



NEPAL EARTHQUAKE: A RAPID REVIEW OF THE RESPONSE AND A FEW LESSONS LEARNT

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The opinions expressed in this report are those of the authors alone.

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Acronyms

BoO	Base of Operation
CADRE	Community Action for Disaster Response
CBDRR	Community Based Disaster Risk Reduction
CCCM	Camp Coordination and Camp Management (cluster)
CDMC	Community Disaster Management Committee
CDO	Chief District Officer
CEO	Chief Executive Officer
CGIS	Corrugated Iron Sheet
DD	District Development Committee
DDPR (P)	District Disaster Preparedness and Response (Plan)
DFID	UK Department for International Development
DiPECHO	Disaster Preparedness ECHO
DIU	District Implementation Unit
DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
DUDBC	Department of Urban Development and Building Construction (under MoUD)
DWCC	District WASH Coordination Committee
DWSS	Department of Water Supply and Sewerage (under MoUD)
ECHO	European Office for Humanitarian Aid and Civil Protection
EPS	Earthquake Preparedness for Safer Communities programme
EPP	Emergency Preparedness Project
ER	Early Recovery
ERU	Emergency Response Unit
FAO	United Nations Food and Agriculture Organization
FMT(CC)	Foreign Medical Team (Coordination Cell)
GFDRR	World Bank Global Facility for Disaster Reduction and Recovery
GLOF	Glacial Lake Outburst Flood
GoN	Government of Nepal
GIS	Geographic Information System
HEOC	Health Emergency Operation centre
HFA	Hyogo Framework for Action
HFT	Himalayan Frontal Thrust
HI	Handicap International
HOPE	Hospital Preparedness for Emergency project
ICC	Inter Cluster Coordination
ICIMOD	International Centre for Integrated Mountain Development
ICRC	International Committee of the Red Cross
IDPs	Internally Displaced Persons
IFRC	International Federation of Red Cross Red Crescent movement
INSARAG	International Search And Rescue Advisory Group
IOM	International Organisation for Migration
JICA	Japan International Cooperation Agency
KAP	Knowledge, Attitude, Practice
KVERMP	Kathmandu Valley Earthquake Risk Management Project
LDO	Local Development Officer
MBT	Main Boundary Thrust
MCM	Mass Casualty Management
MCT	Main Central Thrust
MoAD	Ministry of Agriculture Development, Government of Nepal

MoE	Ministry of Education, Government of Nepal
MoFALD	Ministry of Federal Affairs and Local Development
MoHA	Ministry of Home Affairs, Government of Nepal
MoHP	Ministry of Health and Population, Government of Nepal
MoUD	Ministry of Urban Development, Government of Nepal
NEOC	National Emergency Operation centre
NCDM	National Council on Disaster Management, Government of Nepal
NDMA	National Disaster Management Authority
NDRF	National Disaster Response Framework
NGO	Non-Governmental Organisation
NFI	Non Food Items
NPC	National Planning Commission
NRA	National Reconstruction Authority
NRCS	Nepal Red Cross Society
NRRC	Nepal Risk Reduction Consortium
NSDRM	National Strategy for Disaster Risk Management
NSET	National Society for Earthquake Technology, Nepal
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
ODF	Open Defecation Free zone (Program)
IOM	International Office of Migration
OSOCC	On site Operation Coordination Center
PDNA	Post-Disaster Need Assessment
PIU	Project Implementation Unit
RCC	Reinforced Cement Concrete
RCO	Resident Coordinator Office
RCS	Reception on Dispatch Center
SAR	Search and Rescue
SEDM	Study on Earthquake Disaster Mitigation (for Kathmandu Valley)
UN	United Nations
UNDAC	United Nations Disasters Assessment and Coordination
UNDP	United Nations Development Programme
UNICEF	United Nations Fund for Children
UNRC-HC	United Nations' Resident and Humanitarian Coordinator
USAID	United States Agency for International Development
USAR	Urban Search and Rescue
VCA	Vulnerability and Capacity Assessment
VDC	Village Development Committee
WASH	Water Sanitation and Hygiene
WHO	World Health Organisation

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Executive summary

Nepal's risk profile

Nepal is a small landlocked country between India and China. Its population is about 26.6 million with an annual growth rate of 1.40 percent (preliminary findings of 2011 census) and it is one of the poorest countries in the world (currently ranks 157 out of 187 countries on the Human Development Index with a per capita income of less than US\$650). Administratively, the country has been divided into seven states since the promulgation of a new constitution in autumn 2015.

Nepal is one of the 20 most disaster-prone countries in the world and has gone through many crises in the last 20 years, including a bloody civil war, and regular disasters of different kinds (floods, landslides, earthquakes, windstorms, hailstorms, fire, glacial lake outburst flood (GLOFs) and avalanches). Out of 200 countries, Nepal ranks 11th and 30th, respectively, with regard to relative vulnerability to earthquakes and floods (UNDP/BCPR, 2004). The physical vulnerability of Nepal is very high, with most buildings and infrastructures built without reference to hazard-resistant technology.

Kathmandu is the most populated district in Nepal. According to the preliminary findings of the Population Census of 2011, Kathmandu was the district with the highest population growth rate in the country over the previous decade with 60.93 percent and a population density of 4408/ km². Its population, which was 1.6 million ten years ago, currently stands at 1.74 million.

Kathmandu valley (consisting of three districts; Kathmandu, Lalitpur and Bhaktapur) is one of the fastest-growing urban agglomerations in South Asia, with a population of around 2.5 million people. It is situated on a major fault line, placing it at significant risk of an intense earthquake. Out of 21 cities worldwide that lie in similar seismic zones, Kathmandu is the most at risk in terms of impact on people. Moreover, rapid, haphazard urban development, including non-compliance with the building code, failure to use qualified engineers or trained masons, encroachment of buildings on open spaces and water table depletion are increasing vulnerability at a significant rate. Kathmandu's critical infrastructure and essential services are also extremely vulnerable.

According to the Global Earthquake Safety Initiative, Kathmandu is exposed to the greatest earthquake risk per capita among 21 megacities around the world, largely due to building collapse and insufficient preparedness and medical care. The older neighbourhoods which form the historical core of Nepal's cities are particularly vulnerable to earthquake tremors. The poor quality of building and infrastructure construction is the main cause of structural vulnerability. The fact that over 90% of existing structures are non-engineered, and the poor quality control of materials and construction practices mean that the built environment, and especially lifeline facilities, are problematic.

The importance of DRR in the Nepalese context

Due to its position on the slopes of the Himalaya ranges, Nepal has been a priority for the disaster risk reduction community, with several donors (ECHO, DFID, OFDA, etc.) investing massive amounts of resources in the development of risk reduction and management capacities, including through a flagship programme, the Nepal Risk Reduction Consortium (NRRRC), bringing together UN agencies and other DRR stakeholders¹ to work on earthquake and flood preparedness. Specific activities have been carried out to make the health system resilient to shocks and able to remain operational to deliver health services of all kinds after a high

¹ For more, see: GRUNEWALD F & CARPENTER S., 2014, *Urban Disaster preparedness in Katmandu, Nepal*; British Red Cross and Groupe URD.

impact disaster. The programmes implemented have involved both rural and urban CBDRR and a number of specific programmes supported by USAID, DIFD and DG ECHO have aimed to ensure that health services will function in the event of a high-impact earthquake both in the Kathmandu Valley and in other parts of the country.

The initial response to the 2015 earthquakes: successes and shortcomings

Three key factors shaped the post-earthquake situation. First of all, neither the April nor the May earthquakes were the very high magnitude shock that had been feared. Secondly, although they affected part of Kathmandu Valley, their locations in rural districts meant that the main impact was in low-density rural areas, even though some small towns were also affected. Thirdly, the first tremor fortunately occurred on a Saturday around mid-day, when most people were not at work. If it had taken place on a working day when people were in their offices and children were in their schools, the situation would have been even more tragic.

Reaching the 864,000 people living below the poverty line in hard-to-reach areas, and who had lost their homes, was a priority.

As in many earthquake situations, there were many casualties due to collapsed buildings and infrastructure. The capacity of the health system to care for the wounded was crucial. Prior to the earthquakes, both development and emergency donors had focused on providing assistance to help strengthen the resilience of the health system at all levels.

With the impending monsoon rains expected to further isolate remote villages, district authorities and humanitarian partners prioritized the distribution of shelter materials in the northern-most Village Development Committees (VDCs).

Moving to recovery and rehabilitation: challenges and innovations

The transition to recovery has been difficult due to the problems caused by the political situation in Nepal. The constitutional reform towards federalism that was implemented led to heated debate about the number of new entities to be created. This led to tension at the Indian-Nepali border in the Madesh territory in Terai. As a result it became difficult to import consumer goods, food items and fuel from neighbouring India. This led to a sharp increase in the price of construction materials and transportation, making reconstruction extremely costly for individuals and aid agencies. 8 months after the earthquake, many remote areas were still in ruins or had been rebuilt in a very rudimentary manner as the people living there could not afford to “build back safer”.

Similarly, the political stalemate has held up the creation and staffing of the National Reconstruction Agency. The political leaders who are expected to bring together all national forces and bring about a proper and risk-informed reconstruction, are lost in internal politics. It took them 9 months to vote through the reconstruction bill despite the suffering of the population affected by the monsoon rains and the cold winter.

Despite this, many innovations have been tried in the Nepali context: cash distributions have been used relatively frequently despite the weakness of the banking system in remote rural areas. 3 D printers have been used for the first time to deliver spare parts for water system rehabilitation. The Health Emergency Operation Centre, its network of hospital hubs and its relatively well trained health personnel has been able to provide treatment to most of the patients in the Kathmandu Valley, showing that DRR pays off.

Key lessons learnt and recommendations

Clarify the policies and roles of the line ministries: The new Disaster Management Act needs to be adopted rapidly as it will fill the gap in policy definition, and implementation guidelines preparation and supervision. All national institutions involved in the national disaster structures will then have a clear action plan and their responsibilities will be clearly spelled out. Revisions should be made regularly to make the policies more practical

Improve communication with the affected population: In Nepal, where the political context is very complex and is still affected by the decade of civil war and the complexity of the peace process, aid delivery has been affected a great deal by political factors, there is a need to invest more in communication to establish more active dialogue with the affected populations.

Develop a building code for rural housing: It is essential to adjust the Building Code to rural settings and ensure that all building codes are implemented in urban, peri-urban and rural areas.

Strengthen national search and rescue capacity: The development and strengthening of national rescue and relief capacity should be made a priority. The Nepalese army, police and fire brigades should be trained so that they can act as a middle level rescue capacity. A 7/7 medium type USAR team should be established with a National Disaster training centre.

Improve coordination of international relief support during the early phase: It is important to ensure that incoming actors have a much better understanding of the context and existing needs, as well as the gaps that need to be filled. The list of items to be provided to disaster victims should be decided in advance, in a coordinated manner by all stakeholders. Tax deduction procedures should be designed accordingly. A “one door system for relief provision” should be put in place for relief distribution, using the Disaster Relief Committees under the supervision of local institutions and aid agencies.

Enhance access to remote areas: To assist the population in high altitudes, difficult terrain and bad weather, there should be a sufficient number of helicopters in country. The MOHP/NEOC should also have their own flying capacity. Helipads should be identified and marked at an early stage at the VDC and DCO levels.

Raise the capacity of emergency warehouses and increase prepositioned stocks: National and decentralized pre-positioned stocks should be increased.

Improve the management of internal displacements: It is very important to find ways to improve the management of IDPs with proper movement tracking procedures and registration processes

Debris removal and management: Policy decisions will have to be made in relation to all the weakened and dangerous buildings that need to be demolished and the debris that needs to be removed.

Improve communication with the affected population: The call centre established in the Ministry of Information and Communication (call 1234) should be put in place at the NEOC and HEOC and made more widely known amongst the public.

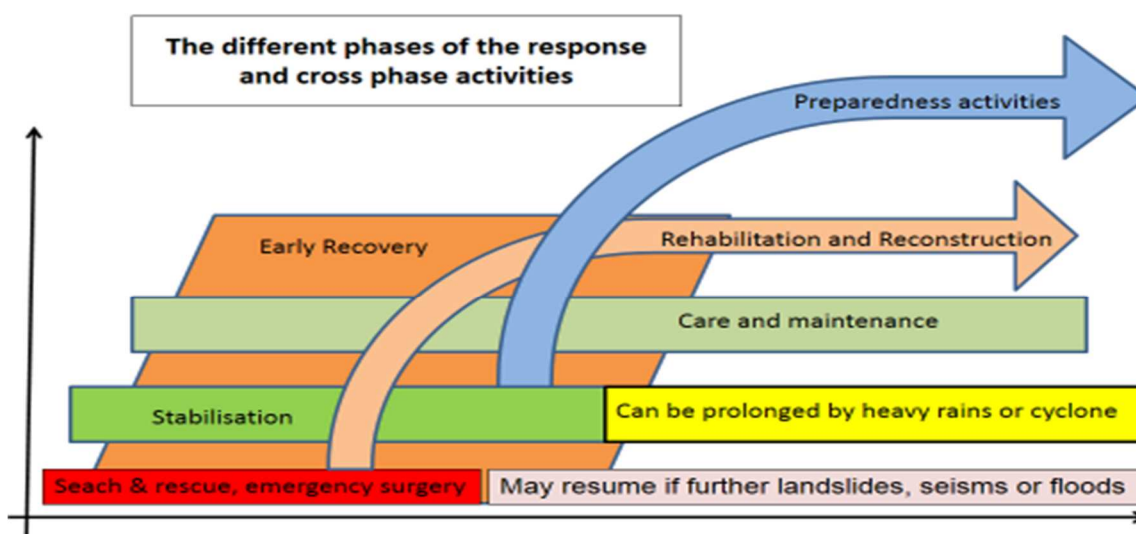
Improve the national capacity for Information and data management: There should be a strong IS system available at the NEOC, and it should be easily accessible by the national disaster centre. A Victim ID Card system should be put in place

FULL REPORT

1. BACKGROUND

The key objective of disaster response is to minimize morbidity and mortality. The initial “search and rescue /medical” response is usually followed by relief operations, where the main areas of activity are food, shelter, water and sanitation. During this phase, a number of cross-cutting issues are taken into account, such as gender, protection and “do no harm”. Subsequently, there is a transition to development, via the early recovery and recovery phases.

Of course, rather than this sequence of clear and distinct phases, in reality there are a lot of overlaps between phases.



The lessons learned from the response to the earthquakes in Nepal in 2015 are of particular interest because the country had previously been the focus of numerous peace building, humanitarian and disaster management activities.

Over a period of four years, Groupe URD conducted a series of field visits to Nepal, two before the earthquakes and three since. These have provided valuable insight into the way disaster management has evolved in the country.

The following review presents lessons learned about the strengths and weaknesses of the disaster response, particularly the initial phases of the response and the difficulties faced in recovering from this period. It is structured as follows:

- The first chapter deals with Nepal’s risk profile and Disaster Risk Management (DRM) activities that were in place before the earthquake;
- The second one describes some of the key features of the response to the 2015 earthquake, including successes and shortcomings;
- Finally, the report examines key lessons learnt and includes a series of recommendations.

2. NEPAL RISK PROFILE AND INSTITUTIONAL SET UP FOR DRM

2.1. Geopolitics

After a decade of civil war, from 1996 to 2006, and after the abolition of the Rana monarchy in 2008, the political situation in Nepal is not yet stable. It is faced with the difficulty of establishing an effective coalition government² due to the tensions between the main parties (the Congress Party, the Maoist Party, who were the flag bearers of the insurrection at the time of the civil war, and the Marxist-Leninist Party, which was created following a split in the Maoist Party³).

There is still not a great deal of confidence between the population, the Armed Forces, the Police, and the administration and social unrest, strikes and “banh” (street demonstrations) are frequent.

The drafting of the new constitution has been held up even though a second constituent assembly has been formed. The blockages are the result not only of the tensions between the main political parties, but also disagreements about the type of federalism to put in place, either on a purely territorial basis, or taking into account ethnic-religious considerations in dividing the different territories⁴.

Indeed, Nepal’s economy is fragile. The country is landlocked, with no industrial sector and very limited resources apart from its agriculture and the manpower it exports to the Gulf countries. It therefore faces many challenges. Due to its location in a complex political landscape surrounded by China and India, Nepal has found itself in the middle of a geostrategic equation that has resulted in a great deal of aid being allocated (International Crisis Group, 2013).

2.2. Risk profile

Nepal is exposed to several types of natural and man-made hazards (Government of Nepal, 2011). A wide variety of geographical, geological, ecological and hydro-meteorological factors contribute to the high levels of hazards faced. Other factors, such as rapid population growth, slow economic development, high levels of poverty, lack of awareness of mitigation measures, and a lack of political and social commitment also contribute to making the country extremely prone to disasters.



The greatest risk of disaster is linked to the geological and climatic features of the country. The seismic record suggests that the risk of a strong intensity earthquake on the Modified Mercalli Intensity Scale (MMI X6) is high. The main source of seismic activity in Nepal is subduction of the Indian plate under the Tibetan plate (the Himalayas).

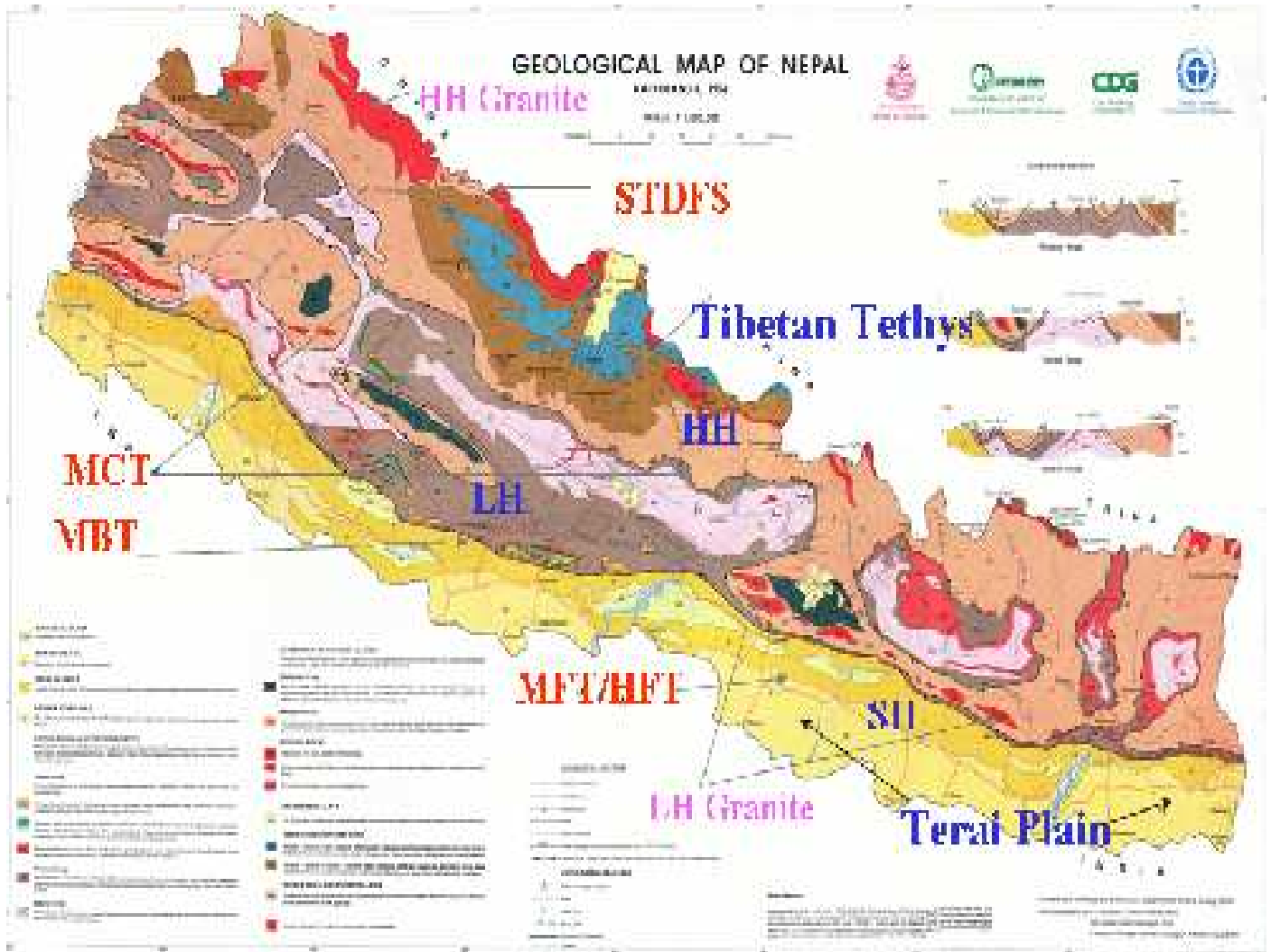
² This is the 7th government since the end of the civil war.

³ Of the 601 members of parliament, 185 represent the Congress Party, 160 the Marxist-Leninists and 127 the Maoists, and there are about 15 small parties.

⁴ Indo-Nepalese (Hindu), Tibetans (Buddhists) and Tibetan-Burmese (mixture of Hindu, Buddhist and animism).

2.2.1. Rural Nepal's risk profile

In rural Nepal, many extreme events, leading to floods and landslides, are caused by the Monsoon rains. The related hazards are presented in the table below. The Nepal Ministry of Home Affairs regularly produces Disaster Reports. The geological map below appeared in the 2011 report.



S.N.	Hazard Type	Number of records/events	Number of deaths	Number of injury	Affected population
1	Epidemics	3413	16521	43076	512967
2	Landslide	2705	4327	1446	555607
3	Flood	3377	3899	461	3665104
4	Fire	4936	1293	1097	252074
5	Thunderstorm	1034	986	1810	6668
6	Accident	1000	969	359	2137
7	Earthquake	95	873	6840	4539
8	Cold wave	320	442	83	2393
9	Structural Collapse	389	404	596	2016
10	Boat Capsize	135	269	124	410
11	Other events	2651	999	1335	928331
	Total	20055	30982	57227	5932246

Source : DesInventar, 2011

2.2.2. Urban Nepal's risk profile

There are a lot of small, fast-growing cities in Nepal exposed to a wide range of risks: floods, landslides and earthquakes, political unrest, epidemics and economic crises. However, most of the efforts on risk profiling have taken place in the capital city, Kathmandu. It is located at an altitude of 1200m in the Himalayan mountain belt, which was produced by the collision between the Indian and Eurasian plates in the early tertiary period. Three major faults, the Main Central Thrust (MCT), the Main Boundary Thrust (MBT) and the Himalayan Frontal Thrust (HFT), run throughout the length of Nepal from east to west and have resulted in many earthquakes in the past in excess of moment magnitude M8. There is therefore a need to estimate possible hazards in order to engage in risk estimation. In 1934, the fault line that runs beneath the Kathmandu valley slipped. In the 20th century alone, over 11,000 people have lost their lives in four major earthquakes. The 1934 earthquake destroyed 20 percent and damaged 40 percent of the building stock in the Kathmandu valley (NSET, 1999). In Kathmandu itself, a quarter of all homes were destroyed. Many of the temples in Bhaktapur were destroyed as well. Three earthquakes of similar size occurred in Kathmandu Valley in the 19th Century: in 1810, 1833, and 1866. The most damaging recent earthquake to take place before the earthquakes in 2015 was the earthquake of 1988. This magnitude 8.4 earthquake destroyed more than 80,000 buildings and claimed 8,500 lives. Since 1988 the city of Kathmandu has evolved enormously.

Kathmandu metropolitan area

Due to the evolution of the context in Nepal since 2000, Kathmandu has become one of the fastest-growing urban agglomerations⁵ in South Asia, with 5000 new concrete buildings built in the valley every year. Rapid population growth and urbanization due to migration to the Kathmandu Valley from different parts of the country has increased demand for housing, water, electricity, drainage, roads and other utilities (Bhattara and Conway, 2010), leading to infrastructure expansion and major pressure on the environment.

As is often the case, new urban constructions are built on the nearest agricultural land and along the roads leading to the city, land that does not have basic infrastructure (road, water, drainage, etc.) but is more easily accessible to new migrants. Subsequently local governments face increased demand for the provision of infrastructure after the construction of houses. Implementing infrastructure in these cases renders the housing on agricultural land more expensive in the long run than on urban developed land. Central government agencies and municipalities (with financial contributions from local communities) are responsible for providing basic services, but most often the agencies and municipalities are not in a position to expand their networks due to lack of funds, lack of management capacity, and lack of proper planning. Local authorities do not have the capacity to provide the appropriate infrastructure and services and their roles are limited to local-level infrastructure only.

Urbanization in the Kathmandu valley but also in other cities has been largely uncontrolled and even though building codes have existed since 1994, they have not been very effective in promoting earthquake resistant construction due to their poor implementation. Every year there is greater risk due to declining construction practices, uncontrolled urban development and a rapidly increasing population, which has now reached two million people in the urban agglomeration. If an earthquake were to take place, it could be even more deadly than the Haiti earthquake of January 2010.

The Ministry of Urban Affairs and the Ministry of Land Management are both involved in revising urbanization in Kathmandu and the different vulnerabilities and structural fragilities in cities (Chamlagain, 2013). Many studies have been carried out in the past to study the seismic risk in the Himalaya Range and to evaluate the

⁵ Muzini and Apericio, *Urban growth and spatial transition in Nepal*, 2013.
<http://www.gbv.de/dms/zbw/731284070.pdf>

earthquake risk in the Kathmandu Valley and there is abundant scientific literature on the subject. There has also been abundant survey literature following the growth of Kathmandu.

The most significant of these studies is the Study on Earthquake Disaster Mitigation for Kathmandu Valley (SEDM) which was carried out by the Ministry of Home Affairs (MoHA) in 2002 with support from the Japan International Cooperation Agency (JICA) (JICA, 2002). However, given the changes in the Valley it is generally agreed that this survey needs to be updated.

Building materials are an important factor when predicting the potential impact of an earthquake:

- Mud buildings: a lot of people will be suffocated by mud dust (based on the experience of the Bam earthquake in Iran in 2003);
- RCC buildings: this will lead to a predominance of broken bones, open wounds, and haemorrhagic wounds (based on the experience in Haiti).

Land use and occupancy, land tenure, and house and flat rental are still not fully understood and in-depth study of these phenomena is needed. Two processes are currently taking place:

- The city limits are expanding rapidly, with new buildings being constructed in the middle of the rice paddy every day;
- Roads are being widened, especially in the old areas. This has an impact on both house occupancy and the structural integrity of buildings that have to be altered.

The Kathmandu Valley is now a densely populated home to almost 2.5 million people, many living and working in buildings that will not withstand a significant seismic event. In addition, many buildings are not being used for the purpose that they were intended with many private schools and hospitals, restaurants and offices in buildings intended for residences. An earthquake could displace more than 1.8 million people, kill over 100,000 and injure a further 300,000. Sixty percent of buildings could be destroyed or damaged, according to NSET.

2.3. Legal framework and institutional set up for disaster management

Improving the response to natural and man-made disasters is a core component of any resilient and sustainable community. In order to increase their capacity to respond to an emergency, local institutions, from the national to the community level, engage in “preparedness” activities which are defined as the “set of measures that ensure the organized mobilization of personnel, funds, equipment, and supplies within a safe environment for effective relief.”⁶

2.3.1. The legal framework

With its high exposure to disasters, Nepal is considered to be one of the first countries in South Asia to have created a policy and legal environment for disaster risk management. The formulation of policy and legislative procedures on disaster issues in Nepal dates back to the early 1980s with the 1982 Natural Calamity (Relief) Act. This document formalizes disaster response as a responsibility of the government to provide relief to the

⁶ World Health Organization, Department of Emergency and Humanitarian Action. *WHO and Emergency Preparedness at the Global Level*. September 13, 2000. Available at: www.who.int/disasters/repo/5813.doc. Accessed October 4, 2015.

victims of disasters, and it designates authorities at the centre and district levels to coordinate the rescue and relief efforts of various response agencies. However, the experience of the past three decades has shown that this structure is only capable of coordinating small to medium level disasters. The institutional mechanisms that were created were unable to manage the emergency response to above medium level disasters such as the Udayapur earthquake of 1988 or the flood disaster in south-central Nepal in 1993. The overarching mechanism for policy elaboration is the National Council for Disaster Risk Management (NCDM). The NCDM is the highest level institution involved in DRM under the chairmanship of the Prime Minister. The Minister of Home Affairs is the Deputy Chair and Council members include ministers, the Army Chief of Staff, the Chief of the police departments and representatives of civil society. The NCDM is responsible for:

- The endorsement of national policies on DRM;
- Approving national & sector-wide DRM plans (including the existing 49 sectoral response plans being currently put into place);
- Guiding and overseeing the management of fund generation and mobilization on Risk Reduction, Mitigation, Preparedness, Response, Recovery, Rehabilitation and Reconstruction;
- Providing policy guidance for bilateral, sub-regional, regional and international cooperation in the area of DRM.

Learning from the devastating 1988 Udayapur earthquake, the Nepali Government began drawing up the Nepal National Building Code, which was finally completed in 1994, and carried out several studies. The Building Code that was developed incorporated provisions for making buildings earthquake-resistant, and addressed the problems not only of buildings designed by engineers but also of houses in rural, semi-urban and urban areas that are mostly constructed without input from staff qualified in para-seismic construction. However, the building code was not enforced immediately. The Government only decided to make compliance with the building code mandatory in all government buildings in 2003 and encouraged its implementation in all municipal areas. It is widely recognized that it is not yet enforced by municipalities who do not have the capacity to do so.

To cope more broadly, proactively and practically with disaster risks, Nepal drew up its National Strategy for Disaster Risk Management (NSDRM) based on the Hyogo Framework for Action 2005-2015 (HFA) in consultation with the relevant stakeholders across all levels⁷. This aimed to implement Disaster Risk Management (DRM) in Nepal in line with current international understanding, scientific progress and regional initiatives. The strategy provides the road map for all sectors to prepare sector specific programs for DRM and formulate the necessary policy decisions for facilitating mainstreaming DRM into the development process.

The Disaster Management Bill, 2009 aims to promote effective management of risk reduction throughout the disaster management cycle - preparedness, mitigation, rescue and relief, rehabilitation and recovery. The proposed Disaster Management Bill, 2009 is due to replace the existing Natural Calamity (Relief) Act, 1982. The principal features of the proposed DM Bill are:

- Disasters are defined distinctly as natural and human-induced;
- Provision for National Council for Disaster Management (NCDM) to be chaired by Prime Minister of Nepal with clear mandate and functions, duties, responsibilities and authority of the Council;

⁷Reference to HFA was made not only because it recommends what every country should do for disaster reduction, but also because the Government of Nepal had taken part in developing this framework and has made commitments to implement it.

- Proposal to set up National Disaster Management Authority (NDMA) under the NCDM, to act as the focal point for disaster management functions in Nepal from formulation of appropriate strategies and plans to implementation and supervision of disaster management activities;
- Clarifies the role, responsibility and functions of security forces including Nepal Army, Nepal Police and Armed Police Force; institutions, industrial sector and private organizations. These institutions are the key responder in the first 48 hours – the military are the most competent of all the trained forces (trained by US engineer corps and US PACOM).

When the Disaster Bill is passed, a National Disaster Management Agency (NDMA) will be created and will become the national focal point for the implementation, facilitation, coordination and monitoring of Disaster Risk Management strategies. During and after a national level disaster, the NDMA should be responsible for emergency response, recovery, reconstruction and rehabilitation. At this stage, the National Emergency Operation Centre is the *de facto* NDMA, under the responsibility of the Ministry of Home Affairs

Strategies, standards and guidelines, and design plans and programmes for capacity building and emergency response will need to be developed. The draft text of the Disaster Bill promoted the constitution of Regional, District and local level Disaster Management Committees (DMC). It is very urgent for the Disaster Management Bill to be passed to support the implementation of the National Strategy for Disaster Risk Management (including the creation of the NDMA) in order to help the country to prepare for the challenges ahead. The Disaster Bill has two main objectives:

- To reinforce inter-ministerial coordination for overall disaster management (to increase the involvement of the Ministries of Defence, Interior, Health Foreign Affairs, Urban construction, Land Management, etc. in addition to the Ministry of Home Affairs);
- To streamline operational procedures by having a strong NDMA that is directly controlled by the highest levels of the state.

In addition to these preparedness efforts, processes are being put in place to be applied in the event of a mega disaster requiring international assistance. In such a situation, as described in the National Disaster Response Framework (NDRF), the Government of Nepal can request help from the UN system, through the humanitarian Coordinator, regional organizations (ICIMOD, the organization of South Asia), neighbouring countries (India, China), bilateral donors, the Red Cross Movement, and national and international NGOs. Until the NDMA is set up, the Ministry of Home Affairs will facilitate and coordinate the overall management of the international humanitarian community, in accordance with the Guidelines for Accepting International Assistance and Early Registration to be prepared in consultation with the Ministry of Finance.

2.3.2. The operational set up

The central body of the operational set up, in the absence of the NDMA, is the National Emergency Operations Centre (NEOC) under the Planning and Special Services Division of the Ministry of Home Affairs (MoHA). The NEOC is responsible for the coordination and communication of disaster information throughout the country, and acts as the central command and control body at the national level for the different government agencies and other response and recovery stakeholders. The NEOC is located in a standalone prefabricated building situated in the Ministry of Home Affairs premises in Singha Durbar. The building has been built to earthquake standards and is completely self-contained, including multiple back-up power supplies. With its Operation room, its capacity to keep staff present 24 hours a day and 7 days a week, and its communication equipment (still relatively rudimentary), the NEOC is supposed to remain on stand-by 24 hours a day, 7 days a week, and works round the clock during a disaster. It is currently run by a nine-member personnel team under the leadership of the Under-Secretary. Many of the staff would welcome additional training in large-scale disaster

management and coordination (with UNDAC and international military forces who might be deployed in the case of a disaster).

Nepali Urban search and rescue capacity

Prior to the earthquake, there was only a mid-level USAR team and a limited dog search capacity in Nepal. These are principally connected to the Army, the Police and the Armed Police. The network of fire brigades is insufficiently developed. Some efforts are being made to move towards more INSARAG compliant capabilities for collapsed structure USAR and develop a group of INSARAG-light trained instructors who will increase the capacities of the Army, the Police and the Fire brigades.

A large number of people have been trained and equipment has been distributed by NGOs, through DIPECHO, DFID and USAID funded projects, by the NRCS under the CADRE project as well as by NSET – Nepal. The quantity of kits of equipment distributed by the CADRE project to wards and sub-wards (2 kits by CDMC) is insufficient to have much of an impact if a major event takes place. They will nevertheless help to give the impression that some people are equipped and are “trying to do something” and will appease anxiety and tension.

Prior to the 2015 earthquakes, Nepal was highly dependent on external actors in the event of a major earthquake in the Kathmandu Valley. If national capacities are overwhelmed in the future, Nepal will have little choice other than to rapidly dispatch USAR teams, probably under regional leadership (India, China), or international leadership (USA, UNDAC). The critical factor in these circumstances will be the state of the airport and of the road and bridge networks between Kathmandu and India and neighbouring Nepali provinces (for the transportation of heavy equipment which is in short supply in the Valley).

The health emergency response system

Regarding health, a Health Emergency Operation Centre was created in 2014. Having been tested for the first time following the 2014 floods, it was activated very rapidly after the earthquake. Making the health sector able to withstand shocks and still remain operational has been seen by both the Government and donors as key to the resilience of the city (Merlin, 2012). There are many public and private hospitals in the Kathmandu Valley, but how many of these will remain operational after a large-scale earthquake is open to question. The structural safety of private hospitals and schools is currently being looked into by the State, donors and NGOs.

It should also be mentioned that the Nepali Army has been given two field hospitals to be deployed in the event of a disaster to complement their USAR capacity.

Hospital Safety: Ensuring hospitals remain intact to save lives and treat the injured NRRRC Flagship 1: School and Hospital Safety (www.nrrc.ne)

According to a 2001 assessment, a major earthquake in the Kathmandu Valley would result in only 10% functionality of hospitals, which will threaten the response to immediate needs, sustainable recovery efforts and health driven development. Led by the Ministry of Health and Population and the World Health Organization, the NRRRC Flagship 1 will ensure that hospitals in the Kathmandu Valley will structurally survive a major earthquake and have the capacity to operate after a disaster to save lives, treat the injured and support recovery.

Strategy

- Structural and non-structural vulnerability assessments to determine which hospitals are in critical need of attention.
- Phased physical retrofitting/strengthening of hospitals of prioritized hospitals.
- Training of health practitioners and engineers in earthquake resiliency and the development of national training materials to guide hospital safety.

Objectives

- To complete non-structural safety work in 3 hospitals in Kathmandu Valley by the end of 2012.
- A seismic vulnerability survey of major hospitals in 2012 will identify priority hospitals for structural surveys and retrofitting design. A donor conference will be held in mid-2013 to identify funding for major structural retrofitting

programmes in 10 hospitals. This will ensure that key hospitals are structurally resilient to a natural disaster and remain fully functional for post-disaster needs and recovery.

Major accomplishments to date:

- A comprehensive structural survey is been conducted through 2012-2013 to provide detailed plans for 10 hospitals.
- A Technical Advisory Group has determined how to prioritize hospitals for the comprehensive structural survey. This will include the 7 priority hospitals identified during a government workshop held in 2010.
- The Government of Nepal has allocated funds for retrofitting Patan Hospital.
- Non-structural assessments have been completed in 2 hospitals in Kathmandu Valley with non-structural retrofitting (including water systems) currently ongoing in TU (Teaching Hospital).

This project complements another project by a group of partners (World Health Organization, Handicap International, Merlin and Oxfam) funded by DIPECHO.

Enhance the capacities of MOHP (Ministry of Health and Population), health facilities and catchment communities around the targeted health facilities to respond effectively to a major disaster (Earthquake)

Objectives

The project aims at contributing towards enhancement of capacities of MOHP, health facilities and surrounding communities to respond effectively to earthquake in Kathmandu Valley.

The project builds upon the DIPECHO VI cycle activities, during which the project has developed the national mass casualty management strategy for health sector, trauma guidelines, national emergency referral guidelines and key documents to document best practices on health sector emergency preparedness. It aims to replicate lessons learnt and best practices from DIPECHO VI cycle and where needed scale up to other facilities and surrounding communities to increase their preparedness and response capacity to manage mass casualty incidents during major disasters.

Strategy:

The project adapts a multi-pronged strategy; at first level the project seeks to strengthen the capacities of MOHP to carry forward the implementation of comprehensive mass casualty management systems and replication in other areas; at second level, building the capacities of health facilities including personnel's skills to respond to mass casualty incidents and at third level to strengthen the capacities of targeted catchment communities of health facilities to be better prepared and respond to disasters. Taking into account the characteristics of the highly populated population catchment of the Kathmandu Valley, the project implemented several activities:

- Preparedness of critical infrastructure needed (nonstructural as most of the structural retrofitting work was done under other projects, especially those funded by DFID);
- Ensure that mechanisms are in place for the response, including the support to the creation of an HEOC, connected with the National Emergency Operation Centre (NEOC) which operates under the Ministry of Home Affairs. The HEOC represents the main Incident Command system in health and can support different types of activation mechanisms, including the activation of the Hub system, the deployment of health professionals, etc.;
- Establishment of the referral network around a certain number of Hub hospitals servicing lower level health structures; supported by an established early deployment scheme of the Nepali Health professionals on the basis of a roster;
- Preparedness for the functioning of health systems: MCM, medical guidelines, treatment guidelines and standardized training packages.

In addition to the development of these emergency health capacities, a specific set of activities have taken place for dead body management. In Nepal this issue has important legal, religious, cultural and symbolic connotations. Places in morgues and mortuaries are limited, and due to the heat during part of the year, dead body management should be implemented relatively swiftly. Bodies are cremated, after which analysis and identification are impossible. This means that it is particularly important that bodies are identified early, that families are informed, misconduct is prevented, rituals are implemented, and that any other forensic procedures are carried out as required. The ICRC has developed training modules on dead body management which are extremely well suited to Nepal.

3. THE POST EARTHQUAKE CONTEXT

Nepal was struck by a 7.8 Magnitude earthquake on Saturday 25th April 2015 with the epicentre located 81 km northwest of the Nepali capital Kathmandu at a depth of 15km. This was not the “big one” everybody was fearing, and turned out to be more of a rural disaster than an urban one. Luckily, most people were at home in the city and were able to escape from their houses.

Many people stayed outside in open spaces for a few nights, but the large fields where IOM and OXFAM had set up facilities were largely underused. There was less destruction in the Kathmandu valley than had been feared, and most people preferred to stay in their neighbourhoods to protect their belongings and remain with their friends and relatives.

After a series of aftershocks (including a 6.7 magnitude earthquake and, on 2 May 2015, another 5.0 magnitude quake near Pokhara), another significant tremor of 7.3 magnitude affected another area west of Kathmandu on 12 May 2015. This caused further damage, and increased levels of fear and anxiety. Aftershocks continued for many months. It is estimated that around eight million people have been affected overall.

Luckily, the airport was unaffected and remained operational, but was rapidly congested. Most of the critical infrastructures of the city remained more or less functional, including telecommunications, electricity, and water, with only short disruptions. There were no major fires, despite the fact that these are often caused by earthquakes in urban settings.

As of 3 June 2015, the Government of Nepal (GoN) reported a total of 505,745 houses destroyed and 279,330 houses damaged by the 7.8 magnitude earthquake on 25 April 2015 and the 7.3 earthquake on 12 May 2015. The earthquakes killed 8,702 people and injured thousands of people. An estimated 2.8 million people are still in need of humanitarian assistance.

It is important to clarify some salient features of the situation:

- April- May was not a cold period, although weather was an issue for the high altitude villages that were affected;
- The events took place before the rainy season when access was still relatively easy. The transportation of people and goods became much more complicated when the monsoon rains started; there were frequent landslides in areas where the geological substratum had been weakened by the series of tremors;
- The majority of people tried to avoid staying too long in tents in the camps and, as soon as they could, they managed to find shelter with relatives. Very few camps were established in the districts although groups of temporary shelters were erected, but in most instances these were located very close to the former houses if not on the same sites;
- The situation became much more complicated when the political situation at the Indian border made it difficult to import goods. Fuel and many priority consumer goods are now in very short supply;
- Transporting aid and reconstruction materials, and travelling to and from the field for staff rotation and monitoring became contingent on the capacity to access black market fuel...
- Several political events took place during the post-earthquake period and contributed to slowing down key processes, such as the creation of the National Reconstruction Authority, the promulgation of the reconstruction code, etc.
- The earthquakes took place while the harvest was in granaries and seeds were being stored in houses. Due to the destruction in rural areas, many agricultural assets were lost;

- After an initial phase where the flow of aid actors was made easy, the GoN restricted the granting of working permits and NGO accreditation, arguing that national human resources should take precedence over international ones. Only a few international NGOs were registered. Others had to work through a Nepalese organization or illegally.

3.1. Immediate response to the April earthquake and the May aftershocks

3.1.1. The national response

First responders

Despite its many structural and institutional weaknesses and limited means, the Government of Nepal reacted relatively swiftly. The fact that the earthquake took place at mid-day on a Saturday, during the only day off of the week, meant that all offices were closed and key staff involved in the response had to rush to their work place. The national institutions reacted as well as they could in this context, with the immediate activation of the NEOC (National Emergency Operation Centre) and the mobilization of the Nepali Armed Forces (which comprise “special response teams”) and the Nepali Red Cross.

However, the specific characteristics of the event took everybody by surprise: the disaster mainly affected rural areas, though several urban centres, including Kathmandu itself, were also seriously affected, and there were several aftershocks, a particularly strong one taking place in a different region. The news on the situation in the districts reached the staff on duty in the NEOC who immediately informed the chain of command. A lot of unforeseen difficulties were created by the fact that the earthquake took place in more remote districts, while existing response plans for a high magnitude earthquake were focused on Kathmandu. This situation continued after the second significant aftershock in Sindupalchock area. To respond to this situation, the government mobilized its full logistical capacity, including the fleet of military helicopters to deploy national staff (and soon international teams) to remote areas. However, many areas remained accessible only on foot due to the large number of landslides caused by the weakened geological strata.

The decentralized structure of the country (districts and village development committees), which is the result of a reportedly relatively effective process towards federalism, meant that information could be shared relatively soon after the first earthquake. The strong institutional position of the district authorities helped with regard to the transfer of information to the central level, and by mid-May, the Government had announced that 14 of the 75 Nepali districts had been severely impacted. However, the engagement of Chief District Officers and Local Development Officers (who respectively report to the MoFALD and the MoHA) was uneven, as was their internal capacity to coordinate the aid system. They nevertheless played a key role in the humanitarian response and recovery phases.

As an auxiliary to the public authorities, the Nepali Red Cross Society (NRCS) rapidly activated its Emergency Operation Centre, mobilized its resources, including many volunteers in the district chapters and branches. The NRCS has given a central place to DRR for a number of years, with many preparedness programmes supported by the Red Cross family (IFRC, British Red Cross, etc.). As a result of this, and the experience it gained during the decade of conflict in the country, it played a strategic role in the early response. Light USAR teams present in the different branches and chapters of the NRCS were mobilized in the afternoon of the 25th and started to work immediately.

Health

The response to the earthquake was the first test for the Nepali health system since the beginning of the efforts to improve its response capacity. Staff mobilized rapidly, leaving their families at home to reach their duty stations in the different health institutions. It is very important to differentiate between the response in Kathmandu valley and the response in rural districts, as there had been far fewer health preparedness activities beyond the limits of the Kathmandu Valley. The government rapidly decreed that health fees would be waived during the state of emergency. Unfortunately, this information did not reach every area and many wounded people stayed at home out of fear that they would have to pay for expensive surgical operations and post-op care.

For Kathmandu, Mass Casualty Management and injury management were managed in a relatively comprehensive manner with positive results in the areas of first aid, rescue, triage, surgery and wound care and slightly less positive results in terms of continuity of care beyond discharge, including early rehabilitation, and follow up in different kinds of environments (hospitals, communities, and rehabilitation centres). The first steps of mass casualty management were put in place very quickly thanks to the response capacity developed through pre-earthquake preparedness (EPP project, HOPE project, DFID support). Many of the sources interviewed indicated that triage was relatively well organised with red, yellow and green zones rapidly established. As well as the earthquake victims, the hospital staff also had to deal with all the patients who had been evacuated and were afraid of aftershocks. The large number of patients who refused to go back to their wards due to the aftershocks made the situation chaotic. Help desks were set up rapidly and played an important role in the first days by providing patients with information. Coordination between the different desks was essential but not sufficiently effective. Due to the prepositioning of drugs and equipment (drugs and surgical equipment by WHO, mobility and rehabilitation devices by HI), operational wards and post-op systems were able to function in a satisfactory manner. However, hospitals ran out of stock rapidly and were not resupplied as quickly as expected. Contingency stocks are never sufficient and have to be rapidly supported by proper resupply systems. This area was a little weak in Kathmandu.

The situation was much more complicated in rural areas, where many health facilities had been partially or completely destroyed. Either spontaneously or at the initiative of the HEOC, most of the emergency cases were transferred to Kathmandu in the first 6 days. While this was not always ideal, it was a wise decision as it allowed better case management, due to the poor conditions in many health structures in the districts. While some facilities were underused, others struggled to provide quality care to patients and had to discharge some who were still in need of care. The lack of a clear referral system was the main reason for underutilization/overloading. In many health structures in the districts, there was no MCM plan in place, and the response was very much on an ad-hoc basis. Limited triage capacity and no Standard Operational Procedures for evacuation meant that there was “no prioritization of cases”. This led to a certain amount of chaos and exhaustion amongst the clinicians. The post operation and discharge procedures were even more chaotic as these took place in a largely destroyed environment.

The Nepali army and police deployed their own tented hospitals, with equipment and specialized staff. According to several witnesses, these health structures functioned extremely well despite all the constraints.

Dead body management remained a complicated issue. The Nepali Police and the local administration were mobilized to ensure that Dead Body Management procedures were followed in areas where bodies were retrieved from debris.

Grant allocation for disaster victims

The government established a system for allocating financial assistance to earthquake victims, so that they could start rebuilding basic facilities. This initial cash grant allowed many affected families to repay their debts.

3.1.2. The international response

As soon as the earthquake took place, several national and international response mechanisms were activated. Nepal (GoN) requested international humanitarian assistance on 26 April 2015. The reaction from the international community was also very rapid and generous. One principal concern was to not repeat the mistakes made in Haiti after the earthquake (the phrase, “Haiti is the Bogey man”, was frequently heard⁸). The UNRC-HC (United Nations Resident and Humanitarian Coordinator) encouraged UN agencies to take action outside Kathmandu, where the humanitarian needs were reported to be much greater, and not to stay within the confines of the UN compound.

The search and rescue response

UNDAC deployed rapidly a strong capacity via an electronic event on the Virtual-OSOCC listserv on the dedicated OCHA web site and in the field with an OSOCC in Kathmandu, a Reception and Dispatch Center (RDC) at the airport and a Base of Operation (BoO) to coordinated logistics for field displacements. Many USAR teams arrived in the country in the days after the earthquake with varied effectiveness and impact, as shown by the table presented in annex N°3, obtained from the NEOC.

In view of the type of disaster (with the capital slightly affected but the main impact in rural areas stretching over 14 districts), light, mobile and self-sufficient SAR teams performed much better than the INSRAG registered “heavy teams”. The one-storey houses in rural areas rarely cause the quantity of debris that requires canine teams.

On 27 April, the GoN decided that there were enough in-country SAR teams to meet the remaining needs and announced the end of the international USAR phase on 3 May. The GoN also asked all foreign USAR teams to leave the country as it began the transition from relief to early recovery activities. No additional international teams were requested to respond to the May aftershock, which caused additional damage, as a certain number teams were still present in country.

The health response

WHO called for assistance and many countries and organizations sent Foreign Medical Teams (FMT) to support Nepal with medical services such as surgery, mobile clinics, orthopaedics, gynaecology, obstetrics, and psychiatry? A Foreign Medical Teams Coordination Cell (FMTCC) was established, directly coordinated by the HEOC to coordinate the presence and activities of the 142 FMTs from 123 organizations following the OSOC model (tasking and placement on the basis of needs assessed and skills provided). Very rapidly, the FMTs in Kathmandu realized that the significant and relatively well-prepared national health capacity in Kathmandu was able to cope with the needs. There were far greater needs in rural areas, but many teams that had been deployed did not have the logistical capacity to reach isolated areas and function relatively autonomously. In fact, the MSF field hospital and the Red Cross health Emergency Response Units (ERU) were among the few health structures that were able to function in the harsh conditions of rural Nepal. Thus, early in the response, the government asked for the deployment of additional FMTs to be postponed or cancelled.

The Red Cross and Red Crescent system mobilized its Health Emergency Response Units. Field clinics (Basic Health Care Units), and field hospitals (Rapid Deployment Emergency Hospitals) were deployed. They are fully self-sufficient for one month, and can operate for up to four months with supplies and a multidisciplinary team of 10 to 20 aid staff. Rapidly after their arrival in Nepal, ERUs were dispatched to the different areas in need, under the guidance of the HEOC. They provided both surgical care to the earthquake victims and all other health care services that were required, including mother and child care, community health and psychosocial support. Some of these ERUs were sent to difficult areas in mountainous areas. The Canadian Red Cross field hospital in Dhunche, for instance, had a full medical team including a surgeon, an obstetrician, emergency medicine physicians and general practitioners. The staff also provided the doctors, nurses and health aid

⁸ Meaning that the difficulties and mistakes made during the Haiti earthquake response had to be avoided at all costs.

workers from the Nepali health system who were still active in the community with support. Other ERUs were sent to less difficult districts, such as the Norwegian Red Cross field hospital which played a key role in a district capital where the hospital had been seriously damaged by the earthquake.

Despite the efforts of the HEOC, coordinating health actors in the field was much more complicated. Much of the response in rural areas was limited to places that were easily accessible and this sometimes led to saturation and duplication, while many areas in need did not receive any assistance. Some villages were visited by a number of different evaluation teams, sometimes even three health assessment teams, who had not coordinated their visits.

Shelters and NFI

With many houses completely or partly destroyed and the monsoon season arriving fast, the distribution of basic shelter materials and non-food items (NFI) was seen as a priority. The initial idea (based, to a great extent, on the experience in Haiti) was to skip the tarpaulin phase and to move straight to the distribution of Corrugated Iron Sheets (CGIS) to limit complex and time-consuming distributions and related processes (identification, recording, targeting, distribution, post-distribution monitoring). Due to the scarcity of local stocks and problems in negotiating tax-free CGIS imports with the GoN (which took up a lot of time and was unsuccessful, despite the efforts and mediation of the donor community and UN), aid agencies had to resort to multiple tarpaulin distributions, causing delays, additional costs, and a lot of frustration on the part of the population. A massive effort was then put in place to move tons of CGIS to the affected villages, including by helicopter and on people's shoulders in hard-to-reach mountainous areas. Different models of shelter were built (squares, tunnel forms, etc.), using different materials (bamboo and clay in certain areas, wood and CGIS in others, etc.), the vast majority being erected by the populations themselves, some with technical advice from aid agencies. A large number of cash-based programmes were implemented for the reconstruction but many people had already undertaken repairs long before they received cash assistance due to the approaching monsoon.

NFI distributions were also delayed by airport congestion, customs clearance difficulties in Nepal, lengthy border crossings at the India-Nepal border (made worse by demonstrations by the Madesh people blocking the whole Terai region). Emergency prepositioned stocks (NFI, Wash, tarpaulins) were rapidly dispatched to the 14 open spaces that had been identified and where part of the population stayed for the first few nights.

Food security and economic security

Food security was assessed as being relatively precarious in several areas, although in many other places, farmers managed to save most of the stored crops, seeds and animals and managed to plant and transplant rice in their terraces. The FAO and several NGOs provided assistance to families who had lost draft animals, milking buffalo females, seeds and equipment. While food aid was widely used for emergency relief, there was also a large cash-based response. This usually took the form of unconditional cash transfers, with people able to use the cash as they wanted: shelter, food, school, health, or debt repayment, which was a significant issue for many families. The regular distribution of 15,000 Nepalese Rupees (a bit more than 100 Euros) was for specifically vulnerable families complemented by an NFI distribution (tarpaulins, blankets, kitchen sets, shelter kits) to ensure that the cash would be used for other priority needs.

Cash was transferred in a number of ways, from the simple handing out of envelopes to bank transfers. Very few agencies had a pre-earthquake negotiated agreement with a Financial Service Provider, though this sector was booming due to the large number of remittances sent by Nepalese overseas workers. This meant that cash was transferred late, and arrived in a disconnected manner in relation to needs: people had already gone into additional debt in order to begin reconstruction work or to meet basic needs when the cash arrived.

Debris removal

Proper debris removal is essential for the return to a certain level of normality, and first of all, to allow people to move around. In most situations, this took place naturally and was undertaken by the population itself so that they could return to their houses and find out what kind of life they could re-establish there. In rural areas this was relatively simple, as the quantity of debris was relatively small (when there was no additional debris caused by a landslide) and could be stored nearby, though there was some added difficulty due to the fact that many areas were sloped. In addition, temporary shelters were often constructed near the destroyed houses, and debris was initially left in the nearby rice fields. In urban centres, the quantity of debris was much higher, transportation and storage was more complex and there were more technical issues involved. As a result, it took a long time and many areas were still not cleared months after the tremors.

It is important to underline that no building reconstruction can take place before the demolition of dangerous structures and the removal of debris have been properly carried out. Debris removal labelled as “early recovery activity” under the coordination of the Early Recovery (ER) Cluster, was led by the MoFald and co-led by UNDP. The ER cluster therefore had an important role to play and it was also important that it cooperated properly with other clusters. The government established that only debris lying on the roads, damaged public buildings and buildings that were a danger to the public would be removed.

Private owners had to manage the removal of debris from their buildings. Heavy equipment, such as heavy duty vehicles were sometimes needed, particularly for multi-storey concrete buildings. However, this equipment is difficult to use in the narrow streets that can often be found in older neighbourhoods. Many of these areas were still not cleared at the end of 2015, 9 months after the earthquake.

A second issue of concern is damaged private houses that are still standing, but have been classified “red” by the expert assessment. Nine months after the earthquake, the situation is unchanged. The inhabitants / owners are not living in these unsafe houses and nothing has been done to demolish them.

Debris removal is a dangerous job, and thus requires care and supervision. The whole chain has to be considered as a comprehensive system, with different chains of actions:

- On-site debris removal to the primary point of deposit, then transportation to a secondary storage point and then on to the final point of storage would have been the normal course of events. This was made very difficult and costly by the topography and the frequent disruption of transportation due to landslides.
- Possible on-site utilization (land stabilization, terracing, road repairs, etc.).

The environmental impact of either solution needed to be assessed properly.

In order to increase efficiency, debris removal has been shared between two main actors, UNDP and the International Organisation for Migration (IOM). The IOM is responsible for cities and urban centres, while UNDP is in charge of villages and rural areas. They have developed two different ways of working:

- The IOM hires contractors who either contract local companies with heavy equipment and people through Cash for Work Programmes (“daily labourers recruited by private companies”).
- UNDP operates through the local authorities and then promotes community participation through Cash for Work Programmes. However, this is a much more time-consuming approach and requires a lot of additional measures to ensure the safety of the workers.

As is often the case, these activities can have either a positive or a negative impact on local markets as well as on the labour market. The latter is especially important in Nepal as a significant proportion of young men work

abroad as labourers in the Gulf States. In the field, the IOM hires equipment on the local market (i.e. cars and drivers), thus providing income for local entrepreneurs, but also inducing price increases. UNDP, on the other hand, procures everything it needs from Kathmandu. As a result, it does not have a negative impact on the local market, but does not contribute to the local redistribution of wealth.

3.2. International Coordination

The OCHA office in Nepal was closed for some times and did not reopen its office in Nepal immediately after the 25th April earthquake. Instead, a strong surge capacity was deployed from the OCHA Bangkok Regional office to support the office of the RC-HC. The OCHA Head of office arrived 4 weeks later, and immediately opened three hubs in the three main affected districts (apart from the Kathmandu valley), Sindhupalchok, Gorkha and Dolakha. These were closed at the end of September, five months after the earthquake. Initially, in Dolakha, the cluster system had been implemented on the basis of the District Disaster Preparedness and Response Plan (DDPRP⁹ - 2011), which only included five clusters (without the Early Recovery cluster). In view of the critical involvement of the District institutions, various clusters brought the coordination down to the district level, allowing for decentralized decision-making and a shorter response time. OCHA was only present for a short time. After the Government decided that the humanitarian period was over, OCHA closed its office at the end of 2015, when the situation remained highly precarious and unpredictable.

Following the Government of Nepal's request for help and the UN mobilization, the full cluster system was immediately deployed at the central level using the pre-existing cluster system in place prior to the earthquake. The organization of the cluster system differed slightly from the usual set up in this post-earthquake response. For instance, when most of the camps closed down in Kathmandu, it became clear that the Camp Coordination and Camp Management (CCCM) Cluster was no longer needed. The CCCM and shelter clusters therefore merged.

3.3. Transition to development

As is often the case after a disaster of this kind, a PDNA was launched to assess the level of damage and quantify recovery and reconstruction needs. The needs identified included:

- Public buildings and facilities (hospitals, health posts, schools, and administrative buildings - for CDOs, and LDOs, for instance);
- Private buildings (houses, shops);
- Some infrastructure (roads, bridges);
- Agricultural systems (irrigation, damaged seed stocks);
- Livestock and agricultural assets that are normally sheltered or stocked in house compounds;
- Water sources and water distribution systems that were damaged by the different shocks.
- Etc.



Though it is important to estimate the cost of the reconstruction, the PDNA was limited to quantitative analysis, and did not include qualitative analysis of how to take advantage of the situation to “build safer”.

⁹ <http://un.org.np/page/list/Preparedness2011/key%20document>

On 25th June, exactly two months after the earthquake, the Government of Nepal organized the International Conference of Nepal's Reconstruction 2015. The Prime Minister announced the government's decision to establish "a high level National Reconstruction Authority (NRA) under the Prime Minister for carrying out the tasks of sustained, durable and planned reconstruction". Discussions were held with the Head of a similar structure that was established in Pakistan after the 2005 earthquake about how this type of agency could function. On 13th August, Govind Raj Pokhrel, was appointed Chief Executive Officer of the NRA. In his previous post as the Vice-Chair of the National Planning Commission (NPC) he had led the task of preparing the PDNA report, which was unveiled just before the 25 June International Conference. A few days before this meeting of donors, the GoN announced the end of the tax exemption for humanitarian products (a list of around 15 products). Two months after the disaster, all imported materials were subject to a 42 % import tax. After the earthquake, humanitarian stakeholders had asked for a tax exemption for CGI sheets, but this was refused by the government, who argued that some retailers had already paid taxes. CGI sheets, which are essential for the roofs of temporary shelters, were never exempted.

One of the reasons the Government of Nepal declared that the humanitarian phase was over was so that recovery funds went through the Ministries, who would then implement projects once policies had been established. Many donors, UN agencies and NGOs did not fully agree with this process, due the risks on aid integrity and are still waiting for the operational policies to be formulated in order to see how they can operate. Some are working in partnership with district authorities and are trying to implement a response based on existing needs. The difficulties encountered in setting up the NRA have shown that concerns about political stability were largely founded. The Reconstruction Bill permitting the creation of the Reconstruction Agency was only adopted a few days before Christmas, nearly 8 months after the disaster and the Agency is far from being operational.

The aid sector has been implementing the transition to recovery for a number of months. By July all the clusters had begun thinking about their own transition to recovery. As part of the initial efforts, the ER cluster was activated very early under the leadership of the Joint Secretary of the MoFALD (first meeting on 27th April). An Early Recovery advisor was nominated straight away at the RCO (Resident Coordinator Office), for 6 weeks. The ER Advisor was not maintained as the system evolved quickly and the different technical agencies with development departments who had been active in the country prior to the earthquake had initiated their own transition to recovery. The task of advising on ER issues was given to the inter-cluster coordination under OCHA.

The shelter cluster - DUDBC, (Department of Urban Development and Building Reconstruction / MoUD), IFRC

The IFRC (International Federation of the Red Cross, Red Crescent movement), the co-lead of the shelter cluster, immediately appointed an (early) recovery advisor who stayed a few months. The targets for housing recovery and reconstruction were established by the World Bank as the sector leader in the PDNA. They are preparing a large and apparently well-funded program with the MoUD. The first step will be an exhaustive reconstruction needs assessment. REACH already carried out damage assessment just after the earthquake and its aftershock¹⁰. In August, four months after the earthquake, the Shelter Cluster had set up a Recovery and Reconstruction working group led by the IFRC.

Even though the DUDBC (Department of Urban Development and Building Reconstruction, MoUD) is the cluster lead, various working groups have been created to address specific issues, under the initiative of the Shelter Cluster co-chaired by IFRC. The MoUD has mainly developed its expertise in cities and it is planning BBB projects in Kathmandu, in areas where buildings have been destroyed. However, these projects focus on

¹⁰ Shelter and settlements vulnerability assessments, June 2015.

house owners to the detriment of those who rent flats. The reconstruction of destroyed buildings will also be a major part of the recovery in small urban centres in rural districts.

The MoFALD, the early recovery cluster lead, is very active in rural and remote areas, where their CDOs are the core institutional level. Care should be taken to avoid overlapping of reconstruction activities by these two structures. It might be useful to limit the MoUD to major urban areas and let the MoFALD operate in rural and remote areas, where its local institutions have good knowledge of contexts and needs. It is not the Shelter cluster's role to propose this separation of areas of activity, but it could still have some influence.

All clusters, including the shelter cluster were closed at the end of 2015. As there was still a need for coordination, a platform was set up, embedded in UN Habitat, to continue the coordination of the housing reconstruction sector. The first meeting of this platform, the HRRP (Housing Recovery and Reconstruction Platform), was held in the last week of 2015, chaired by the CEO of the National Reconstruction Authority (NRA).

The WASH cluster - DWSS (department of Water Supply and Sewerage / MoUD), UNICEF

Before the earthquake, there were a lot of activities in the WASH sector. Water supply systems had been installed in both rural and urban settings. A long-term project to improve hygiene had been running, the ODF program (Open Defecation Free zone), co-led by the DWSS (under the Ministry of Urban Development) and UNICEF. Despite these efforts, there was still a high prevalence of water-borne diseases and cholera was endemic in the Kathmandu Valley. The relief response after the earthquake consisted largely in building emergency latrines, mainly inside camps, but also in affected rural areas (1 latrine for 1 to 5 houses). These shared latrines are not in keeping with Nepalese customs and are not well appropriated by the Nepalese. As almost all the camps are closed and people are trying to rebuild their lives close to their former houses, the GoN has rapidly resumed the ODF approach before people return to their former habits. As the ODF program is implemented at the district level, the WASH clusters will be turned into DWCCs (District WASH Coordination Committees). The DWCCs will be chaired by LDOs and will have a particular focus on Sanitation and Hygiene. The residual emergency work on IDPs will be undertaken by a WASH task force in DWCC sub-groups.

The WASH cluster did not focus on water supply, which is managed at the central level. Local water treatment is carried out using purification tablets. Water and sanitation systems were less damaged than initially feared. The water safety system should be revised with the aim of Building Back Better.

The health cluster - MoHP (Ministry of Health and Population), WHO & UNFPA

Many activities had been taking place in the health sector prior to the earthquake, with support to the health surveillance system, and to the curative and preventive health services at the central and decentralized levels. The impact of the earthquake was strongly felt in the sector as many buildings where health institutions were located were either destroyed (or their equipment rendered unusable) or weakened structurally, making them unsafe.

The recovery approach was based on a series of steps, including:

- Dismantling the emergency health structures set up by the aid agencies and re-establishing health services either in their original buildings when it was possible to retrofit them rapidly or in temporary buildings when the hospitals or health posts had been destroyed by the earthquake or had to be demolished. This critical component of the health recovery approach is largely focused on “destroy, remove and rebuild”. The IOM is very involved in “destroy and remove” activities while several financial institutions have promised sizeable envelopes for the reconstruction and re-equipment of health infrastructures.

- Discussing how to manage the impact of the return to the health fees and cost recovery schemes that were in place prior to the earthquake. The earthquake underlined how difficult it is for many inhabitants in remote areas to pay for health care as they also have to pay for costly transportation and lodgings for the patients and their care takers.
- Taking disaster preparedness in the health sector into consideration in the light of the lessons learnt from previous efforts under the EPP.

The earthquake also revealed the imbalance in the number of health personnel between Kathmandu Valley and the rest of the country. This is an issue that the Ministry of Health wants to address as part of the recovery efforts, with different types of incentive mechanisms.

Food Security cluster - MoAD, WFP & FAO

Once the initial phases of food distributions with high protein biscuits and other emergency food had been implemented, the Food Security Cluster had to address a number of key issues:

- What should be done in areas where the earthquakes had destroyed existing food stocks, seed reserves and livestock?
- When and where should food be distributed and when and where should there be a rapid transition to cash transfer programmes?
- How should the recovery potential of agriculture and livestock activities be assessed?
- How should the “off farm” sector be assessed and supported, especially in the different types of urban centres affected by the earthquake?

While the shift to cash was extremely rapid, support for the productive sector was a bit slower and support for the resumption of non-agricultural activities was largely left to individuals and the private sector.

Education cluster -DOE (Department of Education / MoE), UNICEF & Save the Children

In the education sector, only buildings were destroyed, as the earthquake took place on Saturday at mid-day, when there was nobody in the schools. Temporary solutions were built in many areas, to ensure that children could continue to attend school up to the end of the school year. UNICEF and a wide range of NGOs supported these temporary schools and supplied basic school equipment. A transitional phase will take place from September to December after which the National Education Cluster is planned to be de-activated.

The national co-lead agencies will continue to provide coordination capacity at the national and district levels until December. It is expected that the full National Education Cluster will be replaced by a core group of NGO representatives who will meet regularly and could be called upon on an ad hoc basis as needed. School building reconstruction is planned to take place through a Project Implementation Unit (PIU), chaired by the DoE’s Director General, and District Implementation Units (DIUS) at the district level.

3.4. The impact of the border problems on relief and reconstruction

The revision of the Constitution and the establishment of a federal system of 8 regions led to serious political problems with the Madesh people living in the Terai region. As this ethnic group is present on both sides of the border, they managed to create a situation of insecurity at the different border crossing points between Nepal and India. This led to a quasi-blockade that caused major scarcity of nearly all the goods that are normally imported via or from India. Fuel, cement, cooking gas, and even some food items became more and more rare and costly. It has now become extremely expensive to transport people, relief items and reconstruction items, and as a result, reconstruction efforts are being held up.

4. LESSONS LEARNT AND AREAS TO BE IMPROVED

4.1. Clarify the policies and roles of the line ministries

With the Disaster Management Act not yet approved by the Assembly, the legal framework for national and international organisations remained rather weak, and ad-hoc solutions had to be found all the time. This led to difficulties in the management of the response and led to a lot of different implementation methods running in parallel, which created problems. In a disaster of this kind, a single ministry cannot be effective, so a “whole of government” response has to be implemented. There were signs of efforts in this direction in the response to the earthquakes, but they had no solid legal basis.

- ➔ **Therefore, the new Disaster Management Act needs to be adopted rapidly as it will fill the gap in policy definition, and implementation guidelines preparation and supervision. All national institutions involved in the national disaster structures will then have a clear action plan and their responsibilities will be clearly spelled out. Revisions should be made regularly to make the policies more practical.**

4.2. Improve communication with the affected population

In Nepal, where the political context is very complex and is still affected by the decade of civil war and the complexity of the peace process, aid delivery has been affected a great deal by political factors. Aid actors and donors may see targeting as a virtuous process, but in Nepal, it is, at best, socially rejected, and, at worst, manipulated for political gain or to favour a particular political or ethnic faction. In addition, in most places, lists had to be approved by Government officials. While VDC and District officials were often extremely helpful and processed the files with energy and dedication, cases of corruption and political manipulation were also reported. In order to counterbalance these trends, it is necessary either to implement an extremely complex, and often costly and time-consuming procedure, or to engage in extensive and in-depth dialogue with local opinion makers, social leaders and local activists to diffuse any potential time bomb linked to unaccepted targeting systems.

This does not apply only to Nepal. Indeed, while Nepal benefits from a high level of sympathy abroad, which helped to mobilize financial resources, for many governments their key concern was their own citizens stranded in Kathmandu and along trekking routes, due to politics at home. The high level of resources that were mobilized to locate and evacuate foreign tourists and trekkers was regularly criticized in the Nepali media.

In addition, in many cases, the affected population were insufficiently informed about what they could expect from aid agencies, where they could get relief and medical assistance, etc. Although agencies started to use social media, local radio and other mechanisms to communicate with the affected population, many of the interviewees felt that these had been insufficiently used to give information about programmes, explain selection procedures, counteract rumours, and prevent political manipulation.

- ➔ **The only solution to these two problems is to invest more in communication to establish more active dialogue with the affected populations.**



4.3. Need to develop a building code for rural housing

While urban construction is largely standardized, using concrete beams, cement blocks and special retrofitting techniques which incorporate existing para-seismic technologies, in rural areas, the existing building code is not adequately implemented and there are a lot of self-built houses. As a result, there was a lot of damage and a high number of casualties in the villages. In addition, many areas were already prone to landslides and this has been made worse by the 2015 tremors.

→ **It is essential to adjust the Building Code to rural settings and ensure that all building codes are implemented in urban, peri-urban and rural areas.**

4.4. Strengthen national search and rescue capacity

In large-scale urban disasters, a key factor of a successful emergency response is how fast you are able to get people out of the rubble. What is needed is:

- a highly-trained formal Urban Search and Rescue (USAR) force capable of undertaking collapsed structure interventions in multi-storey buildings and dangerous situations;
- a medium-level capacity in the form of a network of equipped fire brigades;
- a largely decentralized light and very light search and rescue capacity able to operate rapidly in all areas even if communication and transportation lines are cut.

Due to a lack of trained human resources and equipment, foreign help was requested in this domain where the quality of the response depends on timeliness and technical know-how.

- **The development and strengthening of national rescue and relief capacity should be made a priority;**
- **The Nepalese army, police and fire brigades should be trained so that they can act as a middle level rescue capacity. A 7/7 medium type USAR team should be established with a National Disaster training centre.**

4.5. Improve coordination of international relief support during the early phase

The first few days after a disaster are often very complicated with the arrival of many relief teams and organizations who are not necessarily well equipped or prepared. It is often difficult for the national authorities to know what and how much to expect from these organisations. OCHA/UNDAC normally provides the sector with early guidance and information on needs, but in Nepal, as too often in disaster situations, many more people than were needed arrived from abroad. A lot of money was spent inappropriately and national institutions are still burdened with having to coordinate these different actors.

- **When Nepal requests international support, it is important to ensure that incoming actors have a much better understanding of the context and existing needs, as well as the gaps that need to be filled in order to orient the flow of aid towards where it is actually needed.**

There was little coordination of the items provided to disaster victims, and many private organizations brought inappropriate items.

- **The list of items to be provided to disaster victims should be decided in advance, in a coordinated manner by all stakeholders. Tax deduction procedures should be designed accordingly.**

Although there were several attempts to organise a “one door policy” for relief distribution at the DCO and VDC, this initiative was not supported a great deal by aid agencies, leading to gaps, duplications and inequality.

This “one door” system does not mean that agencies lose visibility or assessment and monitoring capacity. It just means that a more coherent system will be in place and that this will alleviate the burden on local institutions.

- **A “one door system for relief provision” should be put in place for relief distribution, using the Disaster Relief Committees under the supervision of local institutions and aid agencies.**

4.6. Enhance access to remote areas

As the earthquake affected mountainous and hilly regions, there was great demand for helicopters. The national army provided theirs and all other options were used. India, China and the US provided a few, but not enough. Due to high altitudes, difficult terrain and bad weather, many helicopters could not be mobilized effectively. In many remote VDCs, it was very difficult to evacuate the wounded and provide relief.

- **Helipads should be identified and marked at an early stage at the VDC and DCO levels.**
- **There should be a sufficient number of helicopters in country, with the security providers. The MOHP/NEOC should also have their own flying capacity.**

4.7. Raise the capacity of emergency warehouses and increase prepositioned stocks

Although the WFP has warehouses in the different airports and in different areas, the overall storage capacity is insufficient.

- **National and decentralized pre-positioned stocks should be increased.**

4.8. Improve the management of internal displacements

Many people were displaced within or outside their district of origin. This created some difficulties in terms of relief allocation. In addition, in the Kathmandu valley, people took shelter in a number of different locations in fear of additional aftershocks. It was very difficult to find these people and provide them with assistance.

- **It is very important to find ways to improve the management of IDPs.**

4.9. Debris removal and management

Debris management was difficult in rural areas as well as in urban centres. Many houses have cracks and have been weakened structurally, and they will have to be destroyed. Rubble clearing will require a lot of equipment and heavy machinery, and will take a long time in rural areas and in certain parts of Kathmandu.

- **Policy decisions will have to be made in relation to all the weakened and dangerous buildings that need to be demolished and the debris that needs to be removed.**

4.10. Improve communication with the affected population

The call centre established in the Ministry of Information and Communication (call 1234) has been widely used.

- **This system should also be put in place at the NEOC and HEOC and made more widely known amongst the public.**

4.11. Improve the national capacity for Information and data management

Due to the geographical complexity of the terrain, many VDC and DCC were not fully taken into account.

- **There should be a strong IS system available at the NEOC, and it should be easily accessible by the national disaster centre.**

Victim identification, follow up and long-term assistance requires proper data management and is always a challenge following a large-scale disaster. An open system that can be used by all agencies, and that can be properly monitored and adjusted is needed. One solution would be a non-duplicable Victim ID system.

- **A Victim ID Card system should be put in place.**

5. THE WAY FORWARD

5.1. Supporting the Nepali Government in its recovery efforts

The central government has shown real commitment to establishing policies on recovery and reconstruction, including building codes. The responsibility for implementing the national recovery and reconstruction strategy has been largely placed in the hands of the district and village levels, as there is a direct link between district authorities and populations and they are usually aware of people's needs. However, it will be important to ensure that there is a sufficiently strong feeling of accountability among district staff, and also that they have the right competencies. These are areas where international and national NGOs could join forces and support the whole process to ensure that needs are properly covered and that aid reaches the population.

In this respect, the debate concerning the establishment of the Prime Minister Relief Fund is of particular interest. Although, from the beginning, the GoN wanted all international actors to contribute to the PMRF, instead they purchased essential relief items and distributed them themselves. International Development Partners did not follow the "one goal policy" which would have been more coherent with the OECD Paris development Principles than to GHDI humanitarian principles and this led to a lot of frustration in government circles.

- **After the next big disaster, the international community could channel some resources through the PMRF on an experimental basis and carefully monitor how they are used to learn from the process.**

5.2. Residual and future humanitarian needs

The Nepalese government's desire to move on from the humanitarian phase as quickly as possible should not mean that the remaining humanitarian needs are overlooked. Even though recovery is very fast in certain areas (urban centres, areas close to roads), there are still many areas in the hard-to-reach zones that will recover only very slowly from the effects of the earthquake. Care should be taken to ensure that possible humanitarian needs in these areas are monitored and responded to. At the same time, there remain numerous political, agro-ecological, climatic and geological risks in Nepal.

- **The Nepalese authorities and the aid community should remain able to move rapidly to high alert mode and respond to possible future needs.**

5.3. Promoting risk-informed recovery and reconstruction

Risk-informed recovery and reconstruction should be the overall paradigm, and this also applies to the early phase of the recovery. This implies that risks are analysed, and taken into account when recovery operations

are designed and implemented. Specific markers could be used, such as the recently developed ECHO marker on DRR and resilience which is very simple.

→ **Risk informed programming should be promoted at all costs.**

5.4. Kathmandu

Although the city was less affected than feared, many buildings have been structurally weakened. Various types of retrofitting activities have been observed, but it is likely that major difficulties still lie ahead, especially if there is a significant new tremor. UNHABITAT and a few other actors are concerned about this and regularly voice their worries. So far, this issue has not yet been taken up properly by the sector...

A specific issue is that of preserving old houses and cultural and religious heritage. The latest earthquake damaged many buildings of cultural significance. Although it was known that there were high risks, little was done to make them more resilient, or even to maintain them adequately. Specific measures are needed for both the reconstruction and preservation of the cultural heritage.



ANNEXES

ANNEX N°1: RISK IN NEPAL

Flood – Flood is a recurrent problem in the Terai as well as in the mountain regions. Most part of Terai faces problem of floods during the monsoon periods (June-August). Most of the flood disasters take place along the banks of the larger rivers such as Mechi, Kankai, Koshi, etc. Rivers originating from the Siwaliks are mostly of ephemeral nature, being wild during the monsoon season, and they also pose high flood hazards to the Terai. Extensive inundation in the Terai plain is due to frequent change in the river courses, bank erosion and erosion in the river meanders. In the mountainous regions, rivers are in spates during the monsoon season. Bank undercutting, inundation of the flood plains are the results. But more disastrous are the floods in the high gradient tributary streams due to cloud bursts or high intensity rainfall concentrated usually in a small catchment. Such flash floods cause triggering of landslide, deep scouring of the stream bed and the side slopes and they rapidly develop into debris flows capable of transporting several cubic meter sized boulders. The problem of flooding in the Terai is also high due to the high bed load, in addition to the suspended load, barred by the rivers. In the plains, all the rivers are widening and cutting their banks each year.

Drought – A severe drought hit Nepal during 1981-1982 causing heavy damage to crops leading to a decline in Gross Domestic Product (GDP) by about 1.4%. Failure of monsoon rains or its late arrival causes partial drought affecting major crops in different parts of the country. Uneven distribution of the monsoon rains, with several parts of the country not receiving the required rains in the required time for the major crop is a recurrent phenomenon. Since a large part of the country still depends on rainfall for cultivation, such phenomena affect the agriculture production of the country very adversely.

Storm – Storms (line-squalls) with heavy rainfall and hail are common during the summer months in the tropical and sub-tropical parts of the country. Major damage from storms has been recorded in eastern Nepal (1980) and mid-western Nepal (1983). Storm winds of even moderate velocities have major effects in the Terai, where most of the houses and structures are lightly roofed. The most occurring disaster in March/April and October are hailstorms that have a disastrous effect especially on agriculture. While most of the hail that precipitates from the clouds is fairly small and virtually harmless, there have been cases of golf ball sized hail that causes much damage especially to the standing crops and inflict injuries.

Landslide and Debris Flow – The causes of landslides in Nepal can be assigned to a complex interaction of several factors which are natural as well as human activity related. High relief, concentrated monsoon rainfall, withdraw of underlying as well as lateral supports by toe cutting and bank erosion, presence of weaker rocks, active neotectonic movements and a complex geological history, which has resulted in very intense faulting, folding and fracturation of the rocks, are the natural factors causing landslides in Nepal. But human activities are also responsible for the very high extent, and they add to the density of landslides in the country. Overgrazing of protective grassy cover, mass felling of trees leading to an unprecedented deforestation, disturbance of the hill slopes by road/canal construction, non-consideration of the geologic conditions in the corresponding location, planning or designs of infrastructures etc. are some of the important anthropogenic factors leading to landslides. There are other social causes for the greater extent of damage. Unawareness on the part of the population and

the decision makers may be cited as the most important of all the anthropogenic activity related indirect causes of landslides. High intensity rainfalls during the monsoon season trigger many highly destructive debris slides and debris flow along the high gradient hill slope channels. Incessant rainfall during the period, when the antecedent moisture content of the land surface reaches a certain critical stage, is accompanied by landslides. Debris flows, frequent in the mountainous parts of the country, are caused by deep scouring of the stream bed and side slope by a high gradient stream. Damming of rivers and tributaries due to landslides and debris and subsequent sudden breaching of the dam is another important phenomena for the generation of debris flows. In the higher mountains, debris flows are frequently generated by Glacial Lakes Outburst Floods (GLOFs) due to the breaching of the moraines or glacier ice damming the lakes. The debris flow travels usually to greater distances along the river valley and destroy terraces, infrastructures and settlements along its course.

Earthquake – The entire territory of Nepal lies in high seismic hazard zone. The country's high seismicity is related to the movement of tectonic plates along the Himalayas that has caused several active faults. A total of 92 active faults have been mapped throughout the country by the Seismic Hazard Mapping and Risk Assessment for Nepal carried out as part of the Building Code Development Project – 1992-1994 (MHPP, 2994). Earthquakes of various magnitudes occur almost every year and have caused heavy losses of lives. The entire country falls in a high earthquake intensity belt: almost the whole of Nepal falls in high intensity scale of MMI IX and X for the generally accepted recurrence period. The seismic zoning map of Nepal, which depicts the primary (shaking hazard), divides the country into three zones elongated in northwest-southeast direction: the middle part of the country is slightly higher than the northern and the southern parts (Bilham & al, 1997). Based on the data available from the Department of Mines and Geology, CBS (1998) concludes that earthquakes of more than or equal to 5.0 on the Richter scale have occurred at least once every year in The Richter scale Nepal since 1987, with the exception of 1989 and 1992 when no such events were recorded. The current disaster database of Nepal shows that there were 22 earthquakes with magnitudes ranging from 4.5 to 6.5 on the Richter scale throughout the country for last 37 years period (1971-2007). About 34,000 buildings were destroyed and 55,000 were damaged (DesInventar, 2007) during this period due to earthquakes. Earthquake is another important landslide triggered. Apart from developing fissures both along and parallel to the hill slopes, and thus generating the potentials for debris slides, the earthquakes are found to trigger a variety of landslide types including huge rock slide, rock fall and slumps. Some of the very big landslides have been reported to have been initiated by the Nepal-Bihar earthquake of 1934 AD.

Epidemic – Epidemics are in fact the number one killer in Nepal, with an average of 410 deaths per year. During 1983-2010, fifty-two per cent of the 22,306 people who lost their lives were caused by epidemics. The pattern is not much changed during later time as well. Lack of treated drinking water supply and poor hygiene conditions, not only in the rural areas but also in the crowded, unplanned urban settlements are the cause for the potentially high risk from epidemic. Gastro-enteritis, cholera, encephalitis, meningitis, dysentery and diarrhoea account for more than 50% of the total deaths due to epidemics. Break out of epidemics after a major disaster such as flood and earthquake etc. is quite frequent. Epidemics of contagious diseases have two peaks: during the months of May and June, before the rainy season begins and in August, the height of the monsoon. Unsafe drinking water and poor sanitation are the main causes of water-borne diseases in Nepal. Waterborne diseases continue to take lives in Nepal. In fact, over 80 per cent of all illness is attributed to inadequate access to clean water supplies, poor sanitation and poor hygiene practices.

Source: 2011 Nepal Disaster report, MoHA

ANNEX N°2: DRR Efforts in Nepal

For over a decade, the international community witnessed the conflict and froze most development aid and kept its presence largely focused on humanitarian aid. With the end of the internal conflict and the emergence of a more peaceful context, the aid community re-engaged vigorously in Nepal in order to stabilize the peace and deliver peace dividends. Disaster Preparedness attracted a lot of interest in this country frequently affected by disasters. DIPECHO programmes have been very important. DIPECHO programmes have significantly contributed to enhance the capacities and resilience of local authorities and communities vulnerable to natural hazards through effective linkages, strengthening DRR systems and structures and replication of DRR initiatives across project areas.

Due to the years of conflict and the frequency of disasters, the humanitarian and DRR communities are quite dynamic in Nepal, with a fully developed Humanitarian Country Team, a complete set of clusters in place inherited from the conflict period, many national and international agencies working on disaster management and a strong commitment of Donors towards DRR and resilience building. Yet, if DRR has been for long time and still largely focussed on rural issues, it is not anymore the case and the urban contexts are more and more taken into account.

The originality of Nepal nowadays is the existence of the Nepal Risk Reduction Consortium¹¹ (NRRC), an initiative arising from the commitment of the Government to the Hyogo Framework for Action (HFA) and supported by the National Strategy for Disaster Risk Management NSDRM.

The NRRC (NRRC 2012a,) brings together aid agencies (IFRC, UNOCHA, UNDP, NGOs) and main donors (World Bank, Asian Development Bank, DFID, USAID). The Nepal Risk Reduction Consortium (NRRC) was conceived in 2009 and formally launched in 2011. Driven by key motivated individuals within the government and in key agencies, especially the RC/HC and donors (DFID, USAID), the NRRC is probably to date the most integrative project to support resilience in a significant manner in a high risk prone context. The NRRC seeks to mitigate the many risks identified in Nepal, but with a focus on two main ones: the risk of “big one” in the Kathmandu Valley and the frequent devastating floods of the Koshi River (NRRC, 2012-b).

The political context (reconciliation, preparation and agreement of a new constitution and uncertainty about what this will mean for local government structures in the context of coming local elections) made it very challenging, but also created a very useful platform for dialogue (Taylor, G. & al, 2013).

The NRRC has three objectives:

- Support the national efforts in DRM;
- Develop multi-stakeholder collaboration and coordination;
- Deliver key practical outputs through five Flagship areas (see below).

¹¹ See *Nepal Risk Reduction Consortium Flagship Programmes*, NRRC Secretariat (2012) ‘The Nepal Risk Reduction Consortium’, *Humanitarian Exchange*, 53, pp. 32-34, February 2012.

5 Flagship areas

<p>Flagship Area 1: School and Hospital Safety</p>	<ul style="list-style-type: none"> • Coordinator: ADB/MoE/WHO/MOPH • Focuses on reducing mass casualties and damage in hospital and schools through retrofitting, training and raising awareness
<p>Flagship Area 2: Emergency Preparedness and Response</p>	<ul style="list-style-type: none"> • Coordinator: OCHA/MOHA • This flagship seeks to enhance the government of Nepal's response capacities at the national, regional and district level in a coordinated manner with all in-country resources including the armed forces, as well as integrating incoming international humanitarian and military assistance
<p>Flagship Area 3: Flood Management in the Koshi river basin</p>	<ul style="list-style-type: none"> • Coordinator: World bank/Mol • This flagship is designed to address the risk of floods in Nepal. Managing water-induced disasters, focusing on the Koshi basin, is a priority for the government. Short-term goals focus on enhancing institutional capabilities in flood management, while the long-term goals focus on implementing effective flood mitigation
<p>Flagship Area 4: Community-based Disaster Risk Management</p>	<ul style="list-style-type: none"> • Coordinator: IFRC/MOLD • This flagship seeks to capitalise on Community-Based Disaster Risk Management (CBDRM) at VDC level by developing a set of minimum characteristics for disaster-resilient communities and adopting a minimum package of common elements to be included in all CBDRM projects. One thousand VDCs will be identified and consulted
<p>Flagship Area 5: Policy/Institutional Support for Disaster Risk Management (DRM)</p>	<ul style="list-style-type: none"> • Coordinator: UNDP/MOHA • This flagship recognises that institutional, legislative and policy frameworks are essential for DRM system building and embedding DRM into Nepal's development efforts. This flagship will work to ensure new risk is minimised

A set of specific programmes derived both from the commitment of the NRRC and the lessons learnt from the Haiti earthquake, for instance the identification and preparation of open spaces to host affected population in and around Kathmandu. There is now an "Open Space Act, a legislative reference for the identification and the protection of 83 sites that can host around 900.000 people. OXFAM is currently mapping them and pre-stocking arrangements are being made for water and sanitation equipment for these sites. Several key projects were launched both for global preparedness and for specific sectoral aspects, ranging from by the earthquake risk assessment and scenario development in 1997 by Kathmandu Valley Earthquake Risk Management Project (KVERMP) implemented by the National Society for Earthquake Technology – Nepal (NSET) to specific activities to enhance school and hospital "resilience" to earthquake, so they can continue to perform and be key centres of activity even in the case of global chaos. UNDP is conducting a more detailed hospital assessment, in three phases, beginning with 60 hospitals and ending with the selection of 10 hospitals to go to a 2014 donor conference for retrofitting.

The Kathmandu Valley Earthquake Risk Management Project (KVERMP)

The KVRMP was implemented from between 1997 and 1999 by the National Society for Earthquake Technology – Nepal (NSET) in technical collaboration with GeoHazards International (GHI), the Asian Urban Disaster Mitigation Program (AUDMP) of the Asian Disaster Preparedness Center (ADPC), with core funding by the Office of Foreign Disaster Assistance (OFDA) of USAID.

Objectives:

- 1) To evaluate Kathmandu Valley's earthquake risk and prescribe an action plan for managing that risk;
- 2) To reduce the public schools' earthquake vulnerability;
- 3) To raise awareness among the public, government officials, the international community and international organizations about Kathmandu Valley's earthquake risk;
- 4) To build local institutions that can sustain the work launched in this project.

Activities

KVERMP included a wide variety of activities aimed at beginning a self-sustaining earthquake risk management program for Kathmandu Valley. Project components included the following.

- 1) Development of an earthquake scenario and an action plan for earthquake risk management;
- 2) A school earthquake safety program · A survey was conducted of all of the public school buildings in Kathmandu Valley. Studies were conducted to determine the most vulnerable types of school building construction prevalent in Kathmandu Valley and to determine methods for retrofitting these structures.

ANNEX N°3: DEPLOYMENT OF INTERNATIONAL USAR TEAMS

Country	Nbr members	Canine team	Arrival date	Dead body	Person rescued	Departure	MNMCC / OSOCC
Algeria	73	9	01-may			10-may	M and O
Australia	na	na	27-apr			Na	O
Bangladesh	19	0	26-apr			09-may	M and O
Belgium	44	2	28-apr			10-may	O
Bhutan	77	0	27-apr			21-may	M
Canada	199	10	29-apr	1		25-may	O 56/M
China	942	12	26-apr		3	03-may	O 131/M
France	32	9	27-apr	2		01-may	O
German	58	7	27-apr			06-may	O
Hungary	3	0	27-apr			06-may	O
India	1415	8	25-apr	128	11	05-may	O 330/M
Indonesia	105	0	28-apr			14-may	O20 / M
Israel	286	2	28-apr			11-may	O 123 /M
Japan	114	8	26-apr	5		Na	O 95 / M
Malaysian	56	0	28-apr			06-may	O 9 / M
Mexico	20	0	30-apr			10-may	O
Netherland	66	11	27-apr	3		10-may	O
Norway	35	5		1	1	10-may	O
Oman	20	0	01-may			10-may	O
Pakistan	94	0	28-apr			15-may	M
Philippines	na	na	28-apr			Na	O
Poland	85	12	27-apr			03-may	O 4 / M
Russia	87	7				10-may	O
South Korea	24	2	28-apr	5		10-may	O
Singapore	182	4	28-apr	1		09-may	O 71 / M
Spain	60	11	28-apr				O20 / M
Sri Lanka	141	0	26-apr			11-may	M
Sweden	42	0	29-apr			10-may	O
Switzerland	9	0	27-apr	2		10-may	O
Thailand	54	0	29-apr			12-may	O 17 / M
Turkey	82	2	26-apr	1		10-may	O
Emirates	87	6	30-apr			10-may	O
UK	134	2	28-apr				O 56/M
USA	286	12	28-apr		1		O 108 / M
Total	4521	141		149	16		



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