

Kathmandu Valley, Nepal

Disaster Risk Management Profile

Last Review, August 2005

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KATHMANDU VALLEY, NEPAL

Disaster Risk Management Profile



1. Introduction

Demographic, economic, social and cultural characteristics

Landlocked between China and India, Nepal is rectangular-shaped with a total area of 147,181 square kilometers. The country is home to eight of world's 10 highest peaks, including Sagarmatha or Mount Everest and a population of 24,797,7059 (Central Bureau of Statistics-Nepal) with a growth rate of 2.25% (2004 estimate).

Geographically, the country is divided into three regions: Mountain, Hills and Tarai (plains area), and administratively, is divided into five development regions: eastern, central, western, mid-western and far western. The Tarai, known as the "grain basket" of Nepal because nearly 40% of the area is actively farmed, is a low, flat, fertile region stretching east-west along the Indian Border covering 23% of the total area of Nepal. Nearly half of Nepal's total population - 47% - live in this region.

The remaining bulk of Nepal's population - 45% - live in the Hilly region, so named because the area varies between 610 meters to 4,877 meters above the sea level. The Hilly region covers 43% of the country of which only 10% is actively farmed.

The remaining 8% of the population live in the Mountainous region, where altitudes vary from 4,877 meters to 8,848 meters above sea level. Although this region covers 34% of the country, only 2% of the land is suitable for cultivation. Agriculture is the mainstay of the economy, providing a livelihood for more than 80% of the population and accounting for 40% of Gross Domestic Product (GDP). Industrial activity mainly involves the processing of agricultural products including jute, sugarcane, tobacco, and grain. A key source of income is tourism. The international community, which funds more than 60% of Nepal's development budget and more than 28% of total budgetary expenditures, is a major ingredient of the nation's growth.

Other indicators for Nepal are as follows:

- 42% of its population living below the poverty line
- GDP_{ppp} is \$1,400 (2004 estimate)
- Life expectancy at birth is 62.2 years (CBS-Nepal 2004)
- Median age is 20.1 years, 2001
- Literacy rate is 54.1% (2001 census), of which 62.7% for males and 27.6% for females (2003 estimate)

With more than 1.5 million people, (220,000 households) **the Valley of Kathmandu (KV)** is the urban center of Nepal and includes five major cities: Kathmandu, Lalitpur, Bhaktapur, Kirtipur, and Thimi.. One-third of its residents live in slum dwellings and 18,000 people are squatting (without land rights).

Rice, wheat, corn, vegetables, and a variety of fruit including bananas and oranges are grown in the fertile Valley, which supports a relatively high percentage of the hill population. Kathmandu Valley along with the Tarai region, has witnessed an intensive migration and urbanization process since the eradication of malaria in 1951. Because of the growing number of people and vehicles in the Valley, especially in Kathmandu, air and water pollution are becoming a serious problem.

Kathmandu Metropolitan City (KMC) is the largest city in Nepal and the cosmopolitan heart of the Himalayan region. With a history and culture dating back 2,000 years, the city, along with the other towns in the Valley, ranks among the oldest human settlements in central Himalaya. Old Kathmandu corresponds to the current city core, encompassing a compact zone of temple

squares and narrow streets. The old royal palace complex Durbar Square, is in the center of Old Kathmandu and has been designated as a World Heritage site by UNESCO.

Densely populated for millennia, Kathmandu's present demography is very cosmopolitan although Newars, the indigenous people of Kathmandu, still comprise a large segment of the population. Kathmandu's culture has been inspired by the convergence of Hindu and Buddhist traditions and traditional customs, festivals, art, and literature are religious in character.

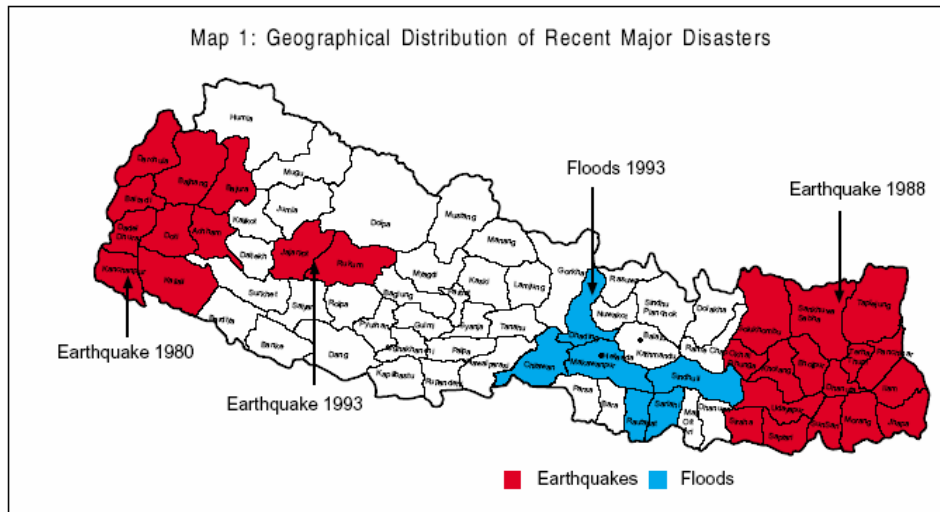
Governance style

[The present political structure of Nepal](#) consists of a multi-party democracy and parliamentary system of government with a constitutional monarchy. A Prime Minister is the head of the government. **Today the citizens of Nepal exercise rights to vote.** The Executive, Legislative, and Judiciary branches function and exercise their rights independently.

The Legislative branch, known as the Parliament, consists of the National Assembly ("Rastriya Sabha") and the House of Representatives ("Pratinidhi Sabha"). The National Assembly or the Upper House consists of 60 members while the House of Representatives, or the Lower House, consists of 205 members directly elected from 205 electoral constituencies within 75 districts of the country.

National hazardscape

Rugged and fragile geophysical structures, steep slopes, complex geology, variable climatic conditions, active tectonic processes, unplanned settlements, dense and increasing population, poor economic conditions, and a low literacy rate have made Nepal vulnerable to various types of natural disasters. Map 1 shows the Geographical Location of Recent Major Disasters in Nepal (UN Nepal's Inter-Agency Disaster Response Preparedness Plan, 2001).



The middle hills are mainly prone to landslides while the flat Tarai region is prone to floods and fire. Thus, flood, landslides, and fire are the most frequent natural disasters causing loss of life and severe damage to property in Nepal. While earthquakes are not frequent, historically Nepal has experienced several destructive earthquakes with more than 11,000 people killed in four major earthquakes just in the past century.

Earthquakes

The main source of seismic activity in Nepal is the subduction of the Indian plate under the Tibetan plate or Himalayas. Another source for earthquakes in the Valley is the identified seismic gap zone in the middle of Nepal=

Seismic records for Nepal date back to 1255. Since that time, destructive earthquakes occurred in 1408, 1681, 1810, 1833, and 1866 with the 1833 earthquake being the most destructive. In 1934, an 8.4 magnitude earthquake struck Kathmandu Valley killing 4,300 people, destroying 20% of all structures, and damaging another 40% of the Valley's buildings. In Kathmandu itself, one quarter of all homes were destroyed along with a number of temples in Bhaktapur.

In recent decades Nepal experienced two major earthquakes: a 6.5 magnitude quake in the Bajhang district that killed 178 people and destroyed about 40,000 houses and a 6.6 magnitude quake in 1988 in the Udayapur district that killed 721 people and destroyed 64,467 houses.

Floods, Landslides and Debris Flow

There are more than 6,000 rivers and streams in Nepal, most of which flow from north to south generally at high velocity due to steep river gradient. The majority of the larger rivers are snow fed from the Himalayas. Since the topography of the country is steep and rugged, with high-angle slopes and complex geology, the large quantities of rainfall during the monsoon season leads to floods, landslides, and debris flows in a number of cities. Unplanned settlements and structures built without consideration of area natural hazards is aggravating this situation tremendously. In addition, landslides caused by the torrential rains add enormous volume to streams and rivers causing floods and debris flows downstream that kill numerous people and inflict immense harm to agricultural lands, crops, and properties.

In July 1993 the Tarai region experienced a destructive flood that claimed the lives of 1,336 people and affected another 487,534 people. In 1998, floods and landslides again affected various parts of the country, mainly the Tarai and the middle Hill region killing 273, , injuring 80,, and impacted 33,549 families. The floods and landslides also ruined 45,000 hectares of crops. Similar flooding occurred in 1999 and continues to occur annually.

Fire

Fires occur mainly between April and June during the dry season when temperatures in the Tarai region reach higher than 35° Celsius and it seldom rains. Fires are common to rural the Tarai and Hill regions where 90.8 percent of the total population live in very poor housing conditions, Houses in rural regions, especially Tarai, are composed of straw or timber and tend to be very close to each other, thereby increasing the risk of fire and fire spread. A 1999 a blaze killed 39 people, injured 10, and affected 1,065 families. The fire, with estimated total losses of NRs \$45.23 million, destroyed 1,035 houses, 52 cattle sheds, and 148 livestock.

Epidemic

In most cases the epidemics of cholera, gastroenteritis, encephalitis, meningitis, typhoid, jaundice, malaria and so forth occur during the summer and rainy season. This type of disaster occurs mainly due to the lack of proper health care

and sanitation. In 1999, 1,207 people died of epidemics affecting 6,119 families in various parts of the country.

National disaster management structure and relevant legislation

The Ministry of Home Affairs through its department of Narcotics, Drug Control, and Disaster Management, is the national agency responsible for disaster management in Nepal. Formulation of national policies and their implementation, preparedness and disaster mitigation, immediate rescue and relief works, data collection and dissemination, collection and distribution of funds and resources are the vital functions of the Ministry. Its network to cope with natural disasters is integrated by 75 Chief District Officers, one in each of the administrative districts, who act as the crisis manager in the event of natural disasters.

Disaster Management Section under MOHA Structure



The main function of the department is to actively and efficiently co-ordinate and carry out emergency preparedness and disaster management activities with concerned agencies.

The Royal Nepal Army and Nepal Police play important roles in rescue

operations. Police officials collect first-hand information of a disaster and inform concerned officials. In the event of a catastrophic disaster, Nepal Police establish command posts to facilitate rescue operations. Moreover, Nepal Police personnel collect most of the disaster data and information.

During the past 20 years the Nepalese government has formulated a number of natural disaster preparedness plans, programs, and acts. Most prominent of them is the Natural Calamity (Relief) Act, of 1982, which defines the official disaster management system at central, regional, district, and local levels. The Central Disaster Relief Committee (CDRC) oversees the disaster response system. Headed by the Minister of Home Affairs, CDRC consists of the Minister of Health, the Minister of Physical Planning and Works, secretaries of other ministries, representatives from the Royal Nepalese Army and the Nepal Police, the Director Generals from the Department of Mines & Geology and from the Department of Hydrology & Meteorology, as well as representatives from the Social Welfare Council, the Nepal Red Cross Society, and the Nepal Scouts.

Following a disaster, CDRC meets as required to address the needs of the affected population. The committee is also involved in coordination of rehabilitation efforts. At the district level, the District Disaster Relief Committee (DDRC) is the active agency for coordinating relief support. This committee, chaired by the Chief District Officer, consists of representatives from public sector organizations, such as the District Health Office, the Nepal Red Cross Society, and similar agencies. DDRC is responsible for coordinating the district level relief efforts, including medical support and distribution of food and other essential supplies.

The following legislation provides the legal framework that assigns roles and responsibilities to different disaster management entities:

- Constitution of the Kingdom of Nepal, 1990
- Natural Calamity Relief Act, 1982
- Local Administration Act, 1971
- HMG Rules for allocation of functions, second amendment, 1996
- Local Self Governance Act, 1999
- Kathmandu Valley Town Development Act, 2000
- Building Act, 1998 or Draft building Council Act, 1994

Given the severe and recurrent impact of water-induced disasters in Nepal, the Ministry of Water Resources relies on the well-trained and specialized Department of Water-Induced Disaster Prevention - the lead agency in this sector. Established as a Technical Center in 1991 after an agreement between his Majesty's Government of Nepal and the Government of Japan, it was upgraded to Department category in 2000 in order to carry out different activities related to water-induced disaster prevention and mitigation. Despite this growth, its mandate, authority, and resources need to be broadened to facilitate its coordinating role.

National land use management system and relevant legislation

Land use regulations and development are a function of both the City and national governments. Large-scale infrastructure within the City is under the central government's jurisdiction. However, city roads, solid waste management, street lighting, and such are operated and promoted by City government. Land use management, though not currently existing in an integrated form, is the responsibility of the City government.

Nepal has 5 development regions and 75 administrative districts. The districts are further divided into smaller units called Municipalities and Village Development Committees (VDC). At present, there are 3,913 VDCs and 58 Municipalities in the country. A VDC consists of 9 wards and the Municipalities consist from 9 to 35 wards.

Significance of Kathmandu Valley to Nepal

Tourism is one of the most important sources of income for the Nepalese economy and the Kathmandu Valley boasts the highest concentration of UNESCO World Heritage Sites on the planet. The six Sites include Swayambhunath, Bodhnath, Pashupatinath, and the three Durbar squares of, Kathmandu, Patan, and Bhaktapur.. Since Kathmandu has the only international airport in the country, more than 95 percent of incoming tourists arrive by air.

Kathmandu Metropolitan City (KMC), the capital and largest urban center in Nepal, is the nation's main business hub. Sprawled across 5,076 hectares in the Kathmandu Valley, KMC is at an elevation of 1,350 meters. Around 20%

of the country's urban population, 701,962 inhabitants (2001 Census), call KMC home. It has a built up area of 3,844.56 hectacre, with an average population density of 175.7per/hectacre.

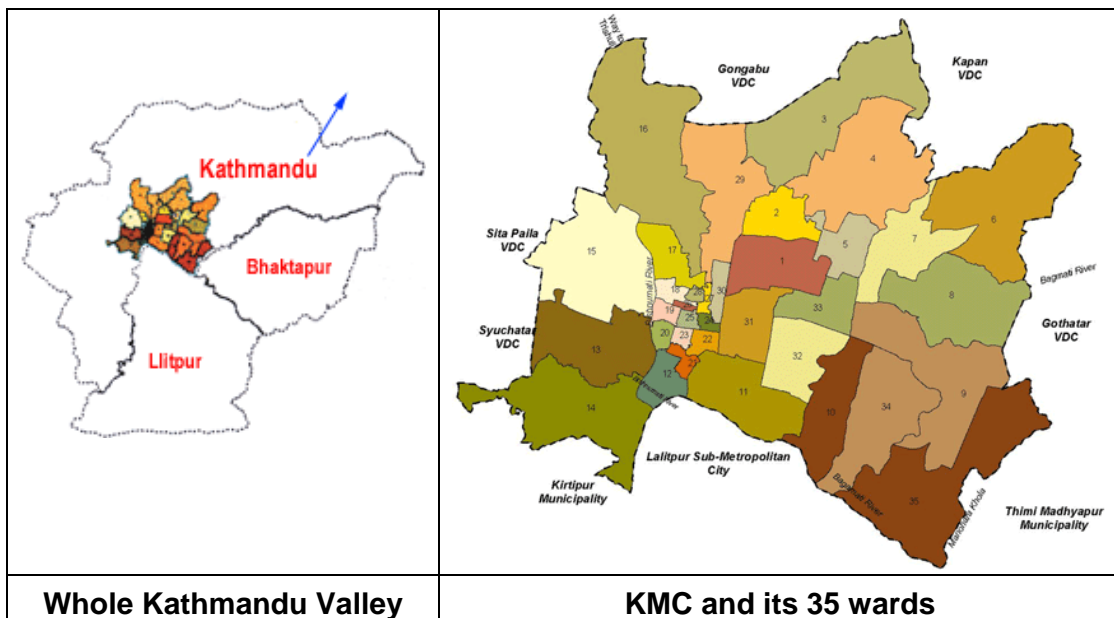
Geographical setting of the City

Located in the Hills region, at an elevation of 1,300 meters, Kathmandu Valley is roughly 25 kilometers from west to east and 20 kilometers from north to south with the surrounding area range from 1,500 to 2,800 meters in elevation. There are three roads that come into the Valley, two to the south going towards India and one in the north going towards Tibet. Several rivers flow to the center of the Valley and meet the holy Bagmati River, which flows south past the Chobar Gorge, eventually joining the Ganges.

2. Inter-City Linkages

Internal division of the City

Of Nepal's five regions, Kathmandu Valley is in the Central region and consists of three districts, the Kathmandu, the Lalitpur and the Baktapur, which include five municipalities, namely Kathmandu, Lalitpur, Baktapur, Madhyapur-Thimi and Kirtipur.



Kathmandu Municipality City was given a Metropolitan status in 1995. As the capital of Nepal. Kathmandu has a Municipal Board, consisting of five members, including the Mayor and Deputy Mayor. . KMC is divided into 35 wards. Each ward has a Ward Chairperson and four ward members, one of which has to be female, who are elected by the public every five years.

Governance/management style

The Mayor, Deputy Mayor, Ward Chairperson and five ward members are all elected directly by the general public. The Ward Chairperson and ward members relate closely to the citizenry in their wards, dealing with many local issues and functions.

Additional administrative entities include:

- Metropolis Council, consisting of 177 elected and 20 nominated members that meets twice a year to review progress, approve the annual budget, and make major policy decisions.
- Metropolis Board, consisting of 39 members that meets at least twice a month.
- City Planning Commission, an advisory body.
- The Mayor's, Deputy Mayor's, and Executive Officer's Secretariats.

There are 14 departments of the KMC government with approximately 2,500 staff.

Formal arrangements

The Kathmandu Valley Town Development Council (KVTDC) was established to serve as a coordinating body among agencies of His Majesty Government (HMG) and local governments for systematic and sustainable development of the Valley. The Minister or the State Minister for Housing and Physical Planning chairs the Council, and the Vice-Chairman of the National Planning Commission serves as vice-chair. Additional members include representatives of other ministries, mayors, chairmen of district and village level committees, and others.

With representatives at every level of government, the KVTDC can significantly contribute to improve DRM in Kathmandu Valley because . it is empowered to

coordinate, implement and enforce land use and development planning and to regulate construction. As such it provides a potential model for inter-governmental and inter-institutional collaboration towards disaster reduction based on a decentralized mode of government.

Relevant legislation/regulations

- Kathmandu Valley Development Authority Act, 2000, created the KVTDC and provides for town planning and regulation, enforcement of land development, issuing and monitoring compliance of guidelines for standards of construction.

- The Local Administration Act, 1971 (as amended through 1991), established powers and authorities of the Chief District Officer (CDO), who is appointed by His Majesty Government .

- The Local Self-Governance Act, 1999, based on decentralization criteria, established District, Municipal, and Village Development Areas. It also provided for Ward structure in villages and municipalities, empowering local bodies to make and implement town planning and prescribe construction standards in their respective areas.

3. Land Use Management

Relevant legislation

Land management in Nepal is centralized and Kathmandu Municipality has no land to develop. Land is either privately owned or belongs to the central government. Water and sewerage are the responsibility of the national government. Since 1956, Nepal has implemented periodic development plans (five-year national plan), and currently the tenth national plan is in effect. The five-year national plan provides the only basis for land use and urbanization policies in Nepal. The Kathmandu Valley Development Plan of 1976 is the statutory plan for Greater Kathmandu, and was approved by His Majesty's Government (HMG). The plan covers the areas lying within the Ring Road with provisions for areas beyond the Ring Road.

With assistance from the United Nations, efforts to develop Kathmandu in a planned way began in 1962.. Seven years later a comprehensive document

entitled “The Physical Development Plan for Kathmandu Valley” was released stating that any development within Kathmandu must be considered within the context of the Valley as a whole. However, the plan was never endorsed by the government, nor implemented. Also, the 1978 UNESCO-prepared “Master Plan for Conservation of Cultural Properties in Nepal” has yet to be implemented by the government.

Unfortunately, clear land use plans and regulations were not prepared. As a result, the lack of proper planning has contributed to the haphazard pattern of rapid urban growth which has occurred in the Valley since the 1970s. The urban area of Kathmandu has expanded from 24% of the total area in 1971 to 67% in 1991.

Presently, new public and private construction occurs with no advance planning, consultation, or review. Even if land use regulations were enacted into law, there would still be formidable problems with implementation and enforcement due to a lack of a workable institutional structure and planning capacity.

The absence of public investment planning and coordination in the Valley is also a major cause of land use problems. Land use regulations cannot be effective if major public facilities continue to be constructed without prior planning and interagency cooperation.

Additional relevant legislation is noted here:

- Town Development Act, 1988
- Kathmandu Valley Development Authority Act, 1988
- Municipality Act, 1991
- District Development Committee Act, 1991
- Village Development Act, 1991

Responsible agents and their relationship

The Ministry of Physical Planning and Works implements urban development plans and programs in Nepal through the Department of Urban Development and Building Construction (DUBDC). . The Ministry of Local Development (MLD) is responsible to administer the programs of local governments, such as municipalities and Village Development Committees. However, the MLD handles only the administrative and personnel management function of the local government and does not have the capacity to assist in preparing physical

development plans, for which it has to rely on the DUDBC. The exchange of cooperation between the two agencies is very weak.

The Kathmandu Valley Town Development Committee (KVTDC), chaired by the Minister for Physical Planning and Works is the agency in charge of planning for all of KV. At present, KVTDC is confined to the enforcement of building bylaws, implementation of land pooling (readjustment) projects, and guided land development (GLD) programs. So far, 11 land pooling projects have been implemented and 280 kilometers of GLD roads have been opened in the Kathmandu Valley.

The Town Development Act of 1988 provides the legal basis for implementing town development plans, empowering central and local government agencies to carry out land pooling projects. The Local Self Governance Act provides the Municipalities and the Village Development Committees the authority to plan and execute development projects locally, but it is not as comprehensive as the Town Development Act for town planning.

There are many cases of conflicts between His Majesty's Government and KMC in coordinating several operational matters. As a local government, the KMC is a municipal service provider engaged in public welfare, service, and infrastructure development activities. For the running and maintaining of these services, municipal governments are assigned a number of taxes and other sources of revenues, such as property tax, business tax, advertisement tax, vehicle tax, and rent tax.

The Kathmandu Valley Town Development Committee is currently preparing a 20-year development plan of the Valley. In its preliminary draft, the Committee has proposed a two-pronged strategy: first, to spread the overconcentration of capital investment and economic opportunities in the Valley to other growth regions of the country; and second to provide a development framework as to where and how much the future growth of the Valley should be channeled, so that various growth externalities are reduced.

Effectiveness of current arrangements

Managing Kathmandu is a complicated issue, as there are no clear-cut job descriptions among dozens of institutions that are supposed to be managing the

capital city.

Currently, about 10 ministries and 15 associated departments and agencies are involved in planning, governing, and providing services in Kathmandu. But due to differing priorities, as well as conflict of jurisdiction and authority, the agencies do not plan and coordinate their actions.

Although the Local Self Governance Act of 1999 mandated that KMC prepare, implement, and monitor its own plans, except for the issuance of building permits, it has been unable to take on these responsibilities due to the lack of trained staff and resources. Kathmandu Metropolitan City currently has no legal mandate to control development beyond its borders or restrict development in the flood plains and rich agriculture lands.

4. Vulnerability Issues

According to the 2002 Human Development Report, Nepal ranks 142nd among 173 nations on the Human Development Index, with more than 80% of the population surviving on less than US\$2 per day (OCHA, 2002).

In addition to socio-economic factors, geological, topographical, and climatic conditions expose Nepal to multiple hazards, most prominently earthquakes, floods, landslides and fires. Statistics suggest that in proportion to the total number of people affected, more people are killed by disasters in Nepal compared to any other country in South Asia (Koirala, Sharma & Regmi, 2002). However, the annual variation in terms of loss of lives and affected families is significant.

The topography of the country poses huge infrastructure challenges in terms of access to disaster sites by land. This is particularly the case during the monsoon season from June to August when landslides tend to block the country's main highways.

At-risk groups

Since earthquakes are a rare but known hazard in this region, the entire community of Kathmandu Valley is at risk to experience destructive earthquakes due to the use of inappropriate building materials and construction techniques. In particular, children, the elderly, and the infirm are specifically at

risk considering the high vulnerability of schools and hospitals due to the use of inadequate building materials. .

Schools in Nepal are at extreme risk for earthquakes since the buildings are generally constructed without the input of engineers trained in earthquake-resistant design or construction. Low budgets increase the likelihood that poor materials or workmanship are used.

The 1998 Udayapur earthquake in eastern Nepal, illustrated the high vulnerability of these types of structures; approximately 6,000 schools were destroyed, fortunately during non-school hours.

The possibility of the entire Valley experiencing a severe earthquake (magnitude 8) is a possibility. According to an magnitude 8 earthquake damage scenario (JICA 2002), 21% of the building stock could be heavily damaged with a potential death toll of 1.3% of the total population, and 3.8% of the people seriously injured. In such a scenario, the disaster risk is directly and primarily related to the inadequate capacity of local institutions to manage an emergency of that magnitude and the high structural vulnerability of the structures (GESI Program 2001).

At-risk locations

The majority of new settlement areas extending beyond the boundaries of the Valley are being built on top of old landslide areas, creating potential disaster-prone zones during the rainy monsoon season. Landslides, debris flows, slope failures, and floods can happen in and around Kathmandu Valley during every monsoon.

Non-engineered dwellings

At present, there are about 63 informal settlements in Kathmandu, popularly known as "Sukumbasi Basti", that provide housing for about 2,600 families or nearly 15,000 people. Most of these informal settlements are on government land. A 1985 study identified 17 such settlements. Although no study has been done on the number of poor families living in rented rooms, it is believed that a several-fold increase in the number of squatter settlements and renters has occurred during the past two decades since no effort has been made to

provide poor families access to land.

City policies on vulnerability alleviation

Squatter settlements in Kathmandu started in the 1950s when rural migrants moved into cities looking for employment. One of the objectives of Kathmandu Valley Town Development Committee is to provide access to land for housing and to plan and control development. In the past 20 years, KVTDC has adopted various innovative approaches to address housing issues. Land pooling is regarded as one of the most successful programs, however it has mostly focused on a small scale on middle and upper income people. Private developers and owners are responsible for making the bulk of Kathmandu's land available to the general public. There are no policies or development plans in place to assist the poor in accessing land; nevertheless, efforts are being made for 5-7% of the land in KVTDC's land pooling project to be allocated for the poor. Directives are being given to developers to do the same.

5. Disaster Risk Management Arrangements

Functional arrangements

The legislative framework for disaster risk management has experienced recent improvements. The "*Local Self Governance Act*" of 1999 gave fresh momentum to the decentralization process and devolution of authority by empowering local governments to undertake disaster management activities. Currently, the *Kathmandu Metropolitan City Act* is being formulated to provide a comprehensive legal and policy framework for an effective governance of the capital including disaster risk management. This Act was expected to be enacted by the end of the year 2004 [since we are in 2005 need to verify this was done]. In addition, the *Kathmandu Valley Town Development Act* has been in effect since 2000 [this needs to be explained further not just mentioned].

The Disaster Management Section, under the Department of Social Welfare, has two employees. It is the city agency responsible for identifying and informing city residents about potential disaster zones, arranging for disaster relief, providing temporary shelters, and establishing a disaster relief fund. The building permit process comes under the jurisdiction of the Urban Development

Department. Several wards have constituted ward-level disaster management committees (WDMC) that include representatives from community-based organizations, non-government organizations, businesses, and clubs.

Risk Assessment

While floods and landslides are annually recurring events, earthquakes happen infrequently. The seismic record of the country seems to suggest that a major earthquake on par with the 1934 earthquake occurs approximately every 75 years. Although this is only a statistical estimate, no one questions that major earthquakes are an unavoidable part of Nepal's future. Poor building practices and insufficient emergency and hospital preparedness elevate the risk of mass mortality and injuries from collapsed structures during an earthquake.

At the request of His Majesty's Government, the Japan International Cooperation Agency recently conducted an Earthquake Disaster Assessment of Kathmandu Valley. Four damage scenarios considered the impact of a magnitude 8 earthquake in mid-Nepal, a magnitude 6 in the North Bagmati region, a Magnitude 5.7 earthquake in Kathmandu Valley, and an earthquake equivalent to the 1934 Bihar 8.4 magnitude earthquake. . Three of the scenarios are expected to produce Modified Mercalli Intensities of VIII in Kathmandu Valley, implying significant human, physical, and economic losses. The fourth scenario, corresponding to the North Bagmati fault, could produce damages associated with MM intensities of VI to VII in the Valley.

Every year, Kathmandu Valley suffers from various types of water-induced disasters such as floods, landslides, and debris flows impacting residents and property including vital infrastructure.. Unscientific land use practices, increased population pressure, extensive deforestation, lack of awareness and unplanned development of infrastructure are additional causes contributing to this extreme condition. The Department of Water Induced Disaster Prevention (DWIDP), through its Disaster Mitigation Support Program has started a process of identifying and mapping disaster prone zones in selected sites around the country, including several wards in the Kathmandu municipality. DWIDP is also striving to implement Disaster Mitigation Activities incorporating structural countermeasures, such as building dams and drainage channels for sediments control, implementing reforestation processes, and increasing community participation in public awareness activities.

DWIDP's Disaster Mitigation Support Program Project is also working on implementing a GIS-based information system for disaster management.

Risk Communication

Two aspects are considered in regards to risk communication.; The first aspect relates to technical issues, such as hazard monitoring, disaster Information, emergency communication, and so forth. In this regard, the Department of Mining and Geology is in charge operating the Nepalese Seismological Network with 17 stations distributed all over the country. The information is transmitted and managed by the National Seismological Center in KMC.

In early 2005 a national-level inventory of all disaster data dating back to 1971 was completed. Developed by LA RED, the data, is stored in a computer-based format known as "DESINVENTAR".. The data is accessible through a government web site as part of the Ministry of Local Development.

The second aspect of risk communication deals with sociological issues, such as disaster education, people's awareness, and preparedness. Community participation in mitigation and emergency preparedness is promoted through media coverage oriented to preparedness and active participation by NGOs. The disaster management section of KMC through the Information and Communication Department is undertaking the task of public awareness activities. However, due to the lack of resources and manpower it is not able to fully accommodate its responsibilities and duties. At the national level, the Department of Water Induced Disaster Preparedness within the Ministry of Water Resources also implements mitigation activities, some of which are in the southern part of the Kathamandu Valley.

The United Nations Development Program (UNDP) in partnership with MOHA, the Japan Women Development Fund, UNOPS, and the International Center for Integrated Mountain Development (ICIMOD) are carrying out a program for Participatory Disaster Management, including the community capacity development by mobilizing women and men into self-governing organizations to cope with natural disasters.

Other mitigation awareness events include the annual Earthquake Safety Day held on January 15, which includes an awareness rally that culminates in a

public meeting where authorities and residents express their commitment to improve seismic safety within their cities. Begun in 1998, this Nepalese program has become a sustainable national effort with ever increasing outreach. . Activities include the Shaking Table Demonstration, Earthquake Trivia, Photo and Poster Exhibition, and a conference for professionals of the region. NSET-Nepal provides technical assistance for all municipal efforts. Likewise, other organizations, including government, non-government, academic, and business organizations are joining hands to implement Earthquake Safety Day programs.

6. Disaster Risk Management Vision

The Nepalese government's objectives regarding population, environment, and natural disaster management are described in Chapter 22 of Nepal's Tenth Development Plan.

“Contribute substantially to make public life secure by managing natural and man made disaster systematically and effectively and by making the development and construction related programs in the country sustainable, reliable and highly gainful”.

The strategic objectives pursued by the Social Welfare Department through the Disaster Management Section are:

- a) to identify disaster prone areas and make the information available to the inhabitants of the city;
- b) to conduct preparedness and mitigation programs to reduce the loss of lives and properties due to the earthquake; and
- c) to make arrangements for security, relief, rehabilitation and temporary settlement of the disaster victims.

The “*Kathmandu Valley Earthquake Management Action Plan*”¹ developed in 1998 through a participatory planning process involving a range of stakeholders, stated eight long-term objectives for risk reduction in the Valley:

- Improve emergency response planning and capability
- Improve awareness of issues related to earthquake risk

¹ Kathmandu Valley Earthquake Risk Management Project implemented by NSET-Nepal and GeoHazards International

- Integrate seismic resistance into the process of new construction
- Increase the safety of school children and school buildings
- Improve the seismic performance of existing buildings
- Improve the seismic performance of utility and transportation systems
- Increase experts' knowledge of the earthquake phenomena, vulnerability, consequences and mitigation techniques
- Improve long-term community recovery following damaging earthquakes

7. Issues

Although the National Planning Commission of Nepal has incorporated aspects related to natural and human-induced disaster management in Nepal's Tenth 5-Year Development Plan (2002-2007), they are clear that the main challenges of natural disaster management relate to:

- Lack of coordination among authorities involved;
- The need to incorporate a preventive instead of responsive vision;
- The lack of modern or appropriate technology that provide pre-information and warning about the possible natural disasters;
- The lack of appraisal of natural disasters while selecting development projects;
- The lack of compliance with building codes; and
- The lack of rehabilitation, support, and risk transfer programs.

Other issues include:

- Lack of adequate legal framework and clear responsibility assignment for disaster management at the national and city level;
- Lack of adequate funding for individual institutions; and
- Relief and rehabilitation focus on the organizational structure rather than efforts for preparedness and mitigation actions.

8. References

Primary data source:

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