shelter sector.

Intended Interventions/programmes		Indicative Budget	
Suggested Activities	Time frame	INR in million	(US\$ in million)
Social and Environmental Impact Assessment of Housing Reconstruction	Feb-Apr 2006	1	0.02
Construction of TDUs* & Training and Capacity Building Programme for 3500 Construction Artisans** @30 per batch	Feb-Dec 2006	7.5	0.17
Training and Capacity Building programme of Engineers from the Govt Department and training of Engineers from the participating NGOs involved in the reconstruction programme	Feb-Dec 2006	3	0.07
Demonstrating shake table tests on earthquake resistant prototypes in two sites	Mar-06	4	0.09
Sensitization programme for Village Level govt functionaries	Feb-06	0.5	0.01
Mass Awareness programme (including development of IEC Material, Guidelines etc) for advocating Seismic Safety in the state	Feb 2006- Dec 2007	6	0.14
Support to Skill Development and formation of Artisan Self Help Groups	June 2006 - Dec 2007	2	0.05
Human Resource Support for setting up of the Housing Reconstruction Programme Management Unit, Technical Advisory Group and Mobile Unit for Quality Control	Feb 2006 - Dec 2007	5	0.11
Capacity Development Support of Technical institutions	Feb 2006 - Dec 2007	2	0.05
Seismic Vulnerability Assessment of Private Building Stock and preparation of Housing Atlas	May 2006 - Apr 2008	2.5	0.06
Damage & Loss Assessment Methodology Framework Development for J&K (Rapid Assessment Methodology/Detailed Assessment Methodology)	May 2006 - Apr 2008	8	0.18
Joint Monitoring Review of the Post Earthquake Reconstruction	May 2006 - Dec 2007	3	0.07
Introducing risk transfer mechanism in housing reconstruction programme	Apr 2006 - Dec 2007	3	0.07
Total Cost		47.5	1.07
*2 model TDUs one featuring seismic resistant construction and other featuring retrofitting of a damaged structure will have to be built in all the 135 villages. The structures will be selected under the ongoing reconstruction programme. These structures shall facilitate the onsite training/hands-on for Engineers and Construction Artisans			
** The Certification process can be considered			

A. Background and Sector Assessment

1. Restoration of the road network damaged in the October 8 earthquake is considered to be among the highest reconstruction priorities of the Government of Jammu and Kashmir (GoK). The State has a relatively extensive road network, totaling about 29,000 km, of which 823 km are national highways. Responsibility for these roads is shared among the Public Works Department (PWD), the Rural Development Department (RDD), the Forest Department (FD), and the Border Roads Organization (BRO). The PWD network covers 14,828 km, of which 2,082 km are in Jammu region, 7,284 km are in Kashmir region, and another 1,792 km in Ladakh. Of the total PWD network, 12,102 km are un-surfaced (black top), installed or graded, and 2,726 km are un-surfaced (air washed, jacquard). BRO is responsible for about 2000 km of national and state highways of which 870 km are national highways. The Forest Department and Rural Development Department between them look after another 12,400 km of village link roads and forest roads, a majority of which (about 11,000 km) are un-surfaced. Major arterial urban roads fall under the jurisdiction of the State PWD and the remaining under various Municipal Corporations.

2. Several road improvement programs have been initiated in the past, most funded through the central government budget. One of the most important programs is the "four-laning" of the national highway between Jammu and Srinagar and the Srinagar bypass, under the National Highway Development Project (NHDP). Four-laning of the national highway, it is understood, is to be extended to Baramulla. The rural road network is also being upgraded under the Prime Minister's Rural Road Program. Rural infrastructure was obtained support from the National Bank for Agriculture and Rural Development (NABARD). The NABARD assistance received by PWD under the Rural Infrastructure Development Fund (RIDF) focuses on roads in rural areas. While J&K also receives funds for state highways from the Central Road Fund (CRF), these funds are far from adequate. About 1,000 km of the network would be rehabilitated under the Asian Development Bank (ADB) assisted Multisector Infrastructure project.

B. Damage Overview and Government Response

3. Earthquake damage to the road network was concentrated in the Kashmir region, in the districts of Uri (Baramulla District) and Tangora (Kupwara District) which are adjacent to the Line of Control (LOC). The main border crossing point, Kaman Post and the Aman (Peace) Bridge, are located in Uri Tehsil and development of the road link, which suffered some of the worst damage, to establish cross-border transport services is an important national priority. In fact the road had only recently been improved in preparation for the cross-border bus services which were inaugurated as part of the peace process. Another cross border link is the Chokidal-Tangora-Chamtoo-Sikh Bridge-Tithwal road section in Tangora Tehsil.

4. Also a road construction and maintenance agency under the Ministry of Shipping, Road Transport and Highways (MORTH), BRO operates in existing works in border areas where it is unable to obtain contractors due to security or access problems. Works undertaken are funded either directly by MORTH (General Civil works), or by State sponsored (Agency works) or by private-governmental bodies (Special works). As a result, BRO has developed the capacity to work under a variety of institutional arrangements.

ROADS AND BRIDGES

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³¹ BRO is a road construction and maintenance agency under the Ministry of Shipping, Road Transport and Highways (MoSRTTH). BRO specializes in executing works in border areas where it is difficult to obtain contractors due to security or access problems. Works undertaken are funded either directly by MoSRTTH (General Staff works), or by State agencies (Agency Works) or by private/non-governmental bodies (Deposit Works). As a result, BRO has developed the capacity to work under a variety of institutional/contractual arrangements.

which is one of the five border crossing points India and Pakistan agreed to open to facilitate relief operations. In addition, there was some damage to roads in Jammu and Poonch districts of Jammu region. In Poonch there was damage to the Akhnour bridge which had to be downgraded to R-9 (tons) capacity as a result of a failure in its post-tensioning cables after the earthquake.

4. The road network being critical for the undertaking of relief operations after the earthquake, the PWD and BRO had responded immediately, and made most of the affected roads operational on the day of the earthquake itself. The emergency operations involved clearance of debris and boulders deposited on the road due to landslides, filling up of fissures and cracks on the road, creation of temporary tracks and bridges, and cutting of hillsides. With regard to expenditures incurred to restore connectivity, impacts on the local population and disruption of economic activity due to road damage, Uri and Tangdhar are of primary concern. Key data for the two tehsils are presented in the table below. Most roads in Uri and Tangdhar suffered some damage either due to landslides and fissures, or from the movements of heavy equipment to clear debris immediately following the earthquake. Basic connectivity was restored and the roads made passable within a relatively short period of time thanks to concerted efforts by PWD and BRO units in the area.

Table 1: Basic Information on Road Networks - Uri and Tangdhar Tehsils

Tehsil	Uri	Tangdhar
Population	119,000	55,000
Number of Villages	95	42
Approximate Land Area (Sq.km.)	255	130
PWD Road Network (km)	152	62
BRO Road Network (km)	100	70

Expenditures Incurred and Losses as a Result of Road Closures

5. It is difficult to estimate the expenditures incurred for this initial effort as various resources were drawn upon without clear contractual arrangements for the works carried out. For the PWD and BRO networks, the estimated expenditures for this effort involving a total of about 600 km of affected roads may be estimated to be on the order of Rs. 30 million to Rs 40 million. In addition, emergency repairs were effected on an estimated 200 km of rural and forestry roads managed by the Rural Development and Forestry Departments, and this may be estimated to add another Rs 10 million to the costs of the immediate restoration works undertaken. Consequently, the total estimated cost of the immediate restoration works for the road network may be estimated at around Rs. 50 million.

6. Economic losses suffered by the local population as a result of road closures are even more difficult to estimate since a significant portion of the employment in the area derives from labor engaged in road works and the demand for this actually increased as a result of the restoration works necessitated. However, there clearly were negative impacts as travel and goods transportation costs increased due to road closures and disruption of bus services. For the population in Uri and Tangdhar numbering around 200,000 these losses, which occurred over a period of about a month, may roughly be estimated to be a reduction in incomes and/or an increase in expenditures totaling about Rs 50 million.

7. The immediate losses suffered as a result of damage to the road network may therefore be estimated to be on the order of Rs 100 million. The need now is for

permanent repairs and concurrently, where appropriate, some upgrading works to improve the functionality of the network. It is noted that further restoration of the unsurfaced network is not required as these earthen roads were adequately repaired in the immediate effort to restore connectivity.

Damage Assessment for the Road Network

8. Earthquake damage to the roads in the area was primarily caused by (i) major landslides causing the loss of an entire section of the mountain slope and the road traversing it, or depositing a large amount of debris on the road where the mountainside is unstable; (ii) longitudinal deep fissures in the road itself; (iii) sinking of roads; (iv) damage and/or distress to bridges and culverts; (v) damage to retaining walls, breast walls, parapet walls, toe walls and crash barriers; (vi) changes in hydrology at a few places affecting the drainage of the road section; and (vii) unstable mountainside slopes that may potentially become landslides.

9. PWD and BRO have produced cost estimates of the works needed to restore and upgrade the road network. Many of the upgrading works proposed were already planned and or been partially implemented prior to the earthquake. In other cases, e.g. under-designed bridges, it would not be efficient to restore the facility to its original under-designed condition. Consequently, much of the upgrading proposed is a necessary complement to the restoration effort. In this section, the upgrading element has been separated to arrive at a damage estimate (Table 2) for comparison with the overall needs assessment presented in the next section which primarily reflects the PWD and BRO estimates.

	100	100
BRO Road Network (km)	100	100
PWD Road Network (km)	100	100

Table 2: Roads and Bridges Damage Assessment

Economic losses suffered by the local population as a result of road closures were more difficult to estimate since a significant portion of the employment in the area derives from labor engaged in road works and the demand for the activity increased as a result of the restoration works necessitated. However, this clearly was a negative impact as travel and goods transportation costs increased due to road closures and disruption of bus services. For the population in UN and Tanager, numbering around 200,000, these losses, which occurred over a period of about a month, may roughly be estimated to be a reduction in incomes and/or an increase in expenditures totaling about \$5 million.

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Sl. No.	Road	Length	Cost(Rs. Million)
Roads (km) under Jurisdiction of PWD Jammu and Kashmir Regions			
1	Baramulla	37.0	111
2	Kupwara	63.7	191
3	Anantnag	2.3	7
4	Srinagar	0.6	2
5	Poonch	14.5	43
6	Jammu	1.3	4
Total Base Cost for PWD Roads and Bridges			358
Roads (km) under the jurisdiction of BRO			
7	Uri-Salamabad-Kaman Post	17.5	123
8	Chowkibal-Tangdhar-Chamkot-Sikh Brdg Tithwal	66.7	300
9	SM Hill-Taya-Ragini-Ustad-Pharkian Galli	53.7	86
10	Baghbella-Nagina	19.4	58
11	Red bridge -Dehrian	23.4	70
12	Uri-Santra-Mike	22.9	69
13	NS Bridge-Rustam-UK	27.0	81
14	Mohra-Baaz	39.2	118
15	Handwara-Naugam-TMG-Kaiyan Bowl	64.9	143
16	Srinagar-Baramulla-Uri ³² National Highway	101.0	1010
Bridges (meters) under the jurisdiction of BRO			
17	Red Bridge on Jhellum River	46	16
18	Twin Bridge on Jhellum River	40	14
19	Akhnoor Bridge on Chenab River	138	48
Total Base Cost for BRO Roads and Bridges			2136
Rural and Forestry Roads (km) under the Jurisdiction of RRD and FD			
20	Estimate of works done on rural and forestry roads	200.0	10
Total Base Cost for RR and Forestry Depts Roads			10
Total Damage Assessment			2504

C. Needs Assessment for Reconstruction and Upgrading Works

10. As mentioned earlier, the needs assessment includes upgrading works necessary to ensure the functionality of the road network. The sorts of design considerations and safety features to be incorporated in the upgrading works are discussed in paras. 14-15 below. In the following the reconstruction needs are presented separately for the PWD and BRO networks. It should be noted that none of the cost estimates presented here include physical or price contingencies.

Public Works Department Roads:

11. As mentioned earlier, the Kashmir region suffered the largest damage in the earthquake, and the PWD provided the mission a list of about 30 roads damaged. The Jammu region suffered far fewer road damages mostly in the Poonch District. The total rehabilitation cost for these PWD roads is estimated to be about Rs 722 million. Rehabilitation of PWD roads is expected to cost about Rs 3 million per km,

³² No estimate was provided for this road. It has been assumed that to develop this existing intermediate lane road to 2-lane National Highway specification will cost about Rs15 million per km.

and the estimates of equivalent kilometer lengths are only indicative estimates based on this assumed unit cost per kilometer.

Roads and Bridges:

12. The road section that suffered most extensively is the Uri-Salamabad-Kaman Post road (length 17.25 km), which was opened in April 2005 for cross border movements of goods and people, including the passenger bus services connecting Srinagar and Muzaffarabad. While the immediate restoration of the road has been completed (it took about 25 days to reopen the road to traffic), permanent rehabilitation and restoration works are still to be carried out. The Aman Bridge is still under construction and had not yet been opened to traffic. Another cross border link affected by the earthquake was the road section Chowkibal-Tangdhar-Chamkot-Sikh bridge - Tithwal (length 66.67 km). However, the link only has a suspension footbridge at Tithwal and therefore cannot handle vehicular traffic. Consideration may be given to upgrading this bridge to accommodate vehicular traffic. These two roads were historical trade links between Central Asia and the Kashmir Region before 1947. Both roads are the responsibility of the BRO who would undertake all rehabilitation works. Besides the abovementioned important road links under the jurisdiction of BRO, some other roads under the jurisdiction of BRO were also affected and these are listed in Table 4 below.

13. The Table also lists the various bridges requiring rehabilitation. BRO, Jammu, informed that a bridge at Akhnoor on Chenab River had been affected on the Jammu - Akhnoor - Rajouri - Poonch road that connects to one of the five border crossing points. Presently, the bridge is operating with restrictions on the weight of the vehicles (9 tons). This bridge requires replacement and upgrading to two lane 70 R standard to meet the requirements of the Indian Road Congress. In addition, an alternate bridge location has been developed upstream from the Akhnoor Bridge and a bridge was under construction but works had been halted after the bridge approaches and some piers had been constructed due to contractual problems. Construction of this alternate bridge will provide redundancy for the Akhnoor bridge along this separate alignment. Two other bridges, the Red Bridge and Twin Bridge, on the river Jhellum are part of the Uri - Khaman Post itinerary discussed above, and will require rehabilitation and upgrading to 70 R to meet the needs of the traffic expected once the border crossing is opened.

14. Based on BRO estimates for the repair of damages, and mission estimates of the additional costs of safety and functionality improvements (see para 15 below), and the overall estimates for the BRO roads is shown in Table 4 below. In addition, BRO presented two tunnel projects needed to maintain year-round access to Leh in the Ladakh region. The first is a 3.1 km tunnel, the 'Z' Morh Tunnel between Gagangir and Sonamarg on the Srinagar - Leh road. The cost estimate for this tunnel is on the order of US\$75 million. The other tunnel is at Zojilla Pass also on the Srinagar - Leh road, and is a 12 km tunnel, with a cost estimate of US\$300 million. These tunnels while intended for an important purpose, round the year access to the Ladakh region, are not directly linked to the reconstruction works related to the earthquake. Consequently, they have not been included in the estimates of reconstruction needs.

D. Reconstruction and Recovery Strategy

15. The recommended reconstruction strategy for the road sector would be based on a three phase approach: short-term measures which can be implemented within a year, medium-term measures which could take a little longer, say three years, and longer term measures. The above needs have been disaggregated into these three Categories as shown in Table 3 below. The expenditure estimates for short-term, medium-term and long-term are Rs. 613 million, Rs 2910 million and Rs 361 million, respectively. In determining the category for the various investments, the primary consideration has been the time needed for preparatory works and implementation considering the relatively short construction season in the area.

Table 3: Roads Sector Short, Medium and Longer Term Programs

	Implementing Organization	Length	Cost (Rs. Million)
Short-Term Program Implemented in Less than 1 year			
Baramulla District PWD Roads	PWD	37.0 km	111
Kupwara District PWD Roads	PWD	63.7 km	191
Anantnag District PWD Roads	PWD	2.3 km	7
Srinagar District PWD Roads	PWD	0.6 km	2
Poonch District PWD Roads	PWD	14.5 km	43
Jammu District PWD Roads	PWD	1.3 km	4
Snow Clearance machines, JCBs, Dozers	PWD		58
Baghbella-Nagina	BRO	19.4 km	58
Red bridge -Dehrian	BRO	23.4 km	70
Uri-Santra-Mike	BRO	22.9 km	69
Total base cost for Short Term			613
Medium-Term Program Implementable Within 3 years			
Uri-Salamabad-Kaman Post	BRO	17.5 km	406
SM Hill-Taya-Ragini-Ustad-Pharkian Galli	BRO	53.7 km	86
NS Bridge-Rustam-UK	BRO	27.0 km	81
Mohra-Baaz	BRO	39.2 km	118
Handwara-Naugam-TMG-Kaiyan Bowl	BRO	64.9 km	143
Chowkibal-Tangdhar-Chamkot-Sikh Brg-Tithwal	BRO	66.7 km	498
Srinagar-Baramulla-Uri National Highway	BRO	101.0 km	1,500
Akhnoor Bridge on Chenab River	BRO	138 m	48
Red Bridge on Jhelum River	BRO	46 m	16
Twin Bridge on Jhelum River	BRO	40 m	14
Total base cost for Medium Term			2,910
Longer Term Program			
Tangdhar New Connectivity	PWD	36.3 km	163
Uri New Connectivity	PWD	31.7 km	142
2 nd Akhnoor Bridge - Separate Alignment	BRO	170 m	56
Total base cost for Longer Term			361
Grand Total Road Sector Cost			3,884

E. Design and Construction Issues

16. GoJK desires that the permanent rehabilitation measures should be undertaken to higher standards than those for the existing facilities that were damaged, as it would (i) ensure higher level of serviceability with minimal period of closure due to landslides and snow; (ii) catalyze socio-economic development in the poverty stricken region; (iii) improve connectivity in the vulnerable areas to facilitate immediate relief measures in case of a future disaster; (iv) facilitate cross border movements and (v) tap the potential of tourism in the area.

17. Rehabilitation works in the area need to take into consideration the need to protect investments against future seismic events. This will require earthquake resistant structures, particularly for bridges, and slope stabilization measures (vegetation, proper drainage). Also, presently many of the bridge design loads are non-uniform varying between 9 R and 70 R along the same itinerary. Along the main national highway itineraries, it is proposed to rebuild the bridges (Red bridge, Twin bridge, Akhnoor bridges) for 70 R loads. The hydrology and drainage patterns along these roads also require careful study. Apparently the hydrology in the area has undergone some changes and new water courses have appeared after the earthquake. This will require a redesign of culvert locations to cater to the new drainage patterns. Along the main highways to be developed by BRO such as Srinagar - Uri - Kaman Post and Chowkibal - Tangdhar - Chamkot - Sikh Bridge - Tithwal, there is a need to improve the geometrics and introduce various safety features such passing zones and climbing lanes, crash barriers, improved sight distances, falling boulder protection where needed. The above cost estimates a little generous to allow for such enhanced features in view of the difficult terrain.

Sl. No.	Particulars	Unit	Quantity	Rate	Total
1	Grand Total Road Sector Cost				3,884
2	Total cost for Road Sector				381
3	1. Akhnoor Bridge - Seismic Reinforcement	BRO	1.70 m		86
4	Uri New Connectivity	PWD	31.7 km		145
5	Tangdhar New Connectivity	PWD	30.3 km		181
Larger Term Program					3,910
Total cost for the Road Sector					3,910
6	Twin Bridge on Jhelum River	BRO	40 m		14
7	Red Bridge on Jhelum River	BRO	40 m		18
8	Akhnoor Bridge on Chandi River	BRO	138 m		48
9	Changar-Baramulla-Uri Road Highway	BRO	101.0 km		1,800
10	Tithwal	BRO	66.7 km		198
11	Chowkibal-Tangdhar-Chamkot-Sikh Brg	BRO	64.8 km		143
12	Kotru-Badgam-Tangdhar-Sikh Brg	BRO	39.5 km		118
13	Uri Bridge - Jhelum	BRO	37.0 km		81
14	Uri Hill - Jhelum - Uri - Tangdhar - Chamkot	BRO	53.7 km		80
15	Uri - Srinagar - Kaman Post	BRO	17.5 km		100
Medium Term Program (Investmentable Within 3 years)					813
Total cost for Road Sector					813
16	Uri - Srinagar - Kaman Post	BRO	33.9 km		80
17	Red Bridge - Srinagar	BRO	33.4 km		70
18	Uri - Srinagar - Kaman Post	BRO	19.4 km		58
19	Snow Clearance Machine, 3000, 2000	PWD			20

STATE PUBLIC BUILDINGS AND HISTORIC MONUMENTS

A. INTRODUCTION

1. This section describes the damage assessment of public buildings, including administrative buildings, historical monuments and buildings. Administrative buildings belong to various line departments, and district level authorities and most of these buildings are built and maintained by the Public Works Department (PWD). The protected monuments mainly include historic monuments, which are under the jurisdiction of Archaeological Survey of India (ASI) and the State Department of Archaeology (DoA). Site visit was carried out with assistance from the PWD. The program covered the districts of Baramulla and Kupwara and the city of Jammu.

2. The main sources of information for the damage assessment presented in this section are the PWD, Urban Development Department and the DoA. Other sources include the reports produced in the local and national newspapers and magazines.

3. The historical monuments and buildings comprise an important part of India and J&K's cultural heritage. DoA is also responsible for those museums and libraries that occupy historic structures. 70 monuments are protected by the ASI, and 29 monuments are protected by the DoA. Some administrative buildings, hospitals, schools and colleges occupy historic structures, especially in Poonch. However, most of the unprotected heritage is under individual private ownership, especially the urban and rural vernacular structures.

Situation before the Disaster

4. Most of the public buildings in the severely affected districts were old, load bearing structures constructed using random rubble masonry laid in clay and mortar, in need of renovation. Many government offices also occupied historical buildings to which, often, new sections have been added without paying sufficient attention to structural aspects especially the seismic safety. The recently constructed buildings were relatively well built, although not necessarily with seismic considerations, and some needed more maintenance. The protected historical monuments also show signs of inadequate conservation and their structural soundness reportedly varied depending on their location, materials used and the historical period to which they belong.

5. The cultural heritage of the state also consists of many forts such as Poonch Fort, Akhnoor Fort, Riasi Fort and Hariparbat Fort, which needed urgent repair and restoration even before the earthquake but, their condition was further aggravated by the earthquake. In addition, there is a wealth of Buddhist heritage in the state, which is slowly and progressively decaying due to lack of protection and management.

B. EARTHQUAKE DAMAGES

6. *Description of damages.* The spatial distribution of damage to administrative buildings followed closely the damages in housing. Most of the public buildings destroyed were located in Baramulla, Kupwara districts in Kashmir region and Poonch in Jammu region. Of the 240 administrative buildings many of the buildings collapsed or were so damaged that these will have to be demolished.

7. The buildings that collapsed were usually old, one or two storey high structures with masonry walls. Damaged buildings were more geographically spread, but were also, for the most part, load bearing structures with light roof. In several cases, walls partially collapsed or developed heavy cracks, while the roof settled. In the case of more modern frame structures, expansion joints generally opened up, and minor cracks appeared in walls.

8. Damage to historic structures, and by extension the impact on J&K's cultural heritage, was significant. Damage to the famous Boniar Temple in Uri (Baramulla district), which is under the AIS responsibility, is extensive, and will require a major restoration effort and specialized technical inputs. Out of the 29 monuments protected by the Government of J&K, 5 suffered major damage and others suffered some damage such as major and minor cracks. Many unprotected historic buildings and monuments have been damaged.

9. *Damage Estimates.* To estimate the asset damages, collapsed buildings or those that will have to be demolished were assessed at their replacement value at current prices, considering additional costs to make them more hazard resistant. Two categories of damages were assumed (minor and major), and costs per square meter were estimated for each category based on current prices. Asset cost due to office furniture and equipment damaged was also assumed at replacement value at current prices. Demolition of buildings and debris removal were assumed as lump sum values and included as part of the asset damages.

10. No survey/assessment was carried out by DoA after the earthquake regarding the historic buildings that are not protected by the state government. No assessment of damage to the historic monuments was undertaken by the Assessment Team. However, the report on historic monument presented here is based on the verbal report of damages reported by DoA and which included Bhim Garh Fort, part of Mubarak Mandi, SPS Museum, State Archives Building and Hari Parbat Fort only. The needs estimated by the DoA is based on the preliminary surveys of the monuments, protection of which is within the state responsibility.

Public Buildings and Historic Monuments

Table 1 – Total Asset Damages and Reconstruction Costs

	Total Damages Rs million	Reconstruction (3 years) Rs million
Public Buildings	324.0	430.0
Historic Monuments	Not Estimated	141.0
TOTAL	324.0 *	571.0

* does not include damage estimates for historic monuments

C. RECOVERY AND RECONSTRUCTION NEEDS

Short, Medium and Long-term Needs

11. *Short-term (next 12 months) Needs.* The PWD is responsible for the repairing and rebuilding of most of the administrative buildings, and it has already started to do some minor repairs. Temporary office will be necessary, in some cases, while some buildings are repaired or reconstructed. Major repairs and strengthening of buildings, as well as design of new buildings with improved standards can be carried

out for smaller structures in the next 12 months. Detailed structural analysis study of the historic monuments and development of preservation strategy is to be taken-up.

Table 2 – Short-term Reconstruction Costs (12 month period)

Item	Administrative Buildings (Rs million)	Historic Buildings (Rs million)	TOTAL (Rs million)
Temporary Office Space	10.0	-	10.0
Minor and Major Repairs (*)	120.0	-	120.0
Office furniture and equipment	10.0	-	10.0
Demolition and Debris Removal	10.0	-	10.0
Conservation of historic monuments	-	6.0	6.0
Consultancies (**)	30.0	5.0	35.0
TOTAL	180.0	11.0	191.0

Notes: (*) Includes strengthening / (**) Includes supervision consultants and technical assistance consultants

12. *Medium-term (2-3 Years) Needs.* Reconstruction of the administrative buildings will have to be completed in the medium-term. However, it will be possible, if the designs are completed during the short-term phase. In addition, it is critical to carry out a comprehensive survey of critical public buildings to develop a state-wide retrofitting program (see para --- of Annex on Disaster Management). Actual implementation of conservation of historic monuments has to begin as early as possible in the second year so that substantial completion is possible by the end of the medium-term.

Table-3: Medium-term Reconstruction Costs (2-3 year period)

Item	Administrative (Rs. million)	Historic Buildings (US\$ million)	TOTAL (Rs million)
Recons. of Administrative Buildings	210.0	-	210.0
Conservation of historic monuments	-	125.0	125.0
Office furniture and equipment	20.0	-	20.0
Consultancies (*)	20.0	5.0	25.0
TOTAL	250.0	130.0	380.0

Source: Joint Assessment Mission Estimates

Notes: (*) Includes supervision consultants and technical assistance consultants

13. *Long-Term (beyond 3 Years) Needs.* Conservation/preservation works of the historical monuments has to be continued following the preservation strategy developed.

D. RECOVERY AND RECONSTRUCTION STRATEGY

14. *Short-term Program.* The short-term program to be implemented in the next 12 months, which would include: provision of temporary office space; minor and major repairs and strengthening to damaged buildings, and preparation of designs for buildings to be reconstructed in the next two to three years. The conservation of the historic monuments is important for preservation of the heritage. But, the works will be a slow process and would take considerable time. Table 3 above contains the detailed costs for the short-term program.

15. *Medium-term Program.* The medium term program would include design and rebuilding of collapsed or badly damaged administrative buildings. Conservation of various components of cultural heritage will have to be carried out by putting in place adequate systems for protection and management, and risk mitigation measures need to be introduced as part of these management systems. Conservation/preservation of the monuments taken-up under the short-term program is to be completed. Table 4 above contains the detailed costs for the medium-term program.

Notes: (*) Includes strengthening; (**) Includes supervision consultants and technical assistance consultants

1.1. Medium-term (2-3 Years) Needs. Reconstruction of the administrative buildings will have to be completed in the medium-term. However, it will be possible if the designs are completed during the short-term phase. In addition, it is critical to carry out a comprehensive survey of critical public buildings to develop a state-wide retrofitting program (see para -- of Annex on Disaster Management). Actual implementation of conservation of historic monuments has to begin as early as possible in the second year so that substantial completion is possible by the end of the medium-term.

Table 3: Medium-term Reconstruction Costs (2-3 year period)

Item	Administrative (Rs. million)	Historic Buildings (Rs. million)	TOTAL (Rs. million)
Repair of Administrative Buildings	210.0		210.0
Conservation of historic monuments		132.0	132.0
Office furniture and equipment	20.0		20.0
Contingencies (*)	20.0	2.0	22.0
TOTAL	250.0	130.0	380.0

Source: Joint Assessment Mission Estimates
Notes: (*) Includes supervision consultants and technical assistance consultants

1.2. Long-Term (Beyond 3 Years) Needs. Conservation/preservation works of the historical monuments has to be continued following the preservation strategy developed.

MUNICIPAL AND URBAN INFRASTRUCTURE

A. INTRODUCTION

1. The earthquake significantly affected the infrastructure sector both in urban and rural areas. But severer damages were concentrated in rural areas of Baramulla and Kupwara Districts (Kashmir Division) and Poonch District (Jammu Division). Damages were reported for such infrastructure systems as water supply and sanitation, electricity, and drainage, but water supply was most affected.

2. The Joint Assessment Team held discussions with various agencies of the GoJK, and made field visits to Uri and Tangdar areas of Kashmir Division. The assessment made by the Team is based on these discussions and field observations as well as on the data and reports received from GoJK. This is an assessment of preliminary nature, and a more precise assessment of the earthquake damage is not possible at this stage, due to the wide spatial spread of damage, time restrictions and data logistics.

B. DAMAGE OVERVIEW

Water supply

3. Water supply is the worst-hit sector among various infrastructure provisions. In the affected areas, most rural water supply schemes before the earthquake were gravity schemes with natural springs being water sources, and these schemes were supplemented by dug wells. In urban areas, there was a mix of gravity and pumping schemes using both groundwater and surface water as water sources.

4. In Kashmir Division, the earthquake damaged 336 rural water schemes and 9 urban water schemes, of which 140 rural schemes and 1 urban scheme were severely damaged. These damages affected the supply of drinking water to more than 1.2 million people. The damaged assets include: 31 water sources/intakes; 119 water reservoirs including overhead water tanks; 32 water treatment plants; and 173 distribution networks. The total estimated cost of these damages is Rs. 378 million.

5. Similarly, in Jammu Division, 169 rural water schemes and 16 urban water schemes were damaged, affecting about 130,000 people. The total estimated cost of these damages is Rs. 76 million.

Sanitation/Sewerage

6. There was a very limited number of sanitation facilities in the affected areas before the earthquake. In urban areas, most of the sewage was discharged into various water bodies without treatment. In Srinagar, however, there is a limited wastewater collection and treatment system. It is believed that there was no earthquake damage to this system. In smaller towns, some households had individual septic tanks, but assessing the damage to the underground tanks was not possible. The only damage reported in the urban sanitation sector is destruction of eight public toilets in Uri Town, and the cost of the damage is estimated to be Rs. 5 million.

7. In rural areas, it was estimated that less than 10% of the households had sanitation facilities before the earthquake. Based on the number of fully damaged houses, as many as 3,000 households may have lost their sanitation facilities. The total replacement cost for these facilities is estimated to be Rs. 150 million (Rs 135 million for Kashmir and Rs. 15 million for Jammu).

Solid Waste Management

8. There was very limited solid waste collection services in the affected areas before the earthquake. In urban areas, collected garbage was disposed of as open dumping in designated sites without any structures. In rural areas, there was no formal disposal system. Therefore, there was no structural damage in any of the dump sites. No damage was reported for collection trucks or any other waste management equipment, either.

Power

9. Electricity distribution was also disrupted by the earthquake. A total of 289 sub-stations and four receiving stations were damaged in Kashmir Division, and 41 sub-stations and five receiving stations were damaged in Jammu Division. GoJK has already restored most of these damaged stations except two in Kashmir Division. The overall damage to the power sector is estimated to be Rs. 350 million (Rs 300 million for Kashmir and Rs. 50 million for Jammu).

Other Infrastructure

10. Damages were also reported for storm drains and culverts in urban areas of Uri Town (Kashmir Division) and Poonch Town (Jammu Division). The cost of the damages is estimated to be Rs. 11 million and Rs. 34 million respectively. In addition, street lighting systems in these towns were damaged, and the estimated cost is approximately Rs. 6 million each in Uri and Poonch. In Uri, retaining walls in various parts of the town also suffered some damages, whose cost is estimated to be about Rs. 5 million.

11. In rural areas, the earthquake damages were also received for such infrastructure assets as drains, community facilities, retaining walls, and river bunds. A total cost of these damages is estimated to be Rs. 17 million in Kashmir Division and Rs. 9 million in Jammu Division.

Table 1: Summary of Damage to Infrastructure Sector (Rs. million)

	Water	Sanitation	Power	Others	Total
Kashmir	378	140	300	39	857
Jammu	76	15	50	49	190
Total	454	155	350	88	1,047

C. RECOVERY AND RECONSTRUCTION NEEDS

12. Following the earthquake disaster, GoJK has restored many damaged infrastructure systems through emergency repairs. In the worst-hit areas, for example, water supply has been restored in 98% of the damaged schemes in Uri area while 45% of the damaged water schemes have been restored in Tangdar area. Most of these repairs are, however, of temporary nature, and GoJK will continue to face a challenge of recovering infrastructure services until permanent restoration of the damaged infrastructure systems is achieved. The following sections will focus on water supply and sanitation sector, which will form a major part of the reconstruction of municipal and rural infrastructure.

Short Term Priorities (up to 12 months)

13. Short term priorities for recovering infrastructure services are continuation of emergency repairs, focusing on critical infrastructure systems such as water supply. For the areas where system restoration requires lengthy reconstruction, water services will be provided by building new hand-pumps for communal use or by delivering water tankers. It is estimated that Kashmir Division will need 125 such hand-pumps and Jammu Division will need about 70. Three new drilling rigs are required for this purpose. At least 10 new tankers are needed for Kashmir Division and three for Jammu Division. It is estimated that these short term measures will cost Rs. 234 million for Kashmir Division and Rs. 53 million for Jammu Division.

14. For sanitation, short term priorities should be given to construction of latrines at schools and reconstruction of public toilets. It seems that public toilets in the affected areas have a very negative image with very little use. Therefore, rebuilding damaged public toilets or constructing new public toilets would require particular attention to the following issues: (i) public consultation for designs and locations; and (ii) arrangements for cleaning and maintenance (possible community ownership or private/NGO operation). Given the very low coverage of sanitation in the affected areas, GoJK will also have to come up with Sanitation Policy to encourage community members to build and use latrines. It is estimated that building 400 public latrines will cost around Rs. 250 million (Rs 188 for Kashmir and Rs. 62 million for Jammu). This figure excludes costs of school latrines and private latrines as they are part of school reconstruction and housing reconstruction.

15. Even though emergency repairs have enabled many affected villages/towns to restore water services, it is reported that the quality of water has been deteriorated compared to the pre-earthquake level due to damage to water supply systems. This situation is believed to be exacerbated by lack of hygiene practices in the affected areas. During the field visits, it was reported that people boil water before drinking in some villages while disinfection tablets are distributed by NGOs in other villages. It is important that a public education/campaign be undertaken to promote practices of safe drinking water together with hygiene education. This education program will need to be designed, depending on each community's unique situation. At the same time, it is recommended that a program of water quality monitoring be initiated either by using field test kits or mobile laboratories. The estimated needs for these programs is Rs. 30 million (Rs 20 million for Kashmir and Rs. 10 million for Jammu).

Medium Term Priorities (12 months to 3 years)

16. Medium term priorities should focus on reconstruction of major infrastructure assets such as water filtration plants and overhead tanks. Before starting reconstruction, it is recommended that building codes and construction methods for these major works be reviewed and revised if deemed necessary. In addition to the design aspect, proper construction is equally important. Therefore, it is crucial to provide adequate construction supervision during the reconstruction of these major infrastructure systems. It is estimated that permanent restoration of the damaged water supply systems will cost Rs. 307 million for Kashmir Division and Rs. 53 million for Jammu Division (including some upgrading and construction supervision).

17. As part of the medium term reconstruction process, it is recommended that a leak detection program be undertaken at least in major cities of Srinagar and Jammu to further investigate the damage of underground pipelines. This should include investigation of sewage pipes in Srinagar and septic tanks in these urban areas. The estimated cost of this program is Rs. 40 million (Rs. 20 million each for Srinagar and Jammu).

18. In the severely affected villages, community facilities and civic amenities will need to be upgraded as other infrastructure systems are to be rebuilt. These mainly include community centers, storm-water drains, footpaths, and may also include garbage disposal facilities in some villages. The estimated costs for these facilities are Rs. 137 million for Kashmir Division and Rs. 59 for Jammu Division.

Table 2: Summary of Recovery and Reconstruction Needs for Infrastructure Short and Medium Terms Combined (Rs. million)

	Water	Sanitation	Power	Others	Total
Kashmir	561	208	330	137	1,236
Jammu	126	72	55	59	312
Total	687	280	385	196	1,548

*Water includes emergency repairs, new hand-pumps and tanker services, permanent reconstruction including some upgrading, and leak detection.

*Sanitation includes rebuilding of public toilets and hygiene education.

*Others include rebuilding and upgrading of community facilities and civic amenities.

D. OTHER CRITICAL ISSUES

Debris Removal and Healthcare Waste Management

19. The earthquake disaster has generated a huge amount of debris, and building permanent houses will in many cases require demolition of damaged houses, which will generate even more debris. At the moment, none of the affected villages/towns has a formal plan to systematically dispose of or recycle the debris. Given that most affected areas are inhabited by communities scattered over the areas, the existence of the debris within the communities might not pose direct health or environmental risks. Haphazard disposal of the debris, however, may block drains or streams, and potentially cause environmental hazards.

20. Moreover, many affected areas are disposing healthcare waste on an ad hoc basis, mostly dumping and burning on the ground within or close to residential areas. This issue needs to be carefully reviewed since it is safe to assume that more injured people due to the earthquake means more healthcare wastes. It is recommended that GoJK pay an appropriate attention to the management of these wastes especially in town areas in the short to medium term.

Relocation of Villages at Risk

21. GoJK is assessing the needs to relocate some villages (six in Uri Tehsil and nine in Tangdar tehsil, with a total 1600 families residing in these villages) affected by the earthquake, which are further facing the risks of future landslides or other natural disasters due to their terrains and locations. This relocation will have to be dealt with on a case by case basis, taking into consideration the degree of risks and costs involved in each village and community. GoJK has engaged Geological Survey of India (GSI) to assess the risks in some villages. The following aspects are to be carefully examined before a final decision to relocate any particular village is taken: (i) possibility of mitigating the risks; (ii) community members' willingness to relocate; (iii) community's inputs to the selection of new settlement or planning the settlement; (iv) access to markets or economic activities in the new settlement; and (v) availability of good water sources and other conditions critical to build new infrastructure systems; etc.

22. Given the uncertainty of whether relocation will actually take place and how many villages will be eventually relocated, it is not possible at this stage to estimate the costs for building new infrastructure systems in the new settlements

DISASTER RISK REDUCTION

A. Introduction

Vulnerability Picture: Jammu and Kashmir is generally an isolated and under-developed region of the country. The chief characteristics of the state are the predominance of the agricultural sector, low degree of urbanization, inadequately developed infrastructure, widespread illiteracy, high birth rates and low levels of investment. Added to the above socio-economic vulnerability its geographical location is in the northern extreme of the Country, distinct from rest of the states in terms of its topography, climate, economy, social setting and last but not least by its strategic location in the country's map.

Jammu and Kashmir, A Disaster Prone State: While Ladakh is practically free of **floods**, Kashmir Valley has recurrent problem of flooding due to overflowing of embankments and breaching of river channels, horizontal erosion of river basin of Jhelum and in Jammu division it is mainly due to spilling of banks and embankment erosion by river Chanab. **Windstorm** is a localized phenomenon but the cold deserts conditions of Ladakh is prone to high wind speed as high as 198 Km/hour which is comparable with "hurricane velocities" in the East Coast of India while in other parts of the State average design wind speed is 140 Km/hour. Being situated among the young folded mountains and hills, the State suffers **Landslides/Avalanches** extensively during rains and high intensity earthquakes. The thick vegetation cover on most of the mountains is subject to **forest fires** but these usually take place due to ill practices of the local people e.g. burning of bushes for making coal for Kangri on the one hand and negligence of the forest staff on the other. Despite being a water surplus state at one time the state now faces recurring **droughts** in all its part. The state has been witnessing one of the worst types of **man made disaster** for the last 15 years in which more than 50,000 human lives were lost.

Earthquakes in Jammu and Kashmir: Jammu and Kashmir state, situated as it is where the Eurasian and Indian sub-continental tectonic plates collide, suffers from very regular seismic activity. A large number of **earthquakes** of magnitude of 5.0 (Richter Scale) has occurred within the State particularly the Kashmir Valley indicating an average return period of about 8 months for one such earthquake. The city of Srinagar, which forms the core of the Kashmir valley, has suffered extensive damages by two earthquakes of magnitude 7.0 (Richter Scale) and 6.5 in 1889 and was destroyed again in 1963 earthquake of magnitude of 5.3 (Richter Scale). In the Vulnerability Atlas of the country, whole Jammu and Kashmir Valley has been identified as seismic zone IV with an elliptical area covering Baramulla & Srinagar and a small part of Jammu attached to Himachal Pradesh in Zone V of IS: 1893-1984.

The economic dependence of affected community is predominantly on traditional livelihood means i.e. agriculture, horticulture, animal husbandry and wage labour related activities provided by armed forces and civil authorities. This lack of diversified economic base as there are no Industries (large or medium) or any other productive enterprise as well as limited opportunities enhances the vulnerability of the community and economy from natural hazards. Due to various socio-cultural factors and geographical terrain the most vulnerable groups are women, children, old, differentially able and require special provisions. In addition to this large scale deforestation, over exploitation of natural resources rapid urbanization, unplanned

development, population explosion etc are some of the key factors to intensify the impact of disasters. Also, the geo-morphological features of the area adds to the vulnerability and due to these natural hazards proposals are floated to relocate villages to safer areas which renders the community as environmental refugee which needs proper planning as relocation may enhance the vulnerability of the community.

Reconstruction and Recovery Needs

Keeping in view the over all situation in the state before and after the earthquake the issues mentioned below based on our observations and discussions with government officials and NGOs involved in the relief and rehabilitation work have emerged as critical issues that need to be addressed for an effective disaster management in the State and the affected areas.

Short Term

- *Lack of Mechanisms for Coordination between different sectors:* During our discussion with government, NGOs as well as community it was felt that each sectors is preparing plans according to their priority and there is no mechanism where these can be converged for reducing the risk. Very little initiative has been taken to converge the needs and requirements of the various sectors.
- *Lack of Sectoral guidelines which not only protects the assets recreated but also provides safety to vulnerable population from future disasters:* the government has taken some steps to usher safe housing construction by providing training to the Engineers and placing them in the affected villages but as it is not linked through any policy mechanism it may not be effective. Secondly no other sector has provided any such guidelines.
- *In absence of proper restoration planning unsafe houses are being built:* No Building bylaws are there for the rural areas as such the houses are built according to the local understanding using stone, clay and mortar with corrugated galvanized iron sheet roofing. These poorly build structures failed during this earthquake and as no proper guidelines have been issued while giving the housing compensation they are once again being rebuilt. We need to address this issue.
- *No mechanism available for involvement of community and professionals to tap traditional knowledge or coping:* it has been found that some buildings built some traditional construction practices perform better during earthquakes.

Medium Term

- *Lack of understanding of Risk, Vulnerability and Safe technologies amongst all the stakeholders:* the majority of the government officials, NGOs, civil society organization and community lack the knowledge about hazards and measure for reducing the risk. For example many people were under the misapprehension that earthquakes in Kashmir occur only once every 120 years, so therefore there is no need for such things as disaster planning and earthquake resistant construction. For them building back to previous standards is the goal.
- *No mechanism available for involvement of community to tap the traditional knowledge or coping skills besides local preferences that need to be addressed to*

reduce future disasters: it was found that the traditional knowledge to building houses which many feel were safe during earthquakes or usage of traditional heating mechanism like bukhari or kangari have reduced presence in the affected areas which increases the dependence on outside help during a disaster as well as reducing the resilience of the village. Secondly, in many places the community centers built by the government or other agencies have not been used and are lying empty as it is culturally not acceptable. Thus it is essential that these practices and local preferences are understood to prepare the community to face any other disaster.

- *Inadequate Multi-Hazard Vulnerability Assessment mechanism that identifies physical, social, economic and cultural aspects to prevent rebuilding of risk:* The state does not have a multi-hazard disaster management plan and the district plans like Srinagar does not highlight the vulnerability or the capability of the district, it also does not take into account the role of different stakeholder present within the district like the armed forces or the other agencies. It is essential that a comprehensive multi-hazard risk assessment looking into the past vulnerability is undertaken in the state with priority given to the affected areas.
- *Heavy dependency on outside agencies for immediate response:* It has been seen that the local administration as well as the community lack the capability of responding to any disaster and are heavily dependent on the forces which increases the response time. We need to adopt community based disaster risk management approach which would enhance the capability of the community for preparedness and emergency response to reduce our losses through capacity development training programmes.
- *Lacks of effective communication system restricts easy flow of information and hamper effective response and relief:* The government as well as the NGOs are still looking for information in all sectors. The information provided in many sectors look as if they have been over estimated while detailed village wise information is still awaited. This not only restricts adequate supply of relief measures but also gives rise to accusation of foul play which can be seen from the number of cases filed in the Lokadalat set up by the J & K government in the affected areas. In Uri Tahsil itself about 8,000 cases had been filed. The communication system put in place not only takes into consideration early warning but also provide adequate support for information management and response.
- *Inadequate trained manpower for safe construction, monitoring of structural Built:* Engineers of the state lack adequate knowledge about earthquake engineering and steps are being taken to address this issue but other construction stakeholders like masons, carpenters, developers etc also lack this knowledge. According to some engineers the valley imports masons and carpenters from outside the state specially Bihar and these masons of plain areas have very poor knowledge about the local geological conditions or traditional techniques of construction and therefore lack knowledge and skills about earthquake safer construction practices.
- *Economic vulnerability in affected areas:* In most of the affected places livelihood is dependent on government jobs, agriculture and labour provided by the armed forces or government. This needs to be addressed as observation indicates that there is a level of frustration amongst the educated youth in the area.
- *Lack of risk transfer mechanism has left people heavily dependent on the Government and other agencies:* Jammu and Kashmir is one of the states which

have the lowest tax collection and while talking to many people it has been felt that they also don't have much knowledge about insurance policies. This is a good opportunity to explore the benefits of risk transfer and financing mechanism to enable the community to recover quickly from a disaster.

Long Term

- *Inadequate institutional mechanism and lack of legal provisions to address the whole cycle of Disaster Management or appropriate techno-legal regime:* This opportunity provides us with a space for strengthening the existing or establishing new institutional, legislative and financial arrangements for comprehensive disaster risk management building.
- *Inadequate provision for vulnerable section of the community:* Due to lack of special provision for vulnerable section of the community especially the women, disabled and the elderly, the state adopted adhoc measures with out keeping the harsh terrain of the state in mind. The widows were given some cash compensation and moved to Nari Niketans while orphans were moved to orphanages. This is not an acceptable way of rehabilitations where the affected community is relocated from their place of stay. These need to be relooked into and adequate measure need to be undertaken to rehabilitate them in their own community.
- *The concentration of population in Urban and Semi urban areas is of specific concern as this increases vulnerability to all hazard:* Due to may reasons there has been an influx of population in the Urban and semi urban areas of the state but no proper land use planning, building codes, reassessment of basic services etc. has been undertaken which adds to the natural vulnerability of the area being in seismic Zone of IV or V or being in the pathway of over flooding rivers etc.
- *Inadequate provision for improving the built environment:* The region is prone to seismic activity and will continue to be shaken by damaging earthquake in the future as well. This emphasizes the need for strengthening the existing buildings so that the structures could withstand the ground shaking without collapse. A seismic retrofitting program has to be installed, beginning on a priority basis, with public buildings, such as schools, hospitals and, other public buildings of critical importance from where the government would function during any emergency situation. Manuals and guidebooks showing the principal aspects of retrofit techniques are to be produced and mass dissemination will have to be taken-up also to educate the home owners on the retrofitting measures.

Reconstruction and Recovery Strategy

In the last couple of years there has been some effort to institutionalize disaster management by constituting the crisis management committee, drafting a Disaster Management Act, modifying the Building bye laws and developing district contingency plans for flood or snow clearing with emphasis on name of the officers responsible for action and their roles during response phase. The Natural Disaster Management Cell of the Institute of Management and Public Administration, Srinagar has been imparting training to state officers on disaster management since 1997 but according to some it has not created any desired impact. The State government had agreed to take up Urban Earthquake Vulnerability Reduction Programme of GoI-

UNDP, in two cities falling under seismic zone IV & V with half-million-plus populations – Jammu and Srinagar but the programme has not yet been initiated. Effort was also made by non-governmental agencies to increase the level of awareness towards natural disaster but it has limited effect.

- The government should adopt a more integrated approach and collaboration between various government departments' responsible for recovery and reconstruction process should ensure that risk is not rebuild and focus is on improving pre-disaster scenario.
- It is suggested that an institutional mechanism should be established for disaster risk reduction programme to enhance emergency response and disaster management for reducing risks through community & civil society participation.
- Appropriate legislation for setting standards such as DM Policy and Act, building codes, defining roles and responsibilities for key actors and allocation of resources for mitigation measures would contribute significantly to mainstreaming disaster risk in development planning.

Key strategic considerations for sustainable DRM programming in Jammu and Kashmir

- A proper road map on DRM strategy would benefit from a good understanding of the risk in the State.
- Linking disaster risk reduction with development planning policy of the Govt.
- The economy is predominantly dependent upon agriculture, horticulture and animal husbandry sectors. Therefore, vulnerability reduction in these sectors must be the focus of any efforts aimed at sustainable economic and social development and diversification of economy.
- Civil government and Community level emergency response capacity building should be another key element for disaster preparedness. The heavy dependence of Government and community upon the armed forces for disaster response can aggravate post-disaster problems, in case the armed forces functions were disrupted due to any simultaneously occurring incident.
- Community Empowerment will be another key principle to be considered as prepared and organized communities can take better actions for their safety.

The Approach and Priorities: The approach to management of disasters in the Jammu and Kashmir would need a preliminary vulnerability assessment of the risks and then would be developed on two levels. They are as follows:

- Strengthening the Institutional and Legal Systems (ILS) for disaster risk management.
- Multi hazard disaster preparedness planning and mitigation activities including training and capacity building

Individual hazard is simply not cost effective therefore the strategy will be designed on the basis of the vulnerability assessment.

Proposed phasing of strategy

Below are listed recommended activities for the whole of the disaster risk management intervention in Jammu and Kashmir. (Figures in brackets refer to budget table following.)

Short term and Medium Term

- Lessons Learnt Workshop on earthquake disaster. (1)
- Consultation with government authorities responsible for reconstruction. (1)
- Training on damage and loss assessment and recovery planning. (3)
- Policy level consultations on formation of State Disaster Management Authority. (1)
- Enactment of Disaster Management Policy and Act besides ushering Techno-legal regime. (1)
- Adaptation of recovery management information system and development of disaster database. (2)
- Pilot Community based Preparedness and Response program in two districts- Baramulla and Kupwara. (3)
- Strengthening of emergency operation centers in the two districts- Baramulla and Kupwara. (2)
- Awareness generation and Capacity Building of manpower on Disaster Risk Management as well as for safe construction practices. (3 & 5)
- Documentation of traditional knowledge and coping mechanism. (6)
- Introducing vocational training programmes, diversified agricultural and horticultural crops to widen livelihood base in affected areas as acceptable to the local people. (3 & 6)
- Promotion of risk transfer mechanisms. (6)
- Conducting of hazard risk vulnerability assessment and preparation of composite risk atlas for the entire state. (4)

Long term

- Pilot Community based Preparedness and Response program in remaining districts in the State of Jammu and Kashmir. (3)
- Strengthening of emergency operation centers in remaining districts in the State of Jammu and Kashmir (2)
- Training of DRM authority staff and all other stakeholders (3)
- Retrofitting of essential public buildings. (7)

Preliminary costs (USD)

Disaster Risk Management Activities	US \$
Strengthening the institutional and legal system (1)	500,000
Strengthening Emergency Operation Centres (2)	2,500,000

Preparedness Planning (emergency plan and training) (3)	5,000,000
Vulnerability assessment (4)	500,000
Information, Communication and public awareness (5)	1,000,000
Studies/pilots on state specific studies on risk transfer mechanism (6)	500,000
Improve Existing Buildings Environment (retrofitting) (7)	10,000,000
TOTAL	20,000,000

- Risk assessment for the entire state. (4)
- Collection of hazard risk vulnerability assessment and preparation of composite risk atlas for the entire state. (4)
- Promotion of risk transfer mechanisms. (6)
- Introducing vocational training programme, diversified agricultural and horticultural crops to widen livelihood base in affected areas as acceptable to the local people. (3 & 6)
- Documentation of traditional knowledge and coping mechanism. (6)
- Management as well as for safe construction practices. (3 & 7)
- Awareness generation and Capacity Building of manpower on Disaster Risk Reduction (DRM) in the two districts- Baranulla and Kuttanur. (2)
- Strengthening of emergency operation centers in the two districts- Baranulla and Kuttanur. (2)
- Pilot Community based Preparedness and Response program in two districts- Baranulla and Kuttanur. (3)
- Adaptation of recovery management information system and development of disaster database. (2)
- Adoption of recovery management information system and development of regime. (1)
- Enactment of Disaster Management Policy and Act besides enacting Techno-legal

- Retrofitting of essential public buildings. (7)
- Training of DRM authority staff and all other stakeholders. (3)
- Strengthening of emergency operation centers in remaining districts in the State of Jammu and Kashmir. (2)
- Pilot Community based Preparedness and Response program in remaining districts in the State of Jammu and Kashmir. (3)

Intelligence data (USD)

Strengthening Emergency Operation Centers (2)	1,200,000
Strengthening of the institutional and legal system (1)	200,000
Disaster Risk Management Activities	US \$

ANNEXES

1, Construction: Practices, Enforcement, Professional Environment:

Construction Practices:

The primary mode of construction in the region is masonry dwellings. In Srinagar and Jammu towns, most houses are in brick masonry while in Tangdhar region the constructions are primarily in stone masonry. Some of the newer constructions in Srinagar and in Jammu are in reinforced concrete frame with masonry infills. Srinagar also has some old buildings with Dhajji Diwari type constructions wherein the brick masonry walls are provided with timber horizontals, verticals and diagonals. Although this type of construction is no longer very prevalent and PWD has discontinued its usage, some private constructions still follow it in the upper stories.

Dhajji Diwari has shown considerably good seismic performance in this earthquake. Considering that this type of system is unique to Srinagar area and is not practiced in other parts of Kashmir, makes one believe that it may have been evolved as a result of some past earthquakes in Srinagar. The main cause of deaths in the earthquake of October 8 has been the collapse of masonry buildings.

The entire state of J&K falls in seismic zone IV with a small area around Srinagar falling in seismic zone V, as per seismic zone map of IS1893. The earthquake of October 8 occurred in area classified in seismic zone IV. Notwithstanding the same, most of the constructions in the region did not comply with the seismic features recommended by the Indian standard codes. Some masonry houses did have lintel bands, particularly so in the government constructions.

Some interesting examples in the following illustrate the situation with respect to seismic safety in buildings:

- At Chamkote Karnah (near Tangdhar), the Government Boys High School building collapsed. Its walls were made of stone masonry in mud mortar. It was supposedly provided with lintel band: a reinforced concrete lintel in the longitudinal and the transverse walls. Unfortunately, the reinforcement of the RC lintel in the longitudinal and the cross walls was not continuous, and therefore, these lintels failed to behave as a band and did not provide the box action that is desirable for good seismic performance.
- Stone masonry below the lintel band of a house in Chamkote (near Tangdhar) collapsed between the door and the window openings, while the masonry about the lintel band remained intact. At the time of the visit, the owners were replacing the fallen stone masonry by providing vertical reinforcement at the corners and elsewhere, with brick masonry enclosing the reinforcement.
- The Primary Health Centre Building under construction by the Public Works Department at Chitterkotte (near Tangdhar) is provided with lintel band but with no other seismic features such as corner reinforcement etc.
- PWD Guest House at Teetwal (about 4 to 5 years old) is in stone masonry: it has lintel band on the outer walls but not in the cross walls. Masonry between the openings below the lintel band collapsed.

- A stone masonry house in Tangdhar collapsed. Out of concern for seismic safety, the owner decided to rebuild the house in brick masonry even though bricks had to be brought from Srinagar and were quite expensive. However, due to ignorance on the part of the owner and the masons, it was being built without any seismic features; even lintel band was not being provided with.
- The two-storey Dental Hospital at Jammu is in brick masonry in mud mortar: its front portion is one storey. It has a three storey connecting block in RC frame. Some damage was sustained by the connecting block: longitudinal cracks in columns caused by corrosion are clearly seen, while some new cracks have developed as a result of the earthquake. At one location, inadequate cover to longitudinal reinforcement in the column was observed. The parapet shows cracks at the base. Some pounding has occurred at the expansion joints. One beam of the connecting block rests on masonry wall and some cracks are seen at this location. It was reported that a building adjacent to the connecting block had collapsed about 15 – 20 years back under service conditions.

Clearly, constructions in both government and private sector are not complying with seismic codes, even though the government sector constructions generally have at least lintel band and hence are safer. There is an obvious need to bring about substantial improvement in construction practices both in government and private sector. This will require:

- (a) Massive awareness campaigns,
- (b) Substantial capacity building through training of architects, engineers and masons,
- (c) Infrastructure for ensuring good construction practices, e.g., certification of masons, competence based licensing of structural engineers, etc.
- (d) Enforcement mechanisms wherein code compliance is not optional but mandatory.
- (e) A paradigm shift in the construction mode such that typologies inherently better for seismic features replace the current construction practices. For instance:
 - Instead of ordinary masonry constructions, the region should adopt confined masonry constructions.
 - A contemporary version of Dhajji Diwari needs to be developed wherein the timber is replaced by precast concrete posts.
 - RC frame buildings should be discouraged; instead RC shear walls should be provided.

As the economy of the area will improve, there will be a construction boom in RC frame buildings. Such buildings are extremely vulnerable unless designed and constructed with good engineering expertise. It is unrealistic to expect such an engineering input to be available for most of the new constructions in the short run. On the other hand, if new buildings are provided with RC shear walls, these will perform well even when lower level of engineering expertise is available.

Professional Environment:

J&K has two prominent engineering colleges: NIT Srinagar and Government College of Engineering and Technology, Jammu. Both teach Civil Engineering at

undergraduate level. Some new private engineering colleges too have come up in the state.

NIT Srinagar has started in 2004 a Masters programme in structural engineering and the first batch of students is yet to graduate. It has a reasonable number of faculty members in civil engineering, with many having done their doctorate in good institutions in India and abroad. Some have received formal education in earthquake engineering as well. The college however has suffered on account of the prevailing law and order conditions in Kashmir in the last decade. Some faculty members have left and the Institute is currently without a Director. If provided with conducive environment and good leadership, it has considerable potential to not only teach the principles of earthquake engineering to the students, but also to undertake capacity building activities for the state.

The Government College of Engineering at Jammu has a critical shortage of faculty. It seems that the Department of Civil Engineering currently has only three regular faculty members, and that no formal recruitment of faculty members has taken place for more than seven years. The College will require considerable support and good administration before it is in a position to play an effective role in the state towards safety of built environment.

The Public Works Department has a Design Directorate headed by a Chief Engineer. However, it was told that the Directorate is primarily engaged in the job of preparation of schedule of rates, and is no longer effective in providing structural designs for the government projects. It was told that the structural design for most government constructions are provided by private structural engineers. The Design Directorate must be revamped by providing suitable incentives and encouragement to the engineers posted therein. The objective should be that in addition to carrying out routine engineering design assignments, the Design Directorate is able to provide the state government a high quality of advice and leadership in implementing the structural safety agenda.

Construction of most residential and even some commercial buildings in Srinagar does not involve either the architects or the engineers. Even when an architect handles a residential building, quite often he may not engage a structural engineer. By one crude estimate, only about 10% of the new residential houses in Srinagar may be having lintel bands. In many cases, the architects simply provide some reinforcement and rich mortar to the masonry above the openings in lieu of lintel band. Clearly, there is a need to engage the architects, engineers and the masons with structural safety agenda, and a public awareness campaign should attempt to sensitize the population that with reasonable amount of care and efforts it is possible to build houses that can withstand earthquake shaking without killing anyone.

Enforcement:

The state of J&K is currently finalizing the Building Bye Laws under the J&K Municipal Act 2000. These Bye Laws will cover the towns other than Srinagar and Jammu (since these towns have Municipal Corporations). A review of the proposed Bye Laws showed that these do not adequately cover enforcement of structural safety, including the seismic safety.

It is important that the state must incorporate in the building bye laws, a systematic methodology for enforcement of structural safety in new constructions. Before a construction can begin, the structural drawings and calculations should be submitted by the structural engineer to the municipal authorities. A cursory review by the

municipal engineers must verify that some of the important features (such as lintel band and corner reinforcement in masonry buildings, closely-spaced stirrups in RC buildings, etc) are indeed provided in the drawings. The structural drawings reviewed by the municipal engineers should be stamped in multiple copies and only a stamped copy should be allowed to be used at the construction site. Small houses may be provided with some suitable waiver clauses, e.g., the architect could provide the structural services as well, and similarly the structural engineer could provide the architectural services as well.

For the above system to work, it is important that a system be developed for state-wide licensing of structural engineers based on competence (and not just based on degrees and qualifications). A malpractice by the engineer should lead to cancellation of his license to practice. Similarly, the municipalities will require some technical assistance and capacity building of municipal engineers.

Major Construction Projects

Currently, a number of large infrastructure projects are under construction in the J&K. These include a major railway project to connect Srinagar by train with rest of the country; this involves numerous long tunnels and tall and long-span bridges. The Mogul Road project envisages connecting Punch with Srinagar. Four-laning of Srinagar - Jammu highway is another major road project. In addition, there are a number of major hydropower projects currently under construction in the state.

It is critically important that all such new projects are designed and constructed for seismic resistance as per latest state of the practice. Unfortunately, some of the seismic codes in India have not been revised for decades and are quite inadequate by current international standards. A review of seismic design philosophy of major projects may be appropriate to ensure that wherever needed, the projects are built beyond the current codes.

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2. Policy Guidelines for SHELTER sector

Below are more detailed guidelines recommended that appropriate authorities take for reconstruction in the housing sector.

A. Encouragement of local participation to ensure owner-driven construction:

The objective of this approach is to minimize the dependency on external support and concentrate on providing advice with respect to local housing needs from local professionals and construction artisans. Advice on low cost disaster resistant construction technology may be introduced with adequate technical support and hands on demonstration to the beneficiaries/local people. The beneficiaries should be in charge of building their homes.

B. Assistance package: The assistance could possibly be made very strategic and the scale of the damage to an individuals building/house has to be evaluated on the technical grounds. The inadequate definition of nature of damage will have to be addressed in the detailed damage assessment of the housing/shelter sector to ensure early recovery of the affected community. Aid packages can accordingly support the reconstruction. However separate package for higher grant assistance can be designed for the key affected part of the towns and for the larger households. The strategy should be to offer loan assistance for those with higher demand.

For quick approval of the plans standard designs can be prepared. Beneficiaries in the past reconstruction experience found it difficult to get building plans prepared by the engineers mainly because of non-availability of the engineers and the cost involved. In order to avoid this situation, the administration will have to facilitate activities to ensure availability of the engineers in the reconstruction period. The remaining instalment of the assistance grant for the reconstruction of the shelter will have to factor in payment of instalment vis-à-vis stage of appropriate construction method and further monitored by technical/financial audit.

C. Rebuilding with local methods and involvement of local construction industry: The reconstruction of the houses should be made with the available building materials and with the involvement of the local construction industry. Reduced involvement of the local construction industry and artisans means loss of skill development, reduced identification of the local community/beneficiary and storing problems for the future. The involvement of the local artisans would also link housing to restore livelihoods. The principle of involving the local construction industry and local artisans will lead in achieving long-term goal of full recovery and overall capacity being built in the region. Proper assistance need to be given to the construction industry to make building materials available, provide necessary tool kit for construction artisans and training programmes for masons/artisan groups. The promotion of the local construction industry to carry the reconstruction work will result in long-term economic development of the region.

D. Building Materials: The reconstruction programme should facilitate the availability of traditional building materials for construction. The material should adhere to the quality standards and quantity requirements so that the community can obtain adequate supplies from the material bank or approved stockist. The local government should facilitate the purchase of the raw materials and organize their transport and distribution to the affected area keeping in mind the inaccessible terrain in certain cases. Various mechanisms need to be put in place to control the price of essential materials and wages of the construction artisans. The collapse of the buildings was mainly due to lack of seismic resistant features and use of poor quality materials and maintenance. Reconstruction programme should promote construction of hazard resistant construction technology and technical advice need to be imparted to all the stakeholders to incorporate seismic safety. The transfer of technical information (IEC material / education aids on shelter) must be provided in a comprehensive form to all stakeholders. The technical material should address the following components:

- details of the shelter programme
- appropriate type of shelter suited for a particular location
- use of various types of indigenous/traditional materials
- simple structural methods
- construction methods
- quality control and simple test methods

This information is needed at all the levels to enable a greater number of people to be familiar with the design options and scientific way of constructing/rebuilding their homes. It is important to prepare this information before hand, and share it with the all the stakeholders before the reconstruction programme sets in. This material will serve as a basis for discussions in future post disaster-housing programmes. Past experience of earthquake hit regions has demonstrated that technical advancement alone will not be sufficient to address the problem of earthquake protection; a continued awareness of the earthquake risk in the region will make the protection (preventive, preparedness and mitigation) measures more effective and will bring in overall effectiveness in setting future standards/reforms of housing in the state.

E. Resettlement of villages prone to slope failures/landslides, geologically unstable/weak areas or unsafe sites: The in-situ approach minimizes the resistance of the population and speedy recovery of the affected people. In cases where the hazard assessment results favours relocation, the land should be chosen as close as possible to the original homes and the associated livelihoods of the affected people. It would be very important to shift people to less hazard-prone areas after conducting a detailed technical assessment. An alternative to the full relocation is to adopt a selective approach and relocate segments of the community away from hazardous sites, but remaining within the same general boundary of the community surroundings, especially as their economic survival may be directly dependent on their particular location. The important pre-conditions for a successful relocation are: the consent of the affected community and their knowledge of the existing risk in the area; proximity to essential services & livelihood. A participatory decision making process will help to find the best solutions for the effected communities.

In case of full scale relocation of the villages land-use planning and control for disaster mitigation can act as a spur to comprehensive land-use planning, especially in the state of J&K where earthquake risk is more of a frequent development problem owing to the felt intensity and frequency of events. Therefore the land-use issue must be recognized and integrated as a part of the post-disaster housing programmes. The administration should also recognize the need to make the land available and put up necessary infrastructure for speedy recovery.

F. Seismic risk reduction policy and housing reforms: The disaster has given an opportunity to restore and reduce vulnerability that existed in the pre-disaster conditions. Incorporating risk reduction measures will improve the general living conditions and reduce future risks. It will be important to introduce policies both for rural and urban areas to modify the conditions that existed before the disaster. It is important to develop a policy that combines the technical, social and economic measures. It goes without saying that all the physical elements getting exposed to the hazard should be made disaster resistant and the risk reduction policies for reconstruction and future development should be decided on a scale that would be achievable. This can be tackled by setting in priorities such as introduction of technolegal regime/regulations for all future construction, land-use controls/safe siting and training of all stakeholders for safe construction. Risk reduction policies shall be an element of *upgrading programme* and an important component of the reconstruction programme. In order to promote hazard resistant construction in hazard prone areas the policies should also focus in the form of financial assistance for local housing (subsidies/loans). Key market instruments/risk transfer schemes on physical/financial risk reduction can be introduced in the stage of permanent reconstruction assistance package.

G. Training and Capacity Building: The early recovery of the housing/shelter sector is heavily dependent on the knowledge of hazard resistant construction techniques and local capacity of the stakeholders for recovery management. One of the most pressing needs in the reconstruction programme is training and capacity building at all levels, starting from the disaster managers/administrators to the beneficiary. The housing reconstruction programme management unit needs to receive training in programme management skills for decision making. The key officials in the Government can take up several important modules/courses on disaster management. The field-level staff also needs to get trained for implementation of the programme at the community level. Training programme on hazard resistant construction must be given to the local professionals, builders, contractors, construction artisans and the beneficiary/community. Engagement of untrained manpower is compromised on four important fronts – safety, productivity, quality and competency. This can lead to major setback in reducing risk during the reconstruction programme. A fair number of construction artisans have learnt the trade from hands on experience in the field and not through a formal training programme. Such practices lack competency level. Masons are employed not merely for masonry work but also for the design and construction of houses. Therefore a *skill certification program* will allow them to test their skills, develop competencies and improve themselves in the areas they are deficient in particularly in seismic detailing of load bearing structures which are predominant in the state of J&K. There may be local housing institutions with knowledge of local resources and technology to facilitate training modules for construction artisans.

