

Profile on Environmental and Social Considerations in Nepal

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Abbreviations and Acronyms

AAP Act	Aquatic Animals Protection Act
ACA	Annapurna Conservation Area
ADB	Asian Development Bank
AM	Accountability Mechanism
BCN	Bird Conservation Nepal
BDS	Blue Diamond Society Nepal
CAI-Asia	Clean Air Initiatives for Asian Cities
CANN	Clean Air Network Nepal
CBD	Convention on Biological Diversity
CBS	Central Bureau of Statistics
CCNCR	Council for the Conservation of Nature and Cultural Resources
CDC	Compensation Determination Committees
CDO	Chief District Officer
CEDA	Centre for Economic Development and Administration
CEN	Clean Energy Nepal
CEPF	Critical Eco System Partnership Fund
CERID	Research Centre for Educational Innovation and Development
CMS	Conservation of Migratory Species of Wild Animals
CMU	Community Mobilisation Unit
CNAS	Centre for Nepal and Asian Studies
CSUWN	Conservation and Sustainable Use of Wetlands in Nepal
DANIDA	Danish International Development Assistance
dB	Decibel
DDC	District Development Committee
DFID	UK Department for International Development
DHRC	Nepal Disabled Human Rights Centre
DFRS	Department of Forest Research and Survey
DHM	Department of Hydrology and Meteorology
DNPWC	Department of National Parks and Wildlife Conservation
DoA	Department of Archaeology
DoF	Department of Forest
DoHS	Department of Health and Services
DoI	Department of Industry

DoI	Department of Irrigation
DoR	Department of Roads
DoTM	Department of Transport Management
DoWC	Department of Women and Children
DP	Displaced People
DSC	Design Supervision Consultant
EA	Environmental Assessment
ECA	Environmentally Critical Area
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ENK	Embassy of Norway in Kathmandu
ENPHO	Environment and Public Health Organisation
EVAN	Electric Vehicle Association of Nepal
FAO	Food and Agriculture Organization of the United Nations
FNCCI	Federation of Nepalese Chambers of Commerce and Industry
FPIC	Free, Prior, and Informed Consent
GIZ	German International Corporation GmbH
GoN	Government of Nepal
GRC	Grievance Redress Committee
HMGN	His Majesty's Government of Nepal
IBAT	Integrated Biodiversity Assessment Tool
ICIMOD	International Centre for Integrated Mountain Development
IDA	International Development Association
IDE-JETRO	Institute of Developing Economies, Japan External Trade Organization
IFC	International Finance Corporation
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
IPP	Indigenous Peoples Plan
IRBC	Immigration and Refugee Board of Canada
IUCN	International Union for Conservation of Nature in Nepal
JBIC	Japan Bank for International Cooperation
JICA	Japan International Corporation Agency
KBA	Key Biodiversity Area
KEVA	Kathmandu Electric Vehicle Association
KUKL	Kathmandu Upatyaka Khanepani Limited
LGBTI	Lesbian, Gay, Bisexual, Transgendered, or Intersex

LRMP	Land Reform Mapping Project
LSMC	Lalitpur Sub-Metropolitan City
MCA	Manaslu Conservation Area
MLD	Ministry of Local Development
MoAD	Ministry of Agriculture and Development
MoE	Ministry of Education
MoEST	Ministry of Environment, Science and Technology
MOFA	Ministry of Foreign Affairs of Japan
MoFSC	Ministry of Forests and Soil Conservation
MoH	Ministry of Health
MoHP	Ministry of Health and Population
MoI	Ministry of Irrigation
MoICS	Ministry of Information and Communications
MoLD	Ministry of Local Development
MoLE	Ministry of Labour and Employment
MoLRM	Ministry of Land Reform and Management
MoLTM	Ministry of Labour and Transport Management
MoPE	Ministry of Population and Environment
MPPW	Ministry of Physical Planning
MPPWDR	Ministry of Physical Planning Department of Roads
MoPPWTM	Ministry of Physical Planning Works and Transport Management
MoSTE	Ministry of Science, Technology and Environment
MoWCSW	Ministry of Women, Children and Social Welfare
NADA	Nepal Automobile Dealers Association
NAPA	National Adaptation Programme of Actions
NAST	Nepal Academy of Science & Technology
NBS	Nepal Biodiversity Strategy
NFDIN	National Foundation for Development of Indigenous Nationalities
NFDN	National Federation of the Disabled Nepal
NEFEJ	Nepal Forum of Environmental Journalists
NEFIN	Nepal Federation of Indigenous Nationalities
NESS	Nepal Environmental and Scientific Services
NEWAH	Nepal Water For Health
NFEJ	Nepal Forum of Environmental Journalists
NGO	Non-Governmental Organization
NIDS	Nepal Institute of Development Studies

NPC	National Planning Commission
NPWCA	National Parks and Wildlife Conservation Act
NRCS	Nepal Red Cross Society
NREA	Nepal Recyclable Entrepreneurs Association
NTNC	National Trust for Nature Conservation
NWCF	Nepal Water Conservation Foundation
NWP	National Water Plan
NWSC	Nepal Water Supply Corporation
OSH	Occupational Safety and Health
PAPs	Project Affected Persons
PID	Project Implementation Directorate
PIO	Project Investigation Officer
PIU	Project Implementation Unit
PM	Project Manager
PM	Particulate Matter
PoE	Panel of Experts
PSMC	Pokhara Sub-Metropolitan City
RECAST	Research Centre for Applied Science and Technology
REDD	Reducing emissions from deforestation and forest degradation, plus conservation, sustainable management of forest, and enhancement of forest carbon stocks
RF	Resettlement Framework
RP	Resettlement Plan
RRT	Refugee Review Tribunal
RS	Resettlement Specialist
SC	Supervision Consultant
SOUP	Society for Urban Poor
SPM	Suspended Particulate Matters
SPS	Safeguard Policy Statement
SWM	Solid Waste Management
SWMRMC	Solid Waste Management and Resource Mobilization Centre
TSP	Total Suspended Particulates
TU	Tribhuvan University
UEMS	Urban Environment Management Society
UN	United Nations
UNDP	United Nations Development Programme

UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNEP	United Nations Environmental Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNHRC	United Nations Human Rights Council
USAID	United States Agency for International Development
USDS	United States Department of State
VDC	Village Development Committees
VDIMP	Voluntary Donation Impact Mitigation Plan
WB	World Bank
WB OP	World Bank Operational Policy
WEPA	Water Environment Partnership in Asia
WEPCO	Women's Environment Preservation Committee
WHO	World Health Organization
WTO	World Trade Organization

Executive Summary

In 2010, Japan International Cooperation Agency (JICA) announced its new JICA guidelines for environmental and social considerations. The guidelines present the JICA objectives and goals related to environmental and social considerations. The new guidelines address some key points, including the strengthening of the requirements for resettlement, the considerations for indigenous peoples, and information disclosure. Consequently, a country profile for environmental and social considerations in Nepal (hereinafter referred to as ‘profile’) was prepared. The profile is expected to serve as a source of information that can be used to integrate environmental and social considerations into the design of future projects in Nepal.

To ensure that all relevant information is covered, a literature review of relevant regulations in Nepal, a revision of historical projects, interviews with local experts, and consultations with relevant agencies were conducted. A review of other donors’ projects was also conducted to identify potential gaps between their safeguard policies and local regulations.

What follows is a key summary of the research conducted on environmental and social considerations in Nepal.

1. Summary of Environmental Considerations

Nepal, known officially as the Democratic Republic of Nepal, is a landlocked country that borders the People’s Republic of China and the Republic of India. Although it’s a small country, Nepal has a greatly varied climate (for details please refer to Section 1.1.2). To protect the rich biodiversity and beautiful landscape, 21.08% of the country is designated as a protected area, including 10 national parks, three wildlife reserves, one hunting reserve, six conservation areas, and 11 buffer zones (Section 2.4.1). Additionally, Bird International, a key environmental protection organisation in Nepal, clearly defines the country’s Important Bird Areas (IBAs) as being part of the environmentally-protected areas that were identified during the course of this study. However, size of the forested areas in Nepal has been generally on the decline and, from 2000 to 2005, the country’s annual deforestation rate was approximately 1.4%. Established in 1973, the National Parks and Wildlife Conservation Act (NPWCA) and its 10 associated regulations are the principal legislative actions that govern management of protected areas in Nepal (Section 2.2.2). Additionally, in Nepal, 86 species of animals and nine species of plants are registered as being critically endangered (CR), endangered (EN) or vulnerable (VU).

Due to its geography, Nepal is highly vulnerable to the adverse impact of climate change. Additionally, Nepal has the highest rate of urbanisation (5% per annum) in South Asia. This has created new issues for Nepal's environmental and developmental challenges, including air, water, soil and other types of pollution (Section 3.8.1).

Although Nepal does not have a separate policy for air quality management, the country has established some existing policies that address urban and industrial pollution and that call for appropriate legal and institutional mechanisms. These policies include the Environment Protection Act of 1996, the Industrial Policy of 1992 and the Nepal Environmental Policy and Action Plan (NEPAP) of 1993. However, a gap exists between policy statements and policy implementation (Section 3.3.1). For example, several policy documents clearly indicate the need to promote zero-emission electric vehicles. However, neither specific plans nor actual programmes have been established to achieve those targets. It is recommended that the implementation status of these plans be monitored.

Water is abundant in the aquifers of the Terai and Kathmandu regions; however, availability is limited in the populated hill regions. In order to manage water resources, the Government of Nepal (GoN) prepared the National Water Plan (NWP) in 2005. It focuses on integration, co-ordination, decentralisation, popular participation and implementation of water-related programs within a framework of good governance, equitable distribution and sustainable development (Section 3.4.1).

Furthermore, several issues related to soil/land pollution should be addressed, including the mismanagement of solid waste materials, which are rapidly increasing due to urbanisation, and the mishandling of pesticides and chemical fertilisers in the agricultural sector (Section 3.5.1). To date, no clear standards directly related to soil quality have been established; however, acts and rules, including the Environment Protection Act, are indirectly related to soil quality (Section 3.5.2). Additionally, the Solid Waste Management and Resource Mobilization Act of 1987 is one of the key legislative actions that partially regulate soil pollution.

In addition, noise pollution has become a growing issue for humans living in Nepal. Due to the lack of proper vehicle maintenance regulations, old vehicles are being used in urban areas and they are responsible for increased levels of traffic noise (Section 3.7.1). The Ministry of Environment, Science and Technology (presently, the Ministry of Science, Technology and Environment) established noise-related standards in 2012. However, at the time of this study,

that legislation had not yet been implemented. It is recommended that the implementation status of that legislation be monitored.

To address these environmental issues, the GoN enacted the Environment Protection Act (EPA) and the Environment Protection Rules (EPR) in 1997, both of which set a legislative basis for environmental assessment in Nepal. The latter was substantially amended on 20 August 2007 to increase the participation of stakeholders; however, there is still no formal legislation related to the Environmental Management Plan (EMP) or Strategic Environmental Assessment (SEA).

The EPA requires the project proponent to prepare an Initial Environmental Examination (IEE) report or an Environmental Impact Assessment (EIA) report on the prescribed proposal. The EPR determines the criteria used to judge whether the required Environmental Assessment (EA) report for the project is an EIA or an IEE report (hereafter, EA refers to both IEE and EIA). During the course of the EIA, public consultation is required three times. In contrast, during the course of the IEE, public participation is only required once.

Furthermore, in addition to the aforementioned acts and rules, the EIA consists of three guidelines: the National EIA Guidelines (1993), the EIA Guidelines for the Forestry Sector (1995) and the EIA Guidelines for the Industry Sector (1995). However, each of these three guidelines is obsolete; therefore, IUCN Nepal has been preparing new versions of the guidelines so that they reflect the major amendments made to the EPR in 2007 (Section 5.1). It is recommended that the revision/development status of the EPR be monitored.

The lack of trained human resources in the governmental sector and the inability to sufficiently incorporate the EA recommendations into the project's design and contract documents are among the major issues affecting the implementation of the EA. Currently in Nepal, the EA system and process does not contain mechanisms for policymaking, reporting requirements, methodology, and implementation. Furthermore, no proper information dissemination or database systems criteria for reviewing the EA reports are available in Nepal.

Moreover, in terms of the governmental EA-related activities, a major discrepancy between the central government and local governments has been identified. In detail, the projects at the national level and/or nationwide appear to be reviewed and monitored by the above-mentioned guidelines. However, local governments are more apt to review and monitor minor projects, such as area-specific projects, with less care or without adhering to proper procedures. Generally, the projects designed by donors are mainly conducted based on their own safeguard

policies, which can lead to a lack of consistency in project implementation throughout the country. Therefore, it is recommended that the gap between the local guidelines and the safeguard policies be closely understood, as described in Section 5.7 and Table G-1.

2. Summary of Social Considerations

Nepal guarantees equal rights to all its citizens as well as the right to live in a clean environment through the Interim Constitution of Nepal (2007) and several acts and regulations (Sections 4.2, 6.1 and 7.1). Additionally, the Government of Nepal (GoN) has ratified international instruments aimed at protecting the rights of the country's indigenous people (International Labour Organisation Convention on Indigenous and Tribal Peoples in 2007), rights of women (Convention on the Political Rights of Women in 1966 and Convention on the Elimination of All Forms of Discrimination against Women in 1991) and the rights of children (Convention on the Rights of the Child in 1990).

Nepal relies on foreign aid to maintain its standard of living; almost one-third of its population lives below the poverty line. Although the GoN has set poverty alleviation as one of its major objectives, social exclusion and inequality, due to caste/ethnic divisions and gender discrimination, hinders its ability to achieve that objective (Section 4.3.1).

In Nepal, indigenous peoples (*Adivasi Janajati*) are generally included in the middle rank castes, although they suffer from the gradual loss of traditional lands and access to life-sustaining natural resources. While Nepal does not have a stand-alone policy on indigenous peoples, the government has adopted several legal instruments to support those citizens, including the National Foundation for Development of Indigenous Nationalities Act of 2002 and the National Foundation for Upliftment of Adivasi Janajati Act 2002 (Section 7.1). However, concerns exist in regard to the lack of progress in developing concrete plans to address the issues relevant to indigenous peoples (Section 7.3.1). Due to these concerns, donors, such as World Bank and ADB, have developed guidelines for their project implementation in Nepal on how to minimise the adverse impacts to the vulnerable groups including indigenous peoples. The guidelines are based on the donors own safeguard policies. Furthermore, for ADB and IFC projects, free prior informed consent is obtained based on collective agreements from affected indigenous groups (Section 7.6).

In Nepal, gender-based discrimination is widespread as the male-dominated family system provides very little room for women to assert themselves. Nevertheless, in the past several

years, policy, legal and institutional frameworks have improved gender equity and have helped to empower women in Nepal. Toward this end, relevant regulations include the Gender Equality Act of 2006 and the National Woman Commission Act enacted in 2006 (Section 4.3.2).

Labour legislation and child labour are among other key social issues in Nepal. Many jobs in informal sectors offer little or no social protection, and they are characterised by the absence of rights and representation in the workplace (Section 4.3.4). More importantly, children are among the people working under these conditions despite the fact that child labour is prohibited by the Child Labour (Prohibition and Regulation) Act of 2000. Although policy developments have been promoted, legal provisions that safeguard children's rights and prevent child labour are not yet adequately enforced (Section 4.3.3).

Involuntary resettlement is another issue that international donors assess for project implementation. In Nepal, the procedures for land acquisition are described in the Land Acquisition Act (LAA) (Section 6.2.1). It provides a grievance redress mechanism that allows the affected people to raise objections against land acquisitions by giving notice to the Ministry of Home Affairs (Section 6.3.2). LAA also makes provision for community participation and information disclosure (Section 6.3.3). Nonetheless, no policy is in place to deal with involuntary resettlement issues for development projects, and resettlement plans have been prepared by donors based on their involuntary resettlement guidelines and policies. These practices have resulted in variations in the compensation entitlements and other assistance provided to the project-affected people. In an effort to increase consistency in all development projects, in 2006 the National Planning Commission drafted the National Resettlement Policy Framework with technical assistance from the ADB. However, the policy has not yet been approved by the government (Section 6.3).

LAA is the key legal framework that governs land acquisition and the removal of the assets belonging to the project-affected people. However, its provisions do not adequately address the adverse impacts associated with land acquisition and involuntary resettlement, nor do they adequately fulfil the involuntary resettlement or international practices requirements of donors, such as JICA, ADB or WB. In essence, the law is largely indifferent to the landowners' presentation of socio-economic conditions or the long-term adverse impacts on the affected people's income and livelihood that might result from land acquisition and involuntary resettlement (Section 6.5). In this regard, it is recommended that the gaps between the local regulations and the respective safeguard policies of donors be closely understood, as described in Section 6.5 and Chapter 8.

Cultural heritage conservation has been an area of interest to many national and international agencies. To protect cultural heritage in Nepal, the government established the Department of Archaeology in 1953, which regulates all archaeology-related activities in the country (Section 4.4.1). However, more effort is needed to establish effective policies and institutional frameworks in order to address those challenges.

Chapter 1

Country Overview

1 Country Overview

1.1 Overview

1.1.1 Map of the Country



Source: UN (2007)

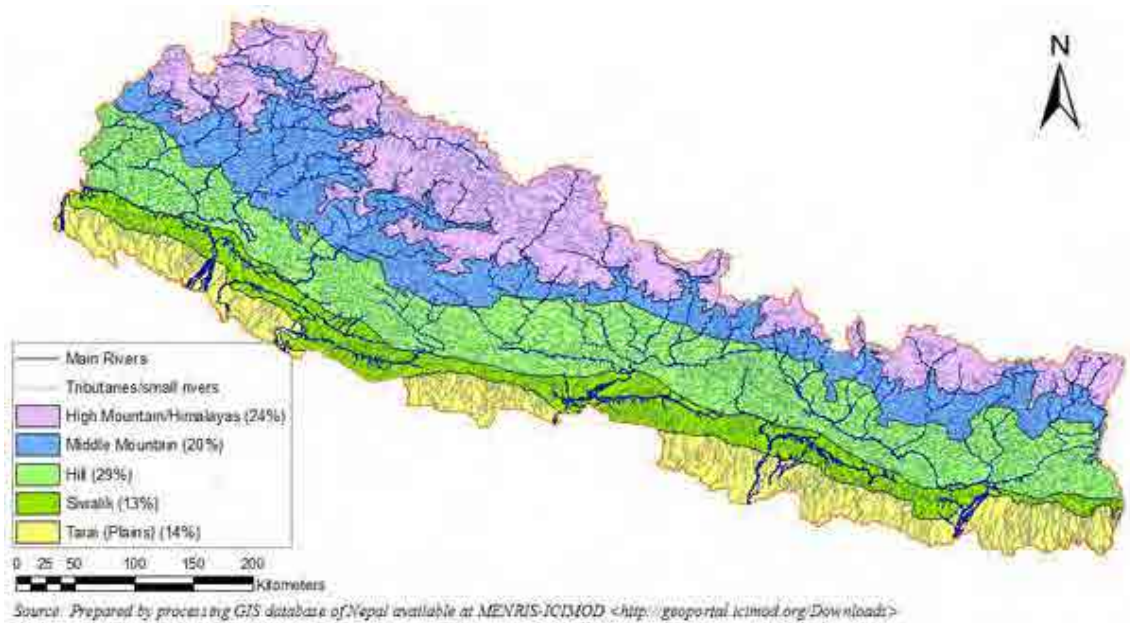
Figure 1.1.1: Map of Nepal

1.1.2 Location and Topography

Nepal, known officially as the Democratic Republic of Nepal, is located between 26°22' and 30°27' N latitudes and 80°40' and 88°12' E longitudes, occupying an area of 147,181 km². The country is nearly rectangular, with an average length of 885 km (east to west) and an average width of 200 km (north to south). It is a landlocked country that shares its northern border with the People's Republic of China (Tibet region), and its other borders (east, south and west) with the Republic of India. Kathmandu, the nation's capital, is its largest metropolis. Within its relatively narrow width of about 193 km, Nepal has huge variations in topography,

ranging from land as low as 64 m above sea level to the highest peak in the world, Mt. Everest (known locally as Mt. Sagarmatha), at 8,848 m above sea level (WEPA 2012).

Nepal can be divided into five distinct physiographic zones, according to the WEPA (2012) classification: the Terai, the Siwaliks, the Hills, the Middle Mountains and the High Mountains/Himalayas.



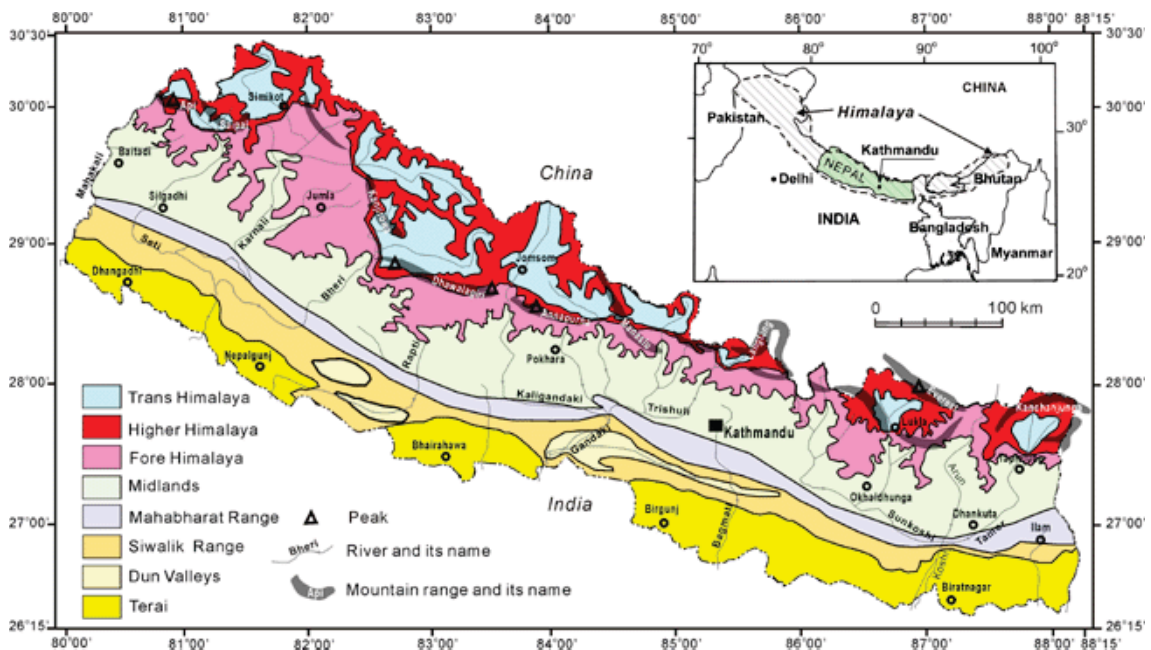
Source: WEPA (2012)

Figure 1.1.2: Five Distinct Physiographic Zones in Nepal

The Terai is the alluvial plain ranging in altitude from 60–200 m. It comprises 14% of the country's area. Major rivers deposit a great deal of sediment in the Terai plain, where river flow decelerates significantly. It is Nepal's most fertile region, the nation's breadbasket. The Siwaliks comprise about 13% of the country's area. These foothills, which stretch from east to west just north of the Terai region, reach up to 1,800 m in altitude. There are also Terai-like valleys in between some of the Siwalik Hills. The Siwaliks are considered an important groundwater-recharge zone for the Terai. The Hills are characterised by steep slopes and narrow valleys, with a moderate elevation range of 1,500–2,500 m. They make up 29% of the country's area. The topography of the Middle Mountains, north of the Hills, is also characterised by steep slopes and narrow valleys, ranging in elevation from 2,000–4,000 m. The Middle Mountains comprise 20% of the country's area. The High Mountains/Himalayas, located in the northernmost part of the country, comprise 24% of the country's area. The entire region is located above 4,000 m and includes the highest point on Earth, the peak of Mt.

Everest, at 8,848 m (WEPA 2012).

Dahal (2006) provides another classification, which comprises eight distinct physiographic regions: (1) the Terai (the northern edge of the Indo-Gangetic plain), (2) the Siwalik (Churia) Range, (3) the Dun Valleys, (4) the Mahabharat Range, (5) the Midlands, (6) the Fore Himalaya, (7) the Higher Himalaya and (8) the Trans Himalaya. Each of these regions is characterised by its own unique variation in altitude, slope, relief characteristics and climatic pattern. Although the number of distinct zones is different, this classification is essentially consistent with that of WEPA (2012).



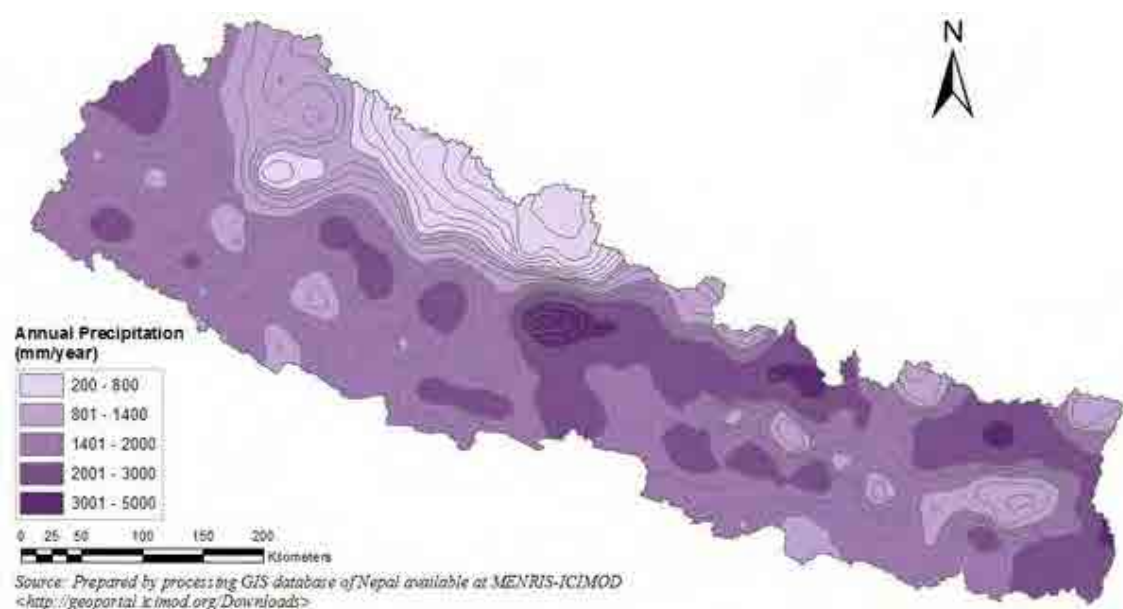
Source: Dahal, R. K. (2006)

Figure 1.1.3: Physiographic Map of Nepal

1.1.3 Climate

Owing to its extensive physical diversity and enormous altitude range within such relatively short north-south distances, the country has a greatly varied climate as well. Although it's a small country, Nepal has five climatic zones: a tropical and subtropical zone (below 1,200 m); a cool, temperate zone (1,200–2,400 m); a cold zone (2,400–3,600 m); a sub-arctic zone (3,600–4,400 m) and an arctic zone (above 4,400 metres altitude). The temperature and precipitation patterns are highly dependent on the altitude. Generally, the temperature in the country decreases from south to north as the altitude increases. The annual rainfall distribution in Nepal is also influenced by the changes in altitude. In addition to those effects, the amount

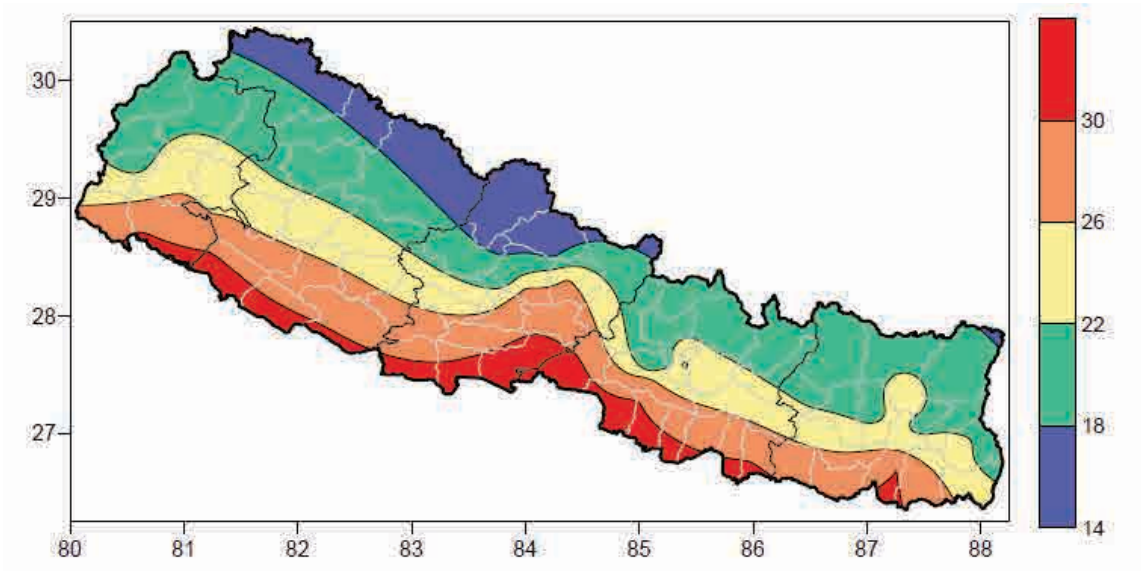
of rainfall also generally decreases from east to west during the summer monsoon (from June to September)—eastern Nepal receives approximately 2,500 mm of rainfall annually; the Kathmandu area, about 1,420 mm; and western Nepal, only about 1,000 mm.



Source: WEPA (2012)

Figure 1.1.4: Annual Precipitation Pattern in Nepal

Temperatures in Nepal are directly related to season and altitude. The hottest part of the country is in the southern Terai belt, and the coldest part lies in the high Himalayas in the north. Mean monthly temperatures vary between above 22°C in the Terai and Siwaliks to less than 12°C in the north-western areas (Nepal Health Research Council 2009).



Source: Nepal Health Research Council (2009)

Figure 1.1.5: Mean Annual Temperature

Wide variations in altitude and diverse climatic conditions have resulted in four core physiographic zones in Nepal: the Lowlands, the Middle Mountains and the High Mountains (Table 1.1.1). The extreme altitudinal gradient has resulted in five levels and 11 sub-levels of bioclimatic zones, from tropical to nival, within a short horizontal span. According to Hagen (1998), Nepal has seven physiographic divisions from south to north: the Terai, the Siwalik Hills, the Mahabharat ‘Lek’ (mountain range), the Midlands, the Himalayas, the Inner Himalayas and the Tibetan marginal mountains (ICIMOD et al. 2007).

Table. 1.1.1: Physiographic Zones of Nepal

Physiographic zone	Surface area	Elevation (m)	Climate
Terai	14%	60–330	Hot monsoon/tropical
Siwaliks	13%	< 1,000	Hot monsoon/subtropical
Middle Mountains	30%	< 2,500	Higher: Cool temperate monsoon Lower: Warm temperate monsoon
High Mountains	20%	< 4,000	Alpine Subalpine
High Himalaya	23%	> 3,500	Tundra-type, arctic

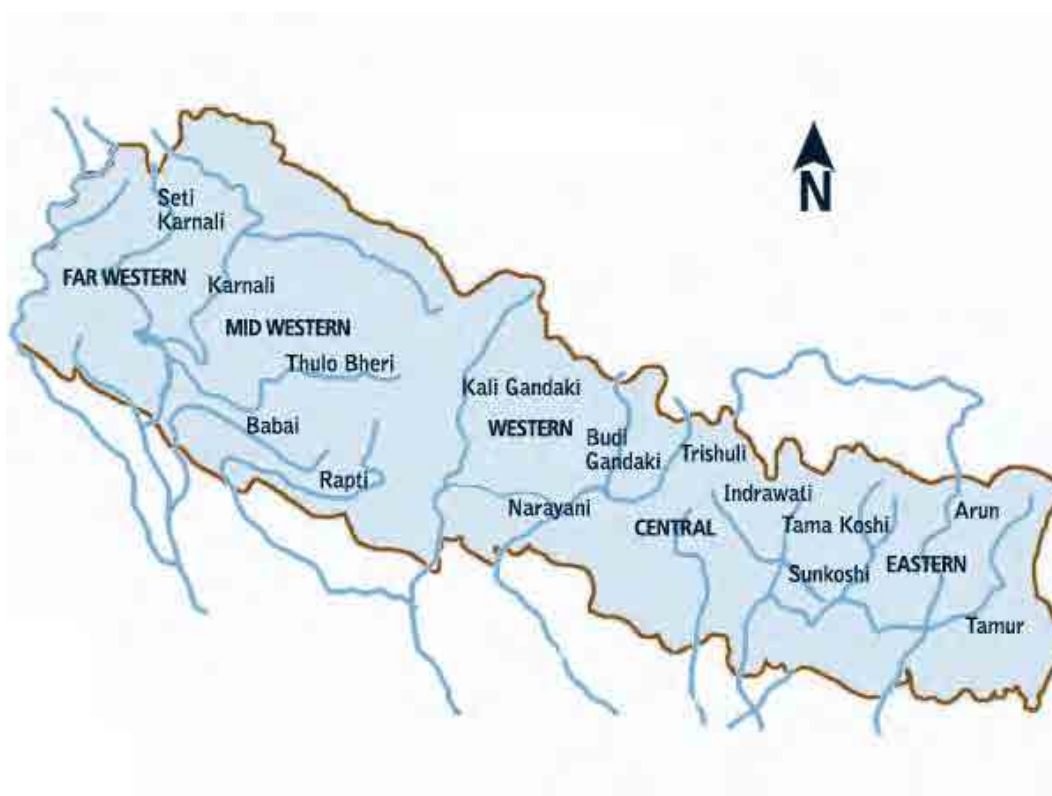
Source: Carson et al. (1986); Dijkshoorn and Huting (2009)

1.1.4 River System

High rainfall totals generally give rise to abundant water supplies, at least seasonally, and both surface water and groundwater are important sources for domestic, industrial and agricultural use. Water is Nepal's largest known natural resource. Nepal has more than 6,000 rivers, which form a dense network across steep topographic conditions. All the river systems drain from north to south towards the Ganges. The major sources of water are rainfall, glaciers, rivers and groundwater (WaterAid Nepal 2011).

Nepal's rivers can be grouped into three categories on the basis of their origin: antecedent to the Himalayas, after the Mahabharat and after the Churia range. Antecedent rivers belong to the period prior to the rise of the Himalayas. These rivers added their tributaries during or after the Himalayan origin, concurrently with the development of monsoon climate. When the Mahabharat hills formed, they acted as barriers, causing the antecedent rivers to change their courses. As a result, most of those rivers ended up flowing either to the east or west and were responsible for depositing the sediment in the Churia basin (Himalayan River Fun 2012).

The primary river systems—namely the Koshi, the Karnali and the Gandaki—belong to the antecedent group. The rivers originating from the Mahabharat range and cutting through Churia hills come under the second group; these include the Kankai, the Bagmati, the Kamala etc. The third group of rivers originates from the southern face of the Churia hills (Himalayan River Fun 2012).



Source: Himalayan River Fun (2012) [modified]

Figure 1.1.6: River System of Nepal

Table 1.1.2: Major River Systems of Nepal

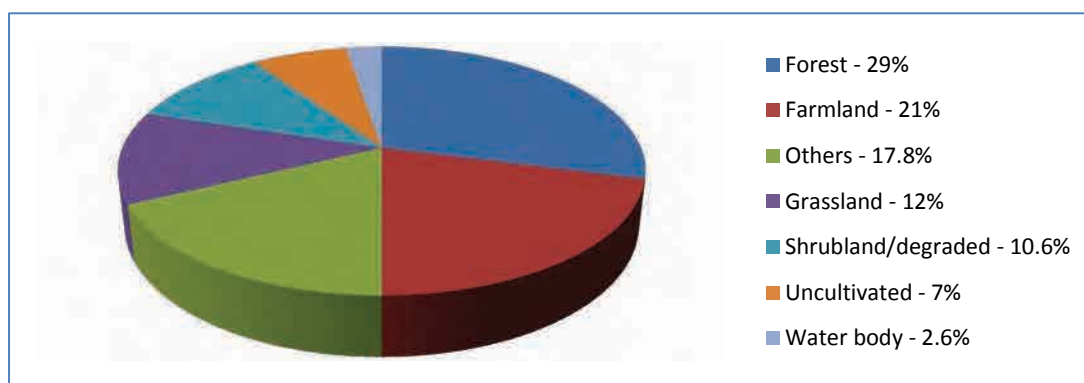
River basin	Catchment area (km ²)		Main tributaries	Annual average runoff discharge (cumec)
	Total	Within Nepal		
Koshi	60,400	46%	Sunkoshi, Arun and Tamur	1,409 (45 BCM)
Narayani (Gandaki)	34,960	90%	Trishuli, Budhi Gandaki, Marsyangdi, Seti and Kaligandaki	1,409 (45 BCM)
Karnali	43,960	94%	West Seti, Bheri, Humla Karnali, Mugu Karnali, Singa Tila, Lahore and Thuli Gad	1,397 (44 BCM)
Mahakali	15,260	34%	Not Available	

Note: BCM: billion cubic metres

Source: WaterAid Nepal (2011)

1.1.5 Land Use

The latest physiographic data indicates that Nepal comprises around 4.27 million hectares (ha) (29% of total land area) of forest, 1.56 million ha (10.6%) of shrubland and degraded forest, 1.76 million ha (12%) of grassland, 3.09 million ha (21%) of farmland, 0.38 million ha (2.6%) of bodies of water, 1.03 million ha (7%) of uncultivated inclusions and 2.61 million ha (17.8%) of other terrain (MoFSC 2009) (Figure 2.5).



Source: MoFSC (2009)

Figure. 1.1.7: Land Use Distribution in Nepal

For further details of the recent situation of forest in the country, refer to Section 5 of Chapter 2 in this document.

1.1.6 Demographics

According to the 2011 Census, the estimated population of Nepal was 26,494,504 as of 22 June 2011. The average rate of the annual population growth between 2001 and 2011 was 1.35 and its population density was 180 people/km² (national average). There are also 125 caste/ethnic groups and the major ethnic composition was roughly divided as follows: Chhetri (16.6%), Brahmin hill (12.2%), Magar (7.1%), Tharu (6.6%), Tamang (5.8%), Newar (5.0%), Kami (4.8%), Muslim (4.4%), Yadav (4.0%), and Rai (2.3%). With regards to religion, 81.3% were Hindus, 9% were Buddhists, 4.4% were Islam, 3.1% were Kirat, and 1.4% were Christians.

1.2 Legal and Political Systems: Environmental and Social Considerations

1.2.1 Dating System

Nepal does not officially use the Gregorian calendar. Rather, they use a dating system called *Bikram Samvat* (or *Vikram Samvat*), often abbreviated as B.S. In this system, dates are completely different from those of the Gregorian calendar. For example, 1 January 2013 on the Gregorian calendar is 17 Pouch 2069 in Bikram Samvat (Pouch is the name of a month). In order to avoid confusion, Gregorian dates are used exclusively in this document. When it is necessary to provide a Bikram Samvat date, the corresponding Gregorian date is also given.

1.2.2 Administrative Divisions

Nepal's administrative zones consist of five development regions (*vikas kshetra* in Nepali), fourteen zones (*anchal* in Nepali) and 75 districts (*jillā* in Nepali) (Figure 1.2.2).



Source: Ncthakur.itgo.com (2011)

Figure 1.2.1: Administrative Divisions of Nepal

Table 1.2.1: Nepal's Five Development Regions

Development region	Capital	Population	Area (km ²)
Central	Hetauda	9,656,985	27,410
Eastern	Dhankuta	5,811,555	28,456
Far-Western	Dipayal	2,552,517	19,539
Mid-Western	Birendranagar	3,546,682	42,378
Western	Pokhara	4,926,765	29,398

Source: Gwillim Law (2012)

Table 1.2.2: Nepal's Fourteen Zones

Zone name	Capital	Population	Area (km ²)
Bagmati	Kathmandu	2,250,805	9,428
Bheri	Nepalgunj, Surkhet	1,103,043	10,545
Dhawalagiri	Baglun	490,877	8,148
Gandaki	Pokhara	1,266,128	12,275
Janakpur	Sindhulimadi, Ramechhap	2,061,816	9,669
Karnali	Jumla	260,529	21,351
Kosi	Biratnagar, Dharan	1,728,247	9,669
Lumbini	Butawal, Bhairawa	2,013,673	8,975
Mahakali	Dadeldhura, Patan	664,952	6,989
Mechi	Ilam	1,118,210	8,196
Narayani	Hetauda (Bhimphedi), Birgunj	1,871,334	8,313
Rapti	Tulsipur, Salyana	1,046,842	10,482
Sagarmatha	Rajbiraj	1,600,292	10,591
Seti	Dhangarhi, Silgadhi	1,014,349	12,550

Source: Gwillim Law (2012)

Table 1.2.3: Nepal's Zones and Districts

Zone	District (District headquarters)
Bagmati Zone	Bhaktapur District (Bhaktapur)
	Dhading District (Dhading Besi)
	Kathmandu District (Kathmandu)
	Kabhrepalanchok District (Dhulikhel)
	Lalitpur District (Patan)
	Nuwakot District (Bidur)
	Rasuwa District (Dhunche)

Zone	District (District headquarters)
	Sindhupalchok District (Chautara)
Bheri Zone	Banke District (Nepalganj)
	Bardiya District (Gulariya)
	Dailekh District (Dullu)
	Jajarkot District (Khalanga)
	Surkhet District (Birendranagar)
Dhawalagiri Zone	Baglung District (Baglung)
	Mustang District (Jomsom)
	Myagdi District (Beni)
	Parbat District (Kusma)
Gandaki Zone	Gorkha District (Gorkha)
	Kaski District (Pokhara)
	Lamjung District (Besisahar)
	Manang District (Chame)
	Syangja District (Syangja)
	Tanahu District (Damauli)
Janakpur Zone	Dhanusa District (Janakpur)
	Dolakha District (Charikot)
	Mahottari District (Jaleswor)
	Ramechhap District (Manthali)
	Sarlahi District (Malangwa)
	Sindhuli District (Kamalamai)
Karnali Zone	Dolpa District (Dunai)
	Humla District (Simikot)
	Jumla District (Jumla Khalanga)
	Kalikot District (Manma)
	Mugu District (Gamgadhi)
Koshi Zone	Bhojpur District (Bhojpur)
	Dhankuta District (Dhankuta)
	Morang District (Biratnagar)
	Sankhuwasabha District (Khandbari)
	Sunsari District (Inaruwa)
	Terhathum District (Myanglung)

Lumbini Zone	Arghakhanchi District (Sandhikharka)
	Gulmi District (Tamghas)
	Kapilvastu District (Kapilvastu)
	Nawalparasi District (Parasi)
	Palpa District (Tansen)
	Rupandehi District (Siddharthanagar)
Mahakali Zone	Baitadi District (Baitadi)
	Dadeldhura District (Dadeldhura)
	Darchula District (Darchula)
	Kanchanpur District (Bhim Dutta)
Mechi Zone	Ilam District (Ilam)
	Jhapa District (Chandragadhi)
	Panchthar District (Phidim)
	Taplejung District (Taplejung)
Narayani Zone	Bara District (Kalaiya)
	Chitwan District (Bharatpur)
	Makwanpur District (Hetauda)
	Parsa District (Birganj)
	Rautahat District (Gaur)
Rapti Zone	Dang Deukhuri District (Tribuvannagar)
	Pyuthan District (Pyuthan Khalanga)
	Rolpa District (Liwang)
	Rukum District (Musikot)
	Salyan District (Salyan Khalanga)
Sagarmatha Zone	Khotang District (Diktel)
	Okhaldhunga District (Okhaldhunga)
	Saptari District (Rajbiraj)
	Siraha District (Siraha)
	Solukhumbu District (Salleri)
	Udayapur District (Gaighat)
Seti Zone	Achham District (Mangalsen)
	Bajhang District (Chainpur)
	Bajura District (Martadi)
	Doti District (Dipayal)
	Kailali District (Dhangadhi)

Source: Wikipedia (2012)

Although the Local Self Governance Act (1999) gives municipalities or local governments a mandate for environmental protection, that provision has not been fully implemented.

1.2.3 Five-Year Plans

Nepal has established several Five-Year Plans since 1956. Although each plan highlighted different developmental priorities, the allocation of resources has not always reflected those priorities. The first four plans concentrated on infrastructure in order to facilitate the movement of goods and services and to increase the size of the market. All of Nepal's Five-Year Plans depend heavily on foreign assistance in the forms of grants and loans (Savada 1993).

Each Five-Year Plan focused on certain aspects of natural resources and environment. The First Five-Year Plan (1956–61) emphasised the importance of agricultural production. The Second Five-Year Plan (1962–65) declared the necessity of conserving wildlife in Nepal. The Third Five-Year Plan (1965–70) called attention to deforestation and soil conservation. The Fourth Five-Year Plan (1970–75) highlighted the conservation of biodiversity by designating national parks and protected areas. The Fifth Five-Year Plan (1975–80) introduced a policy for land use and resource development with a soil-and-reservoir conservation plan, and it advocated afforestation and forestry management. The Sixth Five-Year Plan introduced an Environmental Assessment (EA) System in a preliminary way, while the Seventh Five-Year Plan (1985–90) obligated the government to establish legal basis of that system. The Sixth and Seventh Five-Year Plans tied a number of environmental issues and programs to a population-control policy.

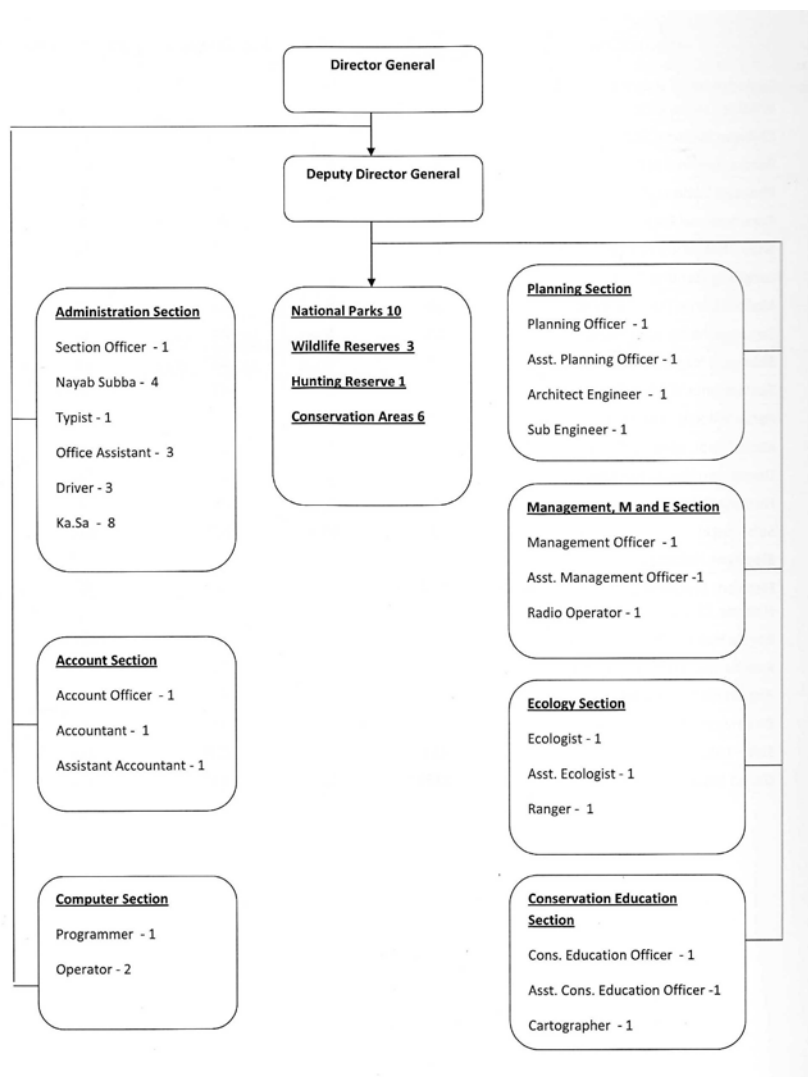
After the restoration of the democratic system in Nepal and the promulgation of the new Constitution in 1990, the nation's awareness of the need for environmental protection increased. The Constitution declares that the conservation of the natural environment should be taken into consideration in the nation's policies and basic principles. Based on the Constitution, the Council for the Conservation of Nature and Cultural Resources (CCNCR) was established under the National Planning Commission (NPC) in January 1991. The CCNCR is responsible for facilitating the implementation of the National Conservation Strategy in collaboration with the International Union for Conservation of Nature.

After the regime change, the Eighth Five-Year Plan (1992–1997) was established. That plan is the first in which the environment took up one independent section on its own. It highlighted

the necessity of addressing environmental issues stemming from poverty, population growth, low economic growth, haphazard urbanisation and unplanned industrialisation. In addition, it advocated the idea of integrating development activities and environmental conservation.

1.2.4 Relevant Organisations

The Department of National Parks and Wildlife Conservation (under the Ministry of Forestry and Soil Conservation) is the organisation primarily responsible for environmental conservation.



Source: DNPWC (2010)

Figure 1.2.2: Organisational Chart of the Department of National Parks and Wildlife Conservation

With regard to EA and the prevention and control of environmental pollution, the most relevant and responsible organisation is thought to be the Ministry of Science, Technology and Environment. The Ministry of Population and Environment (MoPE) was established in September 1995 to implement EA and empowered to prohibit the use of any matter, fuel, equipment or plant that has or is likely to have adverse effects on the environment. It was dissolved in April 2005, and its Environment Division was transferred to the Ministry of Science and Technology, which became the Ministry of Environment, Science and Technology (MoEST), a new ministry whose main mandate was to carry out environmental activities. In November 2012, the MoEST was organisationally restructured, and became the MoSTE. Figure 1.2.3 shows the organisation chart of the MoSTE.

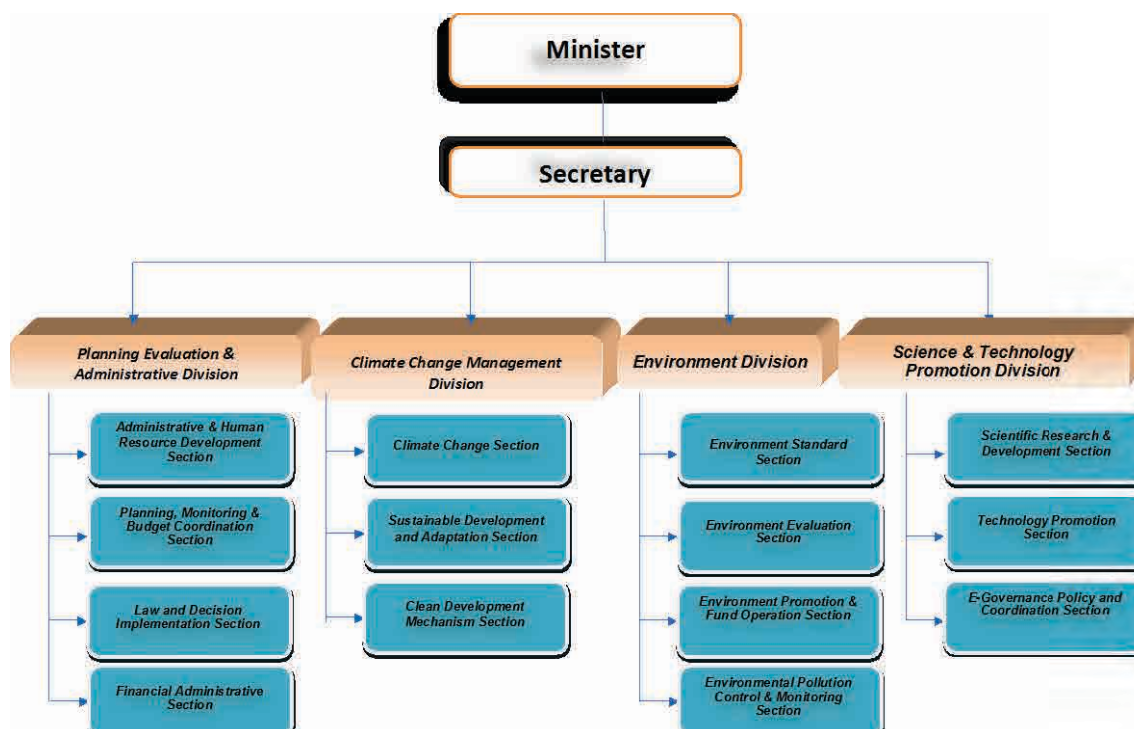


Figure 1.2.3: Organisation Chart of the Ministry of Science, Technology and Environment.

1.3 Overview and Contact Details of Relevant Organisations

1.3.1 Governmental Organisations and Research Institutions

Table 1.3.1 presents a list of governmental organisations and research institutions working in the environmental and social sectors in Nepal.

Table 1.3.1: List of Governmental Organisations and Research Institutions related to Environmental and Social Considerations in Nepal

Organizations	Assigned Roles	Contact Address
Office of the Prime Minister and Council of Ministers (GoN)		Address: Singh Durbar Kathmandu, Nepal P.O. Box: 23312 Tel: +977-1-4211000 Email: info@opmcm.gov.np
Conservation and Sustainable Use of Wetlands in Nepal (CSUWN)	The CSUWN, also known as ‘Wetlands project’, is a joint undertaking of the Government of Nepal (GoN), Global Environmental Facility (GEF) and the United Nations Development Program (UNDP). Ministry of Forests and Soil Conservation (MFSC) is the executing agency. Major working domains are policy and planning framework, institutional capacity and awareness, and collaborative management for wetland resources.	Address: Training Section Building, Second floor, Forestry Complex, Babar Mahal, Kathmandu Tel: +977-1-4226230/422 9669 Fax: +977-1-4229670 Email: info@wetlands.org. np URL: www.wetlands.org.n p
Department of Forest (DoF)	DoF is one of the five departments under the Ministry of Forests and Soil Conservation. The main mandate of DoF is to manage the country’s forest resources for the conservation of the natural environment and to supply the forest products to the people.	Address: Babarmahal, Kathmandu Nepal. Tel: +977-1-4220303, 4221231, 4216379 Fax: +977-1-4227374 Email: info@dof.gov.np URL: www.dof.gov.np
Department of Health and Services	The DoHS is one of three departments under Ministry of Health (MoH). The overall purpose of the DoHS is to deliver preventive, promotive and	Address: Teku, Kathmandu Tel: +977-1- 4261712 Fax: +977-1- 4262038

(DoHS)	curative health services throughout Nepal.	Email: info@dohs.gov.np URL: http://dohs.gov.np
Department of Hydrology and Meteorology (DHM)	DHM is an organization under the Ministry of Environmental, Government of Nepal. The department with headquarters in Kathmandu has three basin offices: Karnali Basin Office in Nepalgunj, Narayani Basin Office in Narayanghat and Kosi Basin Office in Biratnagar. To monitor all the hydrological and meteorological activities in Nepal. The scope of work includes the monitoring of river hydrology, climate, agrometeorology, sediment, air quality, water quality, limology, snow hydrology, glaciology and wind and solar energy	Address: 406, Babar Mahal, Kathmandu, Nepal Tel: +977-1-4255920, 4262374, 4262974, 4248808, 4248876 Fax: +977-1-4254890 Email: dg@dhm.gov.np URL: http://www.dhm.gov.np/contents/about-us
Department of Industry (DoI)	Department of Industries is one of the department under Ministry of Industry, which was incorporated to expedite and implement the policy, rules & regulations of the government of Nepal to enhance the economy of Nepal through industrialization	Address: Tripureshwor, Kathmandu, Nepal Tel: +977-1-4261101, 4261168, 4261169, 4261203 Fax: +977-1-4261112 Email : info@doi.com.np URL: http://www.ip.np.wipo.net
Department of Irrigation (DoI)	Department of Irrigation is a government organization, with a mandate to plan, develop, maintain, operate, manage and monitor different modes of environmentally sustainable and socially acceptable irrigation and drainage systems - from small to larger scale surface systems and from individual to community groundwater schemes. Its ultimate aim is to provide year round irrigation facilities and increase the irrigable area of the country to higher limits. This giving a primary input in increasing the productivity of the land and providing a major input to the GDP and eventually improve the standard of living of the beneficiary farmers. Apart from this the DoI also has to carry	Address: Jawalakhel, Lalitpur Tel: +977-1-5535382 Fax: +977-1-5537169 Email: irrigation@wlink.com.np URL: www.doi.gov.np

	out river training activities to protect the flood ways, floodplains and agricultural lands in the form of river bank protection such that the loss of properties caused by flooding is reduced.	
Department of National Parks and Wildlife Conservation (DNPWC)	DNPWC is under the Ministry of Forest and Soil Conservation. With the early emphasis on species conservation, the Department's present priority stresses a conciliatory approach with participatory management of biodiversity.	Address: Babarmahal Kathmandu Nepal Email: info@dnpsc.gov.np URL: http://www.dnpsc.gov.np
Department of Transport Management (DoTM)	DoTM is under the Ministry of Physical Planning, Works and Transport Management. It responsible for transport management, including issuing of route permits to public transport vehicles and testing emissions from vehicles	Address: Koteshwor, Kathmandu Tel: +977-1-4602126, 4601743, 4601002 Fax: +977-1-4602440 Email: info@dotm.gov.np URL: www.dotm.gov.np
Department of Women and Children (DoWC)	The Department of Women and Children is the implementing wing of the Ministry of Women, Children and Social Welfare of the Government of Nepal. Its mandate is to empower women, especially those who are economically poor, socially deprived or otherwise put at a disadvantage.	URL: www.dwd.gov.np
Ministry of Agriculture and Development (MoAD)	The ministry bears overall responsibility for the growth and development of agriculture sector. Honourable Minister for agricultural development holds the overall charge of the Ministry and the secretary is the administrative head and the chief adviser to the Minister on policy, planning and administration. The Ministry is the central apex body of Government of Nepal to look after the agriculture and allied fields.	Address: Singha Durbar, Kathmandu, Nepal Tel: +977-1-4122706, 4211950, 4211981 Fax: +977-1-4211935 Email: memoad@moad.gov.np URL: www.moad.gov.np
Ministry of Science, Technology and Environment	Dismantling the then Ministry for Population and Environment (MoPE) in 2061 BS, Division of Environment was included to Ministry of Science and Technology and renamed as Ministry for Environment, Science & Technology today. Main	Address: Singha durbar, Kathmandu, Nepal Tel: +977-1-4211641, 4211586, 4211737, 4211869, 4211996,

(MoSTE)	<p>aims are:</p> <ol style="list-style-type: none"> 1. To promote the sustainable development of country 2. To conserve the natural and cultural environment 3. To promote use of modern Science and Technology in Nepal 4. To create enabling environment for research and development in Science and Technology 5. To promote use of Information Technology in national development 6. To conserve the life – support elements (air water, soil) 7. To promote and develop the indigenous methodology 8. To encourage intelligent class by creating proper opportunity in environment field 	<p>4211661 Fax: +977-1-4211954 Email: info@moevn.gov.np URL: www.moenv.gov.np</p>
Ministry of Forests and Soil Conservation (MoFSC)	<p>MOFSC is the key government department tasked with managing and coordinating land and forest resources within Nepal. The MoFSC is responsible for forest conservation, environmental protection, the development of modern farming and the protection of national biological diversity.</p>	<p>Address: Singhadurber, Kathmandu, Nepal Tel: +977-1-4211567 Fax: +977-1-4211868 Email: info@mfsc.gov.np, webmaster@mfsc.gov.np URL: www.mfsc.gov.np</p>
Ministry of Health and Population (MoHP)	<p>MoHP plays a leading role in improving the health of the people including mental, physical and social well-being, for overall national development with the increased participation of the private sector and non-government institutions in the implementation of programmes. The Ministry is also responsible to make necessary arrangements and formulate policies for effective delivery of curative services, disease prevention, health promotive activities and establishment of a primary health care system. These activities will be maintained at an international standard under the policies declared on health by</p>	<p>Address: Ramshah Path, Kathmandu Tel: +977-1-4262802, 4262543 Fax: +977-1-4262896, 4262468, 4262935 URL: www.moHP.gov.np</p>

	Government of Nepal, ultimately improving the overall condition of health services.	
Ministry of Irrigation (MoI)	<p>Water is an important natural resource of Nepal. The immense quantity of water available in the country and its potentiality to irrigate significant percentage of the total agricultural land, provide us the opportunity of overcoming the barriers of economic development in this beautiful Himalayan country. The responsibility of utilization and management of this resource lies in the Ministry of Irrigation. Preparation plan and policies and their implementation regarding development of irrigation for the efforts to achieve agricultural development targets are the objectives of this ministry.</p>	<p>Address: Singh Durbar, Kathmandu, Nepal Tel:+977-1-4211426 Fax:+977-1-4200026 Email : info@moir.gov.np URL: www.moir.gov.np</p>
Ministry of Labour and Employment (MoLE)	<p>Ministry of Labour & Transport Management was renamed to Ministry of Labour and Employment in 2012. Objectives and Long Term vision of the Ministry are:</p> <ol style="list-style-type: none"> 1. Development of Pure Industrial Relationship 2. Ending Unemployment and Development of Productive and Qualitative Employment System 3. Child Labour Alleviation 4. Development of Safety, Managed and help based transportation system. <p>This ministry consists of Department of Foreign Employment, Department of Labour, Occupational and Safety Health Project, Vocational and Skill Development Training Center and Foreign Employment Promotion Board.</p>	<p>Address: Singha Durbar, Kathmandu, Nepal. Tel: +977-1- 4211889, 4211991 Fax: +977-1-4211877 Email: info@moltm.gov.np URL: www.moltm.gov.np</p>
Ministry of Land Reform and Management (MoLRM)	<p>MoLRM, being the core ministry looking after the land administration and management activities, is responsible for ensuring efficient and effective administration and sustainable management of available land resources. It is also the prime responsibility of the ministry to provide effective</p>	<p>Address: Singhadurbar, Kathmandu, Nepal Tel: +977-1-4211833 Fax: +977-1-4211708 Email: info@molrm.gov.np</p>

	and efficient service delivery to the general public. Furthermore, ensuring the availability of all kinds of geo-information products, which is the foundation of land administration and management activities, is the other principal responsibility of the ministry.	URL: www.molrmgov.np
Ministry of Local Development (MoLD)	<p>The Objectives of the MoLD are:</p> <ol style="list-style-type: none"> 1. Contribute in the poverty reduction by mobilizing local means and resources, utilizing skill and technology to the optimum level and creating employment opportunity 2. Enhance access of socially and economically disadvantaged groups, region and community to the service and facility delivered 3. Capacity building of local government through local self-governance and contribute to promote local good governance 4. Empowerment of women, dalit, indigenous, Madheshi, Muslim, disable and ultra-poor people through social mobilization and their mainstreaming into the wave of development 5. Ensure inclusive development by enhancing peoples' participation in decision making and planning process. 	<p>Address: Shreemahal Pulchowk, Lalitpur, Nepal Tel: +977-1-5523329, 5524525, 5536170 Fax: +977-1-5522045 Email: secretary@mld.gov.np, plandiv@ld.gov.np, govdiv@mldgov.np URL: www.mld.gov.np</p>
Ministry of Physical Planning Works and Transport Management (MoPPWTM)	The major responsibilities of the Ministry are to enhance the country's economic and social development by connecting different geologic and economic sector through the national strategic transport network by developing infrastructures such as road networks, railways, waterways and ropeways. The main aim of MoPPWTM is to link rural sector to the local markets and to support different economic activities and projects functioning in the tourism, agricultural, electrical, industrial, and other sectors of Nepal.	<p>Address: Singhadurbar, Kathmandu, Nepal Tel: +977-1-4211782, 4211931, 4211732, 4211655 Fax: +977-1-4211720 Email: info@moppw.gov.np URL: www.moppw.gov.np</p>
Department of Archaeology (DoA)	Department of Archaeology (DoA) was established in 1953 A.D. under the Government of Nepal. This is primer organization for the archaeological	<p>Address: Ramshahpath, Kathmandu, Nepal Tel: 44250683 – Director</p>

	<p>research and protection of the cultural heritage of the country. Protection and maintenance of archaeological sites, ancient monuments including remains of national importance, museum and archive management are the main concern of DoA. DoA also regulate all archaeological activities in the country as per the provision of the ‘Ancient Monument Preservation Act, 2013’ (A.D. 1956) Likewise, the act also provides ample provisions to protect and preserve any individual monuments, group of monuments, sites and even vernacular edifices located throughout the country either private or public having archaeological, historical, artistic and aesthetic values. This act has authorized the DoA as a principal governmental authority to protect and preserve the vast cultural heritage of the country.</p>	<p>General, 4250688, 4250686, 4250687, 4250685 Fax: +977-1-4262856 Email: info@doa.gov.np URL: www.doa.gov.np</p>
Others		
National Planning Commission, Nepal (NPC)	<p>National Planning Commission (NPC) is the advisory body for formulating development plans and policies of the country under the directives of the National Development Council (NDC). It explores and allocates resources for economic development and works as a central agency for monitoring and evaluation of development plans, policies and programmes. Besides, it facilitates the implementation of development policies and programmes. Moreover, it provides a platform for exchange of ideas, discussion and consultation pertaining to economic development of the country. It also serves as an institution for analysing and finding solutions to the problems of civil social ties, non-governmental organizations and the private sector in the country.</p>	<p>Address: Singha Durbar, Kathmandu, Nepal Fax: +977-1-4211700 Email: npcs@npcnepal.gov.np npc@npcnepal.gov.np URL: www.npc.gov.np</p>
Nepal Water Supply Corporation	<p>Under the NWSC Act 1990, NWSC has blooming drinking water supply services in twenty three urban areas in different part of country.</p>	<p>Address: P.O.Box, 534 Tripureshwor, Kathmandu, Nepal</p>

(NWSC)	<p>According to NWSC Act 1990 the Corporation shall get its annual accounts audited by a certified auditor (Chartered Accountant) appointed by the office of the Auditor General.</p> <p>The government of Nepal had developed a PPP(Public Private Partnership) concept for delivering water supply services to the consumer by handling over water supply scheme to the local Board in 2005(A.D.). Under this policy, the Kathmandu Valley Water Supply System has been functioning under PPP concept since last three years. Similarly Bharatpur and Hetauda water supply systems are in under process.</p>	<p>Tel: +977- 4-259857, 267525</p> <p>Email: nWSC@mos.com.np</p> <p>URL: www.nWSC.gov.np</p>
Solid Waste Management and Resource Mobilization Centre (SWMRMC)	<p>The main objective of the SWMRMC is to scientifically and appropriately manage Urban Municipal Waste and Control Environmental Pollution.</p>	<p>Address: Shree Mahal, Lalitpur, Nepal</p> <p>Tel: +977-1-5535755/5544404</p> <p>Fax: +977-1-5535755</p> <p>Email: swmrmc@wlink.com.np</p> <p>URL: www.mld.gov.np/swm/</p>
Nepal Academy of Science & Technology (NAST)	<p>Nepal Academy of Science and Technology (NAST) is an autonomous apex body established in 1982 to promote science and technology in the country. The Academy is entrusted with four major objectives: advancement of science and technology for all-round development of the nation; preservation and further modernization of indigenous technologies; promotion of research in science and technology; and identification and facilitation of appropriate technology transfer.</p>	<p>Address: GPO Box:3323, Khumaltar, Lalitpur, Nepal</p> <p>Tel: +977-1-5547715, 5547717 / 5547720 / 5547721</p> <p>Fax: +977-1-5547713</p> <p>Email: info@nast.org.np</p> <p>URL: www.nast.org.np</p>
Tribhuvan University (TU)	<p>Tribhuvan University (TU) is the first national institution of higher education in Nepal, established in 1959. The University has following four specialized research centres as follows: CEDA (Centre for Economic Development and</p>	<p>P.O.Box 8212, Kirtipur, Kathmandu, Nepal</p> <p>Phone:(977-1)4330436</p> <p>Fax:(977-1)4331964</p> <p>Email:</p>

	Administration) CERID (Research Centre for Educational Innovation and Development) CNAS (Centre for Nepal and Asian Studies) RECAST (Research Centre for Applied Science and Technology)	registraroffice@tribhuvan-university.edu.np URL: www.tribhuvan-university.edu.np/
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1.3.2 Donors

Nepal receives external aid from Japan, India, China, the United Kingdom, the United States, Germany, the Scandinavian countries and other friendly governments. Multilateral organisations such as the World Bank (WB) and the Asian Development Bank (ADB), and UN agencies such as the United Nations Development Programme (UNDP) provide significant assistance through loans and grants. Foreign aid accounts for more than half the country's development budget. Japan is Nepal's largest bilateral aid donor, while the WB and the ADB are the largest multilateral donors.

Donors active in the environmental and social sectors in Nepal are shown in Table 1.3.2.

Table 1.3.2: Major Donors in Nepal

International Donors		
Organizations	Assigned Roles	Contact Address
Asian Development Bank in Nepal (ADB)	The environment for governance and project implementation, including public procurement, continues to be challenging as Nepal undergoes political transition. Implementation is impeded by poor infrastructure, weak institutions and governance, and difficult topography. For 2013-2015, ADB operations in Nepal will continue to mainstream crosscutting themes (such as gender, governance, regional cooperation and integration, environmental sustainability, and private sector development) and fund investments in the energy, transport and urban services space	Nepal Resident Mission Address: Srikunj Kamaladi, Ward No. 31 P.O. Box 5017, Kathmandu, Nepal Tel: +977-1-4227779 Fax: +977-1-4225063 Email: www.adb.org/nepal
Convention on International Trade in	It is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does	Address: C/O WWG House Machagaal-20, Pulchowk, Lalitpur,

<p>Endangered Species of Wild Fauna and Flora in Nepal (CITES)</p>	<p>not threaten their survival. Nepal CITES missions are:</p> <ol style="list-style-type: none"> 1. Eliminating illegal wildlife trade 2. Mainstreaming natural resource and related agenda in mass media for awareness and action 3. Watching impacts and interventions on biodiversity 4. Pro nature advocacy and activism 5. Taking trans-boundary conservation initiatives 	<p>Kathmandu, Nepal GPO Box 8975, EPC 696, Kathmandu Tel: +977-1-5524188, 5555018 Fax: +977-1-5555018 Email: wwg@citesnepal.org g URL: http://www.citesnepal.org, http://www.wwg.org</p>
<p>Food and Agriculture Organization United Nations in Nepal (FAO)</p>	<p>FAO was the first among the different UN agencies to start its office and field level work in Nepal focusing initially on agriculture and water resource management. It provides advice on policy matters and technical support in relevant sub sectors. It also mobilizes extra-budgetary sources in times of disaster and emergency to provide urgent humanitarian support. It also strengthening its capacities to control and contain transboundary animal diseases such as Highly Pathogenic Avian Influenza (HPAI). It is a technical agency and has been supporting the Government of Nepal in an integrated approach to address its immediate priorities through capacity building, institutional improvement, food security-related issues, agriculture and rural development. Currently, FAO is supporting the Government of Nepal in operationalising the Agriculture Perspective Plan (APP), which was approved in 1995 and that covers a period up to 2015. It also is collaborating with other development partners in supporting the Government of Nepal in formulating an Agriculture Development Strategy and a National Food and Nutrition Security Plan, both of which have a vision for 20 years.</p>	<p>Address: UN House, Pulchowk, Kathmandu, Nepal P.O Box 25, Kathmandu Tel: +977-1-5523200 Fax: +977-1-5526358 Email: FAO-NP@fao.org URL: www.fao.org/world/nepal</p>

<p>United Nations Development Programme in Nepal (UNDP)</p>	<p>UNDP has been supporting the Nepali people in their struggle against poverty since it opened an in-country office in 1963. Much of this support has gone to building up the capacity of government agencies, civil society and community groups to fight poverty, and to bringing these groups and Nepal's donors together to design and implement successful poverty alleviation projects.</p> <p>The UNDP Country Programme Action Plan (CPAP 2008-2012) builds on the United Nations Development Assistance Framework (UNDAF 2008-2012) and the Approach Paper of the Government's National Three year Plan (2010-2013).</p>	<p>UNDP, UN House Address: P.O. Box 107 Kathmandu, Nepal Tel: +977-1-5523200 Fax: +977-1-5523991, 5523986 Email: registry.np@undp.org URL: www.undp.org.np</p>
<p>United Nations Environmental Programme in Nepal (UNEP)</p>	<p>UNEP, with the support of GIZ, is providing support to three countries including Nepal, on issues related to trade and environment in pursuit of national sustainable development and poverty reduction goals.</p> <p>Stemming from this larger initiative on capacity building for biotrade efforts, the Biotrade Week is a combined effort of Nepal's Ministry of Commerce and Supplies (MOCS), the Asia Network for Sustainable Agriculture and Bioresources (ANSAB), GIZ, UNEP, and UNCTAD.</p>	<p>No office in Nepal UNEP Regional Office for Asia and the Pacific (UNEP/ROAP) Address: 2nd Floor, Block A, UN Bldg. Rajdamnern Avenue, Bangkok 10200 Tel: +662 288 2314 Fax: +66-2-2803829 Email: uneproap@un.org URL: www.unep.org</p>
<p>United Nation Economic and Social Commission for Asia and the Pacific in Nepal (UNESCAP)</p>	<p>The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) is the regional development arm of the United Nations for the Asia-Pacific region. Established in 1947 with its headquarters in Bangkok, Thailand, ESCAP works to overcome some of the region's greatest challenges by providing results oriented projects, technical assistance and capacity building to member States in the areas of Macroeconomic Policy and Development, Trade and Investment, Transport, Social Development, Environment and Sustainable Development, Information and</p>	<p>No office in Nepal ESCAP South South-West Asia Office Address: C-2, Qutab Institutional Area Post Box No 4575 New Delhi-110016 India Tel: +91 11 30973701 Fax: +91 11 26856274 Email: sswa.escap@un.org URL www.sswa.unescap.org</p>

	Communications Technology and Disaster Risk Reduction, Statistics, and Sub-regional activities for development.	
The World Bank (WB)	The World Bank is a vital source of financial and technical assistance to developing countries around the world.	Address: Kathmandu Public Information Center, 1 st Floor, West Wing Lal Durbar Convention Center, Yak and Yeti Hotel Complex Durbar Marg, Kathmandu, Nepal Tel: +977-1-4226792 Email: nepalpic@worldbank.org URL:www.worldbank.org/ en/country/nepal
Bilateral Donors		
Organizations	Assigned Roles	Contact Address
Danish International Development Assistance in Nepal (DANIDA)	Nepal became a partner country in 1989 and a long-term partnership was established. Through this partnership, Denmark aims to contribute to poverty reduction, political stability and to strengthen economic growth, employment and access to energy. The Danish Development Policy and the Extension for the Interim Strategy 2008-2010 outline the framework for Denmark's assistance to Nepal. Under this framework, Denmark has provided nearly DKK 770 million (USD 132 million) in assistance to Nepal for poverty reduction and support to the peace process.	Address: 761 Neel Saraswati Marg P.O. Box 6332, Lazimpat, Kathmandu Tel: +977-1-441 3010 Fax: +977-1-441 1409 Email: ktmamb@um.dk URL: http://nepal.um.dk/en/about-us/ Contact person: Manju lama (manlam@um.dk)
German International Corporation GmbH in Nepal (GIZ)	GIZ has been active in Nepal since 1975 on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) and opened its own office in the capital, Kathmandu, in 1979. The goals of GIZ work there are to reduce poverty, to ensure inclusive development and to improve the country's economic and political framework.	Address: Neer Bhawan, Sanepa (Patan) Kathmandu, Nepal Tel: +977-1-5523228 Fax: +977-1-5521982 Email: giz-nepal@giz.de URL:www.giz.de/en/world

		wide/378.html
United States Agency for International Development in Nepal (USAID)	The U.S. provides substantial economic assistance to developing countries through USAID. USAID in Nepal decides on the amount and types of aid to be requested, the USAID Mission in Kathmandu consults extensively with the Nepali government, the U.S. Embassy, the non-governmental organization community, the private sector, and other stakeholders. The Mission then formulates a strategic plan that proposes how the aid will be used and the levels of funding needed. The members of the USAID Mission work closely with their Nepali counterparts at all stages of implementing USAID-funded activities. Teams monitor progress, conduct site visits, and conduct evaluations and audits to ensure that activities are being implemented as planned.	Address: G.P.O Box 295, US Embassy, Maharajgunj, Kathmandu, Nepal Tel: +977-1-4007200 Fax: +977-1-4007285 Email: usaidnepal@usaid.gov URL: www.nepal.usaid.gov

(1) ADB

The ADB is Nepal's most active multilateral donor. The ADB's Nepal country partnership strategy for 2010–2012 is built upon four pillars: (1) broad-based and inclusive economic growth, (2) inclusive social development, (3) governance and capacity building and (4) climate change adaptation and environmental sustainability. ADB's country operations business plan 2013-2015 for Nepal is consistent with the strategic and operating priorities of ADB's country partnership strategy 2010-2012. That plan is also in line with the ADB's Strategy 2020 and the Government of Nepal's own development agenda. ADB operations will continue to mainstream cross-cutting themes (such as gender, governance, regional cooperation and integration, environmental sustainability and private-sector development) and fund investments in the energy, transport and urban-services space. These activities have high inclusive-growth content. The ADB will also support other growth-enabling activities where the organisation can add high value, such as skills development, education, water management and financial-sector reform. Future interventions will take into account the risks identified in the country partnership strategy, including the prolonged political transition, weak implementation capacity and governance and vulnerability to natural disasters. The risks are being mitigated by maintaining flexibility and peace sensitivity in operations, simplifying

project design, supporting critical reforms and employing project-screening tools to enhance governance and deal with climate-change risks (ADB 2012).

(2) World Bank

In Nepal, the World Bank Group includes the International Development Association (its concessionary lending arm) and the International Finance Corporation (its private-sector arm). Two more World Bank Group organisations, the Multilateral Investment Guarantee Agency and the World Bank Institute, also provide investment insurance and capacity-building services respectively. Given the transitional nature of Nepal’s current situation—with a new constitution being drafted and elections to follow—the World Bank Group has issued an Interim Strategy Note covering fiscal years 2012 and 2013. It proposes development programs that are consistent with the Government of Nepal’s Three-Year Plan (2007-2010). Supporting the government’s overarching goal of building a peaceful, prosperous and just Nepal, the strategy is organised around three ‘pillars’ that emerged during consultations within the World Bank Group and with the government, donor partners and key stakeholders. The first pillar intends to enhance connectivity and productivity for growth. The second focuses on reducing vulnerabilities and improving resilience. The third pillar concentrates on promoting access to better-quality services. Governance, accountability, gender equality and social inclusion are themes that run across all three pillars (WB 2012).

1.3.3 NGOs

Various international and Nepali NGOs have been active in Nepal since 1951, when the country was first opened to the outside world. The major NGOs active in the environmental and social sectors in Nepal are shown in Table 1.3.3.

Table 1.3.3: NGOs Active in the Environmental and Social Sectors in Nepal

Environmental Considerations		
Organizations	Assigned Roles	Contact Address
Bird Conservation Nepal (BCN)	BCN is a leading organisation in Nepal, focusing on the conservation of birds, their habitats and sites. It seeks to promote interest in birds amongst the general public, encourage research on birds and identify major threats to birds' continued survival.	Address: Kathmandu, Nepal P.O. Box 12465 Phone: +977-1-4417805 / 4420213 Fax: +977-1-4413884 Email:

		bcn@birdlifeneal.org URL: www.birdlifeneal.org/
Clean Air Network Nepal (CANN)	Includes air quality monitoring in Pokhara and Kathmandu, working closely with relevant government organizations in the promotion of public transport system, awareness campaigns for the increase of electric vehicle usage in Nepal, continued lobbying for road safety of pedestrians and cyclists and developing an action plan for Vehicle Free Day	Address: Secretariat Clean Energy Nepal 140 Bulbule Marga, Thapagaun, Baneshwor, Kathmandu, Nepal Tel: +977-1- 4464981, +977-1- 6925649 Email : info@cen.org.np URL: www.cen.org.np/cann/
Clean Energy Nepal (CEN)	Focusing on research based education and advocacy campaigns with policy inputs and implementation on issues related to sustainable energy use and environmental conservation. CEN works towards contributing in sustainable development, promotion of Clean Energy Technologies in the country, reducing air pollution and global warming impacts on natural and human system.	Address: 140 Bulbule Marga, Thapagaon, Kathmandu, Nepal P.O. Box 24581 Tel: +977-1- 4464981 Email: info@cen.org URL: www.cen.org.np/
International Centre for Integrated Mountain Development in Nepal (ICIMOD)	ICIMOD is a regional knowledge development and learning centre serving the eight regional member countries of the Hindu Kush-Himalayas – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – and based in Kathmandu, Nepal. ICIMOD aims to assist mountain people to understand these changes, adapt to them, and make the most of new opportunities, while addressing upstream-downstream issues.	Address: GPO Box 3226, Khumaltar, Lalitpur, Kathmandu, Nepal Tel: +977-1-5003222 Fax: +977-1-5003299 Email: info@icimod.org URL: www.icimod.org
International Union for Conservation of Nature in Nepal (IUCN)	IUCN has been assisting conservation efforts in Nepal since the late 1960s. With strong support from civil society, government, donors, members and partners, IUCN has been able to link conservation benefits with better livelihoods, mobilise local communities and generate tangible results even in the conflict situation.	Address: Bakhundole, Lalitpur P.O Box 3923 Kathmandu, Nepal Tel: +977-1-5528781, 5528761, 5527781, 5526391

	<p>IUCN contributions to important policy reforms in Nepal:</p> <ol style="list-style-type: none"> 1. National Conservation Strategy; 2. National Environmental Policy and Action Plan I and II; 3. Environmental Impact Assessment; 4. Environmental Protection Act 1996; 5. Environmental Protection Regulations 1997; 6. National Wetlands Policy; 	<p>Fax: +977-1-5526391 Email: info@iucn.org.np URL: www.iucn.org/nepal</p>
Nepal Forum of Environmental Journalists (NEFEJ)	<p>NEFEJ is a pioneer among the NGOs promoting the environmental journalism in Nepal. It led its foundation stone in 1986 and since then it has been providing the forum to debate, study, influence public policy and raising awareness for conservation and sustainable development</p>	<p>Address: P.O Box 5143, Thapathali, Kathmandu, Nepal Tel: +977-1-4261991 Fax: +977-1-4261191 URL: www.nefej.org</p>
Nepal Water Conservation Foundation (NWCFC)	<p>NWCF is a non-governmental, non-political and not-for-profit organization conducting interdisciplinary research on interrelated issues that affect the use and management of water with specific focus on the Himalaya-Ganga region. Since its establishment, the foundation has dedicated its focus to generate and disseminate knowledge on water management through research, publications and engagement in public dialogues. It has also sought to address emerging challenges and ever changing educational needs of water management.</p>	<p>Address: Baluwatar, Kathmandu, Nepal Tel: +977-1-4720744 Email: info@nwcfc.org.np URL: www.nwcfc.org.np</p>
Urban Environment Management Society (UEMS)	<p>UEMS is a non-government organization established in 2002 striving to contribute for better living environment through efforts for a sustainable development. At present, it has been working in four thematic areas, Water, Sanitation & Hygiene (WASH), Rainwater Harvesting & Rainwater Recharge, Solid Waste Management and Climate Change & Alternative Energy through integrated programmes and researches.</p>	<p>Address: P.O Box 271 Lalitpur, Nepal Tel: +977-1-5551730 Email: uems@wlimk.com.np URL: www.uems.org.np</p>
Women's	<p>The Women's Environment Preservation Committee</p>	<p>Address: Kopundole1,</p>

Environment Preservation Committee (WEPCO)	(WEPCO) is a popular non-governmental organisation, established in May 1992 has been dedicated to cleaning and conserving the urban environment in the Kathmandu Valley. WEPCO manages a mixture of day-to-day activities and special programmes. WEPCO has great expertise in developing education programmes, mobilizing communities, demonstrating technologies and empowering women to make changes in their lives and environments.	Lalitpur Sub-Metropolitan City, Bagmati, Central Development Region, Nepal Tel: +977-1-5520617, 5541068 Email: wepco@ntcnet.np URL: www.wepco.org.np
Social Considerations		
Organizations	Assigned Roles	Contact Address
Blue Diamond Society (BDS)	Established in 2001, the BDS works in Kathmandu with local communities and on a national level with the mission to improve the sexual health, human rights and well-being of sexual and gender minorities in Nepal.	Address: Shivabhakti Marg no. 344 Khursanitar-2, Lazimpat, Kathmandu, Nepal Phone: 4443350/4000147 Fax: 4438600 URL: www.bds.org.np/
CARE Nepal	CARE Nepal, like any other International Non-Government Organization (INGO) in Nepal, operates through a basic agreement with Social Welfare Council, Government of Nepal that allows it to implement various community development projects and programs in the country.	Address: CARE Nepal, Krishna Galli P.O. Box 1661, Kathmandu, NEPAL Tel: +977-1-5522800 Fax: +977-1- 5521202 Email: carenepal@np.care.org URL: www.carenepal.org
Community Mobilisation Unit (CMU)	Since June 1998, the Community Mobilisation in Nepal project has been supporting village communities in remote areas of Nepal. With funding from the Government of Japan, United Nations Volunteers Programme in Nepal joined hands with the Ministry of Local Development's 'Remote Area Development Committee' (RADC) in promoting community-ownership of the small-scale water-powered village electrification schemes ('microhydro') provided to remote communities by	United Nations Volunteers Address: Harihar Bhawan, Pulchowk, PO Box 107, Kathmandu, Nepal Tel: +977-1-523200 Fax: +977-1-52399 Email: unv.nepal@undp.org.np

	RADC.	
Nepal Disabled Human Rights Centre (DHRC Nepal)	DHRC Nepal is a Disabled Peoples Organisation founded in January 2000 by a group of young disabled people. The core activities include a weekly radio program called Disability Voice, publication of a monthly journal, provision of training programs to the DPOs and PwDs. DHRC-Nepal is also known as Disability Rights Resource Centre. DHRC offers Legal Aid facility to PwDs and also engage in Disability Interest Litigation (DIL).	P.O. Box: 19408 Chuchhepati, Pasang Lhamu Marga Kathmandu, Nepal Tel: 0977-1-4493211, 1-4477664 Fax: 0977-1- 4461364 Email: dhrc@wlink.com.np URL: www.dhrcnepal.org.np/eng
Environment and Public Health Organisation (ENPHO)	ENPHO is a service-oriented national Non-Government Organization that envisages contributing in sustainable community development by combining research and actions through the integrated programs in the environment and public health areas.	Address: 110/25, Adarsa Marg-1, Thapagaon, New Baneshwor G.P.O Box No. 4102 Kathmandu (East) Nepal Tel: +977-1-4468641, 4493188 Fax: +977-1-4491376 Email: enpho@enpho.org URL: www.enpho.org
National Federation of the Disabled Nepal (NFDN)	NFDN is an umbrella organization representing the Disabled Peoples' Organizations (DPOs) working for the cause of disability across the country. As an apex umbrella body it has been leading disability movement in Nepal since 1993. NFDN is also the member national assembly of Disabled People' International (DPI) and regional council member of DPI Asia Pacific Region.	Address: Bhrikutimandap, Kathmandu, Nepal Post Box No. 9188 Phone : 4231159 Fax : +977-1-4 229 522 Email: nfdn@mail.com.np URL: www.nfdn.org.np
Nepal Institute of Development Studies (NIDS)	NIDS (Nepal Institute of Development Studies), a non-governmental research organization established in 1998, has been focusing on prioritized issues which are associated to development of the country. NIDS contributes to the development process by conducting research, implementing effective programs to create environment through initiation,	Address: House No.: 23, Madhur Marg, Chun Devi, Maharajgunj PO Box: 7647, Kathmandu, Nepal Tel: +977-1-4721277, 4721278 Fax: +977-1-4721982

	facilitation and coordination of activities and networking/lobbying and advocating on equitable development strategies.	Email: nids@mail.com.np_ URL: www.nids.org.np
Nepal Water For Health (NEWAH)	Nepal Water for Health (NEWAH) is a national level non-government organization in Nepal working towards clean drinking water, hygiene promotion and sanitation. Established in 1992, it has been actively partnering with local NGOs across the country to provide access to clean water and sanitation facilities to those who need it most. NEWAH works in an integrated manner by complementing infrastructure development with the promotion of health, hygiene and livelihood opportunities. So far, NEWAH has worked in 51 districts across the country serving over 13 million people (as of January 2011)	Address: Lohasal, Kathmandu .P.O Box 4231 Tel: +977-1-4015707, 4015608 Fax: +977-1-4015678 Email: newah@newah.org.np URL: www.newah.org.np
Society for Urban Poor (SOUP)	Society for Urban Poor (SOUP) was established on 1992. It was established as a non-governmental organization with the noble intention to serve women and children of educationally, socially and economically deprived communities of urban and suburbs areas through educational, social and economic empowerment to bring positive change in their respective live styles.	Address: Sanepa Sanchal-2, Lalitpur P.O Box 7508, Kathmandu Nepal Tel: +977-1-5545468 Email: soup@ntc.net.np, soup1992@gmail.com URL: www.soup.com.np

Chapter 2
Natural Environment

2 Natural Environment

2.1 Overview

Although it is a small and landlocked country, Nepal has an amazing diversity in topography, thus nurturing biodiversity as well. Birds in Nepal are especially well studied. To conserve the rich biodiversity and beautiful landscapes, more than 20% of the country's land is designated as protected areas. Nepal has nine sites designated by the Ramsar Convention. The forest area of the country occupies approximately 25% of the land area.

2.2 Regulations and Policies

2.2.1 International Conventions

Based on the commitment as a signatory to the Convention on Biological Diversity at the Earth Summit (1992) in Rio, Nepal developed a Nepal Biodiversity Strategy in 2002. This strategy links the diverse obligations of the Convention together, and serves as an overall framework for the conservation and sustainable use of national biodiversity and biological resources. Nepal is a party to ten major international agreements and conventions on biodiversity conservation. Methods for transforming international treaty norms into domestic laws in Nepal are currently in progress (ICIMOD et al. 2007).

In addition to these international conventions and treaties, Nepal is committed to other global affiliations pertinent to biodiversity conservation and sustainable development, including the World Trade Organization (WTO), the International Union for Conservation of Nature and Natural Resources (IUCN) and the Global Tiger Forum. Nepal has adopted affirmative position to the World Conservation Strategy 1980 and the World Charter for Nature 1982. Government officials and representatives of NGOs have participated in global forums such as the World Park Congress, the World Forestry Congress, and the International Technical Conference on Plant Genetic Resources: Global Action Plan on Plant Genetic Resources 1996, amongst others (ICIMOD et al. 2007).

For further details of the status of the ratification and the application of international agreements, refer to Table A-2 in the Appendix.

2.2.2 Domestic Laws

The National Parks and Wildlife Conservation Act (NPWCA) 1973 and its ten associated regulations are the principal legal instruments that govern the management of protected areas in Nepal (Table 2.2.2). Section 3 of the NPWCA categorically prohibits hunting of animals or birds; construction of any house, hut, or other structure; clearing or cultivation of any part of the land; harvesting of crops; cutting, burning, or damaging any tree, bush, or other forest product; and mining within national parks or protected areas. The Act provides complete protection to 27 species of mammals, nine species of birds, and three species of reptiles. Since its promulgation in 1973, five amendments have been made to this Act. The Fifth Amendment in 2005 accommodated the provision for handing over management responsibility over protected areas to organisations established under the Act. The three regulations formulated after 1996 primarily reflect upon government policy involving local communities in the management of protected areas (ICIMOD et al. 2007).

Table 2.2.1: Acts and Regulations Related to Protected Areas and Wildlife

No.	Acts and Regulations
1	National Parks and Wildlife Conservation Act 1973 (First Amendment 1974, Second Amendment 1983, Third Amendment 1990, Fourth Amendment 1993, and Fifth Amendment 2005)
2	Elephant Management Rules 1966
3	National Parks and Wildlife Conservation Rules 1974 (First Amendment 1975, Second Amendment 1978, and Third Amendment 1985)
4	Chitwan National Park Rules 1974 (First Amendment 1990)
5	Wildlife Reserves Rules 1978 (First Amendment 1985)
6	Himalayan National Parks Rules 1980
7	Khaptad National Park Rules 1988
8	Buffer Zone Rules 1996
9	Bardia National Park Rules 1997
10	Conservation Area Rules 1997
11	Conservation Area Government Rules 1997

Source: ICIMOD et al. (2007)

There are two other Acts pertaining to the conservation of biodiversity: the Aquatic Animals Protection Act (AAP Act) 1961, and National Trust for Nature Conservation (NTNC) Act 1982 (previously KMTNC Act). The Aquatic Animals Protection Act 1961 provides legislative

protection for habitats of aquatic species. This law was amended for the first time in 1998. Section 5a included by the recent amendment permits the use of only safe pesticides if poisonous materials are used to catch aquatic life. Established under the NTNC Act 1982, the Nature Trust for Nature Conservation manages two protected areas, the Annapurna Conservation Area (ACA) and Manaslu Conservation Area (MCA), and the Central Zoo. NTNC also carries out research, training, and education activities in Chitwan National Park, Bardia National Park, and Shuklaphanta Wildlife Reserve (ICIMOD et al. 2007).

Acts and regulations applicable to forests, watersheds, the environment, livestock, self-governance, and tourism (Table 2.2.3) hold equal significance for the conservation of flora and fauna in Nepal. According to the Forest Act 1993 (amended in 1999), forest products also include birds, wildlife, and trophies thereof. Provisions made in the Forest Act 1993 as amended, and Forest Regulations 1995 relating both to national forests including government managed forests, protected forests, community forests, leasehold forests, and religious forests, and private forests will have long-term impacts on the conservation and sustainable use of various components of biodiversity. Section 23 empowers the government to delineate any part of a national forest that has a ‘special environmental, scientific, or cultural importance,’ as a protected forest (ICIMOD et al. 2007).

Table 2.2.2: Acts and Regulations Relevant to Forests and the Environment

No.	Acts and Regulations
1	Aquatic Animals Protection Act 1961
2	Environment Protection Act 1996, and Environment Protection Rules 1997
3	Forest Act 1993 (amended 1999) and Forest Rules 1995
4	Forest Act 1992
5	Local Self Governance Act 1998
6	National Trust for Nature Conservation Act 1982
7	Pesticides Act 1991
8	Plant Protection Act 1964
9	Soil and Watershed Conservation Act 1982

Source: ICIMOD et al. (2007)

Nepal signed the Convention on Biological Diversity (CBD) on June 12, 1992. The Convention was ratified by the parliament on November 23, 1993 and has been enforced in Nepal since February 21, 1994. The Nepal Biodiversity Strategy (NBS), developed in 2002, records the commitment of the government and the people of Nepal as well as to meet the obligations of the

Convention, and to serve as an overall framework for the conservation and sustainable use of biodiversity and biological resources (MoFSC 2009).

The NBS is an important strategy in implementing the CBD in Nepal. The NBS has supported articles of the CBD with a particular emphasis on Article 6 by developing national biodiversity strategies, plans, or programmes and integrating the conservation of biological diversity and the sustainable use of its components into sectoral and cross-sectoral plans, programmes, and policies. It serves as an overall framework for the conservation and sustainable use of biodiversity and biological resources in the country. The strategy also reflects the national commitment to adopt a more holistic approach to biodiversity conservation through the management of habitat, species, and genetic diversity in Nepal (MoFSC 2009).

The overall goal of the Nepal Biodiversity Strategy Implementation Plan (NBSIP) is to contribute to achieve the goals and objectives of the NBS through its successful implementation for the conservation of biological diversity, the maintenance of ecological processes, and the equitable sharing of the benefits accrued (GoN/ MFSC 2006) (MoFSC 2009)

2.3 Wildlife Species

Nepal is endowed with rich and varied biodiversity. Altitudinal variances in short distances give Nepal's biogeography variety that ranges from lush moist forests and sparse alpine deserts to luxurious grasslands in lowland Terai. The mountainous country also shelters some of the world's most rare animals. Sagarmatha (Mt. Everest) National Park and Chitwan National Park with typical natural, cultural, and landscape characteristics were listed as World Heritage sites in 1979 and 1984, respectively (See Section 4.4).

Nepal comprises only 0.1% of land area on a global scale but possesses a disproportionately rich diversity of flora and fauna at genetic, species, and ecosystem levels. The species are found in the dense tropical monsoon forests of the Terai, in the deciduous and coniferous forests of the country's subtropical and temperate regions, and in the sub-alpine and alpine pastures, and the snow-covered Himalayan peaks (ICIMOD et al. 2007).

Even though these inventories are not completed due to insufficient research, Tables 2.3.1 and 2.3.2 summarise biodiversity in Nepal.

Table 2.3.1: Comparative Totals of Plant Species of the World and Nepal

Group (Life Form)	World Number	Nepal	
		Number	%
Flowering Plants	231,638	6391	2.76
Pteridophytes	10,369	534	5.15
Lichens	>17,000	471	2.77
Bryophytes	>14,000	668	4.77
Fungi	>70,000	1,882	2.69
Algae	>40,000	687	1.72
Total	>403,000	10,633	2.80

Source: ICIMOD et al. (2007)

Table 2.3.2: Comparative Totals of Animal Species of the World and Nepal

Group (Life Form)	World Number	Nepal	
		Number	%
Mammals	4,675	185	3.96
Birds	9,799	874	8.90
Herpeto	12,650	195	1.54
Amphibians	4,780	118	2.47
Reptiles	7,870	78	0.99
Fish	10,000	187	1.87
Butterflies	17,500	651	3.72
Moths	160,000	785	0.49
Spiders	30,490	175	0.44

Source: ICIMOD et al. (2007)

2.3.1 Endemic Species

Of the 246 endemic plants recorded, eight species were presumed to be extinct from Nepal (Shrestha and Joshi 1996). Thirty-two species from this list have been reported to have originated elsewhere. In spite of these deductions, 185 species including infraspecific taxa have been added to the checklist of endemic plants, bringing the total count of endemic plant species to 399 (ICIMOD et al. 2007).

Two mammals and one bird species may each be considered endemic in Nepal. From the mammals species, the Himalayan fieldmouse (*Apodemus gurkha*) (Thomas 1924) found in central Nepal between the altitudes of 2,200–3,600 m is an endemic mammal species in Nepal. It was classified as ‘Lower Risk- Least Concern’ in 1994, and assessed in 1996 by the IUCN Red List of Threatened Species (Baillie 1996; and Wilson and Reeder 2005). The *Myotis csorbai* commonly known as Csorba’s Mouse-eared Bat is endemic to western Nepal, where it is known only from the type locality of about 30 km south of Pokhara, Syangja district (ICIMOD et al. 2007).

The Spiny Babbler (*Turdoides nipalensis*) is Nepal’s endemic bird species. It is found in the six mountain protected areas: Khaptad National Park, Bardia National Park, Shivapuri National Park, Makalu-Barun National Park, Annapurna Conservation Area, Manaslu Conservation Area, and Kangchenjunga Conservation Area. It is classified as the species of ‘Least Concern’ in the IUCN Red List in 2001 (BirdLife International 2004). The Nepal Kalij (*Lophuraleucomelanos leucomelanos*) is another species endemic to Nepal (ICIMOD et al. 2007).

Twenty one species of herpetofauna are endemic to Nepal (Living National Treasures 2012). Of these, four species (*Paaercepeae*, *Melanochelys trijuga indopeninsularis*, *Python molurus bivittatus* and *Rana chitwanensis*) are listed as ‘Near Threatened’ in the IUCN Red List, and three species, *Rana humeralis*, *Megophrys parva* and *Polypedates maculatus* as of ‘Least Concern’. Similarly, the Burmese rock python (*Python molurus bivittatus*) is protected under the NPWC Act of Nepal, and also listed in the CITES Appendix A-26. The Che-quered keelback (*Xeno-chrophis piscator piscator*) is listed in the CITES Appendix A-26 (ICIMOD et al. 2007).

Six species of fish are endemic in Nepal. Among them, three species of Asala (*Schizothorax macro-phthal-mus*, *Schizothoraxnepalensis* and *Schizothorax raraensis*) are recorded only in Rara National Park. The Chuche Asala (*Schizo-tharaichthys annandalei*) is recorded in BNP, the ‘Jalkapur Totiyara’ (*Bariliusjalkapoorei*) is recorded in Bardia National Park and Koshitappu Wildlife Reserve, and the ‘Tite machha’ or bitter fish (*Psilorhynchus pseudecheneis*) is recorded in Sagarmatha National Park and Makalu-Barun National Park (ICIMOD et al. 2007).

Table 2.3.3: Endemic Species in Nepal

Family	Number	Species
Vascular Plants	399	
Mammals	2	<i>Apodemus gurkha</i>
		<i>Myotis csorbai</i>
Birds	2	<i>Turdoides nipalensis</i>
		<i>Lophuraleucomelanos leucomelanos</i>
Herpetofauna	21	<i>Scutigera nepalensis</i>
		<i>Amolops nepalicus</i>
		<i>Fejervarya pierrei</i>
		<i>Paa ercepeae</i>
		<i>Paa rara</i>
		<i>Paa rostandi</i>
		<i>Rana chitwanensis</i>
		<i>Sphaerotheca maskeyi</i>
		<i>Sphaerotheca swani</i>
		<i>Polypedates zed</i>
		<i>Trimeresurus karanshahi</i>
		<i>Oriotaridasi</i>
		<i>Sitana fusca</i>
		<i>Sitana schleichi</i>
		<i>Sitana sivalensis</i>
		<i>Gonydactylus markuscombaii</i>
		<i>Gonydactylus martinostolli</i>
		<i>Gonydactylus nepalensis</i>
		<i>Asymblepharus mahabharatus</i>
		<i>Asymblepharus nepalensis</i>
		<i>Scincella capitanea</i>
Fish	6	<i>Schizothorax macro-phthal-mus</i>
		<i>Schizothoraxnepalensis</i>
		<i>Schizothorax raraensis</i>
		<i>Schizo-tharaichthys annandalei</i>
		<i>Bariliusjalkapoorei</i>
		<i>Psilorhynchus pseudecheneis</i>

Sources: Living National Treasures (2012); ICIMOD et al. (2007)

2.3.2 Endangered Species

The world's most comprehensive inventory of the global conservation status of biological species has been compiled by the International Union for Conservation of Nature and Natural Resources (IUCN). It regularly revises the IUCN Red List of Threatened Species. The latest report published in February 2012 categorises 86 species of animals and 9 species of plants in Nepal as critically endangered (CR), endangered (EN) or vulnerable (VU). For details of each species, see Tables A-23 and A-24 in the Appendix.

Table 2.3.4: The Conservation Status of Biological Species in Nepal

	EX	EW	CR	EN	VU	Total
Animal	0	0	12	23	51	86
Plant	0	0	0	4	5	9

Notes: EX: Extinct; EW: Extinct in the wild; CR: Critically endangered; EN: Endangered; VU: Vulnerable

Source: IUCN (2012)

Table 2.3.5: Threatened Species in Nepal (totals by taxonomic group)

Mammals	Birds	Reptiles	Amphibians	Fish	Mollusc	Other Inverts	Plants	Total
31	33	9	3	7	1	2	9	95

Source: IUCN (2012)

2.3.3 Internationally Protected Species

There are several treaties and conventions related to the conservation and protection of species. In this section, the Convention on the Conservation of Migratory Species of Wild Animals (often abbreviated as CMS; also known as the Bonn Convention) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (often abbreviated as CITES) are discussed.

The Convention on the Conservation of Migratory Species of Wild Animals (CMS), also known as the Bonn Convention, was signed in 1979 in Bonn and came into force in 1983. Its aim is to conserve terrestrial, marine, and avian migratory species throughout their range. It is an intergovernmental treaty concluded under the aegis of the United Nations Environment Programme and concerned with the conservation of wildlife and habitats on a global scale. For more detailed information of CMS-designated species in Nepal, see Table A-25 in the Appendix.

As of December 22, 2011, roughly 5,000 species of animals and 29,000 species of plants were protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Sixty-six species of animals and 139 species of plants are listed under Nepal in Appendices I, II and III of the Convention. For the details of the species in Nepal designated by CITES, refer to Tables A-26 in the Appendix.

Table 2.3.6: Total of Species in CITES Appendices

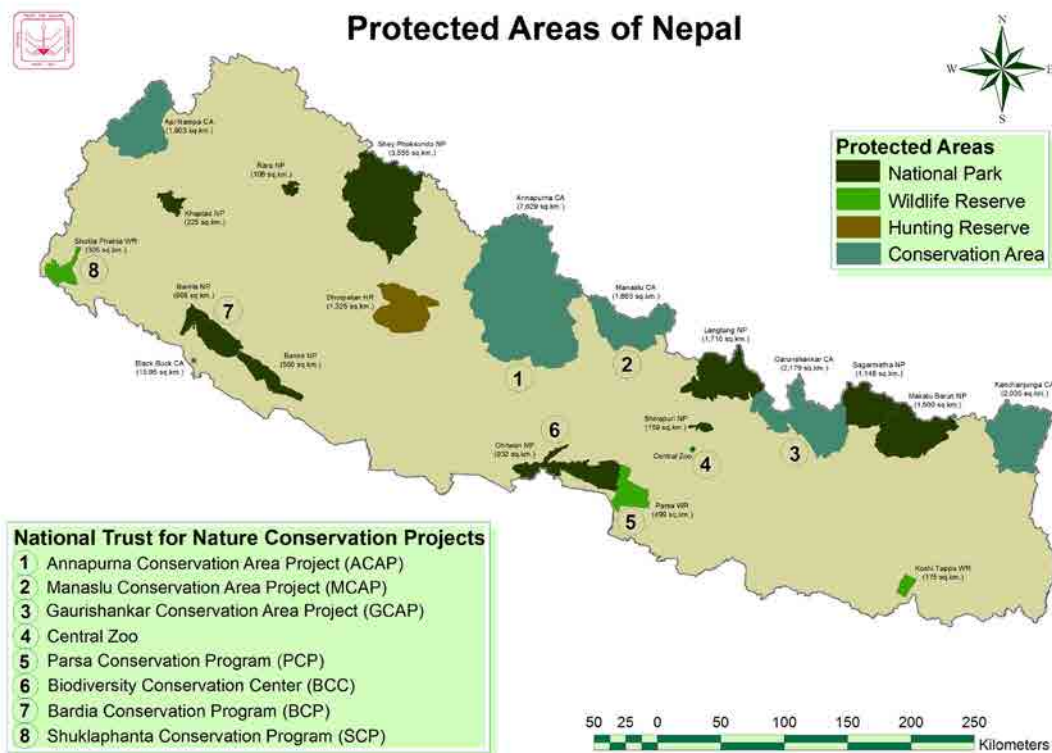
Appendix	Plant	Mammal	Bird	Herpeto
I	2	28	16	8
II	132	14	95	13
III	5	24	17	3
Total	139	66	128	24

Source: ICIMOD et al. (2007)

2.4 Important Ecosystems and Habitats

2.4.1 Protected Areas

Protected area management in Nepal received a real thrust in the 1970s. Not only were protected areas added, but also actions on both their protection and conservation were intensified. The first organized approach to managing protected areas in Nepal dates back to the year 1973 by establishing Chitwan National Park. Now, the protected areas in Nepal include ten national parks, three wildlife reserves, one hunting reserve, six conservation areas, and eleven buffer zones covering an area of 31,029.67 km² that is 21.08% of the total area of the country (MoFSC 2012).



Source: National Trust for Nature Conservation (2011)

Figure 2.4.1: Protected Areas of Nepal

Five types of protected areas—national park, wildlife reserve, hunting reserve, conservation area and buffer zone—were defined under the Nepal National Parks and Wildlife Conservation Act, 1973 with the objective of conserving biodiversity (in situ) and the natural environment of various forest types (Forest Action Organization 1973)

Table 2.4.1: Types of Protected Areas Defined by the Nepal National Parks and Wildlife Conservation Act (NPWCA), 1973

Type of Protected Areas	Description
National Park	An area set aside for the conservation, management, and utilization of flora, fauna, and scenery along with the natural environment.
Wildlife Reserve	An area set aside for the conservation and management of wildlife resources and their habitats.
Hunting Reserve	An area set aside for the management of wildlife by allowing hunters to hunt them.
Conservation Area	An area to be managed according to an integrated plan for the

	conservation of the natural environment and balanced utilization of natural resources.
Buffer Zone	A peripheral area of a national park or reserve prescribed under section 3a in order to provide facilities to use forest resources on a regular and beneficial basis for local people.

Source: Forest Action Nepal (1973)

Table 2.4.2: Protected Areas in Nepal

No.	Site Name	Establish year	Region	Area (km ²)
National Parks (NP)				
1	Chitwan NP	1973	Terai and Siwalik - Centre	932
2	Sagarmatha NP	1976	Highlands – East	1,148
3	Langtang NP	1976	Highlands Hills - Centre	1,710
4	Rara NP	1976	Mid Hills – West	106
5	Khaptad NP	1984	Mid Hills – West	225
6	Shey Phoksundo NP	1984	Highlands – West	3,555
7	Bardiya NP	1976/1988	Terai and Siwalik - West	968
8	Makalu Barun NP	1991	Highlands – East	1,500
9	Shivapuri Nagarjun NP	1984/2002	Highlands Hills - Centre	159
10	Banke NP	2010	Terai and Siwalik - West	550
			Sub-total	10,853
Wildlife Reserves (WR)				
1	Koshi Tappu WR	1976	Terrai and Siwalik - East	175
2	Parsa WR	1984	Terai and Siwalik - Centre	499
3	Sukla Phanta WR	1976	Terai and Siwalik - West	305
			Sub-total	979
Conservation Areas (CA)				
1	Annapurna CA	1992	Highlands Hills - Centre	7,629
2	Manaslu CA	1998	Highlands Hills - Centre	1,663
3	Kanchenjunga CA	1997	Highlands – East	2,035
4	Api nampa CA	2010	Highlands – West	1,903
5	Gaurishankar CA	2010	Highlands - East & Centre	2,790
6	Blackbuck CA	2009	Terai and Siwalik - West	1,595
			Sub-total	12,792

No.	Site Name	Establish year	Region	Area (km ²)
Hunting Reserves (HR)				
1	Dhorpatan HE	1987	Mid Hills – West	1,325
	Sub-total			1,325
Buffer Zone (BZ)				
1	Chitwan NP	1996	Terai and Siwalik - Centre	750
2	Bardia NP	1996	Terai and Siwalik - West	328
3	Makalu Barun NP	1999	Highlands – East	830
4	Langtang NP	1998	Highlands Hills - Centre	420
5	Koshi Tappu WR	2004	Terai and Siwalik - East	173
6	Khaptad NP	2006	Mid Hills – West	216
7	Rara NP	2006	Mid Hills – West	198
8	Parsa WR	2005	Terai and Siwalik - Centre	298.17
9	Sagarmatha NP	2002	Highlands – East	275
10	Suklaphanta WR	2004	Terai and Siwalik - West	243.5
11	Shey Phoksundo NP	1998	Highlands – West	1,349
	Sub-total			5,080.67
	Total			31,029.67
	Total % of Nepal's Territory			21.08%

According to CEPF (2009), most of the Key Biodiversity Areas (KBAs) within eastern Nepal in Kanchenjunga-Singalila Complex are not protected and managed by local communities mainly for livelihood benefit. Bird Conservation Nepal implemented the project entitled 'Developing Civil Society Networks to Conserve Key Biodiversity Areas in Nepal, focusing on the Kanchenjunga-Singalila Complex', funded by CEPF to facilitate the development of civil society networks that support, promote and take responsibility for conservation of KBAs. The project site includes 3 KBAs: Kanchenjunga Conservation Area, Upper Mai Valley and Lower Mai Valley (CEPF 2009).

2.4.2 Ramsar Sites

Popularly known as the 'Ramsar Convention', the Convention on Wetlands of International Importance, especially as habitats for waterfowl, is an intergovernmental treaty adopted on 2 February 1971 in the Iranian city of Ramsar on the southern shore of the Caspian Sea. In December 1987, Nepal became the 46th Contracting Party to the treaty by depositing

Koshitappu Wetland Wildlife Reserve as the 384th wetland in the Convention List. The Convention on Wetlands came into force in Nepal on 17 April 1988 (ICIMOD et al. 2007).

In Nepal, there are nine sites designated as wetlands of international importance under the Convention on Wetlands of International Importance, especially Waterfowl Habitats (also known as the Ramsar Convention).

Table 2.4.3: Wetlands of International Importance in Nepal

Site Name	Date of Designation	Region	Area (ha)	Coordinates
Beeshazar and Associated Lakes	13 Aug 2003	Chitawan	3,200	27°37'N 084°26'E
Ghodaghodi Lake Area	13 Aug 2003	Kailali	2,563	28°41'N 080°57'E
Gokyo and Associated Lakes	23 Sep 2007	Sagarmatha	7,770	27°52'N 080°42'E
Gosaikunda and Associated Lakes	23 Sep 2007	Bagamti	1,030	28°05'N 085°25'E
Jagadishpur Reservoir	13 Aug 2003	Kapilvastu	225	27°35'N 083°05'E
Koshi Tappu	17 Dec 1987	Kosi	17,500	26°39'N 086°59'E
Mai Pokhari	28 Oct 2008	Ilam	90	27°00'N 087°56'E
Phoksundo Lake	23 Sep 2007	Karnali	494	29°12'N 082°57'E
Rara Lake	23 Sep 2007	Karnali	1,583	29°30'N 082°05'E

Source: Ramsar Convention (2012)



Sources: UN (2007) ; Ramsar Convention (2012)

Figure 2.4.2: Map of Ramsar Sites in Nepal

2.4.3 Biodiversity Hotspots

Conservation International (CI) is a non-profit environmental organisation headquartered in Arlington, Virginia. The organisation’s mission is to protect nature and its biodiversity for the benefit of humanity. It mainly works for the conservation of biodiversity hotspots, tropical primary forests, and valuable coastal ecosystems. A biodiversity hotspot is a biogeographic region with a significant reservoir of biodiversity, which is under threat from human activities. CI designates the hotspots according to various criteria including (1) an area that has the world’s highest biodiversity, and (2) an ecosystem damaged severely by human activities, including development. The biodiversity hotspots hold especially high numbers of endemic species, yet their combined area of remaining habitats covers only 2.3% of the Earth’s land surface. Each hotspot faces extreme threats and has already lost at least 70% of its original natural vegetation. Over 50% of the world’s plant species and 42% of all terrestrial vertebrate species are endemic to 34 biodiversity hotspots (Conservation International 2012).

Out of the top ten biodiversity hotspot countries of Asia, Nepal stands at the 5th, 9th, and 10th position, respectively, on species diversity of birds, mammals, and angiospermic flowering plants (MoPE 2000).

Almost all land of the country except around the northwestern part of Annapurna is designated as Biodiversity Hotspots (IBAT 2013).

2.4.4 Important Bird Areas

Biodiversity is not uniformly distributed across the planet. Some places are therefore more significant than others for its conservation. The presence of bird species of global conservation concern can be used to identify sites—Important Bird Areas (IBAs)—critical both for their own conservation and for the conservation of much else besides because of the way that key biodiversity in other groups often co-occurs with birds. IBAs are areas recognised as being globally important habitats, especially for the conservation of birds. Currently there are about 10,000 IBAs all over the world. The IBA programme was developed by BirdLife International.

Bird Conservation Nepal, which is the BirdLife International's affiliate in Nepal, has prepared the IBA directory for Nepal. Established in 1982, Bird Conservation Nepal is one of the leading organisations in Nepal, focusing on the conservation of birds and their habitats. It seeks to promote interest in birds among the general public, encourage research on birds, and identify major threats to birds' continued survival. Bird Conservation Nepal provides scientific data and expertise on birds for the Government of Nepal through the Department of National Parks and Wildlife Conservation (DNPWC), which is under the Ministry of Forest and Soil Conservation, and works closely in bird conservation and biodiversity conservation throughout the country.

Bird Conservation Nepal has identified twenty-seven sites as current IBAs and five potential IBAs in Nepal. A network of the 27 sites (covering more than 2.6 million hectares) has been identified in the alpine zone and temperate forests of the High Mountains, subtropical and tropical moist forests, semi-arid woodland and scrub, lowland grasslands, and freshwater ecosystems. IBAs have a close relationship with Nepal's network of Protected Areas (covering more than 3.4 million hectares).

Out of twenty seven IBAs existing in Nepal, fifteen sites (covering about two million hectares) are wholly within Protected Areas, which are designated and managed by the Department of

National Parks and Wildlife Conservation. More than 80% of the IBA network overlaps with the Protected Area network.

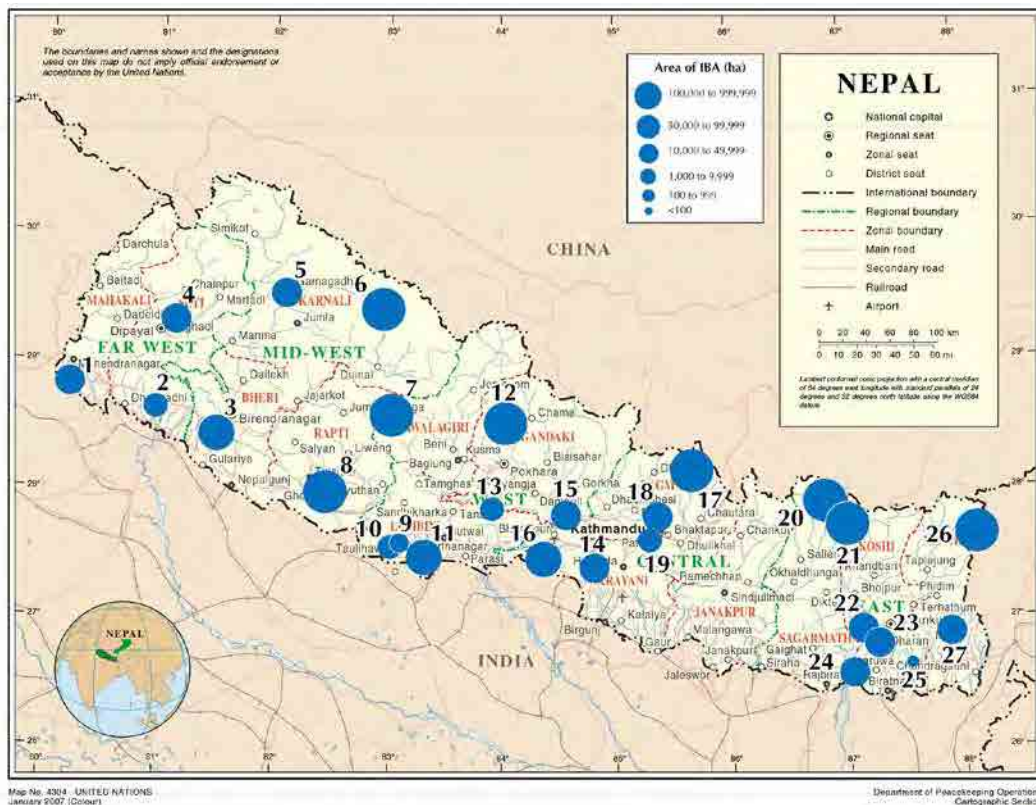
Table 2.4.5: Important Bird Areas in Nepal

No.	Site name	Zone	Area (ha)	Coordinates	Status
1	Sulka Phanta Wildlife Reserve	Mahakali	30,500	28°53' N 80°11' E	Protected
2	Ghodaghodi Lake	Seti	2,563	28°41' N 80°56' E	Unprotected ^R
3	Bardia National Park	Bheri	96,800	28°28' N 81°28' E	Protected
4	Khaptad National Park	Seti	22,500	29°22' N 81°07' E	Protected
5	Rara National Park	Karnali	10,600	29°34' N 82°05' E	Protected
6	Shey-Phoksundo National Park	Karnali	355,500	29°26' N 82°56' E	Protected
7	Dhorpatan Hunting Reserve	Dhawalagiri; Rapti	132,500	28°36' N 83°00' E	Protected
8	Dang Deukhuri foothill forests and west Rapti wetlands	Bheri; Lumbini; Rapti	125,000	28°00' N 82°25' E	Unprotected
9	Jagdishpur Reservoir	Lumbini	225	27°35' N 83°05' E	Unprotected ^R
10	Nawalparasi forests	Lumbini	4,000	27°33' N 83°00' E	Unprotected
11	Farmlands in Lumbini area	Lumbini	141,367	27°29' N 83°17' E	Unprotected
12	Annapurna Conservation Area	Dhawalagiri; Gandaki	762,900	28°32' N 84°00' E	Protected
13	Rampur Valley	Gandaki; Lumbini	3,000	27°51' N 83°54' E	Unprotected
14	Parsa Wildlife Reserve	Narayani	49,900	27°20' N 84°50' E	Protected
15	Barandabhar forests and wetlands	Narayani	12,300	27°48' N 84°33' E	Unprotected

No.	Site name	Zone	Area (ha)	Coordinates	Status
16	Royal Chitwan National Park	Narayani	93,200	27°28'N 84°20'E	Protected ^{WH}
17	Langtang National Park	Bagmati	171,000	28°10'N 85°38'E	Protected
18	Shivapuri National Park	Bagmati	11,200	27°48'N 85°20'E	Partially protected
19	Phulchowki mountain forests	Bagmati	5,000	27°37'N 85°16'E	Unprotected
20	Sagarmatha National Park	Sagarmatha	114,800	27°56'N 86°48'E	Protected ^{WH}
21	Makalu Barun National Park	Koshi	150,000	27°45'N 87°00'E	Protected
22	Tamur Valley	Koshi	20,000	26°55'N 87°10'E	Unprotected
23	Dharan forests	Koshi	40,000	26°49'N 87°17'E	Unprotected
24	Koshi Tappu Wildlife Reserve and Koshi Barrage	Koshi; Sagarmatha	21,000	26°35'N 87°04'E	Partially protected ^R
25	Urlabari forest groves	Koshi	100	26°39'N 87°36'E	Unprotected
26	Kanchenjunga Conservation Area	Mechi	203,500	27°42'N 88°08'E	Protected
27	Mai Valley forests	Mechi	30,000	26°55'N 87°55'E	Unprotected

Notes: R: Ramsar site; WH: World heritage.

Source: BirdLife International (2004) [modified]



Sources: UN (2007); BirdLife International (2004)

Figure 2.4.3: Locations and Areas of Important Bird Areas in Nepal

In addition to the IBAs mentioned above, there are five potential IBAs designated: Bagmati Valley, forests and grasslands of Dadeldhura and Baitadi Districts, Khandbari-Num forests, Manaslu Conservation Area and Reshunga Forest (Table 2.4.6) (Bird Conservation Nepal 2011).

Table 2.4.6: Potential Important Bird Areas in Nepal

No.	Site Name	Zone	Area (ha)	Coordinates	Status
1	Kathmandu Valley	Bagmati	5,067	27°43'N 85°22'E	Unprotected
2	Forests and grasslands of Dadeldhura and Baitadi Districts	Mahakali	N/A	N/A	Unprotected
3	Khandbari-Num forests	Koshi	N/A	27°22'N 87°38'E	Unprotected
4	Manaslu Conservation Area	Gandaki	166,300	28°32'N 84°50' E	Protected
5	Reshunga Forest	Lumbini	675	-	Unprotected

Source: Bird Conservation Nepal (2011)

Besides these IBAs, mainly the Hill zones of Nepal (Figure 1.1.2) are designated as Endemic Bird Areas by BirdLife International (IBAT 2013).

2.5 Forests

At the request of its member countries, the Food and Agriculture Organization (FAO) of the United Nations regularly monitors the world's forests and their management and uses through the Forest Resources Assessment Programme. According to the FAO (2010), the total forest area in Nepal in 2010 was estimated at 3,636,000 hectares (ha), which covers 25% of the land area. The extent of forest areas in Nepal, however, has been generally on the decline. Around 53,000 ha of forest were converted to other uses or lost through natural causes per year during the period between 2000 and 2005; the annual deforestation rate in this period was approximately 1.4%.

Table 2.5.1: Trends in the Extent of Forests, 1990–2010

Forest Area (1,000 ha)				Annual Change Rate					
1990	2000	2005	2010	1990–2000		2000–2005		2005–2010	
				1,000 ha/yr	%	1,000 ha/yr	%	1,000 ha/yr	%
4,817	3,900	3,636	3,636	-92	-2.09	-53	-1.39	0	0

Source: FAO (2010)

As to the types of forests, the following classifications have been made and related definitions and data are provided in FAO (2010).

Table 2.5.2: Classifications of Forests

Primary Forests	The forest areas in National Parks, Wildlife Reserves, and Hunting Reserves have been placed under this category.
Other naturally regenerated forests	The rest of the forest areas of the country (excluding plantations) have been placed under this category.
Planted forests	All plantations for industrial round wood, fuelwood and poles have been placed under this category, and all plantations raised for watershed development have been placed under this category.

Source: FAO (2010)

The primary forests are reported to cover the areas of 526,000 ha, which occupies 14% of all the forest areas in the country. The areas of other naturally regenerated forests are estimated to be 3,067,000 ha, which consists of 84% forest areas. On the other hand, planted forests cover only 43,000 ha, which occupies 1% of all the forest areas. More introduced species inhabits planted forests than other naturally regenerated forests.

Table 2.5.3: Status of Forests in Nepal (by Type)

Primary forests		Other naturally regenerated forests			Planted forests		
1,000 ha	% of FA	1,000 ha	% of FA	% of which IS	1,000 ha	% of FA	% of which IS
526	14	3,067	84	13	43	1	23

Notes: FA: Forest Area; IS: Introduced Species

Source: FAO (2010)

The forest ownership patterns in Nepal show that 100% of the forests are publicly owned, whereas private ownership is too small and not significant. The holder management rights of public forests falls mainly into public administration or communities.

**Table 2.5.4: Ownership Patterns and Holders of Management Rights
of Public Forests in Nepal**

Ownership patterns	Public	100%
	Private	n.s.
	Other	0%
Holders of management rights of public forests	Public administration	66%
	Individual	0%
	Business entities and institutions	1%
	Community	33%
	Other	0%

Notes: n.s.: not significant (indicating a very small value)

Source: FAO (2010)

According to FAO (2010), forest estates within protected areas account for 14% of the total forest areas, and 41% of the forests with management plans.

Table: 2.5.5: Forest Management and Legal Status (as of 2010)

Forests within protected areas		Forests with management plans	
1,000 ha	% of forest areas	1,000 ha	% of forest areas
526	14	1,500	41

Source: FAO (2010)

Chapter 3

Pollution and Environmental Issues

3 Pollution and Environmental Issues

3.1 Overview

Nepal's environment has suffered from agricultural encroachment, and consequent soil, and contamination of the water supply. Between the mid-1960s and the late 1970s, forestland declined from 30% to 22% of the country's total area, mainly because of the felling of for firewood, which provides over 90% of Nepal's fuel. Moreover, researchers have estimated that erosion causes the loss of about 240 million metres of topsoil each year (Advameg 2012).

Air and water are significant environmental problems in Nepal. According to United Nations sources, the nation produces 18,000 tons of carbon monoxide and 3,300 tons of hydrocarbons per year. Roughly one-third of the nation's city inhabitants and two-thirds of all rural dwellers do not have pure water; the use of contaminated drinking water is a health hazard. Untreated is a major pollution factor: the nation's cities produce an average of 400,000 tons of solid waste per year (Advameg 2012).

Various developmental activities have also created several environmental problems in Nepal: loss of forest, forest degradation, soil erosion, air pollution, water pollution and unmanaged solid-waste. It is imperative that in development planning environmental stewardship and management play a crucial role in enabling and sustaining poverty reduction. The Government of Nepal (GoN) and NGOs have been partially successful in overcoming environmental problems through policy and legislative measures, as well as through various economic instruments (Jha 2007).

3.2 Regulations and Policies

3.2.1 International Agreements

GoN has signed several international treaties, conventions, and protocols dealing with pollution control. An overview of the relevant international treaties and conventions signed by the GoN is shown in the table below. (ADB and ICIMOD 2006).

**Table 3.2.1: Major Relevant International Agreements
Signed by the Government of Nepal**

No.	International Agreement
1	Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction, Paris and New York
2	United Nations Framework Convention on Climate Change
3	Kyoto Protocol on the United Nations Framework Convention on Climate Change
4	Montreal Protocol on Substances that Deplete the Ozone Layer
5	Vienna Convention for the Protection of the Ozone Layer
6	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
7	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
8	Stockholm Convention on Persistent Organic Pollutants

Source: UN (2012)

For further details of the status of the ratification and the application of international agreements, refer to Table A-2 in the Appendix.

3.2.2 Domestic Laws

GoN has enacted several important policies and laws to govern the overall management of its natural resources and to address the growing environmental problems facing the country. The major national environmental policies include the National Conservation Strategy (1987), the Nepal Environmental Policy and Action Plan (1993), the Sustainable Development Agenda (2003), and Nepal’s Tenth Five-Year Plan (2002–2007)—also known as the Poverty Reduction Strategy. The Tenth Plan requires the Government of Nepal to ensure the environmental sustainability of economic growth and take action to address a range of environmental challenges. The 1990 constitution also mentions that the state shall give priority to the protection of the environment. More significantly, the 2006 interim constitution of Nepal recognizes the fundamental ‘right to clean environment’, which will have far-reaching implications for future policy decisions and citizens’ ability to hold the government accountable for its actions or inactions in protecting the environment (WB 2007).

Nepal’s main environmental legislation, which establishes the overall environmental management framework in the country, is found in the Environment Protection Act (1997) and

the Environment Protection Rules (1997, substantially amended in 2007). Under the Environment Protection Act and Rules, the primary tools for ensuring the protection of natural resources are the environmental impact assessment (EIA) and the initial environmental examination (IEE). The other major focus of the Environment Protection Rules is the prevention and control of pollution; it prohibits anyone from creating pollution that would cause significant adverse environmental effects or threaten public health (WB 2007). For details of Nepal's environmental impact assessment system, see Chapter 5.

Other sector policies and legislation, such as the Industrial Enterprises Act (1992) and the Water Resources Act (1992), have also been adopted to address sector-specific concerns that have significant environmental implications. Another significant law relating to environmental management and pollution control is the Local Self-Governance Act (1999). This Act gives locally elected bodies—village development committees (VDCs), district development committee (DDCs), and municipal governments—responsibilities for a number of local development issues, including environment and waste and pollution management (WB 2007).

For the purposes of the country environment analysis (CEA), six national agencies with environmental management responsibilities were examined: the Ministry of Environment, Science, and Technology; the Ministry of Forests and Soil Conservation; the Ministry of Water Resources; the Ministry of Local Development; the Ministry of Physical Planning and Works; and the Ministry of Industry, Commerce, and Supplies. The ability of these agencies, particularly the Ministry of Environment, Science, and Technology, to fulfil their statutory responsibilities for environmental management is very constrained. This is due, in part, to the lack of sufficient resources (human, technical, and financial) and the lack of formal coordination mechanisms between agencies and government. One critical area of concern is in compliance and enforcement, where there is little, if any, monitoring or enforcement done by either the Ministry of Environment, Science, and Technology or sector agencies. This has affected the implementation of various environmental laws and environmental management systems, most notably the EIA/IEE system (WB 2007).

The benefits of stronger environmental management with respect to growth, sustainable livelihoods, and poverty reduction need to be constantly promoted and reinforced as Nepal proceeds with the peace process and its ambitious development strategy. The CEA confirms that there are urgent needs and significant opportunities for strengthening environmental management among various institutions. In order to improve the overall performance of the country's environmental management systems, the Government of Nepal is encouraged by

World Bank to consider implementing a comprehensive set of reforms and actions that would focus on:

- a) Updating the policy and regulatory framework for environmental management
 - b) Clarifying national agency roles and responsibilities
 - c) Strengthening institutional capacity for environmental assessments and enforcement
 - d) Empowering local governments to assume greater responsibilities
 - e) Expanding beyond traditional government institutions to enhance performance and accountability
 - f) Improving institutional capacity and access to information
- (WB 2007).

Rule 16, of the Environment Protection Rules (EPR) established in 1997, stipulates the provisional or permanent pollution control certificate. All industries as referred to in Schedule 7 of the Rules (See Table A-34 in the Appendix), shall apply to the concerned body (relevant ministry) to obtain the provisional pollution control certificate (valid for one year). Upon receipt of such applications, the concerned body shall conduct investigation into it, and also seek, as required the opinions and suggestions of the Village Development Committee (VDC) or municipality, where the industry is to be operated, and if it is found thereafter that the operation of the such industry shall cause no substantial adverse impact on the environment, or in case if there is a possibility of reducing or controlling such effect, the concerned body shall issue a provisional pollution control certificate to the applicant within 90 days from the date of receipt of the application. In cases where the standards of sound, heat, nuclear radiation and waste disposal for any industry have been determined by publishing a notice in Nepal Gazette, the concerned body shall require to issue a permanent pollution control certificate (not literally permanent but valid for three years only) to those industries after having their examination from the designated laboratory or institutes within six months from the date of determination of such standards. On failing to issue the provisional or permanent pollution certificate within the stated time limitation, the concerned body may issue such certificate within next three months from the date of lapse of such time limitation. While issuing the provisional or permanent pollution control certificates, the concerned body may, as required, prescribe all or any of the following conditions to be complied by such industries:

- To install within the stated time the equipment required to reduce or control pollution
- To use appropriately the installed equipment of pollution control
- To operate the industries at stated time only.
- To take specific measures to control such activities carries out in the premises of any

industry which generates pollution.

- To take specific measures to control the activities of any industry which generate pollution outside the premises of the industry.
- To make available the equipment necessary for the monitoring activities at the fixed time.
- To work as per other conditions prescribed and deemed necessary by the concerned body in view of the nature of industry.

The provisional pollution control certificate shall be renewed every year and the permanent pollution control certificate shall be renewed every three years. The term laid in the provisional or permanent pollution control certificate obtained shall be put in the places of operation of industry as may be seen by all. The concerned body shall maintain the updated list of the industries who obtained the certificates and the list shall be made available to the Ministry of Science, Technology and Environment (Ministry of Law, Justice and Parliamentary Affairs 2001).

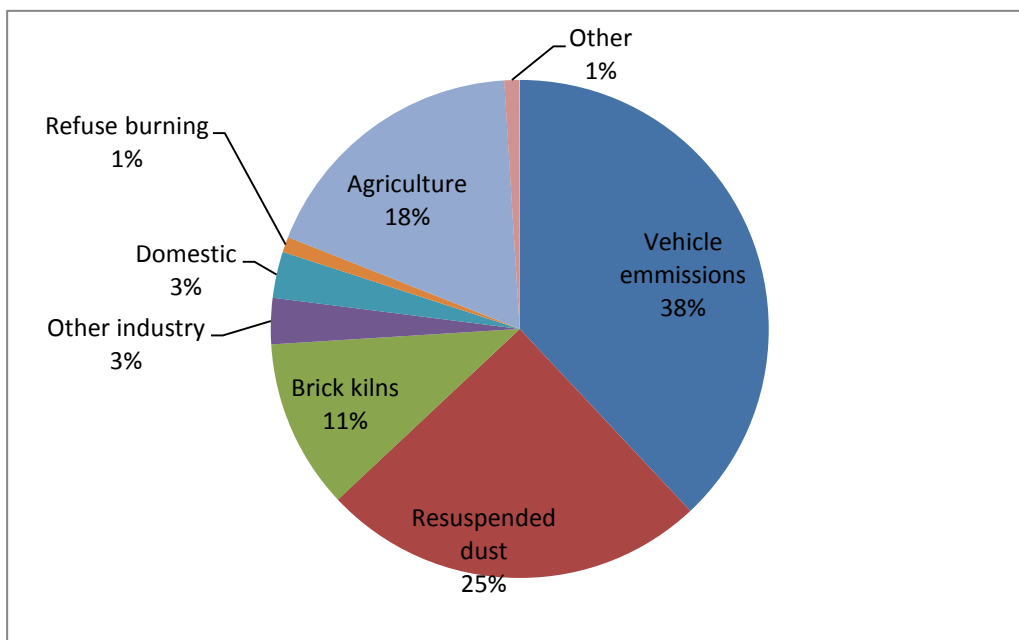
3.3 Air Pollution

3.3.1 Current Situation

Rapid urbanisation, industrialisation, poor road maintenance, poorly maintained vehicles, and a lack of public awareness are all responsible for the deteriorating ambient air quality within the Kathmandu Valley. The main emission sources of air pollutants are smoking vehicles, resuspension of street dust and litter, black smoke plumes from numerous brick kilns, and refuse burning (Shrestha 2001). The steady growth in road traffic has resulted in the increasing contribution of vehicle emissions to urban air pollution, especially in the form of particulate matter (PM), volatile organic compounds (VOC), polycyclic aromatic hydrocarbons (PAH), carbon monoxide (CO), and nitrogen oxides (NO_x). Unregulated motor vehicles, particularly those with diesel and two-stroke engines, are the most significant sources of air pollution in the Kathmandu Valley, along with re-suspended dust from ill-maintained roads, agriculture emission and industrial emissions such as brick kilns and dyeing processes (Figure 3.3.1) (Stockholm Environment Institute 2009).

An inventory of emission sources by the then Ministry of Population and Environment (MoPE) indicated that exhaust fumes had increased more than four times in the eight years between 1993 and 2001. According to a more recent inventory, vehicular emissions are responsible for

38% of the total PM₁₀ (particulate matter with diameter less than 10 micro metres) emitted in the Kathmandu Valley, compared to 18% from the agricultural sector and 11% from brick kilns (ICIMOD 2007).



Source: ICIMOD (2007)

Figure 3.3.1: Sources of PM₁₀ in the Kathmandu Valley

Increase in emissions is mainly due to the increase in the number of automobiles, as well as poor transportation management and vehicle maintenance (Table 3.3.1) (ICIMOD 2007).

Table 3.3.1: Comparison of Emission Inventories in 1993, 2001 and 2005

Source		TSP (tons/yr)			PM ₁₀ (tons/yr)		
		1993	2001	2005	1993	2001	2005
Mobile Sources	Vehicle Exhaust	570	1,971	NA	570	3,259	4,708
	Road Resuspension	1,530	7,008	12,239	400	1,822	3,182
	Subtotal	2,100	8,979	12,239	970	5,081	7,890
	Stationary Sources	Industrial/commercial fuel	585	NA	NA	292	NA

	Domestic fuel combustion	2,328	NA	630	1,166	NA	347
	Brick kilns	5,180	6,676	1,850	1,295	1,688	1,437
	Himal Cement Plant	6,000	3,612	0	800	455	0
	Stone crushers	NA	NA	1,720	NA	NA	372
	Industrial boilers	NA	28	28	NA	15	15
Fugitive Emissions	Refuse burning	385	687	172	190	339	172
	Agricultural sector	NA	NA	NA	NA	NA	2,337
	Cremation	NA	NA	158	NA	NA	79
Total		16,575	19,982*	16,797	4,712	7,580	12,649

Notes: * In original report 19,884; TSP = total suspended particles; NA = not available

Source: ICIMOD (2007)

About 38% of all industries in Nepal are located in the Kathmandu Valley. The records of the Department of Cottage and Small Industries indicate that the Kathmandu Valley has 14,791 industries: 10,527 in Kathmandu; 2,933 in Lalitpur; and 13,331 in Bhaktapur. Among these are 111 brick kilns, 89 stone crushers, and 70 industries with boilers (MoEST 2006). These industries generate stack and fugitive emissions, which directly results in air pollution. According to a recent emission inventory, the industrial sector accounts for about 14% of the PM₁₀ in the Kathmandu Valley—brick kilns 11% and other industries 3% (ICIMOD 2007).

Emissions from the mismanagement of solid waste are one cause of air pollution. Although, in recent years, there has been some improvement in solid waste management in Kathmandu, waste piles left on the streets and the burning of waste are still fairly common occurrences. The situation is especially bad when there is a breakdown in the waste collection system due to strikes or closings of landfill sites (ICIMOD 2007).

Before the establishment of the Ministry of Population and Environment in 1995, no agency was assigned to monitor the quality of air in Nepal. Monitoring at that time was conducted on an ad-hoc or project basis in Kathmandu and in neighbouring municipalities. Today, routine air quality monitoring is only available for the Kathmandu Valley area. Air quality monitoring

outside the Kathmandu Valley is still conducted only on a project-by-project basis (ADB and CAI-Asia Center 2006).

With support from Danish International Development Assistance (DANIDA), MoPE established an air quality monitoring system in the Kathmandu Valley consisting of six monitoring stations. Its objectives include monitoring compliance with air quality standards, assisting in air quality research and management, and raising public awareness. Once completed, all six monitoring stations will monitor a large number of pollutants: PM₁₀, PM_{2.5}, TSP, Carbon monoxide, Nitrogen dioxide, Sulphur dioxide, and Benzene. Currently, however, only PM₁₀ monitoring is fully operational (ADB and CAI-Asia Center 2006).

The six monitoring stations are installed in various locations to appropriately represent the concentration in urban traffic areas (Putali Sadak and Patan Hospital), residential (Thamel), urban background (Bhaktapur and Kirtipur), and valley background (Matsyagaon). All six stations have been monitoring PM₁₀ since November 2002; the Thamel station also monitors PM_{2.5} (ADB and CAI-Asia Center 2006).

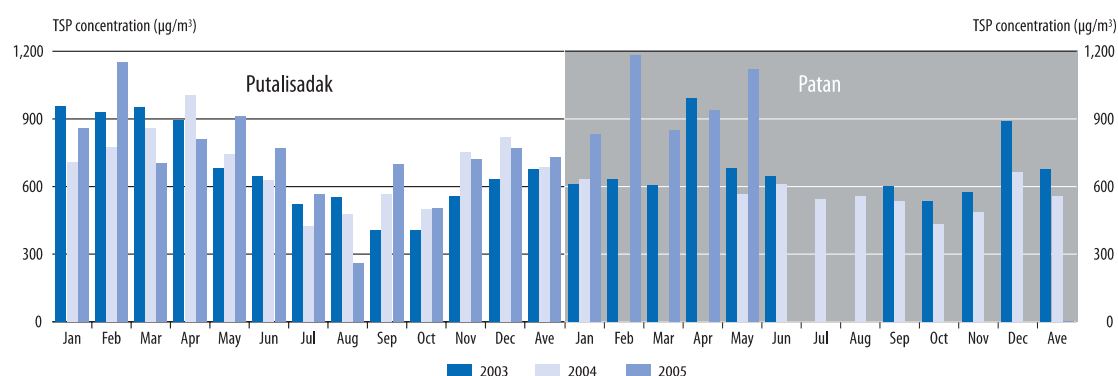
A separate station to collect meteorological information, located at the Nepal Academy of Science and Technology (NAST) and operated by the Department of Hydrology and Meteorology (DHM), is being constructed. All resulting data will be correlated with those collected from the six air quality monitoring stations (MoEST, 2005). The Ministry of Environment, Science and Technology (MoEST), which is presently the Ministry of Science, Technology and Environment (MoSTE), is responsible for the management of the monitoring program, including quality assurance and control (ADB and CAI-Asia Center 2006).

To determine the status of air pollution in urban centres outside the Kathmandu Valley, air quality monitoring (covering TSP, PM₁₀, SO₂, NO₂, CO, and Lead) was also conducted in selected urban areas from November to December 2000. The nine study sites included Nepal's major urban centres outside the Kathmandu Valley: Biratnagar, Janakpur, Birgunj, Narayanghat, Pokhara, Butwal, Bhairahawa, Nepalgunj, and Mahendranagar (IUCN 2004). The monitoring was conducted to obtain eight-hour average concentrations of pollutants for a particular day in each site.

Aside from ambient air quality monitoring, MoEST has also initiated, with support from the International Centre for Integrated Mountain Development (ICIMOD) and the United Nations Environmental Programme (UNEP), the monitoring of transboundary air pollution. A

monitoring station has been set up at the Institute of Agriculture and Animal Sciences (IAAS) in Rampur, Chitwan to monitor air quality and rainwater chemistry (TSP, PM₁₀, SO₂, and NO_x), rainwater analysis for pH, electrical conductivity and concentration of anions (e.g., NO³⁻, SO⁴⁻), and cations (e.g., Ca²⁺, Mg²⁺, K⁺, Na⁺) (ADB and CAI-Asia Center 2006).

The length of time that the air quality monitoring system in Kathmandu has been in operation may not be sufficient to allow a long-term analysis (ten years or more) of the air quality in Kathmandu. The length of its operation is enough, however, to collect sufficient information to evaluate seasonal trends of air pollution in the valley. Since 2003, in the Kathmandu Valley, TSP has been monitored once a week for 24-hour average values in the two roadside stations (Putalisadak and Patan). Figure 3.3.2 shows the high levels of TSP in both stations. A seasonal trend can also be observed: air pollution is highest during the dry season (from December to May) (ADB and CAI-Asia Center 2006).



Source: ADB and CAI-Asia Center (2006)

Figure 3.3.2: Monthly and Annual Average TSP at Putalisadak and Patan Stations

Air quality in nine urban areas outside the Kathmandu Valley also exhibited very high TSP levels, ranging from 658 to 1,529 µg/m³ (Table 3.3.2). These air values clearly indicate that TSP is a major problem in Nepal's urban areas (ADB and CAI-Asia Center 2006)

Table: 3.3.2: TSP Concentrations in Nine Urban Areas Outside Kathmandu Valley

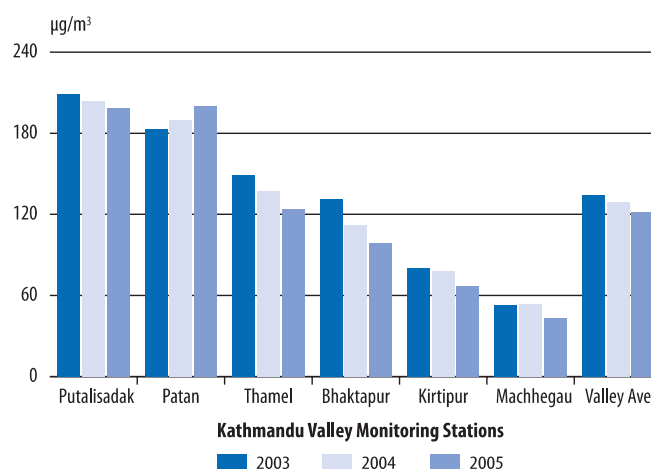
City	TSP Concentration (µg/m ³)
Pokhara	874.4
Birgunj	705.86
Biratnagar	723.06
Janakpur	1,406.1
Narayanghat	658.5

City	TSP Concentration ($\mu\text{g}/\text{m}^3$)
Butwal	1,158.83
Bhairahawa	840.76
Nepalgunj	1,529.21
Mahendra Nagar	736.25

Note: The values are eight-hour average concentrations.

Source: IUCN (2004)

The data for PM_{10} in the Kathmandu Valley from 2003 to 2005 indicates that the average ambient concentration of PM_{10} has slightly increased. Moreover, it continues to exceed the WHO annual guidelines for PM_{10} . Nepal does not have any annual standards for PM_{10} , but even its 24-hour standard of $120 \mu\text{g}/\text{m}^3$ is also exceeded by the annual average concentrations from 2003 to 2005. The PM_{10} concentrations are also highest in the urban traffic areas of Patan and Putalisadak— this is almost double that of the values obtained in the urban background stations in Bhaktapur and Kirtipur, and it is four times higher than the valley background values (Figure 3.3.3).



Source: ADB and CAI-Asia Center (2006)

Figure 3.3.3: PM_{10} Concentrations in the Kathmandu Valley

PM_{10} concentrations in urban areas outside the valley are also very high, exceeding Nepal's daily PM_{10} limit ($120 \mu\text{g}/\text{m}^3$) by as much as 11 times (Table 3.3.3). Compared with the annual guidelines for PM_{10} set by the WHO ($20 \mu\text{g}/\text{m}^3$), the PM_{10} in Nepal's urban areas exceeds the WHO guidelines by as much as 72 times. As with TSP, PM_{10} is thus also a major pollutant of concern in the urban areas of Nepal. (ADB and CAI-Asia Center 2006)

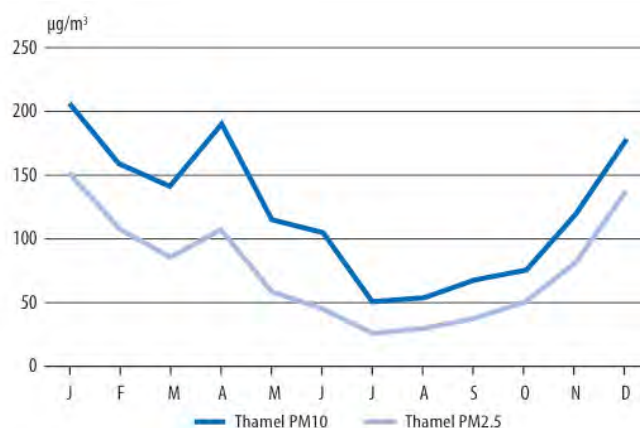
Table 3.3.3: PM₁₀ Concentrations in Nine Urban Areas Outside the Kathmandu Valley

City	PM ₁₀ concentration (µg/m ³)
Pokhara	839.9
Birgunj	664.5
Biratnagar	661.46
Janakpur	1,298.06
Narayanghat	572.93
Butwal	1,066.89
Bhairahawa	776.59
Nepalgunj	1,448.20
Mahendra Nagar	687.5

Note: The values are eight-hour average concentrations.

Source: IUCN (2004)

The Thamel station in the Kathmandu Valley monitors both PM₁₀ and PM_{2.5}. Figure 3.3.4 shows the monthly averages of PM₁₀ and PM_{2.5} paralleled each other at the Thamel residential station; the ratio seems to vary between 0.50 and 0.75. The ratio is clearly higher during the dry season and falls gradually during the wet season, with a minimum of approximately 0.5 during the month of July (ADB and CAI-Asia Center 2006).



Source: ADB and CAI-Asia Center (2006)

Figure 3.3.4: PM₁₀ and PM_{2.5} Concentrations in the Kathmandu Valley

SO₂ was monitored in September 2004 in the Kathmandu Valley using diffusive samplers that were later analyzed by the National Environmental Research Institute in Denmark. SO₂ levels in

Kathmandu and in other urban areas in Nepal are shown in Table 3.3.4. SO₂ levels in the Kathmandu Valley area are much lower than those in their urban counterparts in Nepal. Since Nepal uses annual and 24-hour standards for SO₂, these weekly and eight-hour averages are not directly comparable to Nepal's national standards (ADB and CAI-Asia Center 2006).

Table 3.3.4: SO₂ Concentrations in Kathmandu and in Other Urban Areas in Nepal
(µg/m³)

Location	Sampling Date	SO ₂ concentration	Averaging time
Patan (KV)	Week starting 8 Sep 2004	0.85	—
Patan (KV)	Week starting 14 Sep 2004	4.47	—
Thamel (KV)	Week starting 8 Sep 2004	0.50	—
Thamel (KV)	Week starting 14 Sep 2004	0.13	—
Kirtipur (KV)	Week starting 8 Sep 2004	5.31	—
Kirtipur (KV)	Week starting 14 Sep 2004	0.14	—
Pokhara	26 Nov 2000	98.23	8 hours
Birgunj	30 Nov 2000	85.13	8 hours
Biratnagar	4 Dec 2000	55.08	8 hours
Janakpur	7 Nov 2000	71.7	8 hours
Narayanghat	10 Dec 2000	81.02	8 hours
Butwal	19 Dec 2000	133.1	8 hours
Bhairahawa	22 Dec 2000	106.8	8 hours
Nepalgunj	26 Dec 2000	68.19	8 hours
Mahendra Nagar	29 Dec 2000	59.66	8 hours

Note: KV: Kathmandu Valley

Source: ADB and CAI-Asia Center (2006)

NO₂ was monitored by using passive samplers at the six stations in the Kathmandu Valley. Because of the difference in averaging periods, however, these weekly and eight-hour average readings of NO₂ cannot be directly correlated with Nepal standards for annual and 24-hour NO₂ standards. The results are shown in Table 3.3.5 (ADB and CAI-Asia Center 2006).

Table 3.3.5: NO₂ Concentrations in Kathmandu and in Other Urban Areas in Nepal
($\mu\text{g}/\text{m}^3$)

Location	Sampling Date	NO ₂ concentration	Averaging time
Patan and Putalisadak (Urban Roadside KV)	Nov 2003 to March 2004	27.00	—
Patan and Putalisadak (Urban Roadside KV)	Nov 2004 to March 2005	31.00	—
Thamel (Urban Residential KV)	Nov 2003 to March 2004	27.00	—
Thamel (Urban Residential KV)	Nov 2004 to March 2005	27.00	—
Bhaktapur and TU? (Urban Background KV)	Nov 2003 to March 2004	13.00	—
Bhaktapur and TU? (Urban Background KV)	Nov 2004 to March 2005	13.00	—
Matsyagaon (Valley Background)	Nov 2003 to March 2004	2.00	—
Matsyagaon (Valley Background)	Nov 2004 to March 2005	3.00	—
Valley Overall average	Nov 2003 to March 2004	17.00	—
Valley Overall average	Nov 2004 to March 2005	18.00	—
Pokhara	26 Nov 2000	11.34	8 hours
Birgunj	30 Nov 2000	23.20	8 hours
Biratnagar	4 Dec 2000	19.53	8 hours
Janakpur	7 Nov 2000	20.3	8 hours
Narayanghat	10 Dec 2000	17.61	8 hours
Butwal	19 Dec 2000	23.96	8 hours
Bhairahawa	22 Dec 2000	22.68	8 hours
Nepalgunj	26 Dec 2000	16.41	8 hours
Mahendra Nagar	29 Dec 2000	19.84	8 hours

Note: KV: Kathmandu Valley TU?: sic.

Source: ADB and CAI-Asia Center (2006)

The ambient concentrations of carbon monoxide (CO) and lead (Pb) in urban areas, based on an eight-hour averaging time, are shown in Table 3.3.6. CO values exceed standards at some sites. Since the averaging times are different, Pb concentrations cannot be directly compared with ambient standards (ADB and CAI-Asia Center 2006).

Table 3.3.6: CO and Pb Concentrations in Urban Areas in Nepal ($\mu\text{g}/\text{m}^3$)

Location	CO Concentration	Pb Concentration
Pokhara	1,097.75	0.14
Birgunj	1,494.85	0.32
Biratnagar	620.466	0.22
Janakpur	427.6333	0.81
Narayanghat	1,050.02	0.11
Butwal	515.4633	0.26
Bhairahawa	849.56	0.16
Nepalgunj	801.86	0.35
Mahendra Nagar	85.90	0.13

Source: ADB and CAI-Asia Center (2006)

The air quality data monitored by the six monitoring stations in the Kathmandu Valley used to be reported electronically on the Ministry of Science and Technology's website (ADB and CAI-Asia Center 2006). However, the reporting of air quality information is apparently not working as of December 2012 mainly because of organisational restructuring that occurred in November 2012.

3.3.2 Relevant Laws and Organisations

Although Nepal does not have a separate policy for air quality management like the Clean Air Act, some existing policies do address this issue. As these policies are either general policies of the Government of Nepal (GoN) or specific policies related to the environment, transportation, or industry, they touch upon air quality but do not address it in a comprehensive manner. Some of the key national policies related to air quality management are presented in Table 3.3.7 (ICIMOD 2007).

Table 3.3.7 clearly indicates that several policy documents have touched upon air quality management and some, such as the National Transport Policy, the Tenth Plan, and the Sustainable Development Agenda, include specific policy statements aimed at ensuring all

citizens have access to clean air. However, there seems to be a clear gap between policy statements and policy implementation. For example, all five-year plans, ever since the Sixth Plan, have mentioned that the trolley bus system will be expanded, but so far nothing has been done to expand the system; it has, in fact, decreased in size. Although the Tenth Plan has also mentioned expansion of the trolley bus system, this is mentioned as a low priority activity. Similarly, several policy documents clearly mention the need to promote zero emission electric vehicles, but there are no specific plans or programmes to achieve this. Therefore, there is an urgent need to develop and implement plans and programmes to enact these policies (ICIMOD 2007).

Table 3.3.7: National Policies Related to Air Quality Management

Policy	Description
National Conservation Strategy, 1987	This was the first environment-related policy of the GoN. It mentions the problem of air pollution in urban and industrial areas and highlights the need for an environmental impact assessment of proposed projects.
Industrial Policy, 1992	The policy, which aims to promote industrial activities, also mentions the need to minimise adverse environmental effects during the establishment, extension, and diversification of industries. The policy also calls for the formulation and implementation of guidelines to control pollution and tax benefits for investments in activities related to pollution control.
Nepal Environmental Policy and Action Plan (NEPAP), 1993	NEPAP recognises the need to address urban and industrial pollution and calls for appropriate legal and institutional mechanisms. It also stresses the need for EIAs.
National Transport Policy, 2001	The policy has the following provisions related to air quality: construction, repair, and maintenance of road infrastructure in the context of traffic safety and environmental worthiness; expansion of the use of electric vehicles throughout the country; implementation of safe, reliable, pollution-free, and easily accessible public transportation; limitation of traffic density and vehicle movement to acceptable levels as per land use and carrying capacity; mandatory appropriate axle-load systems for vehicles; mandatory roadworthiness certificates for vehicles; a ban on the import of older vehicles; development of standards for road repair, maintenance, and permits; and tax and customs' rebates for

Policy	Description
	pollution-free vehicles.
Tenth Five-Year Plan 2002–07	<p>Strategies, policies, and programmes related to the environment: the responsibility of checking vehicle emissions will be given to municipalities; formulation and enforcement of environmental standards; collection of pollution fees and establishment of an Environmental Conservation Trust; development and implementation of a Sustainable Development Agenda for Nepal; pollution control and public awareness as priority programmes in the environmental sector.</p> <p>Strategies, policies, and programmes related to transport management: construction of reliable, safe, pollution-free, and service-oriented transport systems; reduction of pollution from vehicles in Kathmandu and other urban centres; enforcement of Nepal Vehicle Emission Standards, 2056; increase public awareness regarding vehicle emissions; and promotion of railway and trolley buses through public-private partnerships.</p>
Sustainable Development Agenda for Nepal, 2003	‘Every citizen [should] ha[ve] access to ... clean air’ is one of the broad goals of Nepal’s Sustainable Development Agenda. Section 5.2.5 of the Agenda mentions both indoor and outdoor air pollution. The 15-year objectives include the following: set strictly enforced ambient air quality standards, exceeding which requires immediate cuts in activities responsible for emission; encourage a shift towards zero-emission vehicles and cleaner fuel in industries; create conditions that foster the growth of domestic institutions for research and monitoring local and transboundary air pollution; and promote cleaner stove technologies and alternative cooking fuels.
Interim Constitution 2007	Recognises a clean environment as a fundamental right.

Source: ICIMOD (2007)

As mentioned above, unlike most other countries, Nepal does not have a separate act dedicated to managing air quality. However, the Environmental Protection Act and Rules (1997) have some provisions related to pollution control, and the act also has provisions for the formulation of separate regulations under the Act to deal with specific issues. Some of the key legislative

measures are mentioned in Table 3.3.8. It shows that the legislation related to air quality is spread over several acts and rules. Considering the growing problem of air pollution, the complex nature of the problem, and the urgent need for effective action in regions such as the Kathmandu Valley, it is essential to amend some of the existing legislation and create a comprehensive Clean Air Act.

Table 3.3.8: Legislation Related to Air Quality Management

Legislation	Provisions
Industrial Enterprises Act, 1992	In Section 15, manufacturing industries dealing with energy efficiency, conservation, and pollution abatement have been declared 'nationally prioritised' industries and can receive tax rebates of up to 50% of the taxable income
Vehicle and Transport Management Act, 1993	<p>Section 17 makes road worthiness certificates mandatory, for which vehicles have to comply with the standards prescribed in Section 23, which deal with the following parameters: the mechanical condition of the vehicle; vehicle emission; vehicle length, width, height, construction, and appearance; and vehicle age.</p> <p>Under Section 23, the government has set standards for emission from in-use vehicles.</p> <p>Sections 24 and 40 mention the right to refuse registration of a vehicle not complying with standards and certificate provisions.</p> <p>Section 39 requires prior permission to change specification or fuel types.</p> <p>Sections 74, 75, 78, and 93 deal with transport management and the public transport system</p>
Environment Protection Rules, 1997	<p>Rule 15 prohibits emission of noise, heat, radioactive material, and waste from any mechanical means, industrial establishment, or any other place in contravention of the standards prescribed by the ministry (then the Ministry of Population and Environment).</p> <p>Rule 16 make it mandatory for 55 different types of industry listed in Annex 7 of the regulations to obtain Pollution Control Certificates. This has not yet been carried out because of some confusion about how it is to be done.</p>
Environment Protection Act, 1996	Section 7 deals with 'Prevention and Control of Pollution' and restricts people from causing pollution that will have adverse effects on environment and public health.

Legislation	Provisions
	<p>Section 8 has a provision for the appointment of environmental inspectors to carry out inspections and examinations to stop activities that cause pollution. However, inspectors have not yet been appointed.</p> <p>Section 15 has a provision to provide additional concessions and facilities to encourage any industry, enterprise, technology, or process that positively impacts environmental protection.</p> <p>Section 21 allows the ministry to devolve any of its responsibilities to other government agencies.</p> <p>Section 23 empowers the GoN to frame and implement necessary guidelines under the act for environmental protection.</p> <p>Section 24 empowers the GoN to frame necessary rules related to pollution control and standards.</p>
Fiscal Act, 2003/04	<p>The Act gives incentives to electrical vehicles.</p> <p>Nepal Vehicle Mass Emission Standard (1999) was made compulsory for all imported vehicles.</p> <p>The Act bans on import of second hand and reconditioned vehicles and two-stroke engine vehicles</p> <p>The Act stipulates that pollution tax on diesel and petrol to be sold in the Kathmandu Valley</p>

Source: ICIMOD (2007)

In June 2003, the Ministry of Population and Environment (MoPE) set the national standards for seven major air pollutants. Unlike other Asian countries with cities that implement standards more stringent than those at the national level, Nepal has only one set of ambient air quality standards. These standards are generally more lenient compared with the updated 2005 WHO guidelines; however, the NO₂, CO, and Pb standards are comparable to the 2000 WHO guidelines (Table 3.3.9). There are no annual standards for particulate matter (TSP and PM₁₀), which is Nepal's main pollutant of concern. Nepal's ambient air quality standards have never been updated since their release, and there is no clear indication of any plans to update them in the near future (ADB and CAI-Asia Center 2006). Allegedly, the Ministry of Environment, Science and Technology (MoEST) published the new air quality standards in the *Nepal Gazette* on 15 October 2012, and the values may have been changed. At present, Nepal does not have any specific standards for industrial (point-source) gas emissions.

Table 3.3.9: Nepal's Ambient Air Quality Standards vs. WHO Guidelines ($\mu\text{g}/\text{m}^3$)

Parameter	Averaging time	Nepal's Ambient Air Quality Standards	WHO Guidelines
TSP	1 year	—	—
	24 hours	230	—
PM ₁₀	1 year	—	20
	24 hours	120	50
SO ₂	1 year	50	—
	24 hours	70	20
NO ₂	1 year	40	40
	24 hours	80	—
CO	8 hours	10,000	10,000
	15 minutes	100,000	—
Pb	1 year	0.5	0.5

Notes: TSP: total suspended particulates; PM₁₀: particulate matter with diameter less than 10 micro metres.

Source: ADB and CAI-Asia Center (2006)

It is noted that IFC's EHS guidelines refer to the WHO guidelines as EHS standards for air pollution control.

Also, plans have been prepared to tackle Kathmandu's air pollution problem. The World Bank-funded URBAIR programme prepared the first action plan for managing Kathmandu's air pollution. In 2005, the Office in Nepal of International Union for Conservation of Nature (IUCN Nepal) prepared comprehensive policy guidelines for air quality management and an Asian Development Bank (ADB) Regional Technical Assistance Programme prepared a strategy and action plan for air quality management. Recently, MoEST, through its own efforts, has prepared a draft action plan for air quality management in the Kathmandu Valley. The plan aims to meet the National Ambient Air Quality Standards within five years. The latest MoEST (presently MoSTE) plan is comprehensive, covering all the main issues such as vehicular emissions, industrial pollution, refuse burning, and land-use planning, and its target of meeting the national ambient air quality standards in five years is also reasonable. However, as the plan has a long list of activities covering various sectors, the activities need to be prioritised, and a serious effort must be made to implement them. Some of the activities mentioned in the plan are quite simple and can be carried out quickly with limited resources, while others require major

decisions. The challenge now is to implement the plan in order to improve the air quality in the valley (ICIMOD 2007).

Table 3.3.10: Key Organisations Related to Air Quality Management

Organisation	Responsibility
Governmental agencies	
Ministry of Science, Technology and Environment (MoSTE)	Responsible for formulating air quality related policies and programmes; recently implemented a project on air quality management in Kathmandu, one of the components of the DANIDA-supported Environment Sector Programme Support (ESPS); currently monitoring air quality in the Kathmandu Valley through six monitoring stations that are being managed by the Environment and Public Health Organisation (ENPHO)
Ministry of Labour and Transport Management (MoLTM)	Responsible for formulating policies on transport management
Department of Transport Management (DoTM)	Responsible for transport management, including issuing of route permits to public transport vehicles and testing emissions from vehicles
Ministry of Information and Communications (MoICS)	Responsible for formulating policies related to industrial development
Traffic Police	Responsible for traffic management and on-the-spot emission testing
Department of Cottage and Small Industries	Responsible for promoting and monitoring cottage and small industries, including brick kilns
Department of Industries	Responsible for promotion and monitoring of industries
Municipalities	Responsible for urban environmental management
Nepal Oil Corporation	Responsible for supplying petroleum products and ensuring quality control
Private organisations	
Various Transport Associations	Responsible for operating public transportation and representing the interests of various public transport operators
Electric Vehicle Association of Nepal (EVAN)	An umbrella organisation for electric vehicle manufacturers, owners/operators, and charging station managers

Nepal Automobile Dealers Association (NADA)	Represents the interests of vehicle importers
Industrialists	Owners of various industries including limited vehicle manufacturing
Federation of Nepalese Chambers of Commerce and Industry (FNCCI)	Umbrella organisation of the private sector
Nepal Environmental and Scientific Services (NESS)	Conducts air quality monitoring and environmental studies
Non-governmental organisations	
Clean Air Network Nepal (CANN)	A network of professionals involved in air quality management. CANN is also the local network for Clean Air Initiatives for Asian Cities (CAI-Asia).
Environment and Public Health Organisation (ENPHO)	NGO involved in conducting monitoring, research and education campaigns on air quality, solid waste management, pollution control and other aspects of environmental management.
Clean Energy Nepal (CEN)	Involved in research-based education and advocacy campaigns
Nepal Forum of Environmental Journalists (NEFEJ)	Forum for Environmental Journalists
International organisations	
DANIDA (Danish aid)	Implemented ESPS from 2000 to 2005 which included components on air quality improvement, industrial pollution prevention, and control and institutional strengthening.
ICIMOD	Implementing transboundary air pollution projects on Male Declaration and Project Atmospheric Brown Cloud
SDC (Swiss aid)	Implementing a project to promote clean brick kiln technology
UNEP	Support to implement projects on Male Declaration and Project Atmospheric Brown Cloud
Asian Development Bank (ADB)	Implementing a project on Urban and Environmental Improvement in eight towns. Clean Air Initiative for Asian Cities (CAI-Asia), a joint ADB and World Bank programme provides some support for air quality management

Kathmandu Electric Vehicle Association (KEVA)	Promoting electric vehicles
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Source: ICIMOD (2007)

3.3.3 Approaches and Efforts

Over the years, various stakeholders have introduced positive steps to control air pollution in the valley (Table 3.3.13). The government response includes banning the use of polluting vehicles such as diesel three-wheelers and Moving Chimney Bulls' Trench Kilns. The government has also established vehicular emission standards and ambient air quality standards. Private sector initiatives have primarily been limited to the operation of public transportation, including electric vehicles. The Himal Cement Factory, which had been spewing hazardous soot and dust in the air for 25 years, was closed down largely due to public pressure from the surrounding community, environmental groups, and media. This is one example of civil society's involvement in cleaning the air (ICIMOD 2007)

Table 3.3.11: Steps Taken to Improve Kathmandu's Air Quality

Year	Action	Year	Action
Government		Private sector	
1991	Ban on import of new three-wheelers	Since 1996	Electric vehicle entrepreneurs have invested more than NPR 450 million in building and operating more than 600 electric three wheelers.
1995	Introduction of in-use vehicle emission standards and emission testing of vehicles	2006	Hulas Motors has developed a prototype for an electric four-wheeler van.
1996	Financial incentives for electric vehicles	Municipalities	
1997	Environment Protection Act and Regulations		Public awareness and infrastructural development
1999	Import of unleaded fuel	NGOs	
1999	Removal of over 600 diesel three-wheelers from Kathmandu		Air quality monitoring and research
1999	Ban on the import of new two-stroke three wheelers		Public awareness and advocacy campaigns

Year	Action	Year	Action
2000	Introduction of EURO I equivalent norms for new vehicles		Development of an electro-bus
2002	Establishment of six permanent monitoring stations in Kathmandu	International organisations	
2003	Introduction of National Ambient Air Quality Standards	2000–05	DANIDA-assisted ESPS project set up air quality monitoring stations, promoted electric vehicles, and promoted cleaner vehicles in industries.
2004	Two-stroke three wheelers removed from Kathmandu	2002–06	Winrock International, together with other partners of KEVA, promoted electric vehicles through technical support and advocacy.
2004	Moving Chimney Bull's Trench Brick Kilns banned from Kathmandu	Since 2003	SDC is promoting Vertical Shaft Brick Kilns.

Source: ICIMOD (2007)

Despite the positive steps taken so far, the high level of pollution in the valley clearly indicates the need for more action. One of the problems has been that the actions have not been carried out in a well-planned and coordinated manner. The overall system for managing air quality is still weak. The government, together with all key stakeholders, should therefore develop a time-bound integrated action plan and take bold action to implement the plan. As the government has already banned the highly-polluting Moving Chimney Bull's Trench Kiln technology that was predominantly used in the valley's brick industry, the focus of future air quality improvement programmes should be on controlling vehicle emissions (ICIMOD 2007).

Clean Air Network Nepal (CANN) was formed in 2004 and is sponsored by Clean Energy Nepal (CEN). It aims to generate collaboration and networking among all relevant stakeholders to tackle the air pollution problem in the country. CANN is an informal network of individuals, experts, national and international non-governmental organizations, governmental organizations, and private sector companies engaged in clean air activities. CANN is the country network of CAI-Asia in Nepal.

Some of CANN's 2011 highlights:

- Participation in the fourth phase of the Fredskorpset Exchange Program. Nepal has received one participant from Indonesia and sent one to Sri Lanka. Mr Zaim Fachmi Andrianto represents KPBB (Indonesia) and is based in the CANN secretariat office of Clean Energy Nepal in Kathmandu, while Ms Kritya Shrestha is currently based in the University of Moratuwa, Colombo for her assignment.
- Conducted a teacher's training session in celebration of World Environment Day. The Air Pollution Teaching toolkit a publication of CEN and CANN was used for the training.
- Supported the third edition of the Eco Football Match, with the theme of 'Goals against Climate Change.' This was organized successfully on 5 June 2011 in the Chyasal Football Ground in Lalitpur to mark World Environment Day.
- Collection of transport and energy data in Nepal, with support from CAI-Asia in connection with a project funded by the World Bank Knowledge Partnership, for a project measuring air pollution and GHG emissions in Asia.
- Conducted training for 'walkability ambassadors' in Pokhara in order to improve the pedestrian infrastructures and services in Nepal. A walkability survey was conducted in Pokhara to promote walking as a sustainable mode of transport.
- Initiated the campaign for non-motorized transport rights. Pedestrians Count and the results of the perception survey results were circulated to media.
- Radio Interview at Ujyaalo 90 Network emphasizing the need for an improved pedestrian infrastructure and services to achieve sustainable urban mobility.
- Conducted a public transport user's survey in Kathmandu to document public transport conditions and identify people's needs and expectations with respect to public transport.
- Organized the 'Kathmandu Sustainable Urban Transport Forum' to inform and sensitize stakeholders on sustainable urban transportation, share approaches and initiatives, forge collaboration, and enhance coordination among governmental, non-governmental and private sectors working on urban transportation.
- Launched walkeasyktm.wordpress.com as an online resource site for sustainable urban transport news, research, and solutions from around Nepal, especially the Kathmandu valley.
- Published an air pollution teaching toolkit, *Bus Rapid Transit: A Way to the Sustainable Urban Transport in Nepal* and the *Clean Air Management Profile (CAMP)*.
- CANN's priority activities in 2012 include the monitoring of air quality in Pokhara and Kathmandu, working closely with relevant government organizations in the promotion of public transport system, creating awareness campaigns with respect to electric vehicle usage in Nepal, and continuing to lobby for road safety for pedestrians and cyclists, as well

as developing an action plan for Vehicle Free Day (CANN 2011).

3.4 Water Pollution

3.4.1 Current Situation

Table 3.4.1 shows the availability of surface water in Nepal and its annual withdrawal trend from 1994 to 1998. As the table indicates, agricultural water use was overwhelmingly greater than domestic or industrial use.

Table 3.4.1: Availability of Surface Water and Annual Withdrawal Trend for 5 years

	1994	1995	1996	1997	1998
Total annual renewable surface water (km ³ /year)	224	224	224	224	224
Per capita renewable surface water (m ³ /year)	11,200	11,000	10,600	10,500	10,300
Total annual withdrawal (km ³ /year)	12.95	13.97	15.10	16.00	16.70
Per capita annual withdrawal (m ³ /year)	650	690	710	750	760
Sectoral withdrawal as % of total water withdrawal					
Domestic	3.97	3.83	3.68	3.50	3.43
Industry	0.34	0.31	0.30	0.28	0.27
Agriculture	95.68	95.86	96.02	96.22	96.30

Source: WaterAid Nepal (2011) [modified]

Groundwater is abundant in the aquifers of the Terai and Kathmandu regions; however, groundwater availability is more limited in the populated hill regions because of the lower permeability of the indurated and crystalline rock types. Despite abundant rainfall, agricultural development is restricted by the limited development of irrigation (WaterAid Nepal 2011).

At present, it is estimated that about 76 million cubic meters (MCM) of groundwater resources are being used for irrigation purposes and 297 MCM for domestic uses. Hence, there is a huge potential for groundwater use in the form of shallow tube wells (STWs) and deep tube wells (DTWs) in the Terai areas (WaterAid Nepal 2011).

Still the drinking water available is not always safe. One of the reasons for this is that the

surface and ground water in the Kathmandu Valley are deteriorating by natural and anthropogenic contaminations. The surface water is polluted by the runoff of untreated sewage. Undoubtedly, the domestic sewage system is one of the top sources of water pollution. It seeps into rivers and lakes, which are the primary sources of drinking water. The capital city of Kathmandu is estimated to produce daily and almost half of this is dumped into rivers; eighty per cent of this wastewater is generated by households. In addition, due to the increasing population, surface water alone cannot provide an adequate supply of water for everyone (Water Project 2012).

A large part of the Nepali population uses surface water for its potable supply, which is distributed to consumers through gravity flow technology without any treatment. This supply is most vulnerable to pollution caused by untreated sewage, industrial waste, agricultural run-off, vegetation, etc. (WaterAid Nepal 2011).

Tables 3.4.2 and 3.4.3 describe rural water quality testing that was conducted by various agencies through 128 samples. They indicate the following:

- The chemical quality of the water was found within WHO guideline values.
- Faecal coliform contamination was found to be widespread in the majority of gravity fed surface water schemes.
- Faecal coliform contamination did not seem to improve even where changes to the intake system were made.
- In Terai, the contamination problem (due, in particular, to calcium and magnesium carbonate) seemed to be serious due to the elevated water temperature.
- Scaling potential in gravity flow supply existed because of calcium and magnesium carbonate; it is not serious in every region. In a study of 80 schemes, only 10 schemes (i.e. 13 % of the total 80 samples) showed high scaling potential; 18% of the samples showed moderate scaling potential, whereas 69% of the total samples had no scaling problem (WaterAid Nepal 2011).

**Table 3.4.2: Percentage of Coliform Grade
in Gravity Flow Surface Water Supply Schemes**

Faecel coliform count (per 100 mL)	Faecal coliform grade	Health risk	% of sample
0	A	No risk	12
1-10	B	Low Risk	23
11-100	C	High Risk	26
101-1000	D	Very High Risk	38

Note: Sample size is 128.

Source: WaterAid Nepal (2011)

**Table 3.4.3: Percentage of Scaling Potential Grade
in Gravity Flow Surface Water Schemes**

Scaling potential grade	Risk	No. of samples	% of samples
A	No Risk (free)	55	69
B	Moderate Risk	15	18
C	High Risk	10	13

Note: Sample size is 80.

Source: WaterAid Nepal (2011)

Most people in the Kathmandu Valley have to depend on groundwater to augment the piped water supplied by the state-run Nepal Water Supply Corporation (NWSC), which meets less than 50 percent of the demand. Unable to find a short-term solution to the water shortage, NWSC has, according to local water resources specialists, given permission to domestic and commercial users to extract unlimited amounts of groundwater. Not only is the groundwater being depleted, but it is also being contaminated due to seepage from septic tanks (IRC 2007).

In some of the rural regions of Nepal, communities still get their drinking water from tube wells. Recently, one of the major concerns in these regions, especially in the region of Terai, The Terai region contains sedimentary layers of sand and gravel deposits interlocked with flood plains carried by rivers, and so it is extremely vulnerable to arsenic contamination (Water Project 2012).

According to a study by the Environment and Public Health Organisation (ENPHO), groundwater is contaminated with nitrate, ammonia, iron and manganese. An expert from

ENPHO said that public awareness with respect to the threat of groundwater contamination was poor, and little was being done to address it. What makes matters worse is the fact that most people cannot afford to treat their water, even if they are aware of the contamination. The Kathmandu-based NGO, Forum for Urban Water & Sanitation, has been trying to address the problem for the past three years by raising awareness about efficient water use (IRC 2007).

In 1999, the presence of arsenic in groundwater in the Terai region was brought to light for the first time during a WHO survey. Figure 3.4.1 indicates the number of samples that contained various concentrations of arsenic in groundwater samples in 25 Nepal districts. In general, the majority of samples show an arsenic concentration below 10 µg/L. A few samples also reported an arsenic concentration in the range of 10–50 µg/L. The southwestern and southeastern regions, located along the Indian border, proved to be severely affected by arsenic, with concentrations larger than 50 µg/L. Thus, this data shows that there is an alarming situation occurring in certain regions, and these regions need the analysis, mitigation, and removal of low-level arsenic concentrations from the groundwater (Thakur et al. 2011).

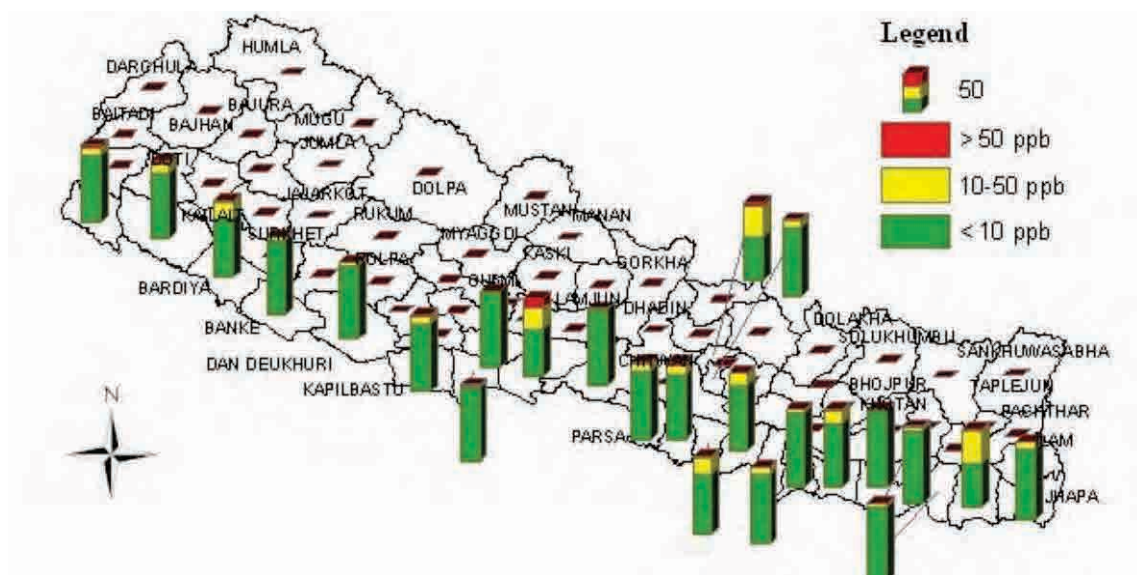


Figure 3.4.1: Map of Groundwater Arsenic Concentration in Nepal

Source: Thakur et al. (2011)

In shallow groundwater, concentrations of nitrate and other pollutants from domestic and agricultural sources may be high and nitrate concentrations frequently fail WHO guidelines frequently. Groundwater in many of the urban areas, especially Kathmandu, has been contaminated by seepage from septic tanks and soakaways. Ammonium concentrations may also be high in these affected areas from domestic pollution and the use of ammonium-based

fertilisers. In the deep aquifers of the Kathmandu Valley, high observed concentrations of ammonium (<3– 35 mg/L as N, mostly <4 mg/L) are of natural, rather than pollutant, origin. The deep aquifers are protected from surface pollutants by the thick overlying layers of largely impermeable sediment (e.g. clay and silt). The high ammonium concentrations are indicative of anaerobic aquifer conditions and are associated with high iron, manganese, and occasionally methane. Under the anaerobic conditions, concentrations of nitrate and nitrite are low (<1 mg/L as NO₃ and <0.01 mg/L as NO₂, respectively). High ammonium concentrations and low nitrate and nitrite concentrations are also likely to be found in the deep anaerobic aquifers of the Terai region. However, no data is available to indicate the concentration ranges. The WHO guideline for ammonium is set on aesthetic grounds (taste and smell) rather than on health grounds, and so the presence of ammonium in drinking water is not believed to be detrimental to health (WaterAid Nepal 2011).

Little data exists for these elements in Nepali groundwater. Concentrations of iron and manganese are likely to be fairly low in the shallow groundwater where the aquifers are aerated. However, they are likely higher in the deep anaerobic aquifers of the Terai region and the Kathmandu Valley. Iron concentrations in the range of <0.5–9 mg/L and manganese in the range of <0.1–0.7 mg/L have been found in the groundwater of the deep aquifers of the Kathmandu Valley. The higher concentration of these elements renders the groundwater unusable without prior treatment. The presence of iron and manganese in the shallow groundwater of Terai will depend on the degree of aeration of these aquifers. If aerobic, concentrations are expected to be low (WaterAid Nepal 2011).

As only 27% of the population has access to basic sanitation, and those without access rely on local surface water sources like rivers for bathing and washing clothes. At the same time, the establishment of water treatment facilities throughout the urban and rural regions are limited. As a result, Nepal faces a high number of water-borne diseases. Starting with the dry season in March to the end of the rainy season in September, one is extremely vulnerable to waterborne illnesses. Coupled with the unhygienic environmental situation, the risk of food and water contamination increases (Water Project 2012).

3.4.2 Relevant Laws and Organisations

So far there have been sub-sectoral policies related to development and water-use, but there has not been any comprehensive water resource policy to guide or incorporate the sub-sectoral development requirements. The main features of these sub-sectoral requirements are

summarized in the following sections (UNESCAP 2010).

The Water Resources Strategy (WRS) was formulated in 2003. Policy principles that have guided Nepal's water sector during WRS maintain:

- Development and management of water resources shall be undertaken in a holistic, systematic manner, relying on integrated water resources management.
- Water utilization shall be sustainable to ensure conservation of the resource and protection of the environment. Each river basin system shall be managed holistically.
- Delivery of water services shall be decentralized in a manner that involves autonomous and accountable agencies (e.g. public, private, community, and user-based agencies).
- Economic efficiency and social equity shall guide water resource development and management.
- Participation of and consultation with all the stakeholders shall constitute the basis of water sector development.
- Sharing of water resource benefits among the co-riparian countries shall be on an equitable basis for mutual benefit.
- Institutional and legal frameworks for coordination and transparency shall be an essential feature of water sector management (UNESCAP 2010).

Ten strategic outputs were identified by the WRS, and performance indicators were identified for 5-, 15- and 25-year timeframes. Each output is categorized with reference to a particular aspect of water resource development:

- Security (Outputs 1 and 2): security from water-induced impacts and security of water supply
- Uses (Outputs 3 to 6): types of water use (e.g. domestic water supply and sanitation; irrigation; hydropower; and other economic uses of water for areas such as industry, tourism, fisheries and navigation)
- Mechanisms (Outputs 7 to 10): mechanisms (i.e. regional cooperation, development of water-related information systems and appropriate regulatory frameworks, provision of appropriate institutional support) that enable the benefits of sustainable water use to be realised, enhanced, or maximized (UNESCAP 2010).

The National Water Plan (NWP) was prepared in 2005 based on the Water Resources Strategy. The major doctrines of the Water Plan are integration, co-ordination, decentralization, popular participation, and implementation of water-related programs within a framework of good governance, equitable distribution and sustainable development. The National Water Plan then

presents the action plan and the required investments to meet the sub-sectoral goals and targets of the National Water Resources Strategy (UNESCAP 2010).

The broad objective and principle policy of the drinking water and sanitation sector is to provide and ensure safe, convenient, and adequate water supply to all Nepali people. Sanitation is its most integral component, with specific focus placed on disadvantaged groups to reduce the incidence of water related diseases and lessen the suffering of women and children who are traditionally responsible for collecting water, domestic sanitation and hygiene. The major policy guidelines to this effect can be summarized as presented as follows:

- 1) The long-term perspective objectives will be to provide high-class service to 25% of the population, while 60% and 15% of the population will receive medium and basic level services based on the standard being maintained on composite index composed of quantity, quality, supply time, reliability, etc.
- 2) Promotion of community education and awareness programmes for enhancing the capabilities of communities and empowering them to effectively obtain benefits from water supply and sanitation (WSS) programmes.
- 3) Integration of drinking water supply as a component of other water resource development projects wherever feasible.
- 4) Redefine the roles and responsibilities of the central, district and local organizations so as to decrease direct involvement of GoN and instead enhance its role as a facilitator in implementation of water supply and sanitation, thus strengthening local institutions such as DDC, VDC, and Community Based Organisations (CBOs) for decentralised WSS service delivery.
- 5) Establishment of autonomous and self-sustaining competent utilities to deliver urban water supply services and improvement of the institutional framework for utilities in general.
- 6) Encourage women's participation in all aspects of water supply planning, management and operation.
- 7) Improvement and establishment of effective water rights administration for facilitating the allocation of such water rights.
- 8) Establishment of a water quality regulatory body for quality surveillance and water tariff fixation.
- 9) While the rural water supply projects would be implemented through community participation, private sector involvement in the development and operation of water supply will be encouraged in the municipalities.

- 10) The drinking water projects will be implemented through a policy of cost recovery/sharing. Mainly, the rural water projects will be implemented with a part of operation and management cost being contributed by the beneficiaries, while in the urban areas; additionally the investment cost also would be recovered.
- 11) Further, a Municipality Drinking Water Supply Act will be enacted to involve the private sector in the development and management of the water supply in urban areas (UNESCAP 2010).

Given the geo-climatic conditions of the country, immediate and long term policy measures need to be formulated, and mitigation measures need to be undertaken to lessen the impacts, respond to emergency measures, and organize relief measures in the event of water-related disasters. The long-term perspective objective is to institutionalize the management of water-induced disasters through coordinated efforts leading to effective control and prevention. The strategic policies are as follows:

- 1) Enhance institutional capabilities for managing water-induced disasters for the first five years of the National Water Plan (i.e. during the Tenth Plan).
- 2) During this period the program envisages to prepare water-induced disaster management policies, plans, and legal frameworks.
- 3) Initiate measures in the Nepal-India Border inundation committee/sub-committee.
- 4) The perspective, as envisaged by the National Water Strategy, is to enhance institutional capacity such that the water-induced disaster management system becomes fully operational, effective, and responsive to people's needs. This system should also be able to address to the needs of marginalized people who are generally more vulnerable to such calamities and disasters (UNESCAP 2010).

The major legal frameworks related to water resource development that are based on the above policies are as follows:

- Water Resources Act (1992)
- Water Resources Regulations (1993)
- Irrigation Rules (2000)
- Drinking Water Rules (1998)
- Nepal Electricity Authority Act (1984)
- Water Resources Act (1992)
- Water Resources Rules (1993)
- National Calamity (Relief) Act (1982)
- Nepal Water Supply Corporation Act (1989)

- Local Self Governance Act (1999)
- Local Self Governance Rules (1999) (UNESCAP 2010).

Legislation in Nepal regarding drinking water, sanitation, irrigation, and hydropower all make provisions for the prevention and control of water pollution. Many of the provisions relating to water pollution are summarised in Table 3.4.6 (WaterAid Nepal).

Table 3.4.4: Major Provisions Regarding Water Pollution in Nepal

Legislation/Act	Description
Pollution of Water Resources	
Water Resource Act 1992	No one shall pollute water resources by placing litter, industrial waste, poisons, chemicals or other toxicants to the effect that it exceeds the pollution tolerance limit. The 'pollution tolerance limit' for water resources shall be prescribed by the GoN, by way of a public notice published in the <i>Nepal Gazette</i> .
	It further provides that, in utilizing water resources, the user must ensure that there is no substantial adverse effect on the environment such as soil erosion, flood, landslide, etc.
	Any person or corporation who pollutes water resources will incur a fine of up to NPR 5,000, and must pay compensation to any person sustaining a loss as a result of the pollution.
Water Resource Rules 1993	The prescribed officer (prescribed in the <i>Nepal Gazette</i>) may examine a water resource in order to determine whether the water resource has been polluted and whether the pollution tolerance limit has been exceeded.
	Requires an EIA to be submitted with the application for a licence to use and survey of water resources.
Local Self Governance Act 1999	Establishes environmental protection and water resource conservation (including the preservation of water sources) as an important duty of local bodies.
	In particular, it allows local bodies to impose a fine of up to NPR 15,000 for the dumping of solid waste in a water body (other than in a designated place) plus expenses incurred in removing the waste.
Pollution of Drinking Water	
Nepal Water Supply	Prohibits the pollution of drinking water and provides a penalty of up

Legislation/Act	Description
Corporation Act 1989	to NPR 10,000 for its violation. Creates a responsibility in the Nepal Water Supply Corporation to control the pollution of drinking water.
Drinking Water Rules 1998	Prohibits a drinking water supplier from doing any work or constructing any structure that will pollute the source of the water resource or have a substantial adverse impact on the environment. Imposes a duty on the water supplier to maintain a determined standard of water quality.
Pollution of Water by Solid Waste	
Solid Waste (Management and Resource Mobilization) Act 1987	Contains provisions that control the adverse impact on the environment caused by solid waste pollution. The act establishes the SWMRMC as the body responsible for the collection, transportation and disposal of municipal solid waste in a safe and environmentally friendly manner.
	In case of air, soil, or water pollution resulting from solid waste effects, or if that pollution is likely to adversely affect human beings, birds, animals, plants and other living creatures, the Centre may make necessary arrangements for the eradication of such pollution.
	Prohibits the following activities: throwing, leaving, or dumping gas or liquid of any kind in anything other than pots, containers or places prescribed for the solid waste; allowing the spill-over from septic tanks to escape; and throwing, leaving or carelessly releasing waste from an industrial establishment in any street or public place.
Local Self Governance Act 1999 and Rules 1999	Gives the local municipality full responsibility for the management and handling of the solid waste in the municipality.

Source: WaterAid Nepal (2011)

The GoN issued this notice of implementation for National Drinking Water Quality Standards in 2005. Table 3.4.5 summarises the Nepal National Drinking Water Quality Standards as compared to the WHO's guideline values.

Table 3.4.5: Nepal National Drinking Water Quality Standards vs. WHO Guideline Values

SN	Category	Parameters	Units	Nepal	WHO
1	Physical	Turbidity	NTU	5 (10)	10
2		pH		6.5–8.5*	6.5–8.5(A)
3		Color	TCU	5 (15)	<15
4		Taste and Odour		Non-objectionable	NA
5		Total Dissolved Solids (TDS)	Mg/L	1000	600
6		Electrical conductivity (EC)	µs/cm	1000	NA
7	Chemical	Iron	mg/L	0.3 (3)	0.3
8		Manganese	mg/L	0.2	0.4
9		Arsenic	mg/L	0.05	0.01
10		Cadmium	mg/L	0.003	0.003
11		Chromium	mg/L	0.05	0.05
12		Cyanide	mg/L	0.07	0.0006
13		Fluoride	mg/L	0.5–1.5*	1.5
14		Lead	mg/L	0.01	0.01
15		Ammonia	mg/L	1.5	0.06
16		Chloride	mg/L	250	NA
17		Sulphate	mg/L	250	500
18		Nitrate	mg/L	50	50
19		Copper	mg/L	1	2
20		Total Hardness	mg/L as CaCO ₃	500	300
21		Calcium	mg/L	200	100–300
22		Zinc	mg/L	3	4
23		Mercury	mg/L	0.001	0.006
24		Aluminium	mg/L	0.2	0.2
25		Residual Chlorine**	mg/L	0.1–0.2*	NA
26	Microbiology	E. Coli	MPN/10 0mL	0	NA
27		Total Coliform	MPN/10 0mL	0 in 95% samples	NA

* These values show lower and upper limits. Values in parenthesis refer to the acceptable values only when an alternative is not available.

** In systems using chlorination.

Note: NA = Not available

Sources: Ministry of Physical Planning and Works (2005); WHO (2011)

In the *Nepal Gazette*, several standards are stipulated for each industry (e.g., the tanning, wool-processing, and fermentation industries) for wastewater from industrial facilities running into inland surface water. (See Tables A-5 through A-14 in the Appendix). Wastewater from the specified types of industries should satisfy the corresponding standards. If the type of industry does not fall under any of the particular types of industries stipulated, then the standards for generic industry are applied. (See Table A-5 in the Appendix).

Limits for processed wastewater, domestic sewage, and contaminated storm water discharged to surface waters in Nepal are generally consistent with the standards set by the IFC, although less stringent. In the case of total suspended particles and biochemical oxygen demand (BOD), the limit in Nepal is expressed in terms of ranges, while the IFC sets a specific value. In addition, for all projects, the IFC requires that levels of contaminants such as pesticides, dioxins, furans, and polycyclic aromatic hydrocarbons (PAHs) in effluent discharges should not exceed either 100 times the WHO guidelines for drinking water or 0.05 mg/L (IFC 2013).

In addition to the tolerance limits for industrial effluents discharged into inland surface water, tolerance limits are also prescribed for industrial effluents to be discharged into public sewage and for wastewater discharged into inland surface waters from combined wastewater treatment plants. (See Tables A-15 and A-16 in the Appendix). Furthermore, the sampling and analysis methods for measuring water quality are specified. (See Tables A-17 and A-18 in the Appendix.)

3.4.3 Approaches and Efforts

There are several organisations that have been actively involved in upgrading and developing the water supply in Nepal. A number of projects have been implemented to prevent and control groundwater pollution. It is impossible to mention all of these projects, so only an outline of the major projects is provided here.

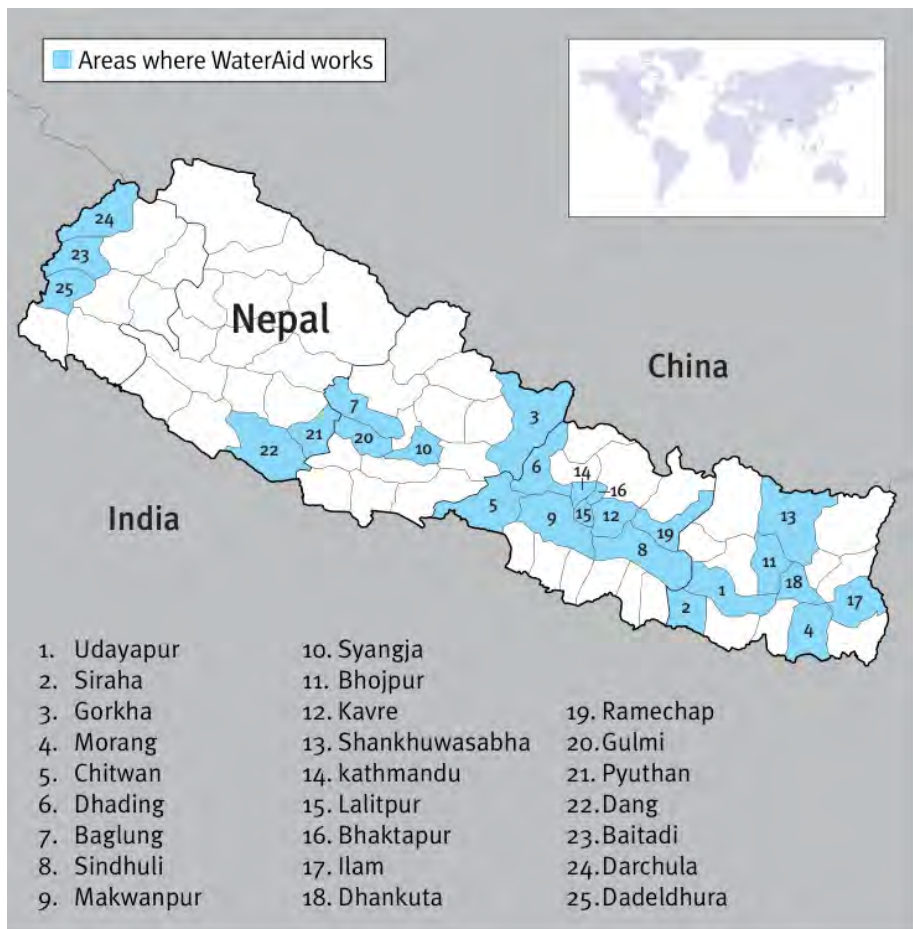
WaterAid Nepal

WaterAid began its water, sanitation, and hygiene work in Nepal in 1987, and it now works with

seven partner organisations in the country. Their activities are vital as approximately a third of all deaths in Nepal are of children under five, and half of these are due to diarrhoea.

In rural areas, WaterAid Nepal works with Nepal Water for Health and has enabled almost 4% of the population to access water, sanitation, and improved hygiene. Their urban work reaches those living in slum and squatter settlements in the Kathmandu valley and towns in the narrow strip of flat, fertile land of the Terai region along the Indian border. From the Terai region, the landscape rises up into the steep foothills and mountains of the Himalayas. This demanding terrain determines the methods required to ensure safe drinking water and improved sanitation.

Latrine installation and access to a safe water source can be difficult, and so these organisations work closely with dispersed communities to find the best solutions for them. In each environment, technologies are chosen that are affordable, appropriate for local conditions, and easy for communities to set up and maintain themselves.



Source: WaterAid Nepal (2010)

Figure 3.4.2: WaterAid Operating Sites

JICA

Supporting the GoN's commitment to providing safe drinking water throughout the country, as stated in its Eighth National Five-Year Plan, Japan has provided assistance in constructing and rehabilitating water supply facilities in Nepal's urban and semi-urban centres. The improvement and construction of water treatment plants and the development of new surface water sources in addition to groundwater sources also has been achieved (Table 3.4.6).

Table 3.4.6: Projects Aided by JICA

Period	Projects
1988–1990	Development study on groundwater management in the Kathmandu Valley
1989–1993	Grant aid for water supply to urban and semi-urban centres
1992–1995	Grant aid for Kathmandu water supply facility improvement project
2000–	Grant aid for improvement of Kathmandu water supply facilities

Source: JICA (2002)

United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)

UNESCAP is another organisation supporting water infrastructure in Nepal. The three-year National Development Plan of Nepal (2011–2013) has been shaped by the National Planning Commission (NPC). All the water-related agencies need to immediately take this opportunity to include eco-efficient water infrastructure projects within this national development plan. The assessment of eco-efficient water infrastructure is closely related to policy-making and implementation processes at the national level, and, hence, awareness and sensitisation activities ought to be initiated with high priority so as to transform Nepal's policy focus from physical infrastructure to non-physical infrastructure. UNESCAP supports the promotion of eco-efficient water infrastructure mainly through research and studies.

According to UNESCAP (2010), despite the variety of issues related to the promotion of eco-efficient water infrastructures, it is vital that such activities should be based on the active participation of a diversity of stakeholders. Pilot research projects must determine eco-efficient schemes applicable to water infrastructure development in Nepal. These may include but are not limited to: transport systems (using rivers for 32 navigation); buildings (enforcement of rain-water harvesting laws); irrigation (use of water-efficient systems); agriculture (use of water-efficient cropping patterns); hydro power projects (multipurpose projects); roads and highways (alignment, design, bridges); water-induced disasters and others (UNESCAP 2010).

Levees, a conventional method of flood defence, may also need further study; there is the

potential that they could be replaced by other multipurpose schemes such as flood storage reservoirs, diversions to adjacent watersheds, underground reservoirs, and advanced flood warning and preparedness systems (UNESCAP 2010).

3.5 Soil Pollution

3.5.1 Current Situation

The soil may be chemically contaminated with a wide range of pollutants, including pesticides and such as lead and cadmium. Agricultural activities, industry, landfill, and emission from road transport are all main sources of soil pollution. Most soil/land pollution in Nepal stems from mismanagement of solid wastes, in both urban and rural settings, and the mishandling of pesticides and chemical fertilizers in the agriculture sector (Poudyal 2000).

Chemical Fertilizer and Pesticide as Soil Contaminant

Chemical fertilizer and pesticides such as organochlorine, dichlorodiphenyltrichloroethane (DDT), organophosphates, and carbamates have been used predominantly to counter malaria and manage pests in the agriculture sector. Organochlorine pesticides are very persistent in nature and pose a threat of chronic exposure. Similarly, organophosphates are acutely neurotoxic, and exposure to these chemicals is of serious concern in environmental health management (WHO 2012).

The use of pesticides raises some concerns. For example, the overuse of pesticides is causing an increase in pest resistance and localised health problems caused by run-off. At present, 250 types of pesticides — including DDT, which is restricted and banned in many countries of the world — are being used in Nepal. The majority of farmers using pesticides are unaware of its adverse effects; thus, little care is taken while handling them, and farmers consequently experience ill-health after application. Demand for pest-free and fresh-looking vegetables encourages the farmers to sell their products immediately after the application of pesticide. The residues on these vegetable products are a source of direct exposure through ingestion for consumers. As a result, pesticide residues have been reported in milk and vegetable products.

Improper disposal of used and expired pesticides and their containers (such as by burning, burying, or disposing of them in the public garbage containers, open places, or streams) is commonly practised in Nepal. Frequently, people improperly use pesticides for killing head lice,

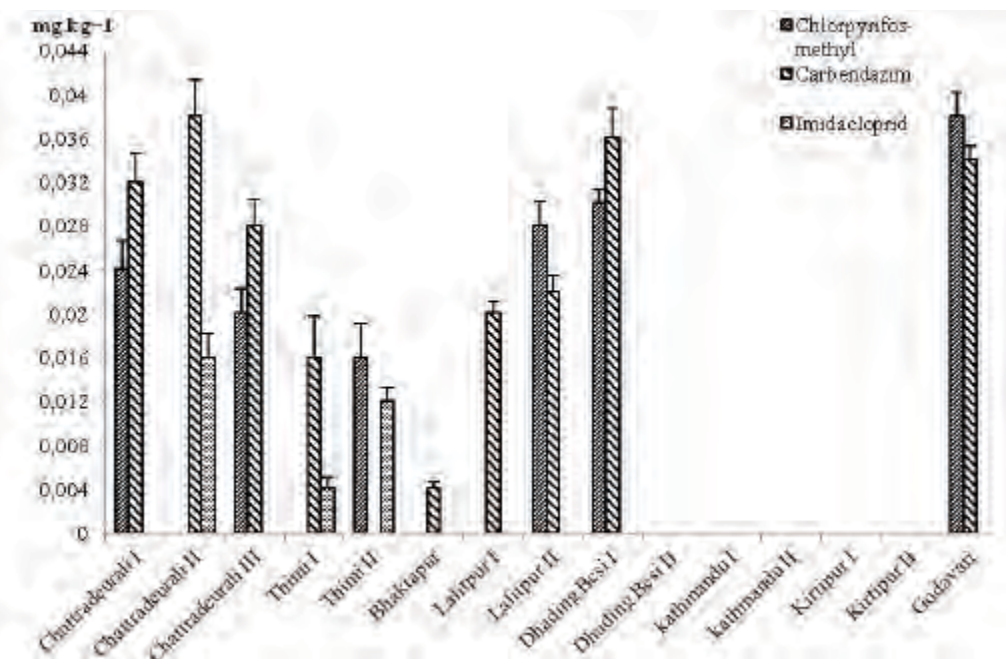
bedbugs, and rats, for general sanitary purposes, and for fishing bait. The major problems are the absence of safety procedures during pesticide application and the failure to disseminate information regarding proper pesticide selection and application. Studies have reported a 1–22mm layer of malathion dust and leaking drums of methyl parathion throughout the some factories. Using river water for irrigation activities can result in soil pollution. It can cause deposits of excessive salts and water logging in soil. The leaching of salts in turn affects groundwater, which is a major source of drinking water. The problem of soil acidification has been serious. This problem was seen in about 23 districts. It is believed to be caused by improper use of ammonium sulphate (WHO 2012).

As a result of the chemical fertilizer and pesticide use, the soils of the Terai plain have become acidic, and they often require chemical treatment by lime. In some places, zinc in the soil has decreased, and at other places sulphur in the soil has increased (Sharma 1990).

The farmers who used small doses of fertilizer in early years are now using more fertilizer to get better yields as they are unaware of the acidity problem. In the past, animal dung provided fibre to the soil along with the required chemical nutrients; now, with the use of chemicals, the soil is hard and heavy. By importing chemical fertilizers and pesticides, Nepal has created pressures on foreign exchange, and the wide and indiscriminate use of fertilizers and pesticides has increased environmental problems (Sharma 1990).

Due to the lack of technical, financial, and trained human resources required for the monitoring and analysis of pesticide residues in agricultural soils and food products, there is no up-to-date database on the pesticide concentrations in different parts of Nepal. Occasional tests for pesticides carried out by the Central Food Research Laboratory affiliated to the GoN have shown that contaminated fruits and vegetables are brought to Kathmandu markets (Poudel 2011).

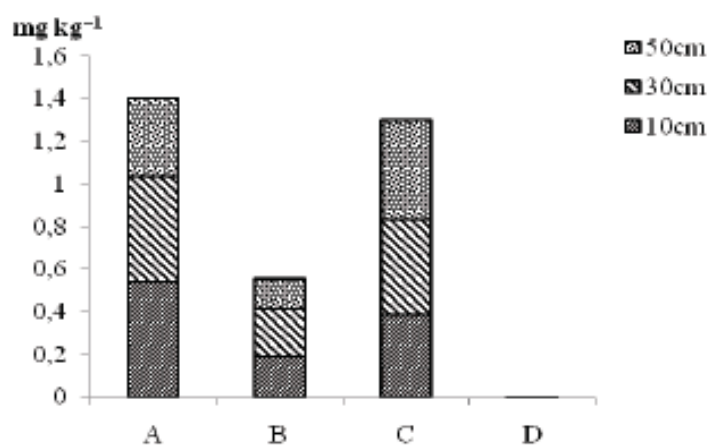
A preliminary study of the content and distribution of pesticide residues in soil samples from the Kathmandu Valley in Nepal was carried out (Giri et al. 2012). The results show that the soil samples collected at the depth of 10 cm were found to be contaminated with the fungicide carbendazim and the insecticide chlorpyrifos-methyl at rates of up to 0.038 mg/kg. The systemic insecticide imidacloprid was also found at up to 0.016 mg/kg (Giri et al. 2012).



Source: Giri et al. 2012

Figure 3.5.1: Levels of Pesticide Residues in Soil

The most commonly used pesticides in Nepal are malathion, chlorpyrifos-methyl, cypermethrin, deltamethrin, mancozeb, parathion-methyl, fenvelerate, dichlorvos, endosulfan sulphate, dimethoate, and carbendazim (Palikhe 2001). Another test carried out at different soil depths (10 cm, 30 cm, and 50 cm) showed that the pesticides were distributed homogeneously through the profile. The ‘old’ insecticide parathion-methyl, which has been banned for use in many countries, was still applied and found in some samples (Giri et al. 2012).



Source: Giri et al. 2012

Figure 3.5.2: Distribution of Pesticide Residues Parathion-Methyl in Soil

This study provides information about soil contamination levels due to pesticide use in Central Nepal and shows that further research and information campaigns for farmers are necessary.

Heavy Metals as Soil Contaminant

Apart from chemical fertilizers and pesticides used in the agriculture sector, heavy metal is also causing soil pollution in Nepal. A research was conducted to investigate heavy metal (copper [Cu], zinc [Zn], cadmium [Cd], and lead [Pb]) concentrations in roadside farmland soils and corresponding grasses around Kathmandu, Nepal under dry condition. Four factors were considered for the experimental design, including sample type, sampling location, roadside distance, and tree protection (Yan et al. 2012).

The statistical description of heavy-metal concentrations (mg/kg) in soil and grass under three independent factors are summarised in Table 3.5.2. On average, the heavy-metal content of grass and soil in mountainous roadside farmland is consistently lower than that in suburban roadside farmland, except for Zn in the soil (Yan et al. 2012).

Table 3.5.1: Heavy-Metal Concentrations (mg/kg) in Soil

Location	Cu		Zn		Cd		Pb	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Mountainous roadside farmland	25.39	6.03	92.09	37.07	0.23	0.30	20.96	10.23
Suburban roadside farmland	27.91	7.43	84.46	33.38	0.30	0.29	31.81	10.70

Source: Yan et al. (2012)

Another study was conducted to evaluate the level of heavy metals in the vegetables and soil of agricultural fields of the Kathmandu Valley (Sharma and Chhetri 2005). Based on the findings of this study, it is hypothesised that toxic heavy metals are deposited in the soil of agricultural fields and also in vegetable crops grown on such fields. Therefore, the study was conducted to determine if the level of toxic heavy metals in the soils of such fields and the vegetables grown in them are within the critical plant tissue concentration. Samples of vegetables and soil were collected from the Kathmandu Valley, which has a dusty and smoky atmosphere due to the pollution of heavy traffic and emissions from various factories such as Banasthali, Shovabhadrawati, and Khusibun, located near the Bishnumati River; Chhapro and Thimi near the Manohora River; Shankhamul, Kusingal, and Nakhu near the Bagmati River; Kalopul and

Ghatteculo near the Dhobikhola River; and Balkhu near the Balkhu Khola River (Sharma and Chhetri 2005).

Table: 3.5.2: Concentrations of Trace Metals in Soil (mg/kg dry weight)

Biotops numbers	Places	Cu	Pb	Ni	Co	Cd	Cr	Zn	Fe	Mn
^{NSV} B		30	35	50	1-40**	0.35	70	90	40000	1000
^{UCSV} KP		125	400	100	-	8	100	400	-	3000
4	Banasthali	34.5*	37.25*	22.25	12	1.5	73.75*	70.50	26719	312
8	Chhapro	18.48	32.76	17.36	10.92	1.68	31.08	72.24	22500	142
12	Manohora	23.0	37.25*	14.25	7.5	1.05	29.0	117.0*	26928	48
20	Nakhu	34.5*	31.46	29.25	8.75	1.25	32.0	90.0	32670	443
28	Thimi	21.32	31.46	12.5	6.25	1.04	29.12	81.12	18009	-
48	Kalopul	20.10	30.5	12.0	5.75	1.0	33.5	141.0*	23661	127
52	Ghatteculo	20.10	34.5	9.9	8.10	1.5	33.0	117.0*	61322*	141
65	Shankhamul	65.5*	46.75*	19.5	10.75	2.0	19.75	115.5*	-	283
72	Kusingal	15.0	36.0*	12.5	7.5	2.0	15.25	70.5	14157	128
79	Shovabhagawati	23.08	37.44*	15.6	8.06	1.56	14.76	76.72	21900	247
88	Khusibun	43.25*	33.0	14.75	8.5	0.75	33.0	162.0*	75636*	-
95	Balkhu	26.25	39.25*	27.5	15.25	1.0	23.75	79.5	18711	675

Note: * exceeded normal soil values. ** Normal soil values as proposed by Swaine 1955, ^{NSV}B Normal soil values proposed by Bowen 1979, ^{UCSV}KP upper critical soil value as proposed by Kabata-Pendias and Pendias 1984

Source: Sharma and Chhetri (2005)

Kathmandu municipality's record of solid waste management so far has been dismal. Consequently, land pollution is evident in the heaps of uncontrolled solid waste, illegal dump sites, open landfills, and exposed human and animal excreta in the streets. Open latrines are common sights in the Kathmandu Valley towns where many residents, especially children, use the sidewalks for defecating. Frustrated by the lack of services from the municipality, some business groups in Kathmandu have often taken up their own solid waste collection and disposal programmes. However, in the absence of powered landfill facilities, the debris thus collected eventually ends up on urban riverbanks and vacant lands, continuing the problems of land pollution for the residents. The severe lack of greenery and open space in the urban areas intensifies the impact of all these forms of land pollution (Adhikari 1995)

3.5.2 Relevant Laws and Organisations

The usage of chemical fertilizers and pesticides in the agriculture sector is the most significant source of soil pollution in Nepal. The Pesticide Registration and Management Office (PRMO) is the nodal agency created to implement the Pesticide Regulations of 1993. It functions through pesticide inspectors, which are designated plant protection officers based in the districts. The key functions carried out by the PRMO include pesticide reseller licensing, import licensing, quality control, training on the safe use of pesticides, and the disposal of obsolete pesticides. As of 2007, 74,165 mega tonnes of obsolete pesticides including organophosphates, organic chlorine, organo-mercurial groups, and methyl bromide are awaiting disposal. As of 2007, 291 commercial formulations and 61 generic products have been registered for acceptable use. In 2003, pesticides equivalent to the value of NPR. 123 million were imported. Almost all imported pesticides are consumed (Upadhyay 2007).

To date, no clear standards that are directly related to soil quality have been established; however, there are some acts and rules which are indirectly related to soil quality, as presented below:

- Soil and Watershed Conservation Act (1982)
- Soil and Watershed Conservation Rules (1985)
- Management and Resource Mobilization Act (1987)
- The Pesticides Act (1991)
- The Pesticide Rules (1994)
- Environment Protection Act (1997)

Soil quality in Nepal is protected indirectly by the standards that have been set for air and/or water quality discharged from industries or households, for soil pollution is induced by these contaminants.

The Ministry of Forests and Soil Conservation is the major organisation to address soil pollution, but as mentioned above, the Pesticide Registration and Management Office, the Solid Waste Management and Resource Mobilization Centre (See Section 3.6.2), and the Ministry of Science ,Technology and Environment (MoSTE) also handle this problem indirectly.

In addition to these acts and organisations, Sustainable Soil Management Program has been created to protect soil quality in Nepal.

3.6 Solid Waste

3.6.1 Current Situation

Nepal has the highest rate of urbanisation (5% per annum) in South Asia. In Nepal, urbanisation has been a recent trend that has taken place rapidly in an uncontrolled and haphazard manner that has created new issues for Nepal's environmental and development problems. The problem is most severe in Nepal's cities, which have to deal with increased amounts of solid waste generated by their expanding populations, overcrowding, changing consumption patterns, use of new materials (like plastics), and increased industrialisation. These changes have resulted in air and water pollution, health risks, and to the increased general deterioration of the cities. Hazardous waste is mainly disposed of with all other waste (through dumping or using incinerators) or stockpiled without adequate safety measures, thereby adding to the problems and risks of solid waste management (South Asia Co-operative Environment Programme 2012).

With changing lifestyles, particularly in urban areas, the increase in inorganic packaging material and broken appliances has in recent decades created solid waste management problems. Today, many settlements of Nepal have polluted rivers as well as streets and open spaces littered with garbage. The seriousness of the problem has mounted tremendously over the years, directly affecting the health of the citizens, polluting environmental resources, and impacting the economy. The problem is acute, particularly in large cities like Kathmandu, Lalitpur, Biratnagar, Pokhara, and Birgunj, where significant amounts of hazardous wastes coming from industries and hospitals are generated and mixed with domestic waste (Nepal Health Research Council 2009).

Solid waste is a pollutant of soil, air, and water, with important implications for public health. It is also an aesthetic or visual pollutant. There is no systematic management of solid waste in industrial districts. The municipalities are trying to help in solving the problem of solid wastes, but the services are not as effective as expected (Poudyal 2000). In Nepal, 85% of the waste is solid waste, generated mainly by households, while waste from hospitals, agriculture (e.g., pesticides, fertilizer), and industries make up the rest. Hazardous waste is mainly disposed of with all other waste (dumping or incinerators) or stockpiled without adequate safety measures thereby adding to the problems and risks of solid waste management. (South Asia Co-operative Environment Programme 2012).

a) Solid Waste from Household

Waste generated from households is the main source of solid waste in Nepal. The composition and the amount of waste generated vary according to the living standard, changing lifestyle, and consumption pattern of each area. The waste generated has changed from the traditional organic waste of the past to papers, plastics, glass, metals, and packaging materials. Although almost all of the waste generated in Kathmandu can be recycled and the government's policy is to recycle, very little of Kathmandu's waste is actually being recycled (Nepal Health Research Council 2009).

The 58 municipalities of Nepal generate 1,369 tons of solid waste per day. Of this amount, Kathmandu alone generates 383.5 tons per day, which is 28% of the total waste. That waste generation and collection in primary five municipalities in the valley are shown in the table below (Nepal Health Research Council 2009).

Table 3.6.1: Actual and Estimated waste Generation and Collection in 2004

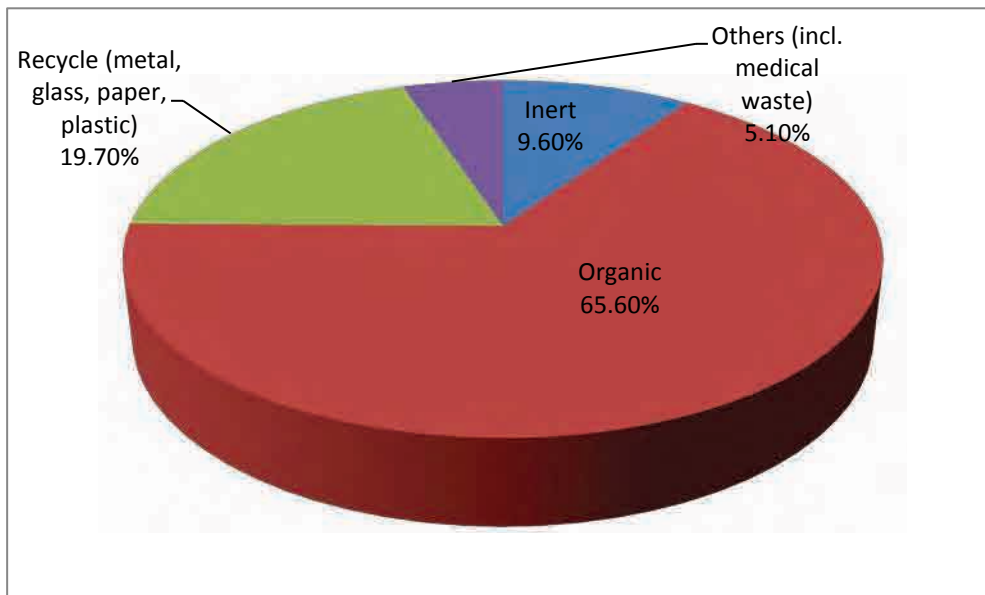
No.	Municipality	Actual Waste Generation and Collection			Estimated Waste Generation
		Per Capita Waste Generation		Total Municipal Waste Generation tons/d	Estimated Total Waste Generation tons/d
		Household kg/person/d	Municipal kg/person/d		
1	Kathmandu	0.39	0.52	383.55	512.2
2	Lalitpur	0.54	0.72	125.64	167.79
3	Bhaktapur	0.30	0.52	39	52.08
4	Madhyapur Thimi	0.11	0.15	7.59	10.13
5	Kirtipur	0.34	0.45	19.52	27.07

Source: SWMRMC (2007)

Even though Table 3.6.1 does not cover, amongst the metropolitan and sub-metropolitan cities of Nepal, Birganj's per capita waste generation of 0.93 kg/person/d is the highest (SWRMC 2004). The per capita waste generation in Kathmandu Metropolitan City (KMC), Lalitpur, and Biratnagar is 0.52 kg/cap/day, 0.72 kg/cap/day, and 0.23/cap/day, respectively. The average per capita waste generation of these five big cities of Nepal is approximately 0.50 kg/cap/d, and

they contribute over 50% of the total municipal waste generation in Nepal. The average per capita waste generation of other 53 municipalities of Nepal is 0.32 kg/cap/day. According to the 2004 report of the Solid Waste Management Resource Centre (SWMRC), the 58 municipalities of Nepal are generating approximately 500,000 tons of municipal waste annually (Nepal Health Research Council 2009).

The physical composition of waste generated from the 58 municipalities of Nepal is broadly categorised into four components: inert, organic, recyclable, and others, as shown in Figure 3.6.1 (Nepal Health Research Council 2009)



Source: SWMRMC (2007)

**Figure 3.6.1: Physical Composition of Household Waste (2003)
Average Value (by wet weight %) of Municipalities**

We can see from the above figure that more than half (65.6%) of the waste generated as municipal waste is organic in nature, which can be recycled. Since recycling is economically driven, the recycling percentage is low for those materials that have low market value. Organic waste recycling has not been given due importance because of the difficulties in its handling and the low market value for its finished products. Since organic waste makes up the bulk of the waste generated, organic composting could significantly reduce the cost and environmental impacts of waste management. Organic waste can be recycled, even with the use of simple technologies (Nepal Health Research Council 2009).

The composition of municipal waste changes over time as consumption patterns change. Various studies carried out since 1976 indicate that around two-thirds of the municipal solid waste generated in Kathmandu Metropolitan City is organic; this figure has remained relatively unchanged over the years. However, the amounts of plastic, paper, metal, and textiles in municipal solid waste have changed significantly: plastic increased from less than 1% in 1976 to more than 16% in 2004; paper increased from around 6% to around 9%; metal decreased from about 5% to less than 1%; and textiles decreased from around 6% to around 3% (UNEP 2001; CBS 2005). The recent composition of solid waste in the five municipalities is compared in Table 3.6.2 below (ICIMOD 2007)

Table 3.6.2: Composition of Municipal Solid Waste, % of Waste (by weight)

Content	Kirtipur	Kathmandu			Lalitpur		Bhaktapur	Thimi
	2000	2002	2003	2004	2003	2004	2003	2003
Organic	74	69	69	66.00	54.0	67.5	70.16	70.1
Paper	3	9	9	10.40	9.9	8.8	2.37	4.9
Rubber	1	1	1	0.24	-	0.3	0.05	0.55
Leather	2	n/a	n/a	0.24	-	-	-	-
Wood	0	1	1	-	-	0.6	-	-
Plastic	9	9	9	16.30	9.49	11.4	3.23	8.25
Textile	6	3	3	3.58	2.72	3.6	1.69	2.31
Ferrous metal	-	1	1	0.84	2.03	0.9	0.07	0.25
Inert	-	-	-	1.01	0.03	-	21.0	12
Glass	1	3	3	1.38	12.8	1.6	1.33	1.29
Other	4	4	4	0.04	7.54	5.3	0.05	0.19
Medical waste	-	-	-	-	1.3	-	-	0.2
Total	100	100	100	100	100	100	100	100
Average collection				65.20	38.2		51.28	47.18

Note: n/a = not available

Sources: IDI (2004); CBS (2005)

b) Solid waste from Health Care Institutions (HCIs)

In recent times, health care institutions (HCIs) have expanded tremendously in number and capacity. With an increasing number of hospital beds, there is an increasing load of biomedical waste, especially with the increased use of disposable materials, the lack of onsite separation

practices, and the lack of proper treatment. These materials pose a risk to the health of those who handle them and those who live in the proximity, thus polluting the environment. When it comes to the management of biomedical waste, there is a lack of a proper system of rules and regulations as well as their implementation. Most of the HCIs, both small and large, have promoted open burning, incinerating outside of the set quality and standards, or dumping these wastes in the city garbage, where they eventually end up on the riverbanks, on the roadside, or in a landfill site. Very hazardous and infectious waste materials including used cotton swabs, appliances, and even amputated body parts are being dumped just outside the hospital buildings (Nepal Health Research Council 2009).

The National Health Research Council (NHRC) classifies waste generated in HCIs into three types: general, hazardous, and sharp. A survey of six hospitals in Kathmandu showed that the proportions of general, hazardous, and sharp materials in the hospital waste are typically 77%, 15%, and 8%, respectively (Table 3.6.3). The larger HCIs generate a greater amount of hazardous waste. (ICIMOD 2007).

Table 3.6.3: Amount and Type of Waste Generated by Selected Hospitals (kg/day)

Hospital	Waste type, kg/day (%)			Total, kg/day
	General	Hazardous	Sharp	
Bir	521 (74%)	120 (17%)	60 (9%)	701
Om	221 (83%)	31 (11%)	16 (6%)	267
Tribhuvan University Teaching Hospital (TUTH)	456 (74%)	105 (17%)	53 (9%)	614
Patan	304 (74%)	70 (17%)	35 (9%)	410
Prasuti	251 (86%)	26 (9%)	16 (5%)	292
Total	1,752 (77%)	352 (15%)	179 (8%)	2,282

Source: Rawal (2004); Basyal and Pokhrel (2004); Poudel et al. (2005).

There is no proper system for the disposal of these medical wastes. Some large HCIs do separate the waste, but they do not treat each type of waste properly. Some HCIs use incinerators that are better called small brick kilns because they do not meet the common

international standards, as they are operated at low temperatures and have low stack height (Nepal Health Research Council 2009).

A rapid study on the assessment of health care waste management was conducted by the NHRC (2007) in 24 HCIs covering four development regions of Nepal. Particularly striking was the fact that there was no practice of waste quantification in the visited HCIs. Additionally, only 33.4% of the HCIs were found to follow the National Health Care Waste Management Guideline or the WHO Guideline. These guidelines were circulated in all HCIs to be implemented five years ago, but almost two-thirds of the HCIs investigated did not follow them. The study revealed the poor management of health care waste and highlighted that the occupational health of waste handlers was a neglected issue. In conclusion, the study showed that waste management among guideline users was better than among the non-users (Nepal Health Research Council 2009).

c) Solid Waste from Industrial Sector

Balaju Industrial Estate, Patan Industrial Estate, and Bhaktapur Industrial Estate are the main sources of industrial solid waste in the Kathmandu Valley. These three estates generate 103,910 kg of solid waste each month (Table 3.6.4) (ICIMOD 2007).

There is no systematic approach to managing the solid waste generated by the industrial estates or from industrial enterprises. Enterprises employ sweepers to clean up the premises. The waste is collected in sacks or drums and dumped into pits or backyards or in open spaces, or else it is burned within or outside the premises of the enterprise. The waste is also mixed with municipal waste. Not enough effort is being made to recycle the waste, apart from selling off scrap metal, even though around 50% of the waste generated in the industrial estate is recyclable (ICIMOD 2007).

Table: 3.6.4: Waste Generated at the Industrial Estates in Kathmandu Valley, kg/month

Waste type		Balaju I.E.	Patan I.E.	Bhaktapur I.E.	Total
Bio-degradable	Food/kitchen	2,500	500	500	
	Agriculture	10,000	2,000	500	
	Sub-total	12,500	2,500	1,000	16,000
	%	26.04	5.0	16.7	15.4
Recyclable (not currently recycled)	Paper	10,000	200	1,000	
	Plastic	5,000	2,300	3,000	
	Tin/iron/steel	1,300	2,000		
	Wood	3,000	30,000		
	Milk products	200	-		
	Other			20	
	Sub-total	19,500	34,500	4,020	58,020
%	40.63	69.1	67.0	55.8	
Non-recyclable	Rubber/leather	9,500		n/a	
	Inert material + dust	5,000	-12,800	960	
	Sub-total	14,500	12,800	960	28,260
	%	30.21	25.6	16.0	27.2
Other waste	Hazardous	500	-	n/a	
	Medical	500	50	n/a	
	Chemical	500	50	20	
	Liquid waste	-	10		
	Sub-total	1,500	110	20	1,630
	%	3.13	0.2	0.3	1.6
Total		48,000	49,910	6,000	103,910

Key: I.E. = industrial estate; N/A = not available

Source: Nippon Koei (2005)

Solid Waste Management System

Waste collection is generally considered to be the most important component of any waste management system because it is the most expensive and visible part of the system. Therefore, properly designed and executed waste collection systems can result in significant savings and reduce environmental and public health risks.

The municipal solid waste (MSW) management in Nepal differs somewhat among the 58 different municipalities and a great deal between urban and rural areas of Nepal. Still, in urban areas, there are certain trends that can be seen as common (Larsson and Sahlén, 2009).

The domestic, industrial, commercial, and institutional sorting of MSW for reuse, recycling, and energy recovery is conducted only when economical incentives are clearly recognised. That is, the MSW is sorted only if the waste in particular has a sell value and can be reused, recycled, or recovered for energy. Objects of value include paper, metals, glass bottles, and plastic bottles as well as other plastic and glass objects (Prasad Luitel, 2008a; Prasad Luitel, 2008b).

In the absence of formal systems for recycling, individual citizens have become a part of the process. Collectors bicycle around on so-called hawk cycles, going from door to door in the cities in search of valuable waste. The collectors can either be self-sufficient or connected to scrap dealer's shops, which are called Kawadi shops. These collectors and scrap dealers are private and make their living on the insufficient nationally-coordinated MSW management of Nepal (Prasad Luitel, 2008a).

Additionally, so-called scavengers scavenge transfer stations, landfill sites (LFs), the streets, municipal containers, and various places where MSW is deposited. The scavengers then sell their findings to Kawadi shops, from where the MSW is sold either within or in the vicinity of the municipality or to industries in India, as the major part is (Prasad Luitel, 2008a).

Both in rural and urban areas of Nepal, the incineration of waste that has no obvious value occurs sporadically and frequently, without energy recovery purposes. Burning piles of waste can be seen along roads and riversides. Furthermore, inaccurate depositing of waste occurs along the riverbanks and even in the rivers, causing hazardous health and environmental problems both at the site and downstream (Pokhrel and Viraraghavan 2005).

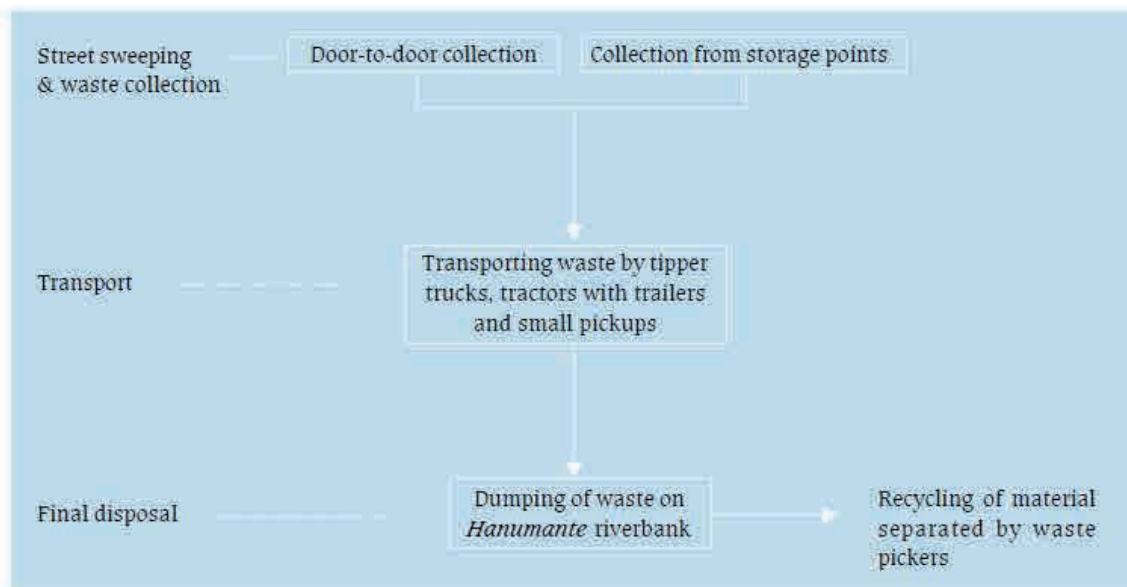
Table 3.6.5 shows some of the solid waste final disposal sites for Bhaktapur, Bharatpur, Biratnagar, Hetauda, and Tribhuvannagar (Practical Action Nepal 2008).

Table 3.6.5: Final Disposal Sites of Major Municipalities in Nepal

No	Area	Final Disposal Site
1	Bhaktapur	Hanumante River bank at a point 5 km southwest of the centre of the municipality
2	Ghorahi (formerly known as Tribhuvannagar)	Karaute Danda Sanitary Landfill site owned by the municipal government and located on the western side of the municipality at a distance of 5.4 km from the city centre
3	Bharatpur	Ramnagar dumping site at a point 11 km from the city
4	Biratnagar	Two leased sites allocated by Biratnagar Sub-Metropolitan City (BSMC) at points 6 km from the main market
		River bank of Singe Khola at a distance of 4 km from the main market area
5	Hetauda	Bank of the Rapti River at a point 1.5 km south of the east-west highway

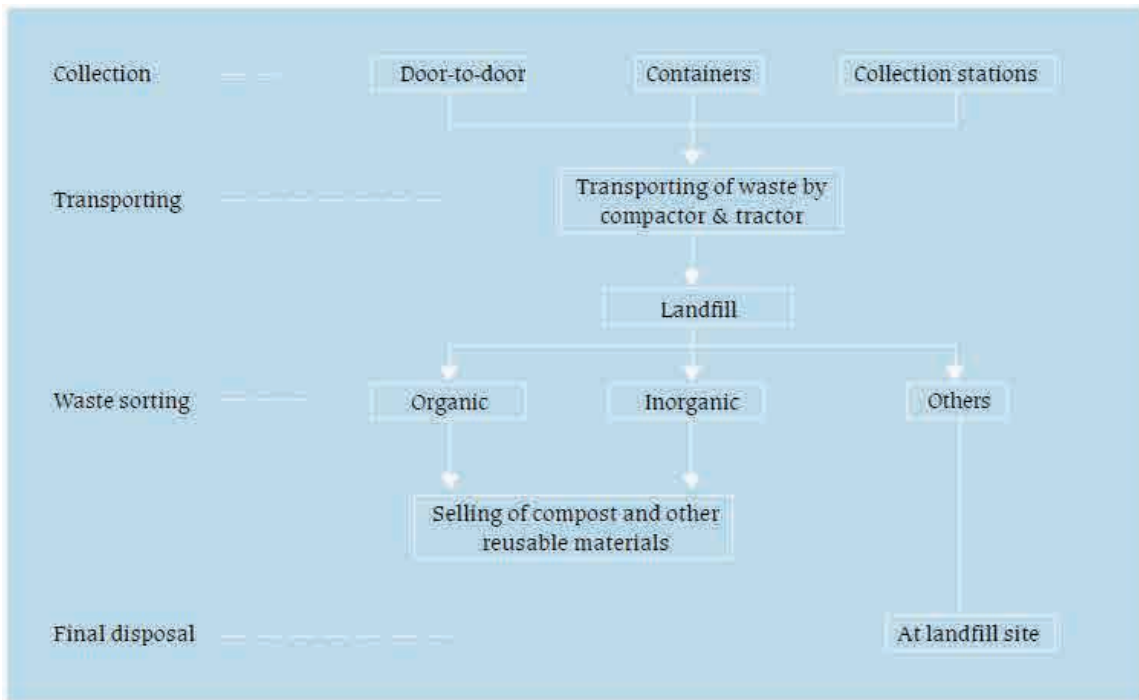
Sources: Practical Action Nepal (2008); Larsson and Sahlén (2009)

An overview of the solid waste management process in Bhaktapur, Tribhuvannagar, Bharatpur, Biratnagar, and Hetauda respectively are given below in Figure 3.6.2 to Figure 3.6.6.



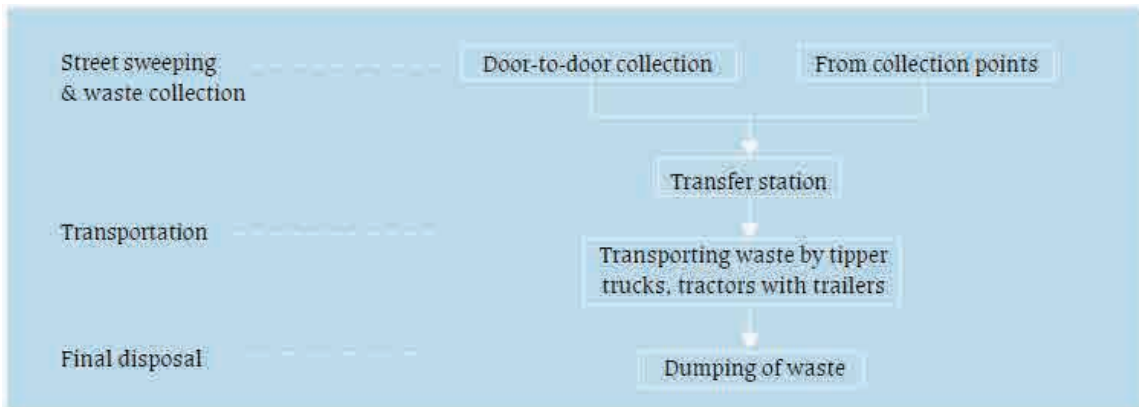
Source: Practical Action Nepal (2008)

Figure 3.6.2: Overview of the Solid Waste Management in Bhaktapur



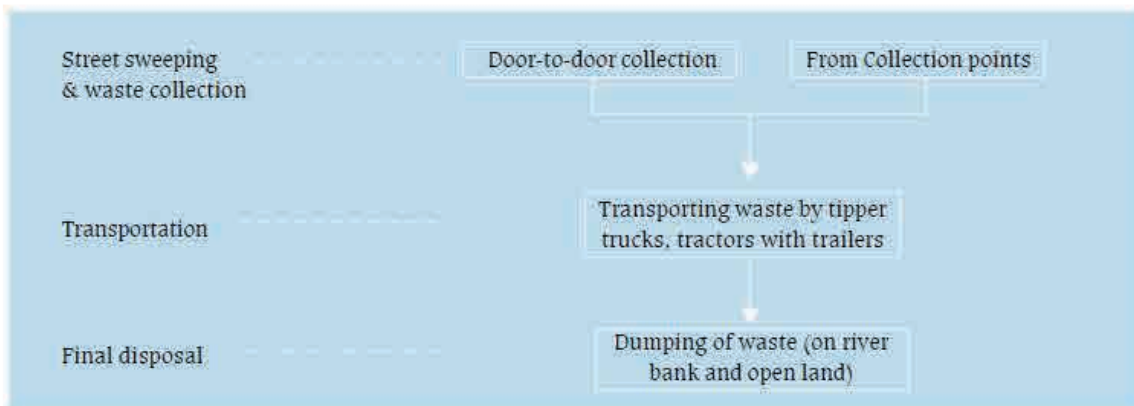
Source: Practical Action Nepal (2008)

Figure 3.6.3: Overview of the Solid Waste Management in Ghorahi (Formerly Known as Tribhuvannagar)



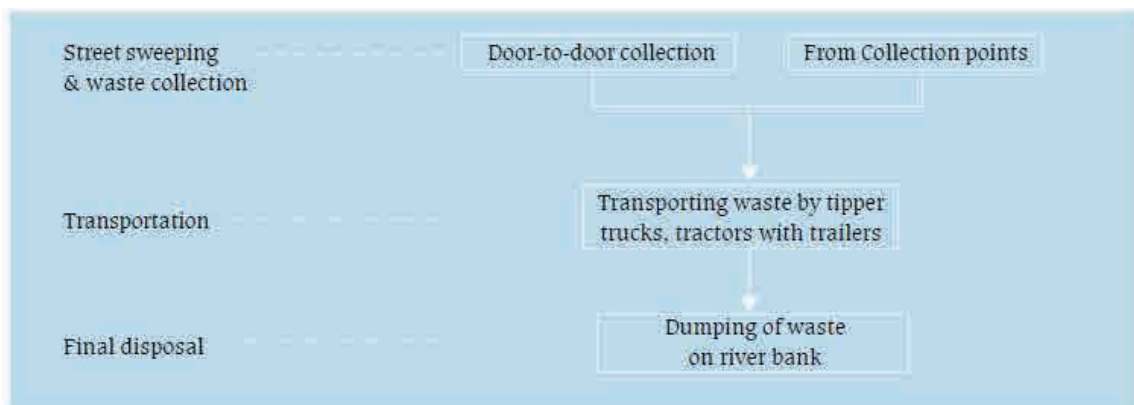
Source: Practical Action Nepal (2008)

Figure 3.6.4: Overview of the Solid Waste Management in Bharatpur



Source: Practical Action Nepal (2008)

Figure 3.6.5: Overview of the Solid Waste Management in Biratnagar



Source: Practical Action Nepal (2008)

Figure 3.6.6: Overview of the Solid Waste Management in Hetauda

Other than the above-mentioned municipalities, Pokhara Sub-Metropolitan City (PSMC) and Kathmandu Metropolitan City (KMC) have their own solid waste management processes (Larsson and Sahlén 2009).

PSMC has eleven collection vehicles in their care, of which four are compactors and seven are tippers. The collection is managed door-to-door once a day at a given time. Moreover, roadside collection at specific points is conducted year-round in the busiest areas of the city core. There are 116 municipal employees working with waste collection and sanitary work. Additionally, there are 19 employees working at the Pokhara Landfill Site (LFS) (Bahadur, 2009; Resham, 2009). There is no specific sorting domestically, except for the services provided by the local

collectors from the 50 Kawadi shops in the city. Officially, all collected MSW is deposited in the Pokhara LFS, but sporadic sorting at the LFS does occur (Bahadur 2009). Still, the MSW deposited in the Pokhara LFS must be considered as unsorted (Larsson and Sahlén 2009).

In Kathmandu, there are approximately 1,300 people working with MSW management in KMC. The staffs have 65 collection vehicles (tractors, tippers) at their use. Moreover, a great unknown number of cycle hawks (bicycling collectors) operate in KMC. According to KMC, 90% of all MSW generated is collected, out of which 60% is collected from designated areas on the roadside, 35% through door-to-door collection, and the remainder is collected in specific containers located in different areas of the city. There are eight containers that are operated by Non-Governmental Organisations (NGOs). When these containers are full, they are directly transported to Sisdole LFS, whereas the rest of the collected MSW first is transported to Teku transfer station. At Teku transfer station, some separation of valuable MSW is conducted, after which the MSW is transported to Sisdole LFS to be deposited. Straightforwardly, residents of KMC and Lutheran Church–Missouri Synod (LSMC) can deposit their MSW at designated areas in the city, either directly on the roadside, in a container, or in one of the collection vehicles in operation (SWMRMC 2007).

The Community Mobilisation Unit (CMU), a sub-department of the Environmental Department in KMC, promotes recycling and reuse. CMU together with the Nepal Recyclable Entrepreneurs Association (NREA) has established centres where recyclable waste can be sold. They also provide information about MSW management to all stakeholders interested (SWMRMC 2007). However, merely sporadic sorting of waste where personal economic benefits are evident is currently conducted. The sorted waste is then sold to Kawadi shops for further distribution (Larsson and Sahlén 2009).

In regard to non-recyclable waste, landfill sites are necessary for the safe disposal of solid waste. Most municipalities in Nepal do not have a permanent landfill site and so are dumping their solid wastes either on riverbanks or on open land. The below paragraph provides information on the three main landfill sites in Nepal (See Fig 3.20).



Source: Larsson and Sahlén (2009)

**Figure 3.6.7: The Location of Landfill Sites in Ghorahi, Pokhara, and Kathmandu
(Modified from Map of World 2006)**

Karaute Danda Sanitary Landfill Site – Ghorahi

The LFS is situated in the vicinity of Ghorahi municipality in the district of Dang in the Terai region of south western Nepal. More accurately, the LFS is in ward 9, approximately 1 km outside of the urban area of Ghorahi. The total area of the LFS is 20 ha, of which 1 ha is used for MSW management and the remaining area is reserved for plantations of various trees and other vegetation. The area used for final disposal has recently been increased within the property. The old site for final disposal now serves as an area for plantation. Moreover, on the property, there is a sorting platform on which a unit of nine employees sorts the MSW into fractions of paper and plastics. There is also a storage house where the two fractions are stored before further distribution (Khanal et al. 2009).

Pokhara Landfill Site – Pokhara

Pokhara LFS is allocated approximately 6 km outside of PSMC in ward 18 in the vicinity of the Seti River. The LFS was constructed between 1997 and 2003 and has been in operation since 2004. The total area of the LFS is 10 ha, of which 4 ha are utilised for final disposal of MSW. Composting and treatment areas (reed bed, leachate collection ditch, leachate treatment plant) make up 2.25 ha. Buffer zone, roads, and other infrastructure account for the remaining 3.75 ha.

The composting area is currently not in use. The constructed wetland area and reed beds function as nutrient and contaminant traps for the effluent leachate water (Khanal et al. 2009).

Sisdole Landfill Site – Kathmandu

At Sisdole LFS, waste from KMC and LSMC is handled (Manandhar 2009). The LFS covers a total area of 15 ha, of which 2 ha is the actual landfill area. The remaining 13 ha of the area are occupied by protection and buffer zones, access and internal services roads, administration facilities, and a leachate treatment plant (Khanal et al. 2009). The landfill site was partly constructed under the supervision, both technical and economical, of the Japan International Co-operation Agency in December 2005. The purpose of the Sisdole LFS was to serve as a short-term disposal site (2–3 years) while other options were investigated (Khanal et al. 2009). Since the LFS has been used for a longer time than predicted, it is causing several problems and the local people living in the area nearby the LFS publically oppose its continued operation. Local protests and roadblocks are a frequent feature.

One of the greatest challenges facing local governments is to generate sufficient revenue to provide basic urban environmental services, such as solid waste management. The five municipalities in the Kathmandu Valley combined spend approximately NPR 235 million (USD 3.2 million) annually on solid waste management. Kathmandu Metropolitan City alone spends approximately 23% of its budget on solid waste management. With the growing amount of waste generated and the rising cost of salaries and fuel associated with waste collection and disposal, the cost of solid waste management is increasing rapidly. It appears that the current situation is unsustainable, considering that less than half of the solid waste generated gets collected. Yet one of the main sources of revenue for local governments, the local development fee, is being phased out by 2013; consequently, local governments will urgently need to explore new mechanisms to bring in the necessary revenues to provide financial sustainability in the future (WB 2007). The details of exploring new mechanisms to ensure financial sustainability are described in Section 3.6.3 below.

3.6.2 Relevant Laws and Organisations

In 1980, a major project was launched with bilateral assistance to reorganise and manage solid waste in the Kathmandu Valley. Although the project was successfully implemented and had several strengths, including efforts to promote recycling and public awareness, it relied on a centralised waste management system. The project created the Solid Waste Management and Resource Mobilization Centre (SWMRMC) to manage the solid waste problem and did not

work directly with the municipalities, although solid waste management was a statutory responsibility of the municipalities. While there were advantages of economies of scale in a centralised system, there were a few drawbacks (WB 2007). These included:

- a) a lack of municipality capacity building for solid waste management;
- b) the absence of a formalised institutional structure for continuing a centrally managed solid waste management system; and
- c) an over dependency on international expertise, machinery, and finance.

Since the project ended, the role of municipalities in solid waste management has increased. In 1999, with the introduction of the Local Self-Governance Act, municipalities in the Kathmandu Valley took over all solid waste management responsibilities from the Solid Waste Management and Resource Mobilization Centre. The role of the SWMRMC, which still lacks clarity, was limited to developing new landfill sites and coordinating matters between municipalities or between municipalities and local communities living around landfill sites (WB 2007).

The SWMRMC works to support the five municipalities in the Kathmandu Valley, specifically Kathmandu Metropolitan City (KMC), Lalitpur Municipality, Bhaktapur Municipality, Madhyapur Thimi Municipality, and Kirtipur Municipality, in the field of solid waste management. To assist the municipalities in issues like development and infrastructure as well as support them technically and financially, 18 people work on a contract basis at SWMRMC (Shahi 2003). Since the municipalities and the SWMRMC work individually without any cooperation, the municipalities make their own decisions and ask the Centre for support when needed (Shakya 2003).

Most recently, the Japanese Government has championed the Clean Kathmandu Valley study, whose objectives are to formulate action plans for recycling and waste collection in the respective municipalities and to pursue technology transfer for solid waste management in the Kathmandu Valley. In order to benefit from economies of scale, the study has proposed a facility development plan within an umbrella concept for solid waste management. The Kathmandu Valley would share resources for the development of solid waste treatment and for disposal facilities and establish an institutional arrangement with the Solid Waste Management and Resource Mobilization Centre and the municipalities to coordinate its operation. The Clean Kathmandu Valley study project, like its predecessor, has proven to be very successful, but there are some weaknesses that will require municipality attention in the future, particularly with regard to sustainable financing of solid waste management service provision (WB 2007).

Solid Waste Management and Resource Mobilization Act, 1987

This Act is one of the key pieces of legislation in Nepal for the management of solid waste. The main objectives of this Act are:

- To manage solid waste and to mobilize resources, and
- To minimise the adverse effect of solid waste on the public health and environment.

For the execution of the objectives of the Act, the Solid Waste Management and Resource Mobilization Centre (SWMRMC) Rules were formulated in 1989. These Rules laid down procedures for the management of solid waste. The Act and Rules empower the Solid Waste Management and Resource Mobilization Centre in the matter of solid waste management (Nepal Health Research Council 2009).

OBJECTIVES AND ROLE OF SWMRMC

The main objective of the SWMRMC is to scientifically and appropriately manage urban municipal waste and control environmental pollution.

The detailed objectives of SWMRMC are as follow:

- 1) To control environmental pollution and minimise its negative impact on public health through placing emphasis on scientific and appropriated municipal waste management;
- 2) To make municipal solid waste management effective, efficient, appropriate, and sustainable;
- 3) To utilise and manage waste as resources;
- 4) To increase awareness among people in solid waste management;
- 5) To promote private sector participation in waste management and attract and promote community participation; and
- 6) To stay abreast of and incorporate new technologies developed in appropriate SWM in waste management processes.

SCOPE OF SWMRMC

The scope of operation of the SWMRMC can be divided into the following two main areas:

- 1) Based on Geographical Area – Geographically, the SWMRM Act, 1987 has limited the area of responsibility of the SWMRMC to within the Kathmandu Valley, though its intent is to make the Centre the agency responsible for supervising the appropriate municipal waste management of all urban centres of the country.
- 2) Type of Work – Initially, before FY 1999/2000, SWMRMC directly carried out the collection, transportation, and final disposal of waste at landfill sites and addressed all waste-related issues of public importance in cooperation and coordination with the municipalities. The various activities carried out by the SWMRMC included, among

others, the following (as of FY 1999/2000):

- a) Developing policy for the implementation of solid waste management plans and programmes;
- b) Collecting, transporting, and disposing of municipal solid waste of the Kathmandu and Lalitpur municipal areas;
- c) Constructing transfer stations;
- d) Providing community and private waste container services;
- e) Constructing and operating landfill sites;
- f) Providing septic tank cleaning services;
- g) Constructing and operating public toilets;
- h) Rehabilitating old lanes and square yards;
- i) Conducting community awareness programmes, developing audio visual programmes on waste management, publishing a newsletter and magazine, and carrying out motivation and public mobilization activities for involving the public in municipal waste management activities;
- j) Mobilizing volunteer groups and school children in developing awareness in solid waste management;
- k) Conducting workshops and seminar at governmental and non-governmental levels to develop appropriate waste management; and

Developing Ramkot as short-term and Okharpauwa as long-term waste management sites.

In the changed context, after the implementation of the Local Self-Governance Act, 1999, the responsibility of the SWMRMC has been primarily focused on searching for, studying, and developing sanitary landfill sites which are handed over to the concerned municipalities. Additionally, the SWMRMC provides technical and financial assistance to KMC for emergency waste management activities.

The activities being carried out by SWMRMC after 1999 are as follows:

- 1) Transforming the existing organisational setup of the Centre and developing it into an institution providing expert and professional services as a national level policy maker;
- 2) Developing EIA Guidelines for developing solid waste management infrastructure;
- 3) Studying potential landfill sites;
- 4) Conducting IEE and EIA studies of landfill sites;
- 5) Acquiring land for landfill sites;
- 6) Developing the infrastructure facilities of potential landfill sites;

- 7) Providing expert consulting services to municipalities and urban centres of the country for development of appropriate waste management systems; and
 - 8) Providing technical and financial assistance to KMC for waste management until a long-term landfill site has been developed.
- (Ministry of Local Development 2012)

The major domestic laws and policies related to solid waste management (except for Solid Waste Management and Resource Mobilization Act) are summarised in Table 3.6.6.

Table 3.6.6: The Major Domestic Laws and Policies Related to Solid Waste Management

Title	Description
The Town Development Act, 1988	Clause 9 of this Act empowers the Town Development Committee to regulate, control, or prohibit any act or activity which has an adverse effect on public health or the aesthetics of the town, or in any way pollutes the environment. It contains penalty provisions in the form of fines for the violation of the Act.
Local Self-Governance Act, 1999	The Local Self-Governance Act, 1999 makes municipalities responsible for managing domestic solid waste. Municipalities are also required to preserve water bodies such as lakes and rivers, assist in controlling water, air, and noise pollution, and prevent the spread of infectious disease. The Act does not require the local governments to manage hazardous waste but empowers them to fine anyone up to NPR 15000.00 for haphazard dumping of solid waste.
The Nepal Environment Policy and Action Plan, 1993 (NEPAP 3)	The NEPAP mentions solid waste in only a few paragraphs. In essence, it suggests that MSW collection and disposal be organised and managed at the ward level, including the levying and collection of fees from residents. As a follow-up (Phase II) Stage of NEPAP (4), GoN produced a draft of 'Sector Action Plan'. The S Plan incorporates a number of specific project proposals in relation to solid waste management, including: the development of a waste exchange and waste minimisation programme for industries (Project number and code : 0608 ITEC); the development of the Waste Act (Project number and code : 1000 XLAW); the development of the National Waste Management Policy (Project number and code : 099 WSOL); and Waste Management through Private Sector (Project number and code : 113 WSOL).

Title	Description
The Environment Protection Act, 1997	Sub-article 7.1 of this Act prohibits haphazard waste disposal, which will have an adverse impact on the environment or civic health.
Environment Protection Rules, 1997	Schedule 1 and Schedule 2 related with Rule 3 of the Environment Protection Rule, 1997 has a mandatory provision to conduct an Initial Environmental Examination or Environment Impact Assessment of solid waste management projects depending on their nature.
National Waste Management Council, 1996	In 1996, GoN created the National Waste Management Council (NWMC) under the chairmanship of the Minister for Local Development. This Council works as a technical arm of the Ministry and is responsible for national policy making. The National Solid Waste Management Policy adopted in 1996 is a major step forward in this endeavour.
Tenth Plan: Policy And Implementation Strategy	
Industrial Enterprise Act, 1992	This Act provides that an industrial license is required if it is related with defence, public health, and the environment. Section 11 clearly provides that a license or registration certificate shall contain provisions regarding concessions, exceptions, facilities that will be given to the enterprise, and prescribed conditions to be fulfilled by them. Section 13 also provides that the industrial promotion board established under the Act can direct the industries to make arrangements for controlling environmental pollution. The Act gives priority to industry based on waste products and industry manufacturing pollution control devices. Similarly, Section 25 (2) empowers GON to punish those who do not comply with the conditions mentioned in the license or registration certificate.
National Health Care Waste Management Guidelines, 2002	These guidelines were prepared by the Nepal Health Research Council and World Health Organization in 2002, and a circular was made based on Minister-level decisions to implement the guidelines in all levels of health facilities. These guidelines contain provisions for waste management policy, waste management committee, waste management plan, waste minimisation, waste segregation, handling, labelling, containment, transport, storage, waste treatment/disposal, occupational health and safety, training, monitoring systems, and

Title	Description
	enforcement instruments for the implementation of health care waste management guidelines. The WHO has classified health care waste into eight categories, but these guidelines categorise health care waste into three groups, namely, sharp waste, hazardous waste, and general waste.
Medical Waste Management Guidelines, 2004	These guidelines were developed by Kathmandu Metropolitan City (KMC) with support from the Kathmandu Valley Mapping Programme in 2004. These guidelines were primarily produced to assist in the management of medical waste that is generated in the course of medical treatment in Kathmandu's hospitals, nursing homes, clinics, pathological labs, and drugstores. These guidelines also include classification of medical waste, its sources, and amounts, in-source management of medical waste, technologies for treatment and disposal of medical waste, health and safety for health care personnel and waste handlers, and responsibilities for medical waste management. Contrary to the National Health Care Waste Management Guidelines, 2002, it classifies the waste into five categories; ordinary medical waste, ordinary inorganic waste, hazardous waste suitable for incineration, hazardous sharp waste, and non-burnable hazardous waste.
Guidelines on Health Care Waste Management 2009	This was developed by the Management Division, Department of Health Services of Ministry of Health and Population. These guidelines also classify the waste into five categories; ordinary medical waste, ordinary inorganic waste, hazardous waste suitable for incineration, hazardous sharp waste, and non-burnable hazardous waste. The guidelines include information about the process of health care waste management and the responsibilities for health care waste management. One of the very important aspects of these guidelines is that they present the waste management options at different levels of health care institutes, indicating the type of waste generation, methods of disposal/treatment, and responsible persons (Ministry of Local Development: Introduction on SWMRMC & Nepal Health Research Council 2009).

Since 2007, the Ministry of Health and Population through the Management Division,

Department of Health Services, with support from WHO, have been building on earlier efforts to promote health care waste management. The focus of the last few years has been on assessments, capacity building, raising awareness, and the development and application of suitable and affordable technologies. Non-burn technologies are promoted with autoclaving the preferred option, as it does not generate air pollution and makes the waste safe for recycling (Nepal Health Research Council 2009).

Table 3.6.7: Major NGOs/CBOs Working in the Field of SWM in LSMC

Name of NGO/CBO	Year of Foundation	Number of Staff	Working Areas
Women Environment Prevention Committee (WEPCO)*	1996	28 paid workers and 7 volunteers	Door-to-door collection, Recycling of paper, Awareness campaign, Sweeping, Composting, Training in Wards 1 and 10
Women Environmental Group (WEG)*	1997	12 paid workers and 6 volunteers	Door-to-door collection in Wards 3, 10, and 22 (600 HHs), Awareness campaign, Composting in Ward 10, Recycling in Ward 10
National Environment Pollution Control (NEPCO)	1998	28 paid workers and 7 volunteers	Door-to-door collection, Awareness campaign, Sweeping, Composting in Wards 6, 8, 14, 15, and 17 (1,050 HHs)
Nepal Pollution Control Environmental Management*	2001	137 (paid workers and volunteers included)	Door-to-door collection in Wards 2, 3, 4, 5, 13, 14, and 19 (2,500–2,800 HHs), and pilot project with support of LSMC in Wards 4, 5, and 13 (150 HHs)
Society for Urban Poor (SOUP)	1992	2 paid workers and 33 volunteers	Community development including clean up in Wards 7, 17, 18, and 22, Composting (560 HHs)
Environmental	1987	8 paid workers	Public awareness on

Camps for Conservation Awareness (ECCA)		and 50 volunteers	environmental education
Zero Waste Nepal	2001	20 volunteers	Public awareness and campaign on SWM
Women's Initiative for Environment and Development (WEID)	2000	3 paid workers and 25 volunteers	Door-to-door collection in Ward 2, (300 HHs + 2 schools)
Kathmandu 2020	1995	1 paid worker and 1,500 volunteers	Composting (20 HHs), Awareness campaign

Note: * According to LSMC, there is coordination with LSMC at programme/activity levels.

Source: JICA Study Team, (2004)

3.7 Noise Pollution

3.7.1 Current Situation

Apart from various kinds of environmental pollutions, noise pollution has become a tough challenge for human health in Nepal. According to the World Health Organization (WHO), noise can be defined as the level of sound which exceeds the acceptable level and creates annoyance. Noise is measure by a Sound Pressure Level (SPL) metre, and the unit of measurement is the decibel (dB). We start hearing when a sound reaches 20 decibels, and we can listen clearly at 45 decibels. While 60 decibels is acceptable for hearing, a 70-decibel sound is harmful to the human ear.

As the population has been increasing rapidly in urban areas, the intensity of noise pollution is also growing faster and faster in Nepal, especially in the urban and industrial areas where the population agglomerates highly. The sources of noise are many and various, including automobiles, factories, industries, aircraft, and the domestic noises from the radio and transistors. All of these sources add to the quantum of noise in daily life in Nepal. There exists a positive relationship between population growth and the acceleration of noise sources, i.e. urban centres, industries, radio, films, automobiles, and so forth (Nepal 2006).

One of the important factors influencing the increase in sound level in Nepal is its physical

geography. Because of the hills lining both sides of the road, sound is trapped within the valley and is reflected again, so that the noise is always louder than on flat plain land (Majumder 2010).

If we compare the situation of noise pollution in Nepal with the suggested acceptable noise levels (dBA), we find that the situation is worse (Nepal 2006). The noise levels in decibels (dB) in different areas of Kathmandu are given in Table 3.7.1.

Table 3.7.1: Noise Levels in Decibels (dB) in Different Areas of Kathmandu

Areas	NLeq (N leg)	Noise Level as % of samples			
		[NI ₁₀]	[NI ₅₀]	[NI ₉₅]	[NI _{max}]
High traffic	78.97	80.97	75.34	69.04	97.11
Low traffic	75.21	78.00	71.96	64.62	94.19
Public places	69.67	72.00	67.04	62.34	86.82
Residential and commercial places	74.52	77.02	70.44	63.38	92.27

Note: NLeq: Noise Level equivalent.

Sources: UNEP (2001)

Due to the lack of proper vehicle maintenance regulations in Nepal, old vehicles like heavy buses and three-wheeler tempos are freely running in urban cities and were responsible for high traffic noise (Joshi et al. 2003). In the past, Banepa was an important station on the trade route to Tibet, and the semi urban town continues to be a main stop for trucks and buses travelling from Kathmandu to China and vice versa. Additionally, Banepa is a trading centre for the three municipalities of the Kavre districts. The density of population is higher than in the other two municipalities of the districts. There has been a surge in population in recent years. The projected population of Banepa in the year 2016 will be 24,282, up from the 2007 population of 15,822 (Murthy et al. 2007). The population density of Banepa is about 2,846 people/km², and there are more than 3,295 registered motor vehicles in Banepa at that present. The increase in population has resulted in greater noise pollution. One assessment was done on traffic noise pollution in Banepa. The number and type of vehicles registered in Banepa for December 2006 is shown in Table 3.7.2, and Table 3.7.3 summarises the results of the assessment (Murthy et al. 2007).

Table 3.7.2: Registered Motor Vehicles in Banepa in 2006

Type of Vehicle	Number
Scooters and motorcycles	2,000
Tractors and trailers	350
Buses	245
Trucks and mini-trucks	200
Auto rickshaws and other three-wheelers	150
Private cars	100
Jeeps, land-rovers, and station wagons	50
Miscellaneous vehicles	200
Total no. of vehicles	3,295

Source: Murthy et al. (2007)

Table 3.7.3: Traffic Noise in Banepa Along the Main Road (Arniko Highway)

Location	N	Sound pressure levels, dBA	
		Min	Max
Bus park, Entry point of main (Ward 10)	12	68.0	110.2
Central Junction (Tribhuwan Chowk)	18	65.5	107.2
In front of Banepa Bit	12	61.2	102.5
Pulbazzar (Chowki Area)	12	63.2	101.3
Tindobato (Bajaj showroom)	12	62.2	99.9
Pubazzar (Pragati Prawat High School)	9	60.1	99.4
Exit point of main Bus park (Ward 6)	12	60.5	99.3
Bus Stop (Chardobato)	15	67.3	98.6
Rainbow photo studio	12	67.7	98.3
Ganesh Bazzar	12	62.1	95.0

Note: N = number of observations

Source: Murthy et al. (2007)

The minimum and maximum noise levels observed at the highway were 60.1 and 110.2 dBA, respectively. The source was predominantly attributable to motor vehicles traffic. The permissible level for road traffic noise is 70 dBA. The researchers conducted 126 trials in 10 locations along the Arniko Highway, and in all of the trials, the noise level surpassed the permissible limit. The departure from the prescribed limit is substantial, and the authors noted that this level of noise on a chronic measure of time can cause definitive health problems to the exposed population (Murthy et al. 2007).

Factories/Industrial Noise Pollution

Industrial machines and processes produce industrial noise. The noise may contain predominantly low or high frequencies. They are impulsive or have unpleasant and disruptive temporal sound patterns. Mechanical processes like weaving, blasting, pressing, drilling, cutting, metal chipping, riveting, and others can possess a significant occupational health hazard. Industrial workers are predominantly exposed to industrial noise that can have serious impact on their health (Joshi et al. 2003).

A study conducted in 28 industries in and outside Kathmandu indicated that industrial noise levels were high in textile industries, metal works, cement industries, and flour mills with noise levels exceeding 90 dBA. The recommended 8 hours tolerance limit in the USA and the UK is 90 dB. In a textile mill in Balaju, a sound level of 120 dBA was reported. This represents an alarming situation because in developed countries, especially in the UK, the maximum daily exposure period for sorters at this level is not permitted to exceed 30 seconds. Hence a higher number of industrial workers are at risk of having hearing impairment. As yet, Nepal does not have effective regulations to control industrial noise. Table 3.7.4 reveals the fact that the degree of industrial noise pollution in Nepal greatly exceeds the acceptable noise level by World Health Organization (WHO) (Nepal 2006).

Table: 3.7.4: Industrial Noise Level in Nepal

Industrial Area	Activity	Noise Level (dBA)
Balaju Aluminium Industries	Spinning	90–98
Plastic Industries	Molding	97
Balaju Yantra Shala Industries	Gutting	104
Birgani Sugar Mill Biganj	Turbine	105
Hulas Steel Industry Pvt, Ltd., Bara	Galvanizing	94

Source: Nepal (2006)

3.7.2 Relevant Laws and Organisations

The Ministry of Environment, Science and Technology (MoEST), which is presently the Ministry of Science, Technology and Environment (MoSTE), established the noise-related standards in the *Nepal Gazette* on 15 October 2012. Table 3.7.5 presents the thresholds of noise level in various conditions.

Table 3.7.5: Limit Values for Noise Control in Nepal vs IFC

		Limit Value (dBA)			
		Nepal		IFC	
		Daytime	Nighttime	Daytime	Nighttime
Area	Industrial area	75	70	70	70
	Commercial area	65	55	70	70
	Residential area	–	–	55	45
Device	Water pump	65		–	
	Generator (Installed inside house)	90		–	
	TV and music system	70		–	

Sources: Himalayan News Service (2012); IFC (2013)

Table 3.7.5 shows that Nepal’s sound quality standards are generally more stringent than those of the IFC. Even though the law setting sound quality standards was published in October 2012, it has still not been implemented. Similar to the data we presented in Section 3.7.1, the sample measurement of sound pollution by the Ministry of Environment, Science and Technology (presently, the Ministry of Science, Technology and Environment) has already crossed the threshold at many places in the city. The implementation of the standards is strongly required (Himalayan News Service 2012).

3.7.3 Approaches and Efforts

To date, few efforts have been made to control noise pollution in Nepal. To resolve this issue, both legislative methods (such as laws and standards) and public awareness must be incorporated. Also, a green sticker system for vehicles is suggested to promote environmental-friendly technology and investment (Himalayan News Service 2012).

3.8 Climate Change

Nowadays the term ‘climate change’ is generally used when referring to changes in our climate which have been identified as occurring since the beginning of the mid-19th century. Climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity (IPCC 2007). Human interactions with the natural environment have grown

tremendously in recent centuries. Environmentally significant greenhouse gases are increasing due to both natural and anthropogenic activities and are contributing to global warming. The Earth's average surface temperature has risen by about 0.74 degrees Celsius in the past 100 years, and it could even rise by up to 5 degrees Celsius by 2080 if the emission of such gases are not decisively reduced (IPCC 2007). It is now universally acknowledged that the climate change we are witnessing will continue for a long time. This obviously has serious implications for human health. While some have been studied, data are still scarce, and it is difficult to draw clear conclusions for future adaptation measures. Human beings are exposed to climate change through changing weather patterns (temperature, precipitation, sea-level rise, and more frequent extreme events) and indirectly through changes in water, air, and food quality and changes in ecosystems, agriculture, industry and settlements, and the economy. The IPCC (2007) reported: 'Climate change currently contributes to the global burden of disease and premature deaths...At this early stage the effects are small, but are projected to progressively increase in all countries and regions' (IPCC 2007). Clearly, Nepal is facing climate change-induced consequences in many spheres of society and development.

3.8.1 Current Situation

Analyses of maximum temperature data from 49 stations in Nepal for the period 1971–1994 reveal warming trends after 1977 ranging from 0.06°C to 0.12°C per year in most of the Middle Mountain and Himalayan regions, while the Siwalik and Terai (southern plains) regions show warming trends less than 0.03°C per year (Shrestha et.al 1999). Nepal is highly vulnerable to the adverse impacts of climate change. Rises in temperature related to global warming are associated with changes to rainfall patterns (such as less frequent but more intense rainfall events), increasing frequency and intensity of floods, changes in monsoon winds, longer dry spells and drought events, increasing storms, and a growing threat from glacial lake outburst floods (GLOFs). Significant glacial retreat as well as significant expansion of several glaciers has also been documented in recent decades, with an extremely high likelihood that such impacts are linked to rising temperatures.

In the early 1990s, there was little awareness of the health risks posed by global climate change (IPCC 1990). The IPCC Second Assessment Report devoted a full chapter to the potential risks of climate change to health (IPCC 1996). In the Third Assessment Report (IPCC 2001), the IPCC concluded: 'Overall, climate change is projected to increase threats to human health, particularly in lower income populations, predominantly within tropical/subtropical countries.' The IPCC latest assessment report of 2007 concluded: 'Climate change currently contributes to

the global burden of disease and premature death. At this early stage the effects are small, but are projected to progressively increase in all countries and regions' (IPCC 2007). Nepal's low level of development and complex topography leaves it quite vulnerable to climate change. The visible impacts of climate change have been observed in agriculture, forestry, biodiversity, water resources, and human health in Nepal (Nepal Health Research Council 2009).

Although Nepal does not emit much greenhouse gas as compared to developed and industrialised economies, it has been facing several consequences of climate changes. The exploitation of natural resources associated with a growing population has led to increasing pollution, declining water quality, land degradation, and other environmental problems. Within such circumstances, climate change represents an additional stress which has multiple consequences such as extreme climate events including flood, draughts, heat wave, cold streams, the melting of Himalayan glaciers, and so forth. Due to such events, agricultural productivity is suffering from severe losses, and the attainment of food security is under tremendous threats. The signs of such changes already felt may become more prominent over the next couple of decades (Lohani 2007).

Nepal signed the United Nations Framework Convention on Climate Change on 12 June 1992 during the UN conference on Environment and Development in Rio De Janeiro, Brazil. In order to implement the convention effectively, Nepal adopted the Kyoto Protocol on 11 December 1997. The protocol entered into force in Nepal on 14 December 2005 (Nepal Health Research Council 2009),

Major initiatives taken by the GoN to address the climate change problems are summarised below:

- Nepal conducted an inventory of Green House Gases (GHGs) for the energy sector based on 1990 data under the US Country Studies Program in October 1994.
- The then-Ministry of Population and Environment (MoPE) prepared two separate studies on implementation strategies for environment-related conventions formulated in 1999 and identified potential linkages between UNCCD, CBD, and UNFCCC in 2000.
- The then-MoPE organised a workshop on UNFCCC and Institutional Design of the Cooperative Implementation Mechanism of KP in August 2000 in collaboration with UNEP/ROAP and the Asian Development Bank (ADB).
- With the assistance of the ADB, the then-MoPE implemented the Promotion of Renewable Energy, Energy Efficiency and GHG Abatement (PREGA) project which contributed to establish the Designated National Authority (DNA) and prepare PINs and PDDs for some

CDM projects.

- With the assistance of GEF/UNEP, the then-MoPE prepared the first initial national communication report with the Parties to UNFCCC and shared it with the Parties in 2004. This report has been the building block to initiate climate change activities in Nepal in the spirit of the UNFCCC and KP.
- From 2006 onwards, MoEST (currently MoSTE) in collaboration with a number of national NGOs has organised public awareness activities including workshops on:
 - (i) capacity building on Clean Development Mechanism (CDM),
 - (ii) capacity building to respond to climate change,
 - (iii) negotiation skills,
 - (iv) pre- and post-Bali conference on climate change, and
 - (v) CDM/DNA.
- In early 2007, the Government of Nepal also prepared a funding proposal for the National Adaptation Programme of Action (NAPA) and submitted it to the GEF/UNDP for funding. The MoEST has entered into an agreement with UNDP Nepal to implement the project.
- The GoN and the Asian Development Bank have entered into an agreement to implement the Strengthening Climate Change and the Environment Project.
- MoEST completed the implementation of the National Capacity Needs Self Assessment (NCSA) Project by December 2008 with the assistance of the GEF/UNDP. Climate change is one of the major components of the NCSA.
- The MoEST has also initiated a climate change policy formulation process in collaboration with the WWF Nepal programme and has completed 6 stakeholder consultations as of April 2009. The fourth meeting of the Climate Change Policy Coordination Committee has decided to conduct studies on:
 - (i) vulnerability and adaptation,
 - (ii) GHG emission inventory,
 - (iii) carbon sinks and mitigation, and
 - (iv) policy and legal provisions.
- The Ministry has constituted a 23-member Climate Change Network (CCN) to coordinate activities and share information. The CCN has been constituted to:
 - (i) identify working areas on climate change amongst the government, NGOs, and private and donor organisations;
 - (ii) conduct policy/field level research and studies and implement activities based on the capacity and expertise;
 - (iii) promote CDM-related activities and launch public awareness and capacity building programmes

- (iv) develop position papers for the Parties meeting and enhance negotiation capacity; and
- (v) develop a Climate Change Clearing House for easy information sharing.
- The second meeting of the CCN has identified thematic areas for collaborative works on:
 - (i) carbon financing,
 - (ii) adaptation and mitigation,
 - (iii) carbon sinks,
 - (iv) a financial mechanism, and
 - (v) knowledge management.
- The MoEST has completed the stocktaking exercise and stakeholder consultations to initiate activities for the preparation of the second national communication (SNC) report. The GEF/UNEP and GoN will shortly enter into an agreement to implement the project to prepare the SNC under UNFCCC.
- The Government has joined the Pilot Programme Climate Resilience (PPCR), which is under implementation with World Bank's assistance. Nepal has been selected as an eligible country for this PPCR. This programme might bring up to USD 50 million to implement climate change programmes in Nepal.
- The Government has also joined the Japan-launched Cool Earth Programme recently. Several projects could be developed under this programme (Nepal Health Research Council 2009).

As describe in earlier paragraphs, Nepal has successfully prepared a National Climate Change Policy, a National Adaptation Programme of Actions (NAPA), a Local Adaptation Plan of Action (LAPA), and a REDD+ Readiness Preparedness Proposal (REDD+ RPP). The Climate Change Policy of Nepal, released in January 2011, is one of the latest additions to Nepal's policy framework. Besides policy documents prepared and promulgated by the Climate Change Division in the Ministry of Environment, various allied departments and ministries have formulated and implemented relevant policies, Acts, and regulations. Some of these policy documents can be associated to the climate change issues – both mitigation and adaptation (HELVETAS 2011).

This analysis assesses the main elements that exist in allied legal instruments, including the Environment Protection Act 1997, Environment Protection Regulation 1999, Water Resource Act 1992, Water Resource Regulations 1993, Forest Act 1993, Forest Regulations 1995, Land Acquisition Act 1977, and Land Acquisition Regulations 1963 (1969). In this regard, the review

is divided into two sections: (a) Constitution of Nepal 2007 and (b) Natural Resource Legislation. The aim of this assessment is to identify the legal reforms that climate change initiatives may require (HELVETAS 2011).

a) Climate Change Issues in the Constitution of Nepal 2007

The review briefly touches upon the constitution of Nepal and the provisions of climate change within it. The Constitution does not have any explicit discussions and provision on climate change; however, the issues of forests, environment, water resources, land, and agriculture find their mention in it. The noteworthy provisions in the constitution include:

- The right of every citizen to live in a clean environment,
- The right of every citizen to food security, and
- The right to a free primary health care facility.

Apart from these, the constitution mentions the responsibilities, principles, and policies of the state, which can be associated with the climate and environment. These provisions include the responsibilities of the state to govern natural resource management mechanism; water resources; land, agriculture, and food; forests, environment and biodiversity (Nepal's Climate Change Policies and Plans- Local Communities' Perspective Environment and climate series 2011-1).

Climate change was not discussed at length in the constituent assembly, but it was a topic of discussion in several committees within the assembly. These committees have proposed the incorporation of the issues of climate change into the provisions of Fundamental Rights, Natural Resource, Financial Rights and Revenue Distribution, and State's Obligation and Policy (HELVETAS 2011).

b) Natural resource legislation

Some major legislation can be associated with either mitigation or adaptation measures of climate change. All the legislation mentioned below was promulgated long before climate change became a prominent issue. The legislation covered includes the following:

- **Forest Act 1993 and National Park and Wildlife Conservation Act 1973**

Neither the Forest Act nor the National Parks and Wildlife Conservation Act have any provisions directly related to climate change. However, provisions for community forestry and the conservation of forests and wildlife provide for measures to mitigate climate change.

- **Environment Protection Act and Rules 1997**

The main objective of the environmental legislation of Nepal is to promote sustainable development to ensure that the negative impacts of environmental degradation do not have adverse impacts on humans, plants, animals, and other natural and physical resources. The review indicates that Initial Environmental Examinations and Environmental Impact Assessments are at the core of the Environment Protection Act and Rules 1997.

- **Water Resource Act 1996**

The existing Water Resource Act of 1996 does not seem to address the potential negative impacts of climate change on water resources. Nepal is one of the richest countries in water resources and relies on water resources for its economic development. The electricity generation in Nepal is largely from its water resources, which are also used extensively for irrigation, drinking, industrial, sanitation, and fishery purposes. However, the existing policy must be updated to prepare the country to mitigate climate change impacts.

- **Land Acquisition Act 1977**

Most of the land-related legislations in Nepal deal with land acquisition, land measurement and distribution, determining the ownership, public benefit land acquisition, land tax, and other physical–financial aspects. Several provisions in the land legislation can be associated with the climate change adaptation, although there is no direct mention of climate change in existing and related legislations.

- **Agriculture and Food Security Legislation**

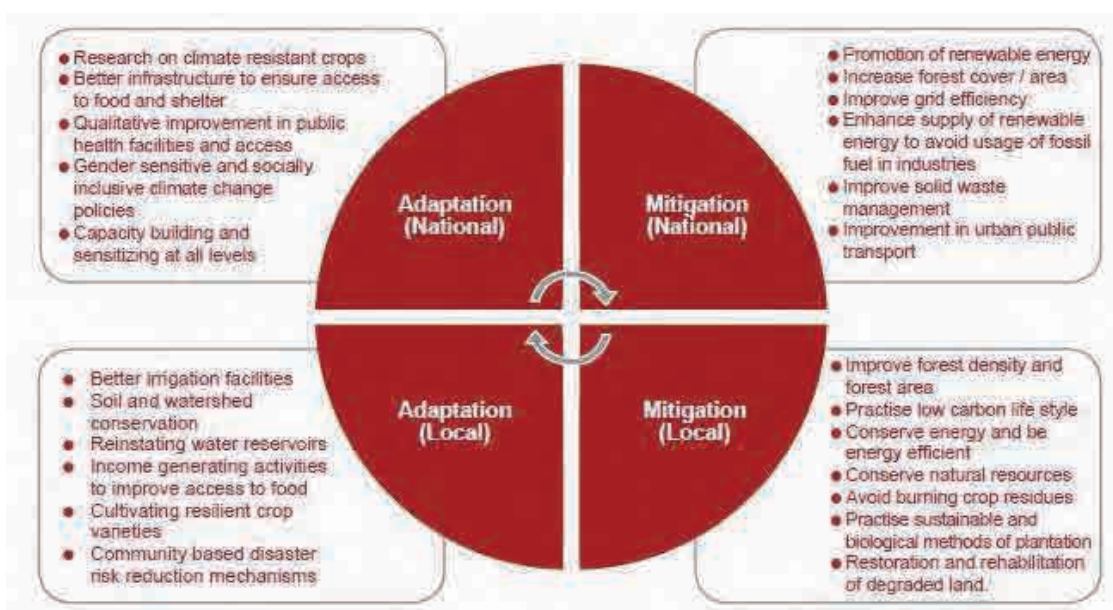
As with other legislation, the existing agriculture and food security legislation does not address climate change issues explicitly. The legislation deals mainly with seeds, food, plant conservation, animal health and veterinary issues, and commercial plantations. Adverse climate change impacts will severely affect agriculture, so farmers are very vulnerable. However, none of the legislation about agriculture and farmers has any amendments or addendum to this effect. This fact instigated the provisions for financial aid for climate-resistant seeds, fertilizer, and agricultural equipment. Still, the government has to do more, such as providing agricultural insurance and compensation.

3.8.2 Approaches and Efforts

The Climate Change Policy 2011 has the following provisions as opportunities for local communities:

- 1) Create awareness of the concept of climate justice;
- 2) Enhance the livelihood opportunities;
- 3) Conduct adaptation-based programmes;
- 4) Build the capacity of local communities to manage the natural resources;
- 5) Associate climate change adaptation activities and programmes with income generation;
- 6) Identify the most vulnerable communities and conduct adaptation programmes in sync with local knowledge, skills, and technology;
- 7) Utilise the benefits of climate change mitigation towards poverty alleviation;
- 8) Provide relief to the victims of climate change;
- 9) Disburse up to 80% of the climate change mitigation and adaptation funds for the community level activities;
- 10) Ensure the participation of the local communities and stakeholders on the climate change mitigation and adaptation activities; and
- 11) Implement the climate change mitigation and adaptation activities through consumer groups.

(HELVETAS 2011)



Source: (HELVETAS 2011).

Figure 3.8.1: Climate Change Policy: A Two-Pronged Approach

One Seventeenth Conference of the Parties (COP 17) Sharing Workshop with the title of 'International Negotiation on Climate Change: Issues for Nepal' was held at Hotel Everest, Kathmandu on 6 January 2012. The Post-COP 17 Sharing Workshop was successful in bringing more than 90 representatives from different government agencies, non-governmental organisations, private sectors, research and academic institutions, federations/alliances, and media in a single platform for discussions on climate change issues, the COP 17 outcome, its implication for Nepal, and the way forward for strengthening Nepal's position in the UNFCCC negotiation process. The programme helped all the stakeholders to realise their strengths and shortcomings in working towards building the country's capacity for climate negotiation, research and evidence-building, and the effective implementation of programmes and policies. The recommendations and insights generated through the deliberations during the programme will be helpful as guidelines for the government and the civil society organisations to work towards achieving the intended capacity-strengthening goals and evaluating the progress made in the future. The format of the programme was also unique in itself such that the discussions were issue-based and focused on strengthening Nepal's capacity for UNFCCC negotiations (UNFCCC 2011).

The government of Nepal, the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), and the International Union for Conservation of Nature (IUCN) jointly launched the 'Ecosystem based Adaptation in mountain ecosystem in Nepal (EbA)' Project on 16 August 2012. The project aims at implementing an emerging approach to help people to adapt to the adverse impacts of climate change. The project document was jointly signed by Harihar Sigdel, Joint Secretary and Chief of Planning and Human Resources Development Division, Ministry of Forests and Soil Conservation (MoFSC), on behalf of the government and Shoko Noda, Country Director, UNDP Nepal, on behalf of the EbA partners UNDP, UNEP, and IUCN. The project is intended to run for three years starting from August 2012. The three million dollar project, funded by the government of Germany, will be piloted in the Panchase area which spans across the Kaski, Parbat, and Syangja districts in the western part of Nepal. The project will strengthen ecosystem resilience and reduce the vulnerabilities of mountain ecosystems and their communities to the impacts of climate change (Himalayan News Service 2012).

Chapter 4
Social Environment

4. Social Environment

4.1 Overview

According to the 2011 Census preliminary result, the estimated population of Nepal was 26,494,504 as of 22 June 2011. The average rate of the annual population growth between 2001 and 2011 was 1.35%. Its population density was 180 people/km² (national average). There are also 125 caste/ethnic groups reported in the 2011 Census. The major ethnic composition was roughly divided as follows: Chhetri (16.6%), Brahmin hill (12.2%), Magar (7.1%), Tharu (6.6%), Tamang (5.8%), Newar (5.0%), Kami (4.8%), Muslim (4.4%), Yadav (4.0%) and Rai (2.3%). With regards to religion, 81.3% were Hindus, 9% were Buddhists, 4.4% were Islam, 3.1% were Kirat and 1.4% were Christians. These groups of people are scattered over different parts of the country. Nepal is a multi-ethnic and multilingual country. Each community, group, and tribe has its own mother tongue. The official language of Nepal is Nepali, but there are more than 92 languages spoken as a mother tongue. Nepali is spoken as mother tongue by 44.6% of the total population, followed by Maithili (11.7%), Bhojpuri (6.0%), Tharu (5.8%), Tamang (5.1%), Newar (3.2%), Bajjika (3.0%), Magar (3.0%), Doteli (3.0%) and Urdu (2.6%) (CBS 2011).

Until Nepal became a republic in May 2008, it had been ruled mostly by monarchs or a ruling family in relative isolation. A brief experiment with multi-party politics in 1959 ended with King Mahendra suspending parliament and taking sole control in 1962. Democratic politics were introduced in 1990, but this resulted in frequent changes of government. The last king of Nepal, Gyanendra, twice assumed executive powers – in 2002 and 2005.

After a ten-year civil war, Nepal is finally on the path to democracy. Maoists ran the decade-long insurgency (1996-2006) against the ruling monarchy. The war left more than 13,000 people dead and an estimated 100,000 to 150,000 people internally displaced according to UN figures. The rebels were only ready to negotiate with the parliamentary government after King Gyanendra ended his rule in 2006. The Comprehensive Peace Agreement was concluded in November 2006, although the Maoists continued to press for the monarchy's abolition. Parliament agreed to the condition in December 2007, and the Maoists emerged as the largest parliamentary party after elections in April 2008. The monarchy was formally abolished and a Maoist-dominated government took office that August. Still, political instability has plagued Nepal ever since the end of the civil war (UNESCO 2011).

Many major historical, social, political, and economic transformations have taken place over past years. In 2012, the overall situation in Nepal was still characterized by ongoing political instability and by the fragility of Nepal's peace process. Establishing efficient and transparent governance and administration, developing basic infrastructure, accelerating economic development, and eradicating poverty remain Nepal's major challenges to development.

Year-long controversies amongst political parties on power-sharing have contributed to Nepal's economic growth, which lags far behind those of neighbouring countries' booming economies. In addition to its fragile economic and political situation, Nepal is characterized by social inequality. Nepal's population is a cultural mosaic, which comprises over 103 ethnic groups and castes speaking over 92 languages.

Nepal was first listed as a Least Developed Country (LDC) by the UN in 1971. Despite almost five decades of foreign aid, Nepal continues to be one of the poorest countries in the world, with almost one-third of its population living below the poverty line. The per capita income was USD1, 300, placing it 204th among 226 countries in 2011; about one quarter of the population lives on less than USD 1.25 per day. The gross domestic product (GDP) in 2011 was estimated at over USD 18.3 billion (adjusted to nominal GDP), making it the 100th largest economy in the world. In 2011, the real GDP growth rate was 3.5%, which was lower than the previous year's 4.5%. Most of the population depends on agriculture, and the country is also heavily dependent on trade with neighbouring India. The country's 18 million-person workforce suffers from a severe shortage of skilled labour. The unemployment rate of the country is 46% (UNESCO 2011).

4.2 Regulations and Policies

The Interim Constitution of Nepal (2007) guarantees equal rights to all citizens (Article 13[1]). It also declares that the right to live in a clean environment is a fundamental right of every person (Article 16[1]). The following is a list of the major acts and regulations declared at various times:

Acts:

- Gender Equality Act (2006)
- National Woman Commission Act (2006)
- Children's Act (1992)
- Child Labour (Prohibition and Regulation) Act (2000)
- Labour Act (1992)
- Trade Union Act (1992)
- Protection and Welfare of the Disabled Persons Act (1982)
- Senior Citizens Act (2006)
- Social Welfare Act (1992)
- National Human Rights Commission Act (2012)

Regulations:

- Children's Rules (1995)
- Child Labour (Prohibition and Regulation) Rules (2006)
- Labour Rules (1993)
- Trade Union Rules (1993)

International instruments:

- Convention on the Political Rights of Women (1966)
- Convention on the Elimination of All Forms of Discrimination against Women (1991)
- Convention on the Rights of the Child (1990)

In addition, Tables A-1 and A-2 in the Appendix show major governmental acts, rules, international conventions, protocols and treaties related to the environmental and social considerations.

4.3 Protection of Rights

4.3.1 Poverty

According to the 2010/11 poverty line, a person in Nepal is considered poor if his/her per capita total annual consumption is below NPR 19,261. Using the same measure, the poverty incidence (head-count rate) in Nepal in 2010-2011 was placed at 25.1% of the population. The poverty rate is much lower in urban areas (15.46%) than in rural areas (27.4%). During the last 15 years,

the incidence of poverty decreased in urban areas from 21.55% to 15.46%. Table 4.3.1 presents a comparison of poverty ratios in 1995/96 and 2010/11.

Table 4.3.1: Poverty Ratio, Gap, and Severity in Nepal (1995/96 and 2010/11)

Segment	Poverty Line People (Head Count Index) (%)		Poverty Gap Index (%)		Squared Poverty Gap Index (%)	
	1995/96	2010/11	1995/96	2010/11	1995/96	2010/11
Nepal	41.76	25.16	11.75	5.43	4.67	1.81
Urban	21.55	15.46	6.54	3.19	2.65	1.01
Rural	43.27	27.43	12.14	5.96	4.83	2.00

Note: The Squared Poverty Gap is often described as a measure of the severity of poverty. While the poverty gap takes into account the distance separating the poor from the poverty line, the squared poverty gap takes the square of that distance into account. When using the squared poverty gap, the poverty gap is weighted by itself, so as to give more weight to the very poor. In other words, the squared poverty gap takes into account the inequality amongst the poor.

Source: CBS (2011)

Since 1976/77, the incidence of poverty has been increasing in Nepal. It was only in 2003/04 that some progress in reducing poverty was reported, and this was mainly due to the significantly higher inflow of remittance compared to earlier years, rapid urbanization, and an increase in non-farm incomes. This resulted not only in the decline in the proportion of the population suffering from poverty but also in a decline in the absolute number of people suffering from poverty. However, such a decline in the incidence of poverty was achieved at the cost of increased inequality. The Gini coefficient increased from 0.24 in 1984/85 to 0.41 in 2003/04. Imbalanced growth in rural and urban areas could be the reason for that increase. The reduction of poverty in urban areas always remains higher when compared to rural areas. Thus, the incidence of poverty is always highest in Nepal's mid-western and far-western rural hills (Joshi et al. 2010).

The poor, whose livelihoods often depend on natural resources, are particularly affected by environmental health problems and climate vulnerability. Health problems—lack of water supply, sanitation and energy access—are significantly linked to the environment. Nepal accounts for the lowest share of commercial energy among all South Asian countries. Nutrition and livelihood security for poor women and men are closely linked to land tenure. Overall, the people who typically remain poor are agricultural wage earners, those who are landless or have small land holdings, those with illiterate household heads, and those living in large households

(with seven or more members). The lack of rural opportunities is leading to huge emigration abroad and to urban areas. Although Nepal is one of the least urbanized countries in the world, its rate of urbanization has increased dramatically and now stands as the highest in South Asia. The economy is growing at 5% per year, but poverty reduction is limited by social exclusion and inequality. Social exclusion remains significant because of caste/ethnic divisions (details in Chapter 7) and gender discrimination (details in section 4.3.2).

The Nepal government made poverty alleviation a major objective of several plans since the Eighth Plan (1992-97). The aim was to reduce the increasing gap between rich and poor through a number of micro level programs. A separate Ministry of Cooperatives and Poverty Alleviation (MoCPA) was formed in May 2012 by breaking up the Ministry of Agriculture and Cooperatives in order to cope with this nation-wide problem. The Poverty Alleviation Fund is another agency concerned with poverty reduction. It was established in 2003 under the Poverty Alleviation Fund Ordinance, operating through the Poverty Alleviation Fund Act 2006.

4.3.2 Gender

In Nepal, like other developing countries, the status of women is unsatisfactory. The male-dominated family system provides very little room for women to assert themselves. They are marginalised and alienated from economic and social opportunities because of illiteracy, poverty, and conservative social taboos.

Gender-based discrimination is widespread and extends to ownership of productive assets (such as cattle), access to resources (such as land and other property), access to health and educational opportunities, access to public decision-making positions, work burden, mobility, and overall cultural status. As a result, the structural dependence of women on men is high. The lack of food, lack of health care and education, malnutrition, iron deficiency, early pregnancy, frequent child bearing and, most importantly, their weak bargaining power to protect themselves from different kinds of violence, these factors all increase the vulnerability of girls and women. Despite progressive policy reforms, human development indicators of Nepali girls and women (especially those from marginalized castes and ethnicities from remote areas) remain low (UNFPA. 2012).

In the last few years progress has been achieved with regards to policy, legal, and institutional frameworks in advancing gender equity and the empowerment of women in Nepal. Some discriminatory laws against women have been amended by the Gender Equality Act 2006. The

National Commission on Women has been formed, and gender focal points have been appointed in all ministries. A national mechanism for institutionalizing gender budgeting has been initiated through the establishment of the gender responsive budget committee in the Ministry of Finance in 2005. For the first time, the 2008 budget included a mechanism to track the budget for gender responsiveness, which showed that 11.3% of allocations were directly gender responsive. A rebate of 10% for land deeds registered in the name of women was introduced in 2004, and this has been increased to 20% since 2005. The number of female parliamentarians in the 2008 Constituent Assembly increased significantly because of a requirement that at least 33% of each party's candidates be women. Efforts have clearly been made to promote greater inclusion in government institutions. In 2007, the second amendment of the Civil Service Act reserved 45% of its positions for women (ADB 2008).

Women's participation in public life is slowly improving, partly due to these legal approaches. However, men still remain in control of most resources and political decision-making processes. The Ministry of Women, Children and Social Welfare (MoWCSW) is one of the main governmental agencies that works to cope with gender-related issues.

4.3.3 Child Labour

The 2008 Nepal Labour Force Survey estimates the child population between 5 and 17 years of age to be 7.77 million. About 3.14 million children (40.4% of the child population in the 5 to 17 year age group) may be classified as children in employment. Among these working children, 1.6 million (51% of all working children) are estimated to fall into the category of child labour. The majority of these children do not go to school (ILO 2011).

The law has established a minimum age requirement of 16 for employment in industry and 14 for employment in agriculture. It also requires acceptable working conditions for children. The law has established specific penalties for those who unlawfully employ children, but regulations to enforce this law have not been fully implemented. The Child Labour Act of 2000 applies only to formal sectors of the economy, such as tourism, factories (e.g., cigarette or carpet manufacturing), and mines (USDS 2013).

Within the child labour category, 620,000 children have been identified as engaged in hazardous work which is prohibited by law. Child labour has been widespread in Nepal for many centuries and mostly in rural areas as part of the normal process of socialization. In the countryside, children have always worked, and they continue to work long hours alongside their parents in

the fields and at home. Although the participation rate for children in Nepal is estimated at about 40.4%, there is a significant difference between that of girls (47.6%) and that of boys (36.1%). In Nepal, the majority of children work in the agricultural sector, followed by services, manufacturing, and other sectors. They are mostly employed informally as domestic servants, porters, rag pickers, or carpet factory workers, but also in restaurants and the transportation sector (ILO 2011).

Recently, some positive steps have been taken with respect to child labour and policy development. One of these is the ten-year National Plan of Action for Children. The International Labour Organization (ILO)'s International Programme on the Elimination of Child Labour (IPEC) has been an active partner with the government in developing the plan. The Ministry of Labour, responsible for enforcing child labour laws and practices, has recently come up with a Master Plan of Action for the Elimination of Child Labour. The Master Plan outlines strategies and programmes that are aimed at eliminating child labour.

Among other important efforts, the decision taken by the government in July 2000 to outlaw the Kamaiya system of bonded labour has had far-reaching consequences. This decision allows the debt-ridden rural farmers and their children who work as bonded labourers to pay off debts incurred by their ancestors. MoWCSW, with the assistance of IPEC, has revised the National Plan of Action to include combating the trafficking of women and children for sexual exploitation. In addition, the government has formed a number of commissions and other bodies, including the Child and Women Development Section of the National Planning Commission (NPC) and the Social Welfare Council, which is responsible for monitoring social welfare activities in the country. Under the coordination of the Chief District Officer, district child welfare boards have been set up. These agencies are responsible for coordinating policy planning and for formulating action programmes related to the welfare, development, and rehabilitation of children working in difficult situations.

Through these initiatives, the labour force participation rate of working children aged 5 to 17 years declined from 48% in 1998 to 41% in 2008. However, there is still a long way to go for the government to reduce the incidence of child labour and increase school enrolment, as legal provisions that safeguard child rights and prevent child labour are not yet adequately enforced (ILO 2011). The revised version of Children's Act 1992 was prepared in 2012, but it has not yet been approved by the government.

4.3.4 Workers' Rights

In 2008, Nepal's economically active population aged 15 and above (labour force) totalled 12 million people, consisting of 6.4 million women and 5.6 million men. The higher number of women in the labour force compared to men is partly a reflection of migration abroad, which is predominantly undertaken by men (Adhikari 2012). Only 10% of the total work force is employed in the formal sector; the remaining 90% work in the informal sector. Of the formal sector work force, 75% of employees participate in unions. The law grants workers the freedom to establish and join unions and associations, but government protection of these rights is randomly implemented. The law permits the prohibition of unions only in cases of subversion, sedition, or similar conditions. In the public sector, employees under the level of undersecretary are permitted to join a union. The law contains enabling regulations; however, the government does not fully implement acts protecting trade unions (USDS 2013).

The government does enforce some barriers against the participation in union federations through the establishment of minimum required thresholds for the formation of trade union federations and confederations. The government does not, however, restrict unions from joining international labour bodies. The law provides the right to strike except by employees in essential services, and workers regularly exercise this right. The government has used this legislation to ban strikes in several sectors, including those that are beyond international standards for essential services. The law allows the government to halt a strike or to suspend a union's activities if the participants are disturbing the peace or if the strike adversely affects the nation's economic interests. The process for conducting a legal strike is cumbersome, as 60% of a union's membership must vote in favour of the strike in a secret ballot and the union is required to give a notice of 30 days before conducting the strike (USDS 2013).

The proportion of paid employees is about 16.9%. It is estimated that about 9 million people are working in informal sectors that are not covered by labour legislation (Adhikari 2012). The unemployment rate in Nepal has not shown a significant change between 1998/99 and 2008, standing at 2.1% in 2008. While recent labour market information does not exist in Nepal to adequately assess the situation, the low unemployment level in Nepal may be a reflection of the absence of well-developed social protection schemes; most people in Nepal simply cannot afford to be unemployed and instead are engaged in any work that becomes available. The urban unemployment rate is significantly higher than the rural unemployment rate, a reflection of the migration of jobseekers into urban areas in search of jobs. There has been an expansion in 'vulnerable employment', rather than a rise in unemployment levels. Many workers in vulnerable employment operate in the informal economy, which typically offers low-quality,

unproductive and poorly remunerated employment opportunities. Moreover, many of these jobs are not recognized or protected by law, offer little or no social protection, and are typically characterized by the absence of rights as well as a lack of representation and voice in the workplace (ILO 2010).

Employers worry about a high level of employee absenteeism and low levels of employee motivation and productivity because of the shortcomings of labour legislation. They often demand more autonomy from the government to oversee employment relations, and they get frustrated by increasing power outages, frequent transportation and market shut-downs, and increasing tension between labour and management. They argue that certain provisions in the Labour Act and Trade Union Act are ambiguous and have led to unnecessary tensions and disputes between employers and employees. Unions, on the other hand, are unhappy with employers' poor compliance with given labour legislation (Adhikari 2012).

Unproductive and poorly remunerated jobs without legal or social protection often entrap Nepali people in a cycle of working poverty. Increasing the quality of jobs will initially require an enabling environment that includes the rule of law, secure property rights, and respect for fundamental principles and rights at work. In their 2010 report, the ILO communicated the need for better coordinated economic, employment and social protection policies. This will require substantial policy coordination between the NPC, the Ministry of Labour and Transport Management, economic, financial, and sectoral ministries, workers' and employers' organizations, as well as the strengthened capacities of these institutions for coordinated policy design, implementation, and monitoring (ILO 2010).

The concept of occupational safety and health (OSH) is still quite new to Nepal. The Labour Act (1992) is considered to be the first legislation that is relevant to OSH. The Labour Act and its subsidiary rules, Bonus Act and rules, are the main labour laws in the country; they cover working conditions, the welfare of workers, safety and health, and industrial disputes. The coverage of the Labour Act is confined to companies that employ ten or more workers, and the government retains the ability to extend these provisions on a selective basis to smaller organizations. The Labour Act contains provisions for conditions of work, workmen's compensation, leave and holidays, safety and health, minimum wage fixation, and the settlement of labour disputes. Nepal has not yet ratified the ILO convention No. 155 on OSH. The Department of Labour is overseen by the Ministry of Labour and Transport Management and is the central body for labour administration, mainly functioning at the policy level. The safety and health provisions under Labour Act (1992) are enforced by factory inspectors

employed by the labour office. However, because of their limited numbers, they are unable to conduct inspections on a regular basis. This lack of regulation adherence is not sufficient for establishing sound OSH conditions. It is estimated that for each year, approximately 20,000 workers in Nepal are harmed from accidents at their place of work, resulting in about 200 deaths (Gautam and Prasain 2011).

Businesses are legally required to notify the concerned Labour Office about all accidents, fatal or otherwise, that lead to man-day losses. Most of the accidents cause finger, hand, head, eye, palm, and leg injuries. There are a variety of causes for these accidents, the most predominant being unsafe working environments; congested workplaces; lack of supervision, monitoring, and training; negligence in the government inspection, monitoring, and supervision system; ignorance, as well as carelessness, of the workers and employers; use of old or outdated machinery or equipment; lack of regular repair and maintenance of tools, machinery, and equipments; bad housekeeping practices; lack of safety equipment that meet quality standards; the violation of safety rules; and unsuitable working conditions. Currently, in addition to places of work, a number of accidents happen on or near roadways due to an increased amount of traffic and poor automobile maintenance. It has also been noted that there many unreported traffic (automobile) accidents. Further, the construction industry, which has a high accident rate, is not fully covered by the Labour Act as its work is often subcontracted to small companies with less than ten workers (Gautam and Prasain 2011).

4.3.5 Persons with Disabilities

In Nepal, persons with physical and mental disabilities face discrimination in schools and the workplace and in their access to health care and the provision of other state services. The country even lacks a consistent and authentic database regarding the disabled population. The NPC estimated the percentage of persons with disabilities in Nepal to be between 1% to 8% of the total population (NPC 2007). Most persons with disabilities (90%) live in rural areas (MoH 2007). In the past, before the development of modern medicine, people passively accepted disabilities as part of their fate or as a punishment from God for some sin committed in a past life. Along with the advancements, such concepts have been slowly changing (Joshi 2004).

The first legal instrument regarding disabilities was enacted in 1982 as the Disabled Protection and Welfare Act; the Disabled Protection and Welfare Rules was established later in 1994. Since there was a need to prepare and implement a timely national policy, the National Policy and Action Plan for persons with disabilities was prepared in 2007. Nepal is also a signatory of the

United Nations Convention on the Rights of Persons with Disabilities, and its interim constitution commits to fulfilling the rights of these individuals. However, the country has yet to take affirmative action to fulfil these rights. The law also mandates that buildings, transportation, employment, education, and other state services be accessible for persons with disabilities, but these provisions are generally not enforced.

The Ministry of Women, Children, and Social Welfare (MoWCSW) has been designated for the coordination and monitoring of the National Policy and Action Plan in an institutional form. The Disabled Service National Coordination committee, which falls under the MoWCSW at the national level, has also been specified for the coordination and monitoring of services for person with disabilities. The Ministry of Education provides scholarships for children with disabilities, and the Ministry of Local Development is required to allocate 5% of the budget of their local development agencies for disability programs (USDS 2013).

In 1993, the National Federation of the Disabled Nepal (NFDN) was established. It is an umbrella organization representing the Disabled Peoples' Organizations (DPOs) working for the cause of persons with disabilities across the country. NFDN supports DPOs to grow and strengthen by providing the following: training, raising awareness, and information to build the capacity of persons with disabilities and the organizations themselves (NFDN 2011). Local and international NGOs, such as the Nepal Disabled Human Rights Center (DHRC-Nepal), are also active in this field. Some of the NGOs receive funding from the government; however, most persons with disabilities rely almost exclusively on family members for financial support.

Overall, persons with disabilities in Nepal are not without a legislative context. However, the government's inability to enforce laws and regulations has limited the effectiveness of its efforts to improve rights and benefits for persons with disabilities. In addition, the legislation and policies tend to be provisional rather than rights-based, focusing on what persons with disabilities will be provided with rather than asserting their equal rights in society. Therefore, a shift from provision to rights-based legislation is important for Nepal (DHRC 2013).

4.3.6 Sexual Minorities

Nepali society is dominated by the Hinduism culture, which has a low level of tolerance for diversity of sexual orientation (BDS 2013). Lesbian, gay, bisexual, transgendered, or intersex (LGBTI) people continue to face violence, harassment, and discrimination. Such treatment is particularly salient in the south, particularly in the Terai region (ENK 2011). Homosexuals can

face harassment by both the authorities and their fellow citizens. Lesbians in Nepal face greater challenges than gay men, largely because of the lower social status of women and the general economic gender inequality. Transgendered people in particular face challenges accessing employment, education, and health care, which may be due to their inability to obtain citizenship certificates recognizing their third-gender status.

Nevertheless, Nepal is seeing a gradual shift toward increased tolerance. The Kathmandu Post, a Nepali newspaper, states that in 2011, Nepal has become 'more gay-friendly in recent years'. The Blue Diamond Society (BDS), an advocacy organization for sexual and gender minorities in Nepal, has indicated that gay individuals can now be more open about their sexuality, particularly in urban areas, although people in rural areas are still afraid to share their sexual orientation publicly (IRBC 2013).

The International Gay and Lesbian Human Rights Commission (IGLHRC) reports that the Government of Nepal (GoN) has developed a three-year human rights work plan for 2011 to 2014. The plan includes a human rights program designed to increase public awareness and acceptance of LGBTI people through public seminars in ten districts around the country. According to the BDS, at least five community-based LGBTI organizations have received funding from their local governments for skills development and public information programs; the BDS itself does not receive funding from the GoN (IRBC 2013).

In 2007, a Supreme Court ruling proclaimed that LGBTI persons are 'natural person[s]' and have the right to enjoy the fundamental human rights guaranteed to all Nepali citizens. Although the law does not specifically criminalize homosexuality, the ruling required that the GoN amend or enact laws to eliminate discrimination against individuals based on gender identity or sexual orientation. The GoN is reviewing a list of discriminatory laws that will be changed in the future to protect the rights of sexual and gender minorities. Various sources also indicate that the protection of rights for LGBTI people will be enshrined in Nepal's new constitution (IRBC 2013). According to recent news in January 2013, in accordance with the Supreme Court ruling, the GoN has started issuing citizenship certificates recognizing the third gender. In addition, the Ministry of Home Affairs has instructed its district administration offices to grant citizenship to sexual and gender minorities under the 'others' category (Kathmandu Post 2013).

4.4 Cultural Heritage

4.4.1 Relevant Regulations and Government Agencies

The Department of Archaeology (DoA), established in 1953 under the GoN, is the primary organisation for archaeological research and protection of the country's cultural heritage. The main concern of the DoA includes the protection and maintenance of archaeological sites and ancient monuments, remains of national importance, and museum and archive management. It also regulates all archaeological activities in the country, as per the provision of the Ancient Monument Preservation Act 1956 (with later amendments in 1988) and Ancient Monuments Preservation Rules 1989. The act and rules also offers ample provisions for the protection and preservation of any individual monuments, group of monuments, sites and even vernacular edifices located around the country, either private or public, that have archaeological, historical, artistic or aesthetic values. This act has authorised the DoA as the principal government authority in protecting and preserving the vast cultural heritage of Nepal.

At local levels, respective district administration and village administration have stakes as per provisions in the Local Self-Governance Act 1999. Similarly, various government agencies have certain roles, as their affiliated acts and laws would entitle them. The other associated legal provisions are Town Development Act 1988; Local Administration Act 1971; Village Development Act 1991; Land (Survey & Measurement) Act 1961; Land Revenue Act 1977; Land Acquisition Act 1977; Environmental Protection Act 1997; Tourism Act 1978; and Tourism Board Act 1997 (UNESCO 2006).

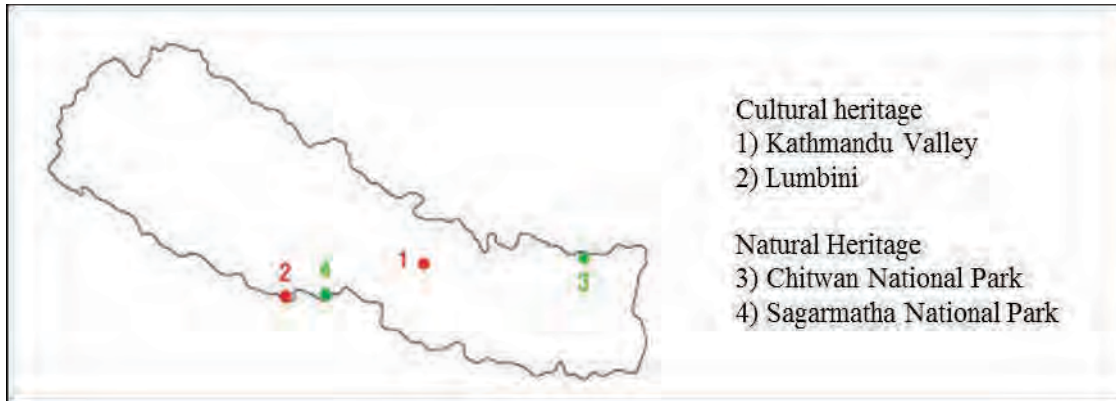
4.4.2 Major Cultural Heritage in Nepal

Four properties are listed on the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List in Nepal as of December 2012, of which two are cultural heritage sites and two are natural heritage sites (Table 4.4.1 and Figure 4.4.1).

Table 4.4.1: World Heritage Sites in Nepal

Site	Properties	Registered year
1. Kathmandu Valley	Cultural heritage	1979
2. Lumbini, the Birthplace of the Lord Buddha	Cultural heritage	1997
3. Chitwan National Park	Natural heritage	1984
4. Sagarmatha National Park	Natural heritage	1979

Source: UNESCO (2012)



Source: ZenTech (2012)

Figure 4.4.1: World Heritage Sites in Nepal

Cultural heritage

1) Kathmandu Valley (1979)

The cultural heritage of the Kathmandu Valley is illustrated by seven groups of monuments and buildings that display the full range of historic and artistic achievements that hold worldwide acclaim. The seven include the Durbar Squares of Hanuman Dhoka (Kathmandu), Patan and Bhaktapur, the Buddhist stupas of Swayambhu and Baudhdhanath and the Hindu temples of Pashupati and Changu Narayan.

2) Lumbini, the Birthplace of the Lord Buddha (1997)

Siddhartha Gautama, the Lord Buddha, was born in 623 B.C. in the famous gardens of Lumbini, which soon became a place of pilgrimage. Among the pilgrims was the Indian emperor Ashoka, who erected one of his commemorative pillars there. The site is now being developed as a Buddhist pilgrimage centre, where the archaeological remains associated with the birth of the Lord Buddha form a central feature.

Natural Heritage

1) Chitwan National Park (1984)

At the foot of the Himalayas, Chitwan is one of the few remaining undisturbed vestiges of the 'Terai' region, which formerly extended over the foothills of India and Nepal. It has particularly rich flora and fauna. One of the last populations of single-horned Asiatic rhinoceros lives in the park, which is also one of the last refuges of the Bengal tiger.

2) Sagarmatha National Park (1979)

Sagarmatha is an exceptional area with dramatic mountains, glaciers and deep valleys,

dominated by Mount Everest, the highest peak in the world (8,848 m). Several rare species, such as the snow leopard and the lesser panda (red panda), are found in the park. The presence of Sherpas, with their unique culture, adds further interest to this site.

There are other properties that have been submitted to the Tentative List of UNESCO World Heritage as follows:

- The early medieval architectural complex of Panauti (1996)
 - Tilaurakot, the archaeological remains of ancient Shakya Kingdom (1996)
 - Cave architecture of Muktinath Valley of Mustang (1996)
 - The medieval palace complex of Gorkha (1996)
 - Ramagrama, the relic stupa of Lord Buddha (1996)
 - Khokana, the vernacular village and its mustard-oil seed industrial heritage (1996)
 - Medieval Earthen Walled City of Lo Manthang (2008)
 - Vajrayogini and early settlement of Sankhu (2008)
 - Medieval Settlement of Kirtipur (2008)
 - Rishikesh Complex of Ruru Kshetra (2008)
 - Nuwakot Palace Complex (2008)
 - Ram Janaki Temple (2008)
 - The Medieval Town of Tansen (2008)
 - Sinja valley (2008)
 - Bhurti Temple Complex of Dailekh (2008)
- (UNESCO 2012)

4.4.3 Issues Related to the Protection of Cultural Heritage

The introduction of the Ancient Monuments Preservation Act 1956 marked the provision of the modern concept of heritage conservation in Nepal. Cultural heritage conservation has been of interest to many national and international agencies. It is also linked with tourism and development, as well as its primary intention of preserving cultural and historic heritage. However, much needs to be done with regards to the promulgation of effective policies and institutional frameworks to address various challenges. There is a pressing need to balance conflicting interests between different stakeholders, for example, tourism agencies and the local entrepreneurs, donor agencies and government institutions, conservation works and development projects. The DoA does not have adequate resources and mechanisms to oversee projects, and to take care of heritage sites across the country. The complications of the management of world heritage sites in the Kathmandu Valley were criticised by international

agencies such as UNESCO, resulting in its position on the 'endangered list' in 2003, which was recently reversed. In addition, as the old saying refers to the Kathmandu Valley as 'Nepal', the Act rather limits itself to the heritage of that specific area. Therefore, the first and foremost challenge of heritage policy in Nepal would be to expand the legal provision to other regions (Chapagain 2008).

Chapter 5
Environmental Assessment

5 Environmental Assessment

5.1 Legal Framework

The legislative bases for environmental assessment in Nepal are the Environment Protection Act (EPA) and the Environment Protection Rules (EPR), both enacted in 1997. The latter was substantially amended on 20 August 2007. The EPA obliges the project proponent to prepare an Initial Environmental Examination (IEE) report or an Environmental Impact Assessment (EIA) report on the prescribed proposal. The EPR determines the criteria to judge whether the required Environmental Assessment (EA; hereafter we use EA to refer to both IEE and EIA) report to the project is IEE or EIA. The criteria are shown in Tables A-28 and A-29 in the Appendix.

The EPR elaborates on the provisions to prepare and submit an EA report for approval. Figure 5.2.1 illustrates the overall procedure of an EA. While an IEE is reviewed and approved by the relevant ministries (Table 5.2.1), an EIA is reviewed and approved by the Ministry of Science, Technology and Environment (MoSTE).

Besides the EPA and the EPR, several other acts and rules provide opportunities to conduct an environmental assessment, as shown in Table 5.1.1.

Table 5.1.1: Sectoral Laws Providing the Opportunity to Conduct an EA

Name (establishment year)	Description
Electricity Act (1992)	It contains provisions to minimise soil erosion, floods, air pollution and damage to the environment while producing and transmitting electricity.
Electricity Rules (1993)	It stresses environmental analysis, which should include environmental mitigation measures to minimise adverse impacts likely to occur while developing hydro-electricity.
Forest Act (1993)	It requests to conduct an EIA of a development proposal if it is to be implemented in a forest area and/or passes through a forest area.
Mines and Minerals Rules (2000)	It obliges the proponent to adopt environmental protection measures and to ensure environmental conservation. These rules provide an opportunity to identify potential

Name (establishment year)	Description
	environmental impacts and to implement mitigation measures, which is a part of the EIA process.
National Parks and Wildlife Conservation Act (1973)	It contains a number of environment-friendly provisions and prohibits activities that will have adverse impacts on the environment. The act empowers government to give consent to use any part or any category of forest areas, in case of the absence of an alternative, for the implementation of the national priority proposal, with the assurance that it does not pose any significant adverse effect on the environment.
Tourism Act (1978)	It contains provisions to minimise waste and environmental pollution in trekking areas.
Water Resources Act (1992)	It contains provisions to minimise environmental impacts, including soil erosion, floods and landslides. The act calls for carrying out an EIA study before project implementation. The act also empowers government to frame standards while utilising water resources, as well as to frame rules on environment-related matters and pollution control.
Buffer Zone Management Regulation (1996)	These acts and rules emphasise EIA provisions in their particular articles.
Explosive Material Act (1961)	
Himalayan National Park Regulations (1979)	
Lands Act (1964)	
Land Acquisition Rules (1977)	
Local Self-Governance Act (1999)	
Local Self-Governance Rules (1999)	
Road Board Act (2002)	

In Nepal, 100 EIAs from 12 different sectors of development projects were approved during the period between 1997 and 2010. Among these projects, the highest number (25%) came from the hydro-electricity sector and the lowest (3%) came from three sectors: hotel and tourism

development, irrigation and apartment buildings. Other approved EIAs of projects came from the following sectors: transmission line (14%), road (10%) and industry (9%), waste management (5%), drinking water (4%), agriculture and forest (11%), and others (12%) (Table 5.1.2).

Table 5.1.2: Approved EIA Reports of 100 Different Projects (by Sector)

Sector	Number
Hydro-electricity	25
Transmission Line	14
Agriculture and Forestry	11
Road	10
Industry	9
Waste Management	5
Drinking Water	4
Hospital	4
Irrigation	3
Hotel and Tourism	3
Apartment Buildings	3
Others	9

Source: Bhatt and Khanal (2010)

Other than acts and rules, there are three EIA Guidelines: National EIA Guidelines (1993), EIA Guidelines for the Forestry Sector (1995) and EIA Guidelines for the Industry Sector (1995).

The National EIA Guidelines (1993) were prepared under the supervision of the National Planning Commission (NPC) in collaboration with the Nepal office of the International Union for Conservation of Nature (IUCN Nepal). The National EIA Guidelines were envisioned for project implementers, project proponents, government officials, consultants and the public. These guidelines summarise the EA system in Nepal as of 1993.

The EIA Guidelines for the Forestry Sector (1995) were prepared under the direction of the National Conservation Strategy Implementation Project by the Ministry of Forestry and the NPC in collaboration with IUCN Nepal. These guidelines for the Forestry Sector provide provisions for the use of forest resources for socio-economic development and to meet the basic needs of communities from forest products. The aim of the guidelines is to promote cultural acceptability of a proposal, its economic feasibility and its environment sustainability.

The EIA Guidelines for the Industry Sector (1995) were also prepared under the direction of the National Conservation Strategy Implementation Project by the Ministry of Industry and the NPC in collaboration with IUCN Nepal.

Each of these three guidelines is obsolete; therefore, IUCN Nepal has been preparing new versions of the guidelines, reflecting the major amendments of the EPR in 2007.

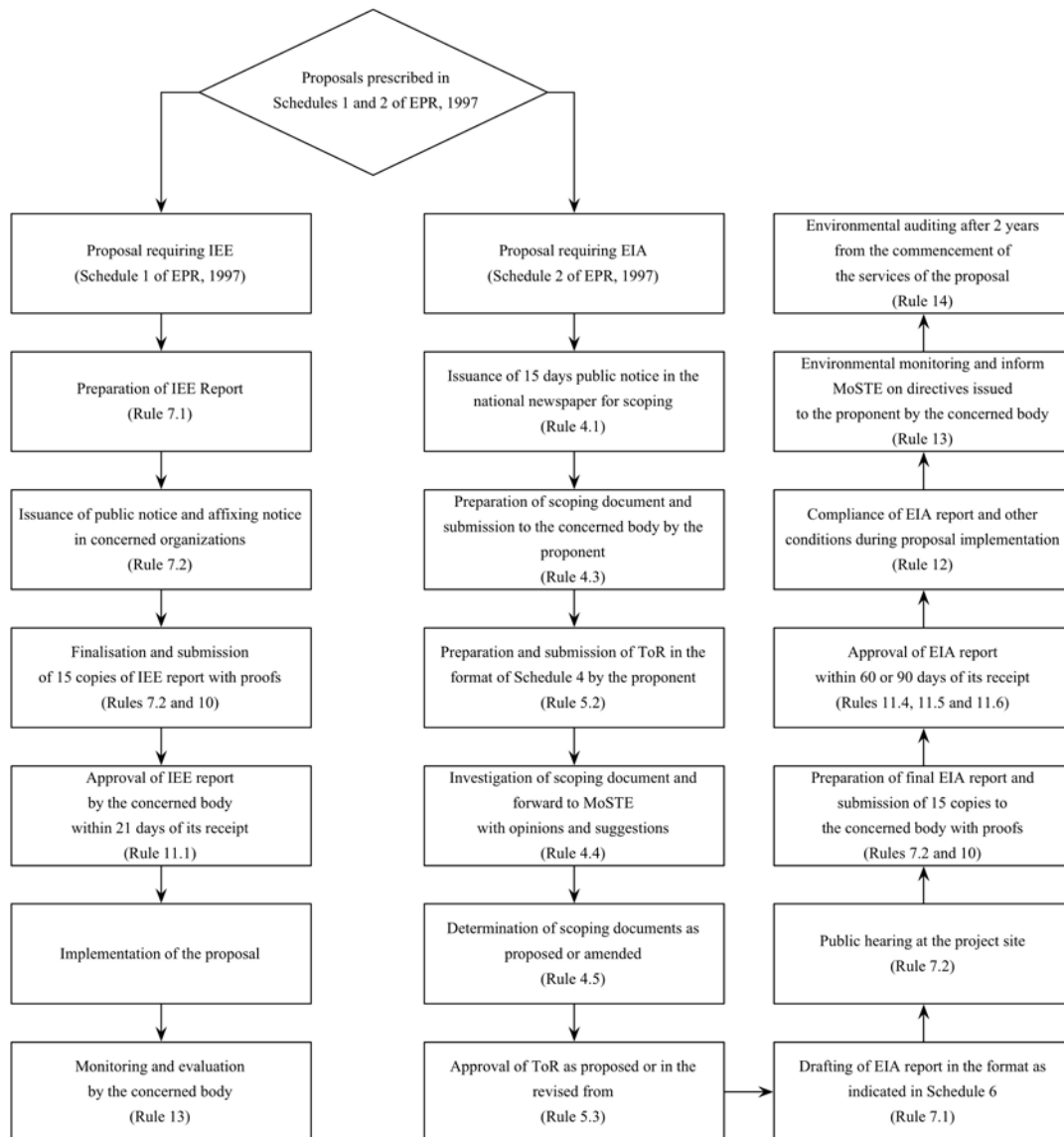
5.2 Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA)

5.2.1 Projects Subject to the IEE/EIA

The development projects that are subject to the IEE and EIA are listed in Schedules 1 and 2 of the EPR, respectively (See Tables A-28 and A-29 in the Appendix). The EPR was substantially amended in 2007, and these schedules were also changed. To date, the schedules are available only in Nepali. The distinction as to whether an EIA or an IEE is required for the project is based mainly on the contents, size and location of the project proposed.

5.2.2 Procedures and Relevant Organisations

Before 1997, when the EPR was first formulated, EAs were implemented in a closed-door approach during the project planning stage. However, with the enforcement of the EPR, the opportunity for the involvement of stakeholders has increased. Now, environmental professionals carry out EAs in a relatively open fashion. The overall process of IEE/EIA review is illustrated in Figure 5.2.1.



Source: GoN and MoEST (2006) [modified]

Figure 5.2.1: Flowchart of the IEE/EIA Process

While an IEE is reviewed and approved by the relevant ministries, an EIA is reviewed and approved by the Ministry of Science, Technology and Environment (MoSTE). MoSTE was formerly called the Ministry of Environment, Science and Technology (MoEST), but the ministry changed its name in November 2012 (Section 1.2). Taking the nature of the proposed project into consideration, the relevant agencies to review the report are determined. The candidates are listed in Table 5.2.1.

Table 5.2.1: List of Ministries and Departments with EA Responsibilities

No.	Ministry	Major Functions	Department
1.	Agricultural Development	Conduct research and usage of knowledge of agriculture chemistry and soil	Agriculture
		Development of agriculture technology, compost and chemical fertilisers	Livestock Services
		Quality certification of agricultural seeds, plants, livestock and fish	Nepal Agriculture Research Council
2.	Industry, Commerce and Supply	Set standards of the products, and promote technology development and technology transfer, including in the environmental field	Industries
			Standards and Metrology
			Mines and Geology
			Cottage and Small Industries
3.	Law, Justice and Parliamentary Affairs	Provide opinions and concerns to the concerned ministry before ratification and accession of multilateral treaties and agreements and membership in international and inter-governmental bodies	
4.	Home Affairs	Traffic control and assistance to disaster victims	
5.	Defence	Security to national parks and wildlife reserves	Royal Nepal Army
6.	Science, Technology and Environment	Development and promotion of alternative energy, data collection and survey of sophisticated technologies, including environment-friendly technologies	Hydrology and Meteorology
			Alternative Energy Promotion Centre
7.	Health	Environmental health	Health Service

No.	Ministry	Major Functions	Department
8.	Physical Planning, Works and Transport Management	Integration of bio-engineering techniques	Roads and Transportation
			Housing and Urban Development
9.	Urban Development	Urban development works	Water Supply Sewerage
10.	Education and Sports	Environmental education	
11.	Labour and Transport	Occupational health and safety Vehicular pollution control	Labour
			Transport management
12.	Local Development	Local development	
13.	Culture, Tourism and Civil Aviation	Cultural heritage Eco-tourism	Archaeology
			Tourism Promotion Board
14.	Water Resources	Integration of EIAs and other aspects of environment in water resources and energy projects	Electricity Development
			Irrigation
			Water and Energy Commission
			Electricity Authority

Source: Anneveldt and Pasman (2001) [modified]

Setting Terms of Reference (TOR) is done for both IEEs and EIAs, although the scoping process is only for an EIA. According to the EPR, an EA report should include detailed information on environmental impacts and environmental protection measures with an implementation plan, monitoring and evaluation. For an EIA, environmental auditing is also required. The EA procedure also includes public consultation processes. It has been a pre-requisite in all the prescribed projects (Section 5.2.3).

The Schedules 5 and 6 of the EPR stipulate the matters to be mentioned in IEE reports and EIA reports, respectively (See Tables A-30 and A-31 in the Appendix).

5.2.3 Public Participation

Public participation takes place at least three times within the entire period of making an EIA. There are three major opportunities of public participation, which are during the process of scoping, during the field study for the EIA and during the EIA report approval process. In addition to the three major opportunities, a public hearing is sometimes required in the draft stage of the EIA report where a disclosure of the draft EIA report is undertaken.

Regarding IEEs, there is only one opportunity for the public to participate during the process: with the strictly limited form of public notice.

5.2.4 Participation of Experts, NGOs and Other Third Parties

The MoSTE is the relevant agency for the implementation of EIAs in Nepal. For the implementation of IEEs, taking the nature of the proposed project into consideration, the relevant agencies to review and approve the report are determined (Table 5.2.1). Including these agencies, the stakeholders governing the EA process and system in Nepal are the following:

1. Parliament
2. Parliamentary Committee on Environmental Management (PCEM)
3. The Cabinet, National Planning Commission (NPC)
4. Environmental Protection Council (EPC)
5. Ministry of Science, Technology and Environment (MoSTE)
6. Ministry and associated departments/agencies
7. Local governments
8. Donor agencies and NGOs/private sector

5.2.5 Information Disclosure

Earlier information disclosure of a draft report to local institutions such as community offices, Village Development Committees (VDCs) or municipalities used to be stipulated under Rules 8 and 9 of the EPR. However, after the 2007 amendment, these rules have been repealed and are now optional.

The project proponent needs to submit 15 copies of the report to the concerned body, as stipulated in Rule 10 of the EPR. After reviewing, the concerned body sends 10 copies of the report with suggestions to MoSTE.

5.3 Environmental Management Plan

Schedule 6 of the EPR stipulates the components of the EIA reports; the Schedule obliges project proponents to mention their Environmental Management Plans (EMPs) in their EIA reports. (See Table A-31 in the Appendix.) There are several cases of development projects in which EMPs have been formulated in their preparation phases. For instance, the National Water Plan, approved by the Government of Nepal in 2007, established an EMP that includes a mitigation plan, environmental monitoring, and environmental auditing (Water and Energy Commission 2005).

5.4 Strategic Environmental Assessment

To date, there is no formal legislation related to strategic environmental assessment (SEA) in Nepal. This means that the implementation of SEAs is optional. However, there are several cases where SEAs have been implemented. For instance, the above-mentioned National Water Plan mentioned an SEA (Water and Energy Commission 2005).

5.5 Monitoring

During the implementation period of the project, the project proponent should comply with the EA report submitted and approved in advance, as well as with comments raised by the concerned body or MoSTE to it, as stipulated under Rule 12 of the EPR. According to Rule 13.1 of the EPR, the concerned body is responsible for the monitoring. Also, according to Schedule 6 of the EPR, the project proponent should formulate monitoring procedures to monitor the impact of the implementation of the proposal on the environment, as well as the monitoring agency, time-schedule, monitoring and evaluation indicators, etc.

During the monitoring process conducted by the concerned body, if the actual impact is found to be more than what was stated in the EA report, the necessary directives are issued by the concerned body, and MoSTE should also be informed about the directive issued to the proponent to reduce or control such impacts. Then, the project proponent should comply with the directives according to Rule 13.2 of the EPR. MoSTE is also responsible for the environmental auditing in the EIA process, which starts only when a project is in its third year of operations, according to Rule 14 of the EPR.

To date, there is no act or ordinance that stipulates disclosure of monitoring results.

5.6 Major Issues and Challenges in the Current System

Effective implementation of the EA tool has been limited due to a lack of trained human resources and the practice of not mobilising the available human resources in environmental monitoring, a lack of information dissemination and database systems, ad-hoc procedure and criteria for reviewing the EA reports, and a lack of integrating EA recommendations into design and contract documents.

The influence of non-professionals in developing and enforcing the legal regime on EA and in preparing the EA reports prevails in many sectors. Because of this, the benefits of the EA tool have been boiled down largely to legal complication and the effectiveness of this tool has been diluted in project- planning and implementation. Furthermore, monitoring and evaluation are grossly inadequate.

The EA system and process in Nepal is lacking in policy-making, reporting requirement, methodology, and implementation mechanisms. The lack of skilled environmental professionals makes it worse for effective implementation of existing policies, guidelines and sectoral laws. Effective execution of the EIA as a tool is narrowed due to the lack of trained human resources and the practice of not mobilising available human resources in environmental monitoring. There is no proper information dissemination, nor are there database systems criteria for reviewing the EA reports.

Additionally, there is no formal policy for EAs, as well as no post-evaluation mechanism, which could show some implications and constraints in the EA system for an effective EA system, as at the international level. The monitoring and implementation of recommendation measures, audits and evaluations in the EA reports are inadequate, except for 20% of the large-scale donor-supported projects. Thus, the effectiveness of the EA as a tool has been boiled down largely to legal complication and its effectiveness has been reduced in project planning and implementation. Thus, assessments of EA studies strategically should be appropriate and emerged for policy- and decision-making processes, as well as for trends established in developed countries (Anneveldt and Pasma 2001).

Regarding environmental monitoring and auditing, within the responsibilities of the concerned

body and MoSTE, there are no proper guidelines for implementing, monitoring and auditing under the current EA system. According to the EPR, monitoring and auditing are included in the EA report; however, there exist no standards for compliance enforcement. There are no indicators for monitoring, and nothing is mentioned about schedules, plans and responsibilities.

Moreover, there is a major discrepancy between the central government and local governments. The projects at the national level and/or nationwide are likely to be reviewed and monitored by the guidelines stated in this chapter. However, small projects, such as area-specific projects, are likely to be reviewed and monitored by the local governments less properly.

5.7 Gap Analysis Between the Present Domestic Regulations, the JICA Guidelines for Environmental and Social Considerations and the World Bank Safeguard Policy

Although some gaps are identified between the existing domestic regulations and JICA Guidelines, no mutual contradictions have been identified. Generally speaking, the JICA Guideline is more specific and stringent than the stipulations on EA in Nepal.

The government laws pay less attention to the social impacts than the JICA Guidelines or the World Bank Safeguard Policy. Thus, the preparing of the Resettlement Action Plans (RAPs) or Indigenous People Plans (IPPs) is not mandatory. The 30-day term of public notice that the government stipulates differs greatly from the recommended 120-day by the JICA Guideline. Although the JICA Guideline suggest that the project proponents should disclose information related to EA, environmental monitoring and auditing, the responsibilities to implement these activities are incurred not by the project proponent but by the concerned body (relevant ministry) or MoSTE under the Nepal's legislation. Moreover, Request for external resources if the project proponent's capacity is inadequate has not been mentioned in the government laws.

Taking the above-mentioned into consideration, the project proponent should implement EA in line with both the government laws and the JICA Guidelines. Especially, for the aspect which no government laws mention, the project proponents should refer to the JICA Guidelines. The JICA Guidelines are consistent with the World Bank Safeguard Policy.

For further details of the gap analysis and case examples of projects by World Bank and Asian Development Bank, refer to Chapter 8.

Chapter 6

Land Acquisition and Involuntary Resettlement

6 Land Acquisition and Involuntary Resettlement

6.1 Legal Framework

Prior to 1990 there was no constitutional obligation for the State to pay compensation for the acquisition of personal property. The right to receive compensation was therefore not a fundamental right although there was a ‘moral obligation to pay for what you take’ (Thapa 1988). Article 17 of the Constitution of the Kingdom of Nepal (1990), however, establishes the right to property as a fundamental right, stating that ‘no person shall be deprived of his property save in accordance with the law’. The basis of compensation and the procedures for delivering compensation for any property acquired by the State are therefore prescribed by law. Land and asset acquisition is undertaken within the framework of the *Land Acquisition Act* (for permanent land acquisition) and the *Public Road Act* (for temporary land acquisition). The 1978 amendment to the Public Road Act was promulgated to ensure uniformity with the Land Acquisition Act (ADB 2008).

1) Land Acquisition Act (1977)

This Act empowers the Government of Nepal (GoN) to acquire any land for public purposes or works on payment of compensation. The acquisition and compensation of privately owned assets are undertaken according to a formal procedure consisting of (a) initial procedures, (b) a preliminary investigation process, (c) an acquisition notification, (d) a compensation notification and (e) appeal procedures.

Compensation determination committees (CDC) are established at district level to ascertain compensation rates for land and other assets. Compensation is paid (a) for damages caused as a result of investigations during the preliminary investigation process and (b) for land and assets permanently acquired by the project (including standing crops, trees and houses). Compensation is paid in a cash lump sum although titleholders who have lost all of their landholdings may be given replacement land, if available. Titleholders are required to submit compensation claims or complaints within a specified period after the land acquisition notice has been issued by the local authority (chief district officer). Compensation for land is paid after the determination of rates and verification of the list of entitled applicants by the CDC (MPPWDR 2011).

2) Public Road Act (1974)

The Public Road Act empowers the Department of Roads (DoR) to acquire any land on a temporary basis (for storage facilities, construction camps, etc.) during road construction and upgrades. The temporary acquisition of land containing any buildings (e.g. houses, sheds, temples and schools) is avoided where possible. The Act also empowers the DoR to 'lift earth, stone or sand from any adjoining land' during construction and upgrading works but does not provide for the leasing of land. However, the DoR is required to pay compensation for any damages caused to buildings, crops and trees where the farming activity of the landowner is interrupted or the landowner incurs expenses to restore the land after its return (MPPWDR 2007).

3) Land Reform Act (1964)

The provisions of the Land Reform Act that relate to the maximum permitted size of individual landholdings also apply to land acquisition since a landowner may not be compensated for more land than he is entitled to under the Land Reform Act regulations. In 1996 this Act was amended and this step was considered revolutionary in that it changed the existing system of land tenure by establishing the rights of tenants and providing ownership rights to the actual tiller. Different ceilings of agricultural land were set for Kathmandu Valley (50 ropani), hills and mountains (80 ropani) and the Tarai (25 bigha). (One bigha is the equivalent of 0.66 hectares while one ropani equals 0.05 hectares.) In addition to this ceiling, for houses and kitchen gardens, a family may own 8 ropani in the Kathmandu Valley, 16 ropani in hills and mountains and 3 bigha in the Tarai (Upreti et al. 2007).

The Land Reform Act also specifies compensation entitlements for registered tenants on land sold by the owner or acquired for development purposes. The provisions of the Land Acquisition Act are consistent with those of the Land Reform Act of 1964, namely, that a registered tenant is entitled to 25% of the total compensation. However, the fourth amendment of the Land Reform Act in 1996 increased the tenant's entitlement to 50%.

4) Guthi Corporation Act (1976)

Land acquisition must also comply with the provisions of the Guthi Corporation Act. Section 42 of this Act states that Guthi (religious trust land) acquired for a development must be replaced with other land rather than compensated in cash.

5) Forest Act (1993)

The Forest Act recognises the importance of forests in maintaining a healthy environment. Therefore Section 49 of the Act prohibits the reclamation of land, the setting of fires, grazing, removal or damage to forest products, the felling of trees or plants, wildlife hunting and the extraction of boulders, sand and soil from the national forest without prior government approval. Clause 68 (1) of the Forest Act states that the government may allow the use of any part of a government-managed forest, leasehold forest or community forest but only if the plan or project is of national priority and there is no alternative for its implementation. According to Clause 68 (2), if any people or communities experience loss while the land is in use, the government is required to compensate the loss (MoEST 2006).

6) Water Resources Act (1993)

The main objective of the Water Resources Act is to make legal arrangements for determining beneficial uses of water resources, preventing social, environmental and other hazardous effects to water resources and also for keeping these resources free from pollution. There is a provision in Section 16 for land acquisition from the government or the public for the construction of water resource projects. If the project is undertaken by the GoN or a licensee, the government may forbid the use of a house or land located in the area where the construction work is being performed or within a prescribed distance from the construction work by any other person for any reason. The government or licensee is, however, required to pay compensation, as prescribed under Land Acquisition Act, to the concerned person for any resultant damage or loss.

7) Local Self Governance Act (1999)

Part 5 of Clause 258 states that if a local governing body needs to acquire land to carry out any development and/or construction work within its area, it can acquire the land required as long as it follows the requirements of the prevailing law and provides compensation to the concerned landowner for the land.

8) Town Development Act (1988)

The Town Development Act provides the legal basis for implementing town development plans. The Act empowers both central and local government agencies to carry out land pooling projects. The Local Self Governance Act also allows municipalities and village development committees to carry out town development plans but is not as comprehensive as the Town Development Act.

According to Clause 12.1.1 of the Town Development Act, the government can acquire pieces of land so that it can integrate them and add facilities and services. The Town Development Committee can then reimburse its investment by selling the developed plots of land and transferring the remaining land to the original landowners. In Clause 5.2 of the Town Planning Directives (2005), there is provision to distribute the plots to marginal and excluded communities albeit with certain conditions (MPPW 2011).

9) Electricity Act (1993)

Under the land Acquisition Act 1977, full acquisition and compensation payment should be made to the land occupied by the Transmission Line tower and angle tower footings. However, the land under transmission line (the right-of-way (ROW) easement), the law stipulates the following:

- **Act and regulation (Electricity Act (1993))**
 - Under Section 33 of Electricity Act, 2049, the owners of land acquired for the Transmission and Distribution system need to be paid compensation.
 - Similarly, Rule 87 has a prescribed procedure to fix compensation. The rule and law require a committee to fix the level of compensation.

- **Nepal Electricity Authority's (NEA) Policy**
 - The NEA does not provide any compensation for the transmission of line that is 33 KV and below along with the distribution system.
 - However, they do provide compensation equal to 10% of the total land value for line that is 66 KV and more along with the distribution system.

6.2 Land Acquisition Process and Relevant Organisations

The procedures detailed in the Land Acquisition Act form the overall framework for the acquisition of land and other assets in Nepal. It specifies the actions and responsibilities of the agency requiring the land and the district government department that will acquire the land or land revenue. The procedures in the Act are broadly categorised as follows: (a) Initial Procedures, (b) Preliminary Process, (c) Notice of Acquisition and (d) Compensation Determination and Eligibility. These are depicted in Fig. 6.2.1 and summarised below.

1) Initial Procedures

The department or agency requiring the land is required to forward a proposal for acquisition to its superior ministry. The proposal must show the location, area of land required, purpose and maps. Initial approval can take approximately one month.

2) Preliminary Process

The Preliminary Process starts with the issuing of a notice (within seven days but up to one month if more than one district is involved) to landowners to inform them of a preliminary investigation by a project investigation officer (PIO). The preliminary investigation can commence as soon as three days after the notice had been issued.

The PIO is required to submit a report within 15 days of the issuing of the original notice. This report must contain all relevant information as well as details of the extent of damage caused during the preliminary investigation and the compensation due for these damages. The process is then transferred to the local officer (chief district officer) who arranges for the serving of notices at principal places of public thoroughfare, local settlement offices and on the door of the affected houses.

3) Notice of Acquisition

The local officer is required to prepare a notice of acquisition indicating that the assets under consideration are to be acquired. The notice must provide details of the type and location of the required properties. The local officer must also advise the district land revenue office to stop any transactions on the concerned land.

Once this notice has been issued, the concerned landowners are granted at least 15 days to submit an application (with the necessary supporting documents) for compensation or seven days (excluding travelling time to the district office) to submit a letter of complaint/contest. The Ministry of Home Affairs is normally required to make a decision on a complaint within 15 days unless further information is required or the complaint has to be solved in a court of law due to, for example, ownership disputes.

The concerned properties can be acquired at any time after the lapse of the period granted for the lodging of complaints or after a final decision has been made about a complain. The local officer is subsequently required to arrange for the transfer of ownership to GoN within 15 days of taking control of the land.

4) Compensation Determination and Eligibility

CDC is established to assess the list of compensation claims and determine the compensation rates for the lost assets. A list of the people entitled to compensation is prepared and submitted to the local officer for publication. Anyone who disagrees with the list can register a complaint with the Ministry of Home Affairs within 15 days of the issuing of the notice. The Ministry is required to solve any complaints within approximately 15 days except for those that have to be resolved in a court of law.

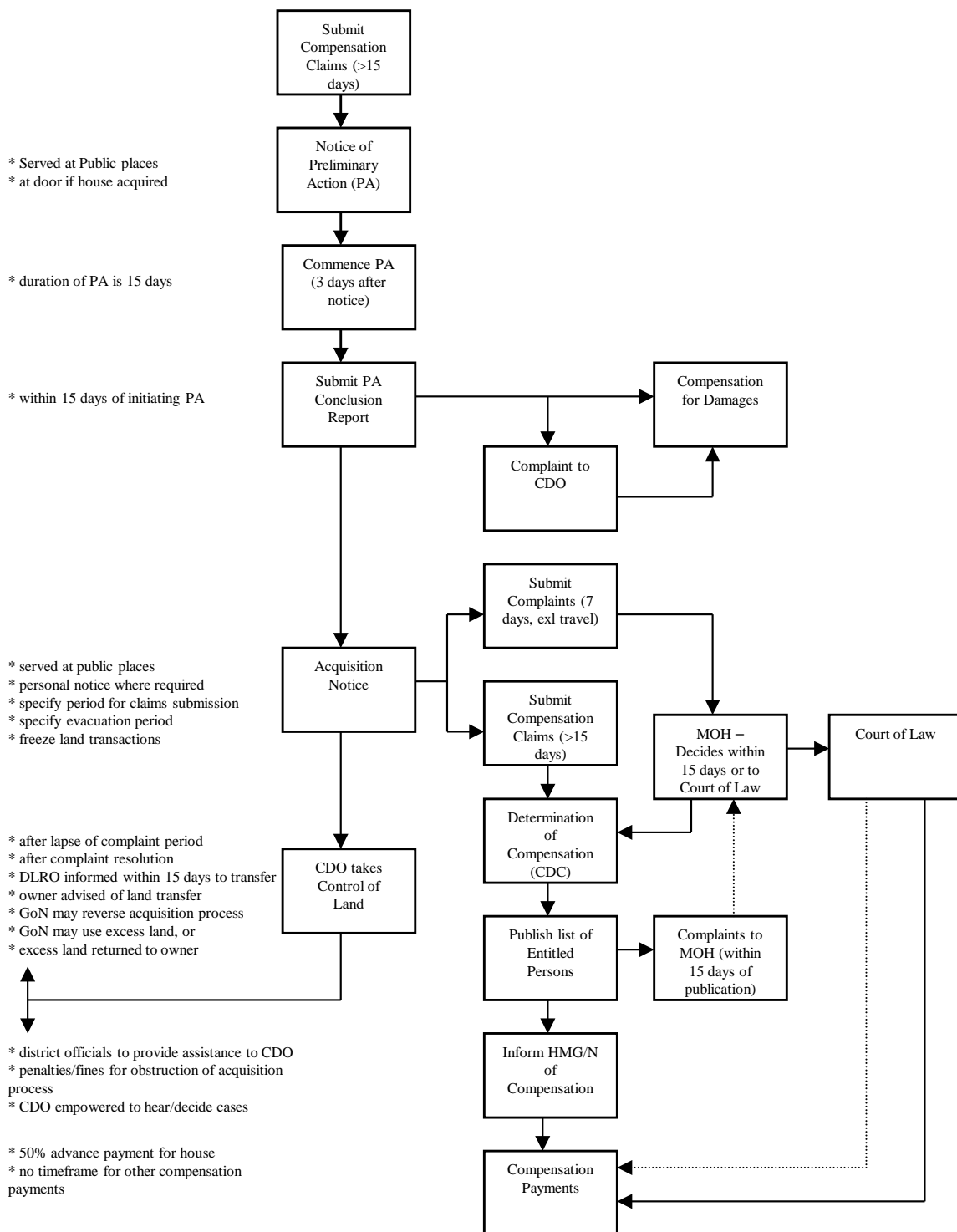


Figure 6.2.1: Diagram of the Land Acquisition Process

Source: ADB (2008)

6.3 Involuntary Resettlement

The Land Acquisition Act is the main legislation guiding land acquisition and involuntary resettlement in Nepal. There is no resettlement policy to deal with resettlement issues. Resettlement policies have thus been prepared for specific projects funded by donors and guided by the donor's involuntary resettlement guidelines and policies, such as the Asian Development Bank (ADB)'s Social Safeguard Policy Statement 2009, and the World Bank (WB)'s Involuntary Resettlement Policies, such as Operational Directive (OD) 4.30 and Operational Policy (OP) 4.12. These practices have resulted in variations in the compensation entitlements and other assistance provided to project-affected people. In order to bring about consistency in all development projects, in 2006, the government's National Planning Commission (NPC) drafted a national policy on land acquisition, compensation and resettlement called the National Resettlement Policy Framework with the technical assistance of the ADB. However, the policy has not yet been approved by the government (ADB 2006).

6.3.1 National Policy on Land Acquisition, Compensation and Resettlement

The National Policy on Land Acquisition, Compensation and Resettlement in Development Projects in Nepal was prepared in September 2006 by the NPC with the assistance of the ADB. The Policy was approved by both a ministerial working committee and the NPC but its finalisation is still awaiting approval from the concerned government agencies, cabinet and parliament. The Policy has the following guiding principles:

- Appropriate and adequate compensation for the loss of assets or income is the fundamental right of all project-affected people. Physically displaced people must be relocated to sites with basic amenities such as school, health posts and other facilities.
- All affected people should be assisted to restore at least their pre-project income and livelihood sources.
- The absence of a legal title to land should not prevent compensation, resettlement and rehabilitation assistance.
- Vulnerable groups, such as Adivasi Janajati (indigenous peoples), Dalits, the landless, women (especially women-headed households), the differently abled, poverty groups and senior citizens, are entitled to special benefits and assistance packages in addition to compensation and resettlement.

(MLD 2008)

Drawing on the provisions of the ADB and WB's involuntary resettlement policies, and building on current resettlement practices in the country, the Policy establishes a range of compensation entitlements for people affected by development projects. Among others, this includes:

- cash compensation at full market value (equivalent to the replacement value) for all acquired land if it is not feasible to provide replacement land. There is also a stipulation that a person who becomes a marginal landholder as a result of land acquisition should be provided with replacement land of equivalent productivity or value;
- cash compensation at the replacement cost for the loss of all structures (residential, business and other structures) with no deductions for depreciation or salvageable materials, or the provision of a replacement house;
- cash compensation for private trees based on the annual value of the produce;
- compensation for the loss of income from rented buildings;
- cash compensation for the loss of standing crops; and
- compensation to registered tenants and sharecroppers that is equivalent to 50% of the compensation for the concerned area of land and lost crops.

(MLD 2008)

The Policy further states that squatters and non-titled landholders are not entitled to compensation for the land they occupy. However, people who have earned their livelihoods from access to or use of the land for more than three years prior to the project's compensation cut-off date should, wherever possible, be provided with replacement land on a lease basis. They should also be assisted in their efforts to legalise their tenure in order to qualify for compensation.

The rehabilitation measures proposed by the Policy include:

- proper resettlement planning, including developed relocation sites with amenities or easy access to amenities;
- resettled farming communities, homestead sites of sufficient size for storage of agricultural produce, keeping of livestock and kitchen gardens;
- employment on the project, where possible, for at least one member of each affected household, with half of the employment opportunities going to women; and
- additional relocation and rehabilitation support measures, particularly to displaced households, severely affected households, women and vulnerable people.

(MLD 2008)

6.3.2 Grievance Redress Mechanism (GRM)

There are provisions for compensation due to losses or damages that take place during land acquisition under the Land Acquisition Act. The Act allows for people affected by a land acquisition process to file or present their cases to the chief district officer (CDO), to raise objections against acquisitions by giving notice to the Ministry of Home Affairs and to obtain redress under the Act, Clause 11, Sections 1, 2 and 3.

Examples of GRM

(a) Road Connectivity Sector 1 Project, Sub-Regional Transport Enhancement Project

[ADB Grant No.0051-NEP (SF)]

The project's main objective is to improve road connectivity in northern Nepal so that the remote rural communities, mostly in the hilly region, are not isolated. This will allow the poor to have greater access to basic services, employment opportunities and service centres of health and education in major towns and district headquarters.

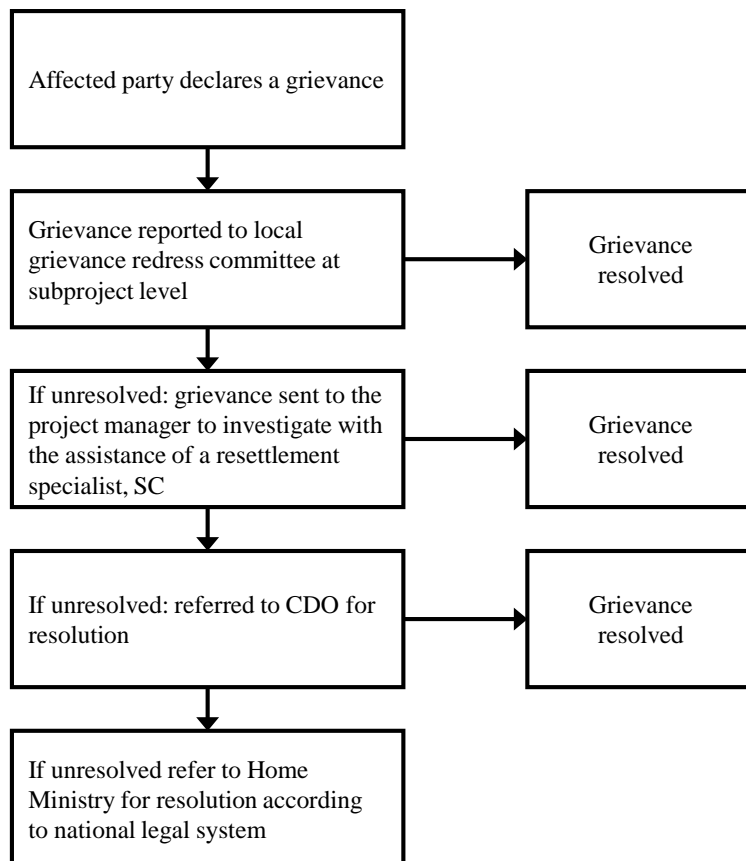
A grievance redress committee (GRC) will be established for each subproject road under the chairmanship of the Village Development Committee Chairperson. The balance of the committee will comprise two representatives of the displaced people (DPs) (one man and one woman), a representative from the DoR, an SC representative and a representative from the project. The GRC meetings will be held at least once a month. The DPs may submit their concerns or grievances verbally or in writing to the GRC. All complaints or grievances will need to be documented properly by the Committee which will then be required to make field-based assessments to verify the grievances, if necessary. After proper examination or verification of the grievances, the GRC shall be required to facilitate the project, the DoR, the DPs and other concerned parties so that they can agree on a time-bound action plan to resolve the grievance, assuming it is found to be genuine. Attempts will need to be made to settle the issues at subproject level through the involvement of social and resettlement experts, non-governmental organisations (NGOs), mediators and facilitators, as required. All costs incurred in resolving the complaints will be borne by the project.

Grievance resolution procedure

Figure 6.3.1 shows how affected people submit their grievances/complaints to the GRC, which will attempt to solve the grievances at project site level within a week. If the grievances cannot be solved at project-site level, they will be handed over to the project manager (PM), DoR, at project level. If the grievances cannot be solved within a week by the PM, they will be referred to the district administration office. If the grievances cannot be resolved by the CDO, they will

be then referred to the home ministry. The Ministry of Home Affairs is normally required to make a decision on a complaint within 15 days unless further information is required or the complaint has to be solved in a court of law, for example, in the case of an ownership dispute. The proposed grievance resolution procedure will be as follows:

- The local community group will resolve the grievance at project-site level. If it cannot, it will be referred to the PM, DoR for resolution.
- The DoR PM will make a field visit to verify the grievance. The grievance will be assessed and, if required, a solution will be recommended. If the grievance is not resolved, it will be referred to the CDO.
- The CDO will assess the grievance and try to resolve it through discussion with the PM. If the CDO cannot resolve it, the grievance will be referred to the Ministry of Home Affairs.



Source: ADB (2008)

Figure 6.3.1: Grievance Redress Mechanism for the Road Connectivity Sector 1 Project

(b) Kathmandu Valley Urban Environment Improvement Project (ADB PPTA 7936-NEP)

The project comprises the rehabilitation and new sewer connections, rehabilitation/construction of a new wastewater treatment plant, and the laying of interceptors in the banks of rivers in Kathmandu Valley.

A GRM was established by the project implementation directorate (PID) with the assistance of the design supervision consultant (DSC), community awareness consultant and contractor in order to receive, evaluate and facilitate the resolution of affected people's concerns, complaints and grievances about the social and environmental performance at project level. The GRM aims to provide a trusted and effective way for affected people to voice and resolve concerns linked to the project. The GRM procedure for the project is outlined below and consists of three levels with time-bound schedules and specific people to handle the grievances.

First level of GRM. The first-level, most accessible and immediate contact for the fastest resolution of grievances are the on-site contractors and supervision consultants. Prior to the construction of any works, the community awareness consultants, DSC and contractors will be required to hold local community meetings to notify the local residents and businesses of the temporary disturbance and to tell them more about the project. If a local area committee (tole committee) exists in the area, they should also be informed and made aware of the project. If any complaints arise, the contractors, DSC and PID will immediately be able to resolve the complaint on site, if necessary, with the assistance of the tole committee. The PID branch offices can also be involved in grievance redress at this stage. The *Kathmandu Upatyaka Khanepani Limited* (KUKL) hotline and PID office phone number will be posted in public areas within the project area and construction sites. Any person with a grievance related to the project works will be able to contact the project to file a complaint. The PID branch offices will be staffed with a consumer relations officer to field and resolve complaints. The consumer relations officer or branch manager will document the complaint and immediately address and resolve the issue with the contractor within one to two days if the complaint remains unresolved at field level. The branch manager may seek the help of the DSC safeguards specialists (the environmental specialist or social safeguards specialist) to resolve the issue. The consumer relations officer or branch manager will also be responsible for notifying the PID safeguards unit that a complaint has been received and whether or not it has been resolved. The branch manager will be required to fully document the following information: (i) name of the person, (ii) date of complaint received, (iii) nature of complaint, (iv) location and (v) how the complaint was resolved (assuming a resolution was reached).

Second level of GRM. Should the grievance remain unresolved, the branch manager will forward the complaint to the PID safeguards unit. The person filing the grievance will be notified by the consumer relations officer or branch manager that the grievance has been forwarded to the PID safeguards unit. For resettlement issues, the resettlement officer will address the grievance and, for environmental issues, the environmental officer will be responsible. Grievances should ideally be resolved through continuous interactions with the displaced people and the PID will be tasked with answering queries and resolving grievances regarding various issues, including environmental, social or livelihood impacts. Corrective measures will be undertaken at field level by the PID safeguards staff within seven days. The relevant safeguards unit staff will be required to fully document the following information: (i) name of the person, (ii) date of complaint received, (iii) nature of complaint, (iv) location and (v) how the complaint was resolved (assuming a resolution was reached).

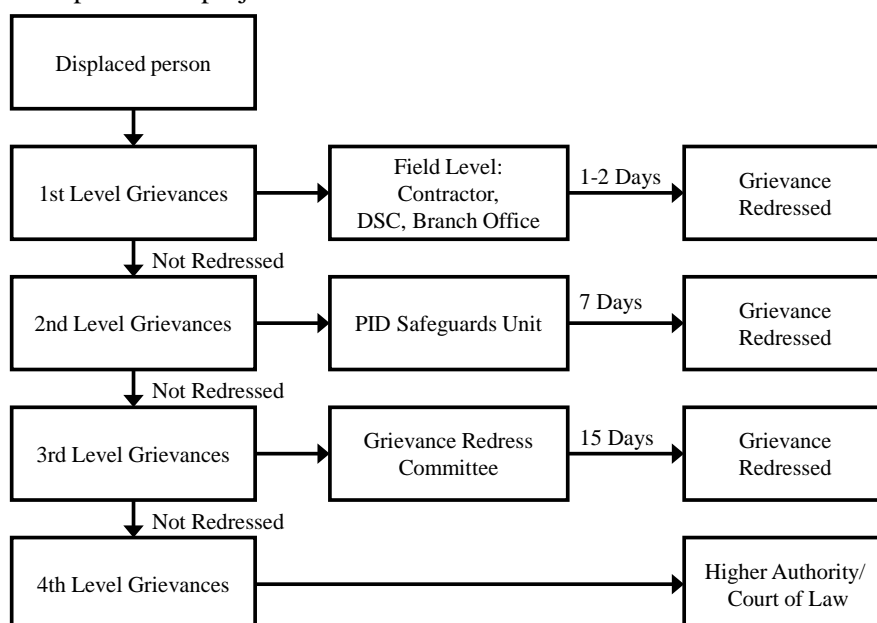
Third level of GRM. Should the grievance still remain unresolved, the PID project director will need to activate the third level of the GRM by referring the issue (with written documentation) to the local GRC of KUKL. Based on a review of the grievances, this committee will address them in consultation with the PID safeguards unit project director and the DPs. The local GRC will consist of around five members comprising the PID, DPs and the local area committee, among others determined to be capable of providing impartial, balanced views on any issues. A hearing will be called with the GRC, if necessary, where the displaced person can present his or her concerns/issues. The process will promote conflict resolution through mediation and the local GRC will meet as necessary when there are grievances to be addressed. The committee will be required to suggest corrective measures at field level and assign clear responsibilities for implementing its decision within 15 days. The functions of the local GRC will be as follows: (i) to provide support to DPs on problems arising from environmental or social disruption, asset acquisition (if necessary) and eligibility for entitlements, compensation and assistance; (ii) to record the grievances of DPs, categorise and prioritise them and provide solutions within 15 days; and (iii) to report developments regarding grievances or decisions taken by the GRC to the aggrieved parties. The PID safeguards officers will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings and taking follow-up action to see that formal orders are issued and the decisions carried out.

Fourth level of GRM. In the event that a grievance is not addressed by the contractor, DSC, branch office, PID or GRC, the DP will be able to seek legal redress of the grievance in the appropriate courts through the formal legal court system. The grievance redress mechanism and procedure is illustrated in Figure 6.3.2.

Establishment of a grievance redress committee. The grievances/complaints received at the project site will be documented by the consumer relation officer/branch manager who will try to resolve them with the assistance of the DSC safeguards specialist. If the grievances/complaints cannot be solved at site level, they will be referred to the PID of the safeguards unit which will already have been established to redress the grievances. The PID of the safeguards unit will be assisted by the DSC safeguards consultant and the community awareness consultant. If the grievances are not solved at PID level, they will be referred to KUKL. The chairperson of KUKL will then be required to establish a GRC at KUKL under his or her chairmanship to resolve the issue. The balance of the committee will comprise representatives of the safeguard unit, the community relations officer, representatives from the DPs, the ward secretary and the local/tole committee. If the grievances are not addressed at the different levels, the DPs can seek redress at the last level of the GRM, namely, a formal court of law (ADB 2011).

ADB Accountability Mechanism

In the event that an issue cannot be resolved through the established GRM, the affected person can also use the ADB Accountability Mechanism (AM) through direct contact (in writing) to the complaints receiving officer at the ADB headquarters or the ADB Nepal Resident Mission. The complaint can be submitted in any of the official languages of the ADB's developing member countries. The ADB AM information is included in the PID to be distributed to the affected communities as part of the project GRM.



Note: DSC = design and supervision consultant, PID = project implementation directorate

Source: ADB (2011)

Figure 6.3.2: GRM for the Kathmandu Valley Urban Environment Improvement Project

6.3.3 Information Disclosure

The Land Acquisition Act makes provision for community participation and information disclosure during the Preliminary Process. At this time, notice will be issued to the landowners to inform them about the preliminary investigation into the proposed project sites. They will be informed about the damage, loss and compensation resulting from the project. Landowners are also consulted by the district administration office during the compensation determination about their affected assets. Furthermore, there is provision in the Act to publish a notice of acquisition which includes details about the type and locations of the required properties.

6.3.4 Monitoring

Currently, there are no particular regulations specifying the implementation of involuntary resettlement monitoring in Nepal. Only aid projects sponsored by donors conduct periodic external monitoring activities and the results are disclosed according to their individual safeguard policies.

In donor's projects, different compensation packages, such as the compensation of land/assets according to replacement costs, resettlement assistance, training, and employment, will be proposed in the Resettlement Plan. Whether the livelihood of the resettled people is restored will be monitored through the socioeconomic household survey of the affected people. Further, the donors themselves will visit the site and monitor the status of the resettlers. For example, ADB use the following indicators for external monitoring and evaluation to confirm livelihood restoration:

1) Restoration of living standards

- Were house compensation payments made free of depreciation, fees or transfer costs to the AP?
- Have APs adopted the housing options developed?
- Have perceptions of "community" been restored?
- Have APs achieved replacement of key social and cultural elements?

2) Restoration of livelihoods

- Were compensation payments free of deductions for depreciation, fees or transfer costs to the AP?
- Were compensation payment sufficient to replace lost assets?

- Was sufficient replacement land available of suitable standard?
- Did transfer and relocation payments cover these costs?
- Did income substitution allow for re-establishment of enterprises and production?
- Have enterprises affected received sufficient assistance to re-establish themselves?
- Have vulnerable groups been provided income earning opportunities? Are these effective and sustainable?
- Do jobs provided restore pre-project income levels and living standards?

(ADB 1998)

Examples of monitoring and reporting

(a) Road Connectivity Sector 1 Project, Sub-Regional Transport Enhancement Project

(ADB Grant No.0051-NEP (SF))

The DoR will establish a quarterly monitoring system and prepare progress reports on all aspects of land acquisition and resettlement activities. The activities will be monitored internally by the DoR and evaluated externally through an independently appointed agency to provide feedback to management on implementation and to identify problems and successes as early as possible. Within three months of the loan becoming effective, external monitors will be hired by the DoR with the agreement of the ADB. A set of monitoring indicators and a terms of reference will be developed for the external evaluation agency and included in the resettlement plan (RP). Biannual independent monitoring will be carried out during implementation.

Internal monitoring

The project implementation unit (PIU) and resettlement specialist (RS) of the supervision consultant (SC) will be responsible for internal monitoring. The RS will provide feedback and suggestions for the effective implementation of the RP. The monitoring activities for, for example, compensation for the loss of land, allowances for the loss of crops, identification of severely project-affected people and vulnerable groups, will be made during the implementation of the project.

The PIU will be responsible for maintaining a record of all transactions in the resettlement database with the help of the RS of the SC while the subproject office will be liable for keeping record of the baseline, socioeconomic, census, land acquisition and compensation payment data for field-level monitoring.

External monitoring

An external professional/individual/researcher or consulting agency, university department or development NGO that will carry out independent, bi-annual reviews of the resettlement implementation as well as a post subproject evaluation will be recruited by the DoR. Two monitoring surveys of a sample of displaced households will be undertaken biannually by an independent external monitoring agency or researcher. The main objective of this monitoring will be to measure the extent to which household subsistence agricultural production levels and the standard of living have been restored or improved. For an effective comparison of internal monitoring and assessment, the monitoring survey will include data collection of the following:

- Household composition, demography and occupation and employment level;
- Household assets;
- Income and expenditure;
- Consumption patterns;
- Consultation and grievance procedures;
- Delivery of entitlement as per the approved entitlements;
- Income restoration programme to vulnerable groups and severely affected families.
- Gender development;
- HIV/AIDs, anti-trafficking and child labour awareness.

Reporting

The RS of the SC will be responsible for monitoring the resettlement activities and submitting monthly resettlement implementation progress reports to the DoR. The DoR will then submit quarterly reports of the RP implementation to the ADB with the help of the supervision consultant. The independent monitoring agency will submit biannual reports directly to the ADB with a copy to the Executing Agency (EA) to determine whether or not resettlement goals have been achieved. The external monitoring agency will also carry out a final post-evaluation to ensure that all resettlement and land acquisition activities have been completed (ADB 2008).

(b) Kathmandu Valley Urban Environment Improvement Project (ADB PPTA 7936-NEP)

The DSC is to submit quarterly reports to the PID while the PID will submit semi-annual monitoring reports to the ADB. The PID is also responsible for submitting the resettlement plan implementation report to the ADB with the assistance of design supervision consultant and social development consultant in order to obtain approval before the civil works commence. After approval from the ADB, the construction works can start. If any unanticipated

environmental and/or social risks and impacts arise during the construction, implementation or operation of the project that were not considered in the resettlement plan, the government is to promptly inform the ADB of the occurrence of such risks or impacts, with a detailed description of the event and proposed corrective action plan. The PID will report any actual or potential breach of compliance with the measures and requirements set forth in the resettlement plan promptly once it has become aware of the breach.

The internal monitoring by PID will include: (i) administrative monitoring to ensure that all compensation is paid as per the resettlement plan, implementation is on schedule and problems are dealt with on a timely basis. Monitoring will also include the following:

- (i) consultations with displaced people;
- (ii) issues raised through the grievance redress mechanism;
- (iii) the status of the compensation amounts and all assistance provided; and
- (iv) the progress of the resettlement plan implementation.

Table 6.3.1 shows a sample of monitoring indicators which was adopted in the project.

Table 6.3.1: Sample Monitoring Indicators

	Resettlement plan activities	Progress	Remarks
A. Pre-construction activities and resettlement plan activities			
1	Assessment of new resettlement impacts due to changes in project design (if required)		
2	Preparation/updating of resettlement plan(s) based on final detailed design		
3	Disclosure of updated resettlement plan to affected people and communities		
4	Submission for review and approval of the final/updated resettlement plan from the ADB		
5	Approval from the ADB to start the civil works		
6	Disclosure of approved final RP(s) on the ADB and EA websites		
7	Establishment of the grievance redress committee		
8	Verification of the displaced people census list; assessment of compensation and assistance and readjustment		
9	Preparation/selection of temporary relocation sites for hawkers		

Resettlement plan implementation			
1	Payment of compensation to displaced people		
2	Special measures for vulnerable groups		
3	Reinstallation of public utilities		
4	Records of the redress of grievance		
5	Temporary relocation of hawkers and vendors		
C. Social measures during construction as per contract provisions			
1	Prohibition of employment or use of children as labour		
2	Prohibition of forced or compulsory labour		
3	Ensure equal pay for equal work to both men and women		
4	Implementation of all statutory provisions on labour, such as health, safety, welfare, sanitation and working conditions		
5	Maintenance of employment records of workers		

Source: ADB (2011)

6.4 Major Issues and Challenges in the Current System

The followings are major issues and challenges related to land acquisition and involuntary resettlement in the projects funded by donors:

- Non-registration of project-affected land in the district land revenue office;
- Non-transfer of a land title of Guthi land to the petitioning person;
- Delay in land acquisition procedures;
- Delay in compensation payment because of delay in funds release from the Ministry of Finance;
- Issues in the determination of compensation because the government usually prefers to provide low compensation at the government rate while the affected owners demand more than the market price or replacement value;
- Shifting of road alignments during implementation makes it difficult to prepare RPs on time;
- Inappropriately detailed design creates problems during implementation;
- Difficulties in land acquisition due to the absence of landowners (e.g. residing overseas);
- Politically motivated disruptions or disturbances by local elites with vested interests in the land acquisition or resettlement process;
- Issues with squatters and encroachers;

- Mobilisation of contractors before payment of compensation to the affected owners;
 - Land ownership details are kept at district land revenue offices along with cadastral maps. However, land ownership changes, through inheritance and/or subdivision, are not always recorded at district offices. These discrepancies complicate the process of identifying and confirming entitled persons;
 - Lack of coordination between and among the land revenue office, land survey office, project implementing and executing agency and concerned line agencies;
 - Land acquisition in Nepal has resulted in conflict, especially during the acquisition of forest land while land redistribution has overlooked issues of equality, etc.
- (ADB 2010)

6.5 Gap Analysis Between the Present Domestic Regulations, the JICA Guidelines for Environmental and Social Considerations and the World Bank Safeguard Policy

The Land Acquisition Act (1977) is the only legal framework in Nepal for governing the acquisition and removal of the affected assets of project-affected people. However, its provisions do not adequately address adverse impacts associated with land acquisition and involuntary displacement, nor do they fulfil the requirements of the JICA, ADB, or WB or adhere to international practices on involuntary resettlement.

In essence, the law is largely indifferent to the landowners' socioeconomic conditions or the long-term adverse impact on their income and livelihood that acquisition and displacement may cause. In addition, there are no other policies in place to complement the acquisition ordinance in terms of assessing, mitigating, and monitoring the adverse impacts that the affected people may suffer. Some of the salient gaps between the existing legal framework, JICA's Guidelines for Environmental and Social Considerations, the ADB Safeguard Policy Statement 2009, and the WB Safeguard Policy, are summarised as follows:

- Avoiding/minimising land acquisition: The law discourages unnecessary acquisition; that is, lands acquired for one purpose cannot be used for a different purpose and lands that remain unused for a long period are to be returned to the original owners unless otherwise utilized by GoN or an institution fully owned by the government. However, there are no mechanisms to monitor if these conditions are actually adhered to.

- Eligibility for compensation: The law does not recognise the rights of people who do not possess legal titles to the land they live on or make a living from, such as squatters. There are thus no provisions to mitigate the adverse impacts that they might suffer.
- People impacted through loss of income: The Land Acquisition Act provides for compensation of the land and other fixed assets built and grown on it (e.g., structures, trees, crops, and any other developments, like ponds, built amenities). However, there is no provision to assess the impact on the displaced peoples' incomes, livelihood, loss of employment and businesses or mitigation measures to restore loss of income and livelihood.
- Relocation of displaced persons: There is no provision in the existing laws for relocation of displaced families who are affected by the loss of their assets (land and/or structures). However, the government will consider compensation for the damages sustained by the concerned person due to dislocation.
- Socioeconomic rehabilitation: The existing legal framework does not have any provisions to mitigate the long-term impact on peoples' livelihoods caused by their displacement.
- Temporary disruption of income: Compensation for the loss of livelihood of those temporarily affected by the project, such as shop owners, street vendors, or hawkers, is not considered in the existing legal framework.
- Income restoration: An income restoration program to restore and improve the standard of living of the displaced households who lose their assets and income due to the project is not considered.
- Compensation for nontitle-holders: Nontitle-holders, such as squatters, informal settlers, or vulnerable encroachers, are not entitled to compensation for the loss of their structures, houses, businesses, crops, trees, etc. They are also not entitled to other assistance in the existing legal framework.
- Vulnerable groups: The existing legal framework does not focus on the poor and vulnerable or permanent economically displaced people, such as helping them to avoid future impoverishment or creating new opportunities for them.

The difference between the national laws and the donor guidelines, such as the level of compensation to the project affected people, will be bridged by the Resettlement Framework (RF) and Resettlement Plan (RP) prepared for the project and approved by the donors. The compensation gap will be addressed in the Entitlement Matrix in the RP, and the budget will be estimated accordingly. The implementing agency should follow the approved Resettlement Framework and Entitlement Matrix mentioned in the Resettlement Plan. The framework and

plan will be approved by the cabinet; thus, there should be not any difficulties with the execution of the approved plan and compensation payment in the implementation of the specific project.

Illegal residents, such as squatters or encroachers, are not entitled to compensation for the land. They are, however, eligible for resettlement assistance and compensation for the loss of nonland assets. This will also be mentioned in the RF and Entitlement Matrix prepared under the RP. The government should approve the RF and RP prepared for the specific project with donors' assistance before implementation of the project. The framework and plan will also be approved by the cabinet, and thus, there should be no problems in the execution of the approved plan.

Chapter 8 provides further detailed gap analysis information between the governmental laws of Nepal and other donors guidelines, including case studies.

Chapter 7

Indigenous Peoples, Ethnic Minority Groups and the Caste System

7 Indigenous Peoples, Ethnic Minority Groups and the Caste System

7.1 Regulations and Policies

While Nepal does not have a standalone policy on indigenous peoples (also known as the ‘Adivasi Janajati’), the government has adopted several legal instruments and passed various laws to support them. Inclusive development and participation played a key role in these advancements.

The 1990 Constitution of Nepal included a number of provisions affirming that Nepal is a ‘multi-ethnic, multilingual, democratic’ state (Article 4). While the Constitution did not recognize the rights of indigenous peoples as such, it paved the way for a number of policy initiatives that enabled some limited recognition of indigenous peoples and their rights. Specific policy initiatives for the advancement of indigenous peoples and other disadvantaged groups started in 1997 with the ninth (1997-2002) and tenth (2002-2007) national development plans.

The National Foundation for Development of Indigenous Nationalities Act 2002 established the first comprehensive policy and institutional framework regarding indigenous peoples. This act created the National Foundation for Development of Indigenous Nationalities (NFDIN) as a successor to the National Committee for the Development of Nationalities (NCDN).

The Interim Constitution of 2007 recognizes the diversity of Nepal (Article 3), and defines the country as a secular, inclusive and democratic state (Article 4). The Interim Constitution further recognizes the status of all mother languages as national languages, enabling their use in the governmental sector (Article 5). Each community has the right to preserve and promote its language and cultural heritage and to receive basic education in its mother tongue (Article 17). In addition, the document explicitly recognizes the rights of indigenous peoples to ‘participate in State structures on the basis of principles of proportional inclusion’ (Article 21). It also authorizes the State of Nepal to implement special measures ‘for the protection, empowerment and advancement of indigenous nationalities’ (Article 13).

The Three-Year Interim Plan (2007-2010) (or the eleventh national development plan) includes the following policies for inclusive development of Adivasi Janajati and other disadvantaged groups:

- (i) creating an environment for social inclusion
- (ii) participation of disadvantaged groups in policy and decision making
- (iii) developing special programs for disadvantaged groups
- (iv) positive discrimination or reservation in education, employment, etc.
- (v) protection of their culture, language and knowledge
- (vi) proportional representation in development
- (vii) making the country's entire economic framework socially inclusive

The Government of Nepal (GoN) ratified International Labour Organization (ILO) Convention (No. 169) on Indigenous and Tribal Peoples in 2007, and voted in favour of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Convention No. 169 entered into force in Nepal the following year.

The caste system in Nepal was officially abolished in 1963, although it continues to be deeply embedded in Nepali society.

7.2 Procedures and Relevant Organisations

The development of effective national mechanisms is equally indispensable for ensuring the protection of rights guaranteed in the Constitution, other national laws and international law. The NFDIN is a semi-autonomous body that acts as the state's focal point for indigenous policy, with a mandate to make recommendations to the government on measures to promote the development of indigenous groups in the social, economic and cultural areas. It has the Prime Minister of Nepal as its chair, the Minister of Local Development as its co-chair, and a vice-chairperson that functions as its chief executive and is selected from among names provided by the Nepal Federation of Indigenous Nationalities (the main national collation of indigenous organizations). Also, the NFDIN has a governing council and an executive committee, both composed mostly of indigenous members. Functionally, the Ministry of Local Development oversees the activities of the NFDIN, and the development and execution of government policy on matters of indigenous peoples more generally (UNHRC 2010).

The NFDIN provides the legal basis for the recognition of indigenous peoples. It also formalises the role of the Nepal Federation of Indigenous Nationalities (NEFIN) to represent the interest of indigenous peoples to the GoN. The NEFIN is the only legally recognized representative organization of the country's indigenous nationalities. It has a federal council consisting of one representative from each of its member organisations. The nine office holders of the council and secretariat rotate among the member organisations in alphabetical order. There is also a general secretary and seven other secretaries responsible for the various departments. Elections for office-bearing positions are held once every three years at the general assembly. The NEFIN also elects the Vice-Chairperson of the NFDIN (ILO 2005).

7.3 Social and Economic Situation

A person's status in Nepal is for the most part decided by birthplace, gender and caste/ethnicity. Disparities in social status are the result of a long history of social hierarchy and inequality in power among the diverse social and cultural groups (UNESCO 2011). Nepal is, as stated in a 2005 ADB paper on ethnic and caste diversity, 'a cultural mosaic comprising different caste and ethnic groups' belonging to the Tibeto-Burman and Indo-Aryan linguistic families (Pradhan and Shrestha 2005). Given the complexity of Nepal's diverse population, Nepali society categorizes various groups by geographical, linguistic, cultural, ethnic and religious elements. In such a society, caste and ethnicity are often viewed interchangeably (RRT 2008).

In 2001, caste groups constituted 57.5% of the population, Adivasi Janajati constituted 37.2% and religious minorities constituted 4.3%. Among the 10 major social groups, the Hill Brahmins and Chhetris were the most populous, constituting 30.9% of the population, while the Hill Janajatis (including the Newars) constituted 28% and the Tarai Middle Castes constituted 12.9 % (CBS 2001). Table 7.3.1 shows the dimensions of exclusion in Nepal.

Table 7.3.1: Dimensions of Exclusion in Nepal

Social Category Status	Gender	Caste	Ethnicity/ Race	Language	Religion	Geo-political
Dominant	Men/Boys	Tagadhari: Brahman, Chhetri	Caucasoid	Nepali	Hindu	Parbatiya (Hill dweller)
Subordinate	Women/ Girls	Dalit	Adivasi Janajati / Mongoloid	Other	Non-Hindu	Madhesi (Plains dweller)

Source: WB and DFID (2006)

7.3.1 Indigenous Peoples and Ethnic Minority Groups

It is not easy to clearly divide the population of Nepal into indigenous versus non-indigenous sectors. The country's populations are the product of a long history of original settlement and migration in the country caused by social and political processes. However, the particular groups collectively called 'Adivasi Janajati' are identified both by the government and by these groups themselves as 'indigenous peoples'. According to the 2001 census, indigenous people inhabit the mountains, hills and lowland regions (Terai), and constitute 37% of the total population; alternative sources put the figure higher and criticize the quality of census data.

The GoN identified and listed 59 ethnic groups as indigenous peoples or nationalities living in Nepal through the 2001 Census ('*Schedule of Indigenous People/Nationalities*'), but the official list is contested. The UN Committee on Economic, Social and Cultural Rights expressed concern in 2008 about the lack of clarification regarding the criteria used by the NFDIN to recognize indigenous peoples. Adivasi Janajati differ from the other, mainly Hindu- and Nepali-speaking groups in various ways, including their languages, social structures, distinct cultural and religious traditions and ways of life (UNHRC 2009).

According to the official definition given by the NFDIN Act 2002, indigenous peoples/nationalities are those ethnic groups or communities that have their own mother tongue, traditional customs, distinct cultural identity, distinct social structure and written or oral history of their own. The characteristics of the indigenous peoples of Nepal are as follows:

- Have their own ethnic languages other than Nepali
- Have their own distinct traditional customs other than those of the ruling high castes
- Espouse a culture distinct from that of the Aryan/Hindu culture of the dominant groups
- Have distinct social structures that do not fall under the hierarchical varna or caste system
- Have a written or oral history that traces their line of descent back to the occupants of the territories before their annexation into the present frontiers of Nepal
- Are listed in the *Schedule of Indigenous People/Nationalities* published by the GoN

The NFDIN has classified the 59 indigenous people identified by the GoN into five major categories (illustrated in Table 7.3.2).

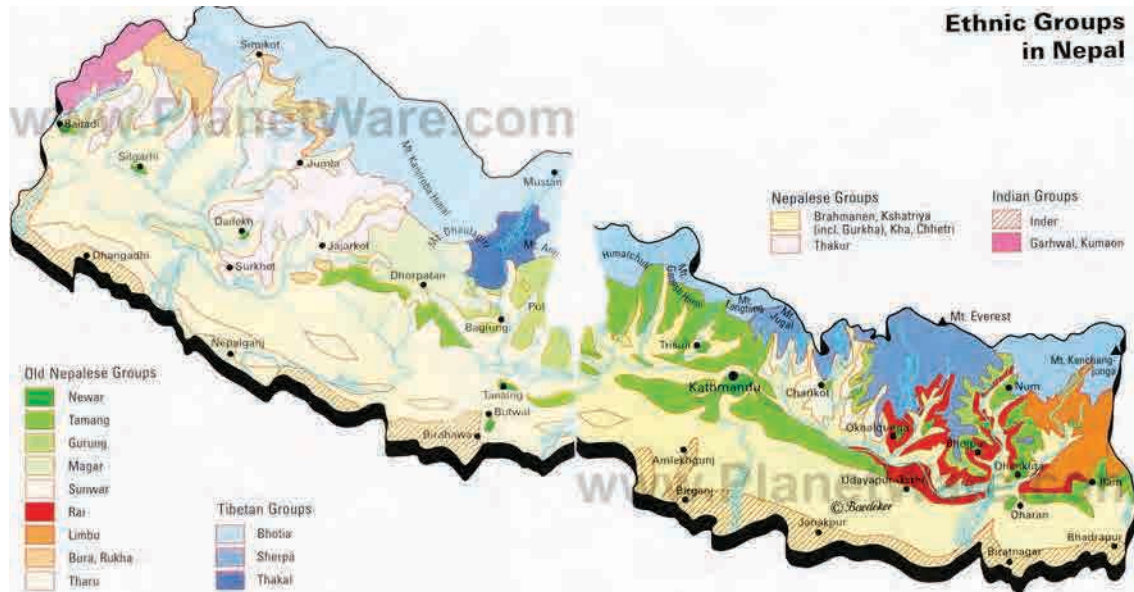
Table 7.3.2: Indigenous Groups of Nepal

	Vulnerability	Group
1	Advantaged (2 groups)	Newar (H), Thakali (M)
2	Disadvantaged (15 groups)	Chairotan (M), Tanbe (M), Tingaule Thakali (H), Baragaunle Thakali (M), Marphali Thakali (M), Gurung (H), Magar (H), Rai (H), Limbu (H), Sherpa (M), Yakkha (H), Chhantyal (H), Jirel (H), Byansi (M), Yolmo (H)
3	Marginalized (20 groups)	Sunuwar (H), Tharu (T), Tamang (H), Bhujel (H), Kumal (H), Rajbanshi (T), Gangaai (T), Dhimal (T), Bhote (M), Darai (IT), Tajpuriya (T), Pahari (H), Topkegola (M), Dolpo (M), Fri (H), Mugal (M), Larke (M), Lohpa (M), Dura (H), Walung (M)
4	Highly Marginalized (12 groups)	Majhi (IT), Siyar (M), Lhomi/Shinsaba (M), Thudam (M), Dhanuk (T), Chepang (H), Santhal (T), Jhagad (T), Thami (H), Bote (IT), Danuwar (IT), Baramu (H)
5	Endangered (10 groups)	Kusunda (H), Bankariya (IT), Raute (IT), Surel (H), Hayu (H), Raji (IT), Kisan (T), Lepcha (H), Meche (T), Kuswadiya (T)

Note: M: Mountain (17 groups); H: Hills (24 groups), IT: Inner Tarai (7 groups), T: Tarai (11 groups)

Source: MoE (2011)

The population density of Nepal varies widely. Approximately half of Nepal's population lives in the mountain and hill areas, while the other half lives in the much smaller area of the Tarai plains. Nepal is still largely a rural country, with 86% of its population living in rural areas and the remaining 14% living mainly in Kathmandu and other emerging urban areas. The geographic areas where different ethnic groups are concentrated are shown in Figure 7.3.1.



Source: PlanetWare (2013)

Figure 7.3.1: Distribution of Selected Ethnic (Non-IP and IP) Groups in Nepal

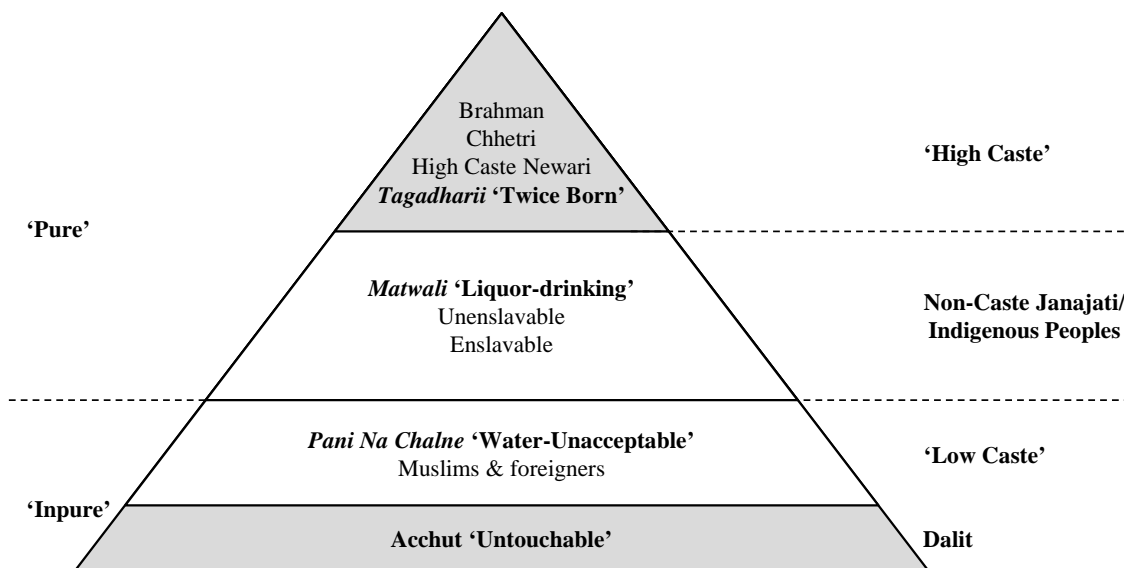
At varying levels, most indigenous peoples in the country (with the exception of the Newars) have experienced political, economic, social and cultural marginalisation. Many are affected by inequalities and injustices in income, education, health, jobs and political representation. They are also among the most vulnerable to under-employment, migration, bonded labour, discrimination, trafficking and child labour. They are predominately concentrated in remote rural areas and rely primarily on subsistence farming for their livelihood. Land ownership in Nepal is dominated by the higher castes; much of the indigenous peoples' traditional land was appropriated by the state in the process of nation building. Landlessness and lack of access to natural resources, on which their livelihood previously depended, has led to extreme poverty and lack of access to basic services. The high proportion of indigenous recruits in the national armed forces reflects an attempt to break out of the cycle of poverty (ILO 2005).

7.3.2 Caste System

Among the Nepalis, one's caste often signifies one's identity. A person's caste affects his or her family life, food, dress, occupations and culture. In short, it determines an individual's way of life. On the whole, the caste system has an important role in social stratification in Nepal. There are many castes in Nepal amongst the various communities living in the hills, valleys and plains. The communities that live in the high mountains do not follow the caste system. These people are generally Tibetan migrants and practice communal ownership.

Historically, priestly Brahmins were at the top of the caste hierarchy with the Kshatriya (kings and warriors) just beneath them; next came the Vaishya (merchants) and the Sudra (peasants and laborers) (Figure 7.3.2). Beneath everyone were members of occupational groups, considered ‘impure’, and the ‘untouchables’, or *acchut*. They now call themselves the Dalits. In the hills, the top two ranks (priest and warrior) and the lowest (‘untouchable’) rank were filled by the in-migrating Hindus of Caucasoid stock who spoke an Indo-Aryan language on which modern Nepali is based.

The middle rank was accorded to indigenous peoples, generally of Mongoloid racial stock. These groups - classified by the Hindus as Matwali or liquor drinkers - generally spoke Tibeto-Burman languages and followed Buddhism or various shamanist/animist religions. The Matwalis comprise the Adivasi Janajati. The Muluki Ain or Country Code (1854) brought all these diverse groups together under a single legal system, but accorded differential privileges and obligations to each caste and sub-caste. For many groups, including the indigenous peoples, the conquest by the rulers of Gorkha and their subsequent unification of Nepal was ironically an ‘exclusionary inclusion’ (WB & DFID 2006).



Note: The area showing the different groups in the triangle does not represent population size. Dark red shows the Hindu caste groups.

Source: WB & DFID (2006)

Figure 7.3.2: The Nepal Caste Pyramid According to the Muluki Ain of 1854

The Constitution of 1990, drafted after the *Jana Andolan* or People's Democratic Movement against the Panchayat regime, established Nepal as a more inclusive state. As mentioned in Section 7.1, it describes the country as 'multi-ethnic, multilingual and democratic' and states that all citizens are 'equal irrespective of religion, race, gender, caste, tribe or ideology.' The Constitution also gives all communities the right to preserve and promote their language, script and culture, to educate children in their mother tongue and to practice their own religion. Nevertheless, the Constitution retains some contradictions and ambiguities, such as declaring Nepal a Hindu Kingdom, denying women the right to pass their citizenship to their children and explicitly protecting 'traditional practices'. These contradictions and ambiguities in the Constitution have left room for the continuation of gender and caste-based discrimination.

The new Constitution allowed space for another major development – the growth of civil society organizations, especially those based on ethnic and caste identity. The post-1990 period witnessed the dismantling of the old projection of a 'single Nepali culture' that had been controlled by upper-caste Parbatiyas. Self-chosen terms like Adivasi Janajati and Dalit emerged to replace terms like 'tribal', Matwali and 'sano jat' ('small caste') that had been used to describe ethnic and 'low caste' groups. However, in many hierarchical institutions, especially the powerful informal networks, behavioral norms and expectations remained unchanged (WB & DFID 2006).

Main Nepal caste and indigenous peoples (ethnic groups) with regional divisions and social groups are illustrated in Table A-35 in the Appendix.

7.4 Affirmative Actions

As stated in Sections 7.1 and 7.2, the government has adopted several legal instruments to support indigenous peoples. Together with the various provisions of the Interim Constitution and the NFDIN Act 2002, other pieces of recent legislation and policies address the situation of and call for specific measures with regard to indigenous peoples and other marginalized groups. These include the National Foundation for Upliftment of Adivasi Janajati Act 2002 and the National Human Rights Action Plan 2005. The Forest Act 1993 and the Environmental Act 1997 emphasized the protection and promotion of indigenous peoples' knowledge and cultural heritage.

In 1999, the Local Self-Governance Act was enacted to give more power to the local political

bodies, including authority to promote, preserve and protect indigenous peoples' language, religion, culture and welfare. It also acknowledges the past exclusion of indigenous communities and the need to incorporate them into the development process. It also provides for the representation of at least one indigenous representative at the village, town and district councils. However, in practice, indigenous peoples continue to be ill-represented in the local governing bodies, particularly in the geographic areas in which they are demographic minorities. They also continue to lack decision-making powers over district and village development programmes affecting them (UNHRC 2009).

Other efforts have been made to increase representation of Adivasi Janajati and other under-represented groups in public service sectors. In 2007, the Civil Service Act was amended to include a quota system that stipulates that of the 45% of new recruitments reserved for various under-represented groups, 27% are to be allocated to 'ethnic groups'. Similar amendments were also made in 2007 to the Police Regulation and to the Armed Police Regulation in order to make the police force more inclusive. In 2009, the Ordinance on Inclusion in Public Service likewise demonstrated attention to the problem of under-representation by creating a quota system that benefits indigenous peoples, though it has been criticized for not adequately differentiating among groups. (WB 2012)

7.5 Major Issues and Challenges in the Current System

Although the government has developed the legal instruments to support indigenous peoples, there are still gaps between the claims of indigenous peoples and the government's response. On the basis of the impact of the provisions of prevailing national laws on indigenous nationalities, the following problems and issues have been identified:

- Discriminatory laws and decisions for indigenous peoples
- Exclusion of indigenous peoples in judicial administration
- Double standards for indigenous peoples and non-indigenous peoples in legislation and in practice
- Preferential treatment given to Khas Hindus and to issues related to their identities in laws, policies and in practice, at the cost of negatively affecting non-Hindus
- Absence of a full recognition of the human rights and fundamental freedoms of indigenous peoples
- Lack of access to justice for indigenous peoples
- Absence of the right to a fair hearing for indigenous peoples

(Maden et al. 2010)

The following facts identified by the NEFIN also illustrate the marginalisation of indigenous peoples and the issues in the current system:

- Only 14% of indigenous people are in the civil service
- 65% of the ancestral land of indigenous peoples are occupied by national parks and conservation agencies, thus forcing the majority of indigenous people to migrate elsewhere
- No sufficient budget to print indigenous language text books and hire teachers to teach indigenous language
- The majority of school dropout are indigenous students
- The word 'indigenous/Adivasi' is not mentioned in any of the text books, history books or museums in Nepal
- The majority of Nepalis who migrated abroad are indigenous youths
- The majority of prisoners are indigenous people
- There are no public holidays for many indigenous festivals
- Bhote Indigenous people of Bajura District, including many indigenous people in the far west of Nepal, are forced to take citizenship with Brahman and Chhetri identity.
- Raaji, Kusunda and Tharu are still working as slaves and bonded labourers; there has been no change in the living standard of these groups

(NEFIN 2012)

Having suffered the gradual loss of traditional lands and access to life-sustaining natural resources, indigenous peoples throughout Nepal generally rank low in all human development indicators. Most communities of indigenous peoples live in conditions of poverty that, on the whole, are double (or more) the national poverty level. This is true not only in remote and rural regions but in cities as well. Adequate health care and opportunities for education among indigenous communities is lacking, with indigenous women and children being especially vulnerable.

According to the UN Human Rights Council report, Nepali government officials acknowledged the need to promote a wider revision of existing legislation in order to accommodate Nepal's evolving constitutional make-up as well as its international commitments regarding the rights of indigenous peoples, particularly with regard to sectorial legislation. With few exceptions beyond the Ministry of Local Development, as of yet there have been no significant advances in the development and implementation of adequately funded programming and concrete plans of

action to address the issues relevant to indigenous peoples (UNHRC 2009).

As noted previously, the caste system strongly influences all aspects of Nepali society. Caste and ethnic discrimination are long-standing and deeply entrenched. Although attitudes have been changing with increasing ‘modernisation’, sources indicate that the traditional caste system still dominates both urban and village societies in Nepal. In addition, the higher castes have traditionally maintained control of economic resources and political power, and have a vested interest in keeping these structural divisions intact in Nepali society. Sources report that there has been an increase recently in identity-based politics, with groups that have traditionally been marginalized because of their caste/ethnicity demanding greater representation in the government (RRT 2008).

7.6 Gap Analysis Between the Present Domestic Regulations, the JICA Guidelines for Environmental and Social Considerations and the World Bank Safeguard Policy

A review of the legal framework and guidelines reveals that despite some common provisions between the government’s legal frameworks, JICA’s Guidelines for Environmental and Social Considerations and the World Bank’s Safeguard Policy, there are also certain key differences.

The Interim Constitution of Nepal and the NFDIN Act 2002 commit the government to the protection and promotion of indigenous people’s knowledge and cultural heritage. In 1999, the Local Self-Governance Act was enacted to give more power to the local political bodies, including authority to promote, preserve and protect indigenous people’s language, religion, culture and welfare. However, implementation of this legal framework is still not sufficient in Nepal.

Other major donors’ guidelines and policies, including those of JICA and the World Bank, ensures free, prior and informed consultation/consent with the affected indigenous people to obtain broad community support for a project. Social assessment will be carried out to identify potential effects and prepare plans to ensure that indigenous peoples receive social and economic benefits that are culturally appropriate.

In 2007, the United Nations 61st General Assembly adopted the UNDRIP, which refers to ‘obtaining Indigenous communities’ free, prior, and informed consent prior to the approval of

any project affecting them.’ This nonbinding declaration was supported by many Asian countries. International donors usually see this free, prior, and informed consent (FPIC) notion as collective consent rather than individual. According to the International Finance Corporation (IFC) Guidance Note 7 in 2012 on Indigenous Peoples, the FPIC process and outcome ‘do not require unanimous support from all members of Affected Communities of Indigenous Peoples’. FPIC should be viewed as a process that both allows and facilitates affected communities of indigenous people to build and agree upon a collective position with regard to the proposed development, while keeping in mind that individuals and groups within the affected communities may have differing views on the issues pertaining to the proposed development. Such collective ‘community consent’ should come from the group of affected communities as a whole, representing their collective view regarding the proposed development. Thus, an FPIC agreement should capture the affected communities’ collective agreement on the legitimacy of the engagement process and the decisions made (IFC 2012).

If the project will potentially impact indigenous people under ADB category A or B, an Indigenous Peoples Plan, including assessment of social impact, is required. ADB also states in the SPS 2009 that for the purposes of policy application, it is proposed that consent of affected Indigenous Peoples communities refers to a collective expression by the affected Indigenous Peoples communities, through individuals and/or their recognized representatives, of broad community support for the project activities. Such broad community support may exist even if some individuals or groups object to the project activities (ADB 2009). Further, their consent can be obtained during the social impact assessment survey and census and focus group discussions.

There are efforts by some of the ministries to develop policies with the assistance of ADB and World Bank that reference the donors’ safeguard policies, examples are as follows:

- Social and Environmental Safeguards Framework: Local Governance and Community Development Program (LGCDP), led by the Ministry of Local Development (supported by ADB)
- Social Management Framework for Urban Governance and Development Program: Emerging Towns Project (UGDP: ETP), led by the Ministry of Physical Planning and Works (supported by the World Bank)

These frameworks include policy on indigenous peoples. However, the policy has not yet been approved by the government.

In order to bridge the gap, when carrying out a project in Nepal that affects indigenous peoples,

a vulnerable group development guideline will be developed. Traditional rights to land and other natural resources, communal property and specific characteristics of ethnic groups in relation to land and other natural resources and subsequent losses resulting from the project will be assessed and compensated accordingly.

Chapter 8 provides further detailed gap analysis information between the governmental laws of Nepal and other donors guidelines, including case studies.

Chapter 8
Environmental and Social Considerations in
Other Donors' Projects

8 Environmental and Social Considerations in Other Donors' Projects

8.1 World Bank

8.1.1 Environmental Assessment

The World Bank (WB) conducts environmental screening of each proposed project in order to determine the appropriate extent and type of environmental assessment (EA). The World Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts as follows:

- Category A: A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the 'without project' situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for preparing a report, normally an Environmental Impact Assessment (EIA) (or a suitably comprehensive regional or sectoral EA), that includes, as necessary, elements of the other instruments referred to in paragraph 7 of Operational Policy (OP) 4.01.
- Category B: A Category B project has potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—which are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases, mitigatory measures can be designed more readily than for Category A projects. The scope of the EA for a Category B project may vary from project to project, but it is narrower than that of a Category A assessment. Like Category A, a Category B environmental assessment examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of an EA for a Category B project are described in the project documentation (Project Appraisal

Document and Project Information Document).

- Category C: A Category C project is likely to have minimal or no adverse environmental impacts and therefore does not require further EA action beyond screening.
- Category FI: Category FI projects are those in which the World Bank provides funds to participating national banks, credit institutions, and other financial intermediaries (FIs) for lending at the FIs' risk to final borrowers. In the case of such projects, the FI screens each subproject proposed for financing and classifies it into one of the three categories A, B, or C (WB 2012b).

For all Category A and B projects, the borrower provides relevant material in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted (OP 4.01, 14) (WB 2012b).

Table 8.1.1: Recent Projects that Conducted EIA in Nepal

Project Name (ID)	Date of Approval	Description
Bridges Improvement and Maintenance Program (P125495) http://www.worldbank.org/projects/P125495/results-based-bridges-improvement-maintenance-project?lang=en	28 June 2012	Category B. The Department of Roads (DOR) under the Ministry of Physical Planning and Works with the assistance of the World Bank will be responsible of the project. In order to minimize environmental impact, the project will consider only bridges that do not require significantly altering or impacting the hydrology or hydro-geological aspects of the river or any construction inside protected areas or reserved forests.
Kabeli 'A' Hydroelectric Project (P122406) http://www.worldbank.org/projects/P122406/kabeli-hydroelectric-project?lang=en	N/A	Category A. Project proposed by The Kabeli Energy Limited (KEL) with a Project Development Agreement (PDA) with the Department of Electricity Development (DoED). The project consists of a peaking run-of-river (PRoR) type with a proposed installed capacity of 37.6 MW with a design discharge 37.73 m ³ /s. The project requires clearance of 1.57 ha of forest land. Additionally, the barrier created by the dam structure to the aquatic life is a significant impact of the project in the operation phase. To minimize

		impact provisions of fish ladder in the dam structure, release of 10% minimum monthly flow will be implemented. EIA related documents were submitted in February, 2012, but the project has not been approved by the board.
Nepal Kabeli Transmission Project (P112893) http://www.worldbank.org/projects/P112893/kabeli-transmission-project?lang=en	10 May 2011	Category B. The project consists of a 132 kV transmission line in eastern Nepal, with associated technical assistance. Up to 17 hydropower projects that have already been licensed for development have been delayed due to the lack of an adequate capacity high voltage transmission line to evacuate the power from the generation area to the consumption centres. The project expects to provide transmission line facility to the licensed hydropower projects to be developed in the immediate future. The project expects the loss of 59.26 ha of forest and the electro-magnetic field's effect.

Note: N/A: not available.

Source: WB (2012c)

Based on regulations by the Government of Nepal (GoN), any development project falling under the criteria stipulated by the Environment Protection Rules (EPR) should be subjected to Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA); for example, Construction of District Road requires IEE and Feeder Road requires EIA). According to recently amended the EPR, the improvement of districts roads does not require the preparation of an IEE/EIA. Under this approach, potential risks and impacts can be overlooked. For example, depending on site conditions, a district road itself could be riskier than a feeder road. Forest regulations require that permission from related authorities (DFO, CFUG etc.) must be obtained for any intervention in a forested area. In order to bridge the gap with the World Bank's Policy Guidelines, an Environmental Management Plan (EMP) shall be prepared for each contract during the detail engineering design phase. The EMP aims to address adverse environmental impacts arising due to project intervention. The projects which fall under the category of 'Construction of District Road' will strictly follow re-plantation guidelines, and the ratio will be fixed by the local forest authority including the requirement of taking 25 samples for every tree cut and maintaining them for five years (e.g., CFUG). The compensatory re-plantation ratio is not defined for a service-oriented project.

8.1.2 Land Acquisition and Involuntary Resettlement

In cases where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits.

The resettlement plan must include all the necessary measures to ensure that the displaced persons are:

- informed about their options and rights pertaining to resettlement;
- consulted and provided with technically and economically feasible resettlement alternatives; and
- provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project (WB 2011b).

The WB also emphasizes the importance of conducting regular monitoring by an external monitoring agent to confirm:

- the results of internal monitoring;
- that the compensation process has been accomplished adhering to procedures communicated to project-affected families and indigenous peoples during consultation;
- whether the resettlement entitlements were suitable to the objectives, whether the objectives were suited to the project-affected families, and if the livelihood and standard of living were restored or enhanced;
- that the affected enterprises received enough assistance to reestablish themselves; and
- if vulnerable groups were provided with effective and sustainable income earning opportunities to help restore pre-project income levels (WB 2011b).

Resettlement planning includes early screening, scoping of key issues, the choice of resettlement instrument, and the information required to prepare the resettlement component or subcomponent. The scope and level of detail of the resettlement instruments vary with the magnitude and complexity of resettlement. In preparing the resettlement component, the borrower draws on appropriate social, technical, and legal expertise and on relevant community-based organizations and non-governmental organizations (NGOs).

While the World Bank prioritizes the avoidance of resettlement and promotes the research of alternative options, Nepal national policy focuses on mitigation of the effects of resettlement

rather than trying to avoid it. The World Bank stipulates that compensation for loss of assets should be at replacement cost, while government policy in Nepal considers compensation only for crop damage or loss of income source. To bridge the gaps, the WB recommends that all projects affecting individuals and families including already existing vulnerable communities will be addressed by developing a Voluntary Donation Impact Mitigation Plan (VCDP). Such peoples will be benefited through community infrastructure subprojects.

The main gaps and limitations of the national legal and policy framework are:

- National law makes provisions for compensation to the titled landholder only and, by default, omits all other PAP (project affected people), including non-registered tenant farmers, landless farmers, squatters, agricultural labourers, shopkeepers, artisan groups, and Dalits. There are also no provisions to protect the interests of vulnerable groups.
- National law does not make any provision for encroachers or squatters regarding the entitlement for compensation. In their view, the purpose of compensation is to assist poor people whose assets and livelihoods may be lost or disrupted by the project.
- Accordingly, there is no provision for rehabilitation assistance for such vulnerable groups.
- When GoN requires assets, national law does not specify about the provision of mandatory replacement cost.
- The Land Acquisition Act, 1977 does not emphasize transparency and stakeholder participation for various decisions that directly affect the long-term wellbeing of PAPs. Also, the compensation determination committees (CDC) do not require participation of either the representatives of PAPs or representatives from the local village development committees or municipalities.
- There are no clear directives to look at project design options that avoid or minimize involuntary resettlement.
- Only cash compensation is considered for payment. It is the easiest mode of operation, but its long-term impact on families who are not used to large cash flow can be more negative than otherwise.
- There is a provision in the Land Acquisition Act, 1977 for land-for-land compensation such that if a titleholder loses all his/her land and opts for land as compensation, the government may provide land if there is ailani (unclaimed land) or other government land available. Past experience, however, indicates that the relevant clauses are too general and do not oblige implementation. It is not clear if PAPs can exercise this right or if it is entirely the decision of the government.
- Lack of consideration of the apparent time gap between notification of acquisition and the payment of compensation is another limitation of the existing legal framework.

Table 8.1.2: World Bank Projects with Resettlement Plan in Nepal

Project name (ID)	Approval Date	Description
<p>Road Sector Development Project (P095977) http://www.worldbank.org/projects/P095977/road-sector-development-project?lang=en</p>	<p>6 Dec 2007</p>	<p>While the project considers the positive impacts of providing improved access to markets and other social service facilities within the influenced area, it will also have negative impacts such as the loss of assets like houses and structures, land, trees, and other community property. For this project, the client requested a comparative analysis between the resettlement policy in Nepal and the WB policies. In general terms, national policy rather focuses on mitigation of the effects of resettlement, while the WB prioritizes the avoidance or minimisation of impact to the extent possible through the incorporation of social consideration into design options and alignment selections.</p> <p>Where displacement is unavoidable, livelihood and other resources shall be provided to assist in improving or, at a minimum, regaining their former status of living at no cost to themselves.</p>
<p>Rural Access Improvement and Decentralization Project (P107853) http://www.worldbank.org/projects/P107853/rural-access-improvement-decentralization-project-addl-financing?lang=en</p>	<p>17 Dec 2009</p>	<p>The Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR) under the Ministry of Local Development (MoLD) with the assistance of the WB is in charge of improving the existing rural roads, constructing trail bridges, and providing support for community infrastructure development in 20 districts. In order to complete the project, land acquisitions were necessary. In order to mitigate the impacts associated with land acquisition and associated impacts, an Environment and Social Management Framework (ESMF) was formulated at the beginning of the project. The ESMF incorporated the existing legal provisions of the GoN, especially on land acquisition and environmental protection, and relevant WB policies, such as those on Involuntary Resettlement (OP 4.12) and Indigenous Peoples (OP 4.10) as well as other</p>

		policies related to the protection of the environment, natural habitats, physical and cultural resources, and indigenous people.
Nepal Kabeli Transmission Project (P112893) http://www.worldbank.org/projects/P112893/kabeli-transmission-project?lang=en	10 May 2011	<p>Nepal is currently suffering from a deficit of electricity that manifests itself in load-shedding that reaches 14 hours a day in the dry season. This deficit of electricity is a fundamental obstacle to economic and human development in Nepal. The project will consist of a transmission line that will extend from north of the Panchthar District, to Damak in the Jhapa District in the south.</p> <p>The project will require 2.8 ha of private land which will impact a total population of 203 in 34 households. A resettlement action plan (RAP) was prepared to address the impacts associated with the construction of towers at angle points.</p> <p>The social planning team carried out an inventory survey of the project impacts and a census of the affected population. A profile was established for every affected household that records their household demographic profiles, land holdings, livelihood and income sources, and losses under the project.</p>

Source: WB (2012c)

Case Study 1: Nepal Kabeli Transmission Project (P112893)

The Kabeli Corridor 132 kV Transmission Line Project (KCTLP) is part of the Government of Nepal's KabeJi Power Generation Project under development by the Nepal Electricity Authority (NEA). The project is funded through the Nepal Power Development Project (NPDP) under a loan from the World Bank/International Development Association (IDA).

In order to address involuntary resettlement, a Social Management and Entitlement Framework (SMEF) was drafted to ensure realistic rehabilitation and compensation of the acquired assets of the project-affected persons/families. The acquired assets may include any or all of the following: land (homestead, agricultural, or community land), livestock, standing crops, trees, access to common property resources (CPRs) and facilities, and additional benefits for vulnerable persons/groups. The framework below provides mitigation measures against losses

for titleholders (i.e., legal land owners and people with Usufruct and traditional rights) and non-titleholders (including tenants and leaseholders).

The SMEF aims to:

- a) minimize displacement and identify the non-displacing or least-displacing alternatives;
- b) plan the resettlement and rehabilitation of project-affected families (PAFs), including special needs of vulnerable persons/groups;
- c) assist affected persons in maintaining/restoring their former living standards, income-earning capacity, and production levels;
- d) facilitate harmonious relations between the implementing authority (i.e., asset acquiring body) and PAFs through mutual cooperation and regular iteration; and
- e) ensure that affected persons/groups are meaningfully consulted and provided opportunities to participate in the planning and implementation stages of the resettlement program in order to suitably accommodate their inputs and make this framework more participatory in nature and broad-based in its scope.

As specified in the Land Acquisition Act Clause 13, a four-member committee headed by the Chief District Officer (CDO) of the concerned district is constituted for fixing up the compensation for lost assets. Compensation is fixed through a Community Consensus Valuation (CCV). During the implementation process of the resettlement plan (RP), the report is submitted to the CDO with the details of the specific location for the land and other assets to be acquired by the concerned Officer-in-Charge of the Project. After this stage is complete, the acquisition process is undertaken. In this process, the Committee issues circulars or undertakes extensive consultation with representatives of the project-affected population, political party's local representatives, and relevant district level chiefs of line agencies to finalize and fix the rate of compensation. This integrated approach is in line with the World Bank policy guidelines. After finalization of the agreements, formal notification is placed in public places and local and national newspapers identifying the amount of land, owner, and ownership-related matters of the affected assets. The compensation amount will be paid to the affected person (AP) before the construction work begins.

The Social Management and Entitlement Framework for this project adopted the following principles:

- Acquisition of land will be minimized and will avoid the resettlement of people, as much as possible;
- Local stakeholders will be systematically informed and properly consulted to identify the

possible alternative subproject engineering and operational solutions to avoid or minimize the adverse impacts of land acquisition; and the preparation of RPs, eligibility of APs, compensation, entitlements and special assistance measures to vulnerable groups will be disclosed to the public;

- All APs will be properly identified and recorded in a census instrument in which the cut-off date for their eligibility is the last day of the survey in the subproject area, and will be notified in advance when land for the subproject will be acquired; lack of formal legal rights to the assets lost will not prevent APs from receiving compensation, entitlement, and rehabilitation measures;
- Where resettlement cannot be avoided, relocation site(s) will be provided prior to relocation, in consultation with APs and their hosts; these sites, whether permanent or temporary, will be free from environmental risks and will provide access to drinking water and sanitation, social services, and all other services accessible in the previous location;
- Relocated APs will be provided with assistance to maintain or improve their pre-subproject living standards, income earning capacity, and production levels;
- Special assistance measures will be incorporated in the resettlement implementation process to protect the socially and economically vulnerable groups that will be affected;
- An effective mechanism for arbitration of complaints and grievances will be provided during resettlement implementation;
- Institutional arrangements and human resources will be in place for consultation, liaison, land acquisition, resettlement, and monitoring to ensure the effective resettlement implementation prior to commencement of the subproject; and
- Payment of compensation must be provided prior to displacement, and other resettlement assistance must be initiated prior to the award of a civil works contract.

Case Study 2: Road Sector Development Project (P095977)

The Department of Roads (DoR) has carried out a Priority Investment Plan (PIP) for the period 2007–2016. As per the recommendation of the PIP, sections of the roads Satbanj-Gokuleshwore-Darchula, Khodpe-Kalingagad-Bajhang, and Surkhet-Kalikot-Jumla are being upgraded to bituminous sealed standards using low cost technology under the Road Sector Development Project (RSDP) through grant assistance from the IDA (IDA Grant No. 339-NEP).

The study was proposed because poor transport connectivity in the rural and hilly areas of the country has been a major development constraint for Nepal. Inadequate feeder roads worsen the isolation of remote rural areas, mostly in the northern hilly regions in the mid-west and

far-western development regions. Growing congestion is also an emerging constraint at the east–west highway around the borders due to the increasing volume of traffic.

The RAP was prepared according to regulations from Government of Nepal (GoN) legislation and World Bank guidelines (OD 4.30 and OP4.12), which state:

- The acquisition of private assets and the displacement of people will be avoided or minimized to the extent possible, through the incorporation of social considerations into alignment selection and road design. Where asset acquisition and population displacement are unavoidable, the pre-project living standards of affected persons will be restored.
- Community consultation ensures people's views; concerns and suggestions will be incorporated into the implementation procedure.
- An institutional framework will be developed as an integral part of the project to ensure that appropriate social impact management mechanisms are set up and maintained during implementation. These mechanisms and arrangements will ensure that compensation, resettlement, and rehabilitation are carried out in a timely and effective manner.
- Construction work will commence on road sections only after acquisition procedures are completed.

As stated by the RAP, land and asset acquisition will be undertaken within the framework of the Land Acquisition Act (for permanent land acquisition) and the Public Road Act (for temporary land acquisition).

Key provisions of the Land Acquisition Act are:

- The act empowers the GoN to acquire any land, on the payment of compensation, for public purposes and works.
- The acquisition and compensation of privately-owned assets are undertaken according to a formal procedure, consisting of initial procedures, a preliminary investigation process, acquisition notification, compensation notification, and appeal procedures.
- Compensation Determination Committees are established (at district level) to ascertain compensation rates for land and other assets.
- Compensation must be paid for damages caused by the road construction and for land and assets permanently acquired by the project (including standing crops, trees, and houses).
- Compensation must be in cash, although titleholders who have lost all of their landholding may be given replacement land, if available.
- Titleholders are required to submit compensation claims or complaints within a specified period after the Local Authority (Chief District Officer) issues the land acquisition notice. Compensation for land is paid after the CDC determines the rates and verifies the list of

entitled applicants.

Key Provisions of the Public Road Act are:

- The Act empowers the DoR to acquire any land on a temporary basis (for storage facilities, construction camps etc.) during road improvement and upgrading.
- The temporary acquisition of land containing any buildings (houses, sheds, temples, schools etc.) should be avoided wherever possible. The Act also empowers the DoR to ‘lift earth, stone or sand from any adjoining land’ during construction and upgrading works.
- The Act does not provide for leasing of land. However, the DoR is required to pay compensation for any damages caused to buildings, crops, and trees, where the farming activity of the landowner is interrupted, and where the landowner has to incur expenses to restore the land after its return.
- Compensation is determined between the DoR and the titleholder, or through mediation involving officials from the relevant Village Development Committee (VDC) and District.
- The GoN may prohibit, through notification in the *Nepal Rajpatra* (Government Gazette), the construction of any permanent structure (other than walls) within 6m of the road limit or ledge.

Additionally the RAP was prepared under the World Bank Operational Directive 4.30 (being reissued as Operational Policy 4.12 and Bank Procedure 4.12), dealing with involuntary resettlement and compensation for losses associated with development projects. The overall principle of OD 4.30/OP 4.12 is that PAPs are provided with prompt and effective compensation for all losses directly attributable to the project, with lost assets valued at full replacement cost. The value of benefits to be derived from the project is also not deducted from the valuation of the affected asset, nor is depreciation of the asset or the value of salvage materials.

8.1.3 Indigenous Peoples

The WB’s Safeguard Policies related to the considerations on indigenous peoples require the following:

- Screening by the Bank to identify whether indigenous peoples are present, or have a collective attachment to the project area;
- Social assessment by the borrower. The assessment should include baseline information on the demographic, social, cultural, and political characteristics of the affected indigenous peoples’ communities;

- Free, prior, and informed consultation with the affected indigenous peoples' communities at each stage of the project, and particularly during project preparation, to fully identify their views and ascertain their broad community support for the project;
- Preparation of an Indigenous Peoples Plan or an Indigenous Peoples Planning Framework; and
- Disclosure of the draft Indigenous Peoples Plan or draft Indigenous Peoples Planning Framework.

The World Bank assumes the responsibility of disclosing the information to the public in accordance with the World Bank Policy on Disclosure of Information, while the borrower should make it available to the affected indigenous peoples' communities in a culturally appropriate form, manner, and language.

There are no specifications under Nepal's national laws that consider the impact of projects on indigenous peoples; as a result, minority leaders have limited opportunities to participate in the discussion at the planning and implementation stages of development projects. Because they have few opportunities to formulate and implement policies to strengthen their social position, indigenous peoples and ethnic minority groups have weak political clout and little means to defend their basic rights. Given the lack of local regulations regarding indigenous peoples, the World Bank conducts impact assessments to follow its own operational policy.

Table 8.1.3: World Bank Projects with Indigenous Peoples Plan in Nepal

Project Name (ID)	Approval Date	Description
Modernization of Rani Jamara Kulariya Irrigation Scheme Project (P118179) http://www.worldbank.org/projects/P118179/modernization-rani-jamara-kulariya-irrigation-scheme-phase-1?lang=en	5 Jul 2011	The objective of the project is to improve irrigation water delivery to, and management in, the command area. Department of Irrigation carried out a The socio-economic environmental and institutional survey and found that the project will be implemented in an area where different indigenous groups, mainly the Tharus are in a majority. The policy framework for indigenous people has been designed in line with relevant government policies as well as the World Bank's OP 4.10 on Indigenous Peoples.

<p>Road Sector Development Project (P095977) http://www.worldbank.org/projects/P095977/road-sector-development-project?lang=en</p>	<p>6 Dec 2007</p>	<p>While the project considers the positive impacts of providing improved access to markets and other social service facilities within the influenced area, it will also have negative impacts such as the loss of assets like houses and structures, land, trees, and other community property. A socio-economic study was conducted for the project. According to the study, in the study areas, there was overwhelming majority (more than 70%) of high caste Thakuries, Chhetries, Brahmins and low caste Dalits. The indigenous nationalities were considered to be in negligible numbers and were highly scattered and their presence is marginally nominal.</p>
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Source: WB (2012c)

Case Study: Modernization of Rani Jamara Kulariya Irrigation Scheme Project

The objective is to improve irrigation water delivery to, and management in, the command area. The Department of Irrigation (DoI) carried out a socio-economic, environmental, and institutional survey of Rani Jamara Kulariya Irrigation Systems (RJKIS) and found that the project will be implemented in an area where different indigenous groups, mainly the Tharus, are in the majority.

An assessment of the field situation and consultations with various stakeholders identified the major concerns of vulnerable communities within and between Tharus and non-Tharus as follows:

- Ensuring vulnerable communities – including Tharus, Dalits, Janajatis, and women-headed households– are actively involved in all phases of the project cycle, from planning to implementation;
- Ensuring the current Tharu-led governance structure is not disrupted by the upcoming modernization and rehabilitation project;
- Securing the inclusion and participation of Dalits, Janajatis, and Mukta-Kamaiyas in the governance systems, e.g., IUC;
- Incentivizing and ensuring the equal contribution of all users to the operation and maintenance of the modernized and rehabilitated irrigation systems;
- Addressing the implications of intra-Tharu inequalities based on disparities in gender, land-ownership, and land tenure arrangements on the irrigation systems;

- Enabling vulnerable communities such as Dalits, Mukta-Kamaiyas, and small Tharu landholders access to employment opportunities on a preferential basis during the project construction activities; and
- Addressing potential gaps in access to complementary infrastructure.

For this project, a Vulnerable Community Development Framework (VDCF) will be developed in line with relevant domestic and World Bank policies to guide the preparation of Vulnerable Community Development Action Plans when the project designs are completed.

The major objective of the VDCF is to ensure that the RJKIS modernization and rehabilitation project avoids or minimizes adverse impacts on vulnerable peoples, mainly socially disadvantaged communities such as Janajatis (indigenous peoples) and Dalits, as well as provides the necessary institutional and budgetary mechanisms to ensure that they get equal access to program benefits.

The policy framework for this project has been designed in line with relevant government policies as well as the World Bank's OP 4.10 on Indigenous Peoples, a key component of the Bank's Operational Policies relating to Social and Environmental Safeguards.

8.1.4 Monitoring

The WB has developed a monitoring and evaluation system for use during the project implementation as well as after completion of the project. At first the WB task team will conduct a mid-term monitoring review. During the course of the review, the team's environmental and social considerations specialist will periodically (at least twice a year) visit the field to monitor.

The team verifies compliance with the conditions agreed upon between the WB and the borrower, and the monitoring results done by the borrowers. The World Bank also stipulates that during project implementation, the borrower must report on:

- compliance with measures agreed upon with the Bank on the basis of the findings and results of the EA, including implementation of any EMP, as set out in the project documents;
- the status of mitigatory measures; and
- the findings of monitoring programs.

The World Bank bases supervision of the project's environmental aspects on the findings and recommendations of the EA, including measures set out in the legal agreements, any EMP, and other project documents.

According to an EIA study conducted by the WB, environmental management plans (EMPs) include the activities to be monitored (parameters and indicators) during three phases of a project: pre-construction, construction, and operation. Monitoring provides reliable information and a scientific basis for environmental management by investigating the quality of the environment prior to the project and keeping records of the project's impact on environmental quality during construction and operation (WB 2012b).

Regular monitoring of the EMP implementation is to be conducted by the implementing agency as well as by an independent external monitoring and evaluation organization or by an individual designated by the Ministry of Energy (MoEn) to verify that:

- Actions and commitments described in the EMP are implemented fully on time;
- EMP actions and compensation measures are effective enough to enhance (or at least restore) affected environmental components;
- Complaints and grievances lodged by project-affected people are followed up and that where necessary, appropriate corrective actions are implemented; and
- If necessary, changes in EMP procedure are made to improve delivery of entitlements to project-affected people.

(WB 2012b)

For example, in the case of the Kabeli 'A' Hydroelectricity Project, primary monitoring responsibility will rest with Kabeli Energy Limited (KEL). KEL is to establish a Kabeli-A Environment and Community Development Unit (KAECDU) to undertake social and environmental monitoring of the project. KAECDU will carry out the internal monitoring. Additionally, the external monitoring and evaluation is to be conducted by an organisation or an individual designated by MoEn. This organisation or individual will carry out biannual reviews of the EMP implementation to ensure that the project activity complies with the environmental standards, to check for proper implementation, and to verify that any grievances are addressed in a prompt manner (WB 2012d).

A Panel of Experts (POE) comprised of an environmentalist and sociologist will be established per the World Bank Operational Policy on Environmental Assessment, Involuntary Resettlement and Indigenous People for the project preparation phase. The POE shall, inter alia,

review, comment, and provide suggestions or recommendations as it deems necessary, or as requested by KEL or its consultant, on any subject it considers vital to the successful completion and approval of the environmental and social studies of the project. The key tasks of the POE are to:

- Carry out an independent review of the EIA processes and steps followed and provide guidance on the treatment of environmental and social issues associated with the project at critical stages of EIA;
- Review and provide an expert opinion on the methodology, work plan, and approaches to consultations proposed by the EIA team in addition to reviewing the EIA report;
- Provide specialized guidance on the main and critical environmental and social issues of the project such as environmental flows, cumulative impact assessment, and construction stage impacts, and advise the EIA team on the preparation of the EMP of the KAHEP in compliance with relevant national and World Bank policies;
- Advise KEL on incorporating the environmental and social findings and recommendations into the project and on ensuring adequate interaction between the Engineering Consultant and EIA team;
- Provide timely and strategic social and environmental inputs to the Engineering Consultant in potential conflict areas with locals and help avoid unnecessary delays in the implementation of the EMP;
- Assess and advise on incorporating the environmental and social obligations in bidding documents and contract documents; and
- Review and advise on the implementation of the agreed and approved social and environmental action plans.

(WB 2012d)

The POE shall provide a report to KEL including the topics reviewed, areas of concern, requests for additional analysis, and conclusions and recommendations for action, if any. KEL will forward the report to the financing agencies (World Bank and any others), including a statement of actions taken on the recommendations of the previous meeting of the POE (WB 2012d).

For land acquisition and involuntary resettlement, there are currently no particular regulations specifying the implementation of involuntary resettlement monitoring in Nepal, although WB OP4.12 requires the borrower of adequate monitoring and evaluation of the activities set forth in the resettlement instrument. Therefore the World Bank conducts monitoring activities based on its own operational policy.

8.1.5 Information Disclosure

The World Bank's Safeguard Policies state that, for meaningful consultations between the borrower, project-affected groups, and local NGOs in all Category A and B projects, the borrower should provide relevant material in a timely manner prior to the consultation and in a form and language understandable and accessible to the groups being consulted.

For a Category A project, the borrower must provide a summary of the proposed project's objectives, description, and potential impacts for the initial consultation. In addition, for a Category A project, the borrower must make the draft EA report available at a public place accessible to project-affected groups and local NGOs. Any separate Category B report for a project proposed for IDA financing must be made available to project-affected groups and local NGOs (WB 2012b).

As part of an EIA study, regular informal public consultation is implemented in the World Bank's projects. For example, in the course of preparing the EIA report on the Kabeli 'A' Hydroelectric Project, a total of fourteen focus group discussions with local people have been conducted in different locations of the project areas to identify various issues related to the project as well as its socio-economic consequences and corresponding mitigation measures (WB 2012d).

The purpose of the focus group discussion meeting was to:

- Provide factual information on the project location, particularly the main project structures such as dam, tunnel, adit portals, powerhouse, surge tank, tailrace, and the project access roads, as well as tentative locations of the project's quarry sites, construction camps, and operation camps;
- Clarify the objective of the project's social assessment and its procedures;
- Provide technical information on the potential impacts of the project during construction and operation in the project area's physical, biological, social, socio-economic, and cultural domains;
- Collect information on the project area's physical, biological, socio-economic, and cultural environments from the local peoples' perspective;
- Solicit feedback from local people on the potential impacts of the project, particularly on the local infrastructure, social norms, culture, and the physical and biological environments;
- Solicit the opinion of local people on the alternative mitigation measures to abate or avoid

potential impacts; and

- Solicit the opinion of the local people with regard to the development aspiration of the project.

(WB 2012d)

In addition to the focus group discussions, public hearings were organised at both the local level (in the project area) and national level (in Kathmandu) to present the findings of the EIA study as well as to collect the concerns and views of the people of the project area and stakeholders (WB 2012d).

The result of the EIA study is disclosed in languages including as Nepali, Khaling Rai, Tamang, Bantawa Rai, and Limbu in addition to English.

For land acquisition and involuntary resettlement, the Land Acquisition Act has a provision for informing the stakeholder about the details of land to be acquired by the government, but it is missing an explicit provision for the preparation or disclosure of involuntary resettlement planning information to project-affected persons. On the other hand, the WB OP 4.12 requires disclosing draft resettlement plans before appraisal formally begins. Therefore the World Bank conducts information disclosure activities based on its own policy.

8.2 Asian Development Bank

8.2.1 Environmental Assessment

The Asian Development Bank (ADB) Environmental Guidelines were updated in 2003 in order to:

- incorporate the increasing expectations of environmental assessment that reflect the growing environmental concerns around the globe;
- have a more transparent procedure for determining the environmental category;
- formalize approaches for the ADB's lending activities to financial intermediaries;
- refine approaches to sector lending where the subprojects and specific locations may not be known in advance; and
- strengthen requirements for environmental management plans.

In accordance with the project's assessed potential environmental impacts, a project is categorized into:

- Category A: A Category A project is likely to have significant adverse environmental impacts and requires an environmental impact assessment (EIA).
- Category B: A Category B project includes potentially adverse environmental impacts that are less than those of Category A. An initial environmental examination (IEE) is required to determine whether or not significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report (ADB 2003).
- Category C: A Category C project does not require an EIA or an IEE, although environmental implications are still reviewed.
- Category FI: Projects are classified as Category FI if they involve a credit line through a financial intermediary or an equity investment in a financial intermediary.

Table 8.2.1: ADB Projects with Environmental Assessment in Nepal

Project Name (ID)	Approved Date	Description
Subregional Transport Enhancement Project: Upgrading of Nepalgunj–Kohalpur Road (44143-013) http://www.adb.org/projects/44143-013/main	27 Oct 2010	ADB Category B. Improve the country’s road network totalling about 195 km, (i) providing north–south link of the country’s north eastern region to the east–west highway (EWH); and (ii) improving major international trade corridors in the country in conjunction with customs systems enhancement.
Tanahu (Upper Seti) Hydropower Project (43281-013) http://www.adb.org/projects/43281-013/main	N/A	ADB Category A. The ADB country partnership strategy identifies Nepal’s power sector as the most severe infrastructure constraint on economic growth. The project will be the development of a medium-sized hydropower plant (140 MW) with water storage to make power supply available year-round and meet the country’s peak demand in particular for the dry season. The project site is on the Seti River in the Tanahu district, about 150 km from Kathmandu.
Kathmandu Valley Water Supply Improvement Project (34304-043)	16 Sep 2011	ADB Category B. The project fits into the priority sector water supply and other municipal infrastructure and services identified in the country partnership strategy and will support the country’s

http://www.adb.org/projects/34304-043/main		peace and development through improved access to basic services. The project is included in the country operations business plan of Nepal.
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Note: N/A: not available.

Source: ADB (2012c)

Case Study: Tanahu (Upper Seti) Hydropower Project

The Tanahu Hydropower Project ('The Project') is located on the banks of the Seti River in the jurisdiction of Bhimad Village Development Committee (VDC) and the Kahun Shivapur VDC, close to Damauli, the district capital of the Tanahu District. The project is a storage type hydropower project with a rated capacity of 140 MW, with estimated average annual energy generation of 587.7 GWh (Years 1–10) and 489.9 GWh (Year 11 onwards). The Project is designed to supply power to the Nepali grid.

The EIA was prepared by the ADB in cooperation with the Japan International Cooperation Agency (JICA). It was prepared in accordance with the legal requirements of the Government of Nepal (GoN) following the Environmental Protection Rules, 1997, the Environmental Protection Act, 1997, and the National EIA Guidelines, 1993.

High, moderate, and low impact areas were defined, and several site visits were made by the EIA team to perform the field study. The study identified the following potential physical impacts:

- physical impacts associated with the land taken for the reservoir;
- potential disturbance or change in the slope stability, runoff, and drainage patterns in project facility areas;
- shoreline erosion around the reservoir due to fluctuations in water level;
- changes in the river morphology process; and
- change in water quality.

Additionally, negative impacts such as noise and air pollution are expected during the construction time. However, the impact is expected to be moderate and for short duration.

In order to decrease the severity of the impact, a concrete gravity dam type with an underground powerhouse with a headrace tunnel was chosen. The EIA concluded that there were no significant environmental issues that would prevent advancing the project to the design phase where a full environmental mitigation and monitoring plan would be developed.

8.2.2 Land Acquisition and Involuntary Resettlement

According to the ADB, Category A and B projects may involve land acquisition, potentially resulting in adverse social impacts, including the displacement of individuals and communities, under the following stipulations: the project proponent must avoid involuntary resettlement wherever possible and minimize involuntary resettlement by exploring design alternatives. The borrower/client will conduct social impact assessments and set the cut-off date to identify the affected persons as well as any structures which will be affected. Based on the results, the Resettlement Plan will be formulated and should include:

- the scope of land acquisition and resettlement;
- objectives, policy framework, and entitlements that describe key national and local land, compensation and resettlement policies, laws, and guidelines that apply to the project;
- consultation and grievance redress participation;
- compensation, relocation, and income restoration in which are described the arrangements for valuing and disbursing compensation and the arrangements for housing relocation, including transfer and establishment, as well as income restoration measures to be implemented;
- institutional framework;
- resettlement budget and financing;
- implementation schedule; and
- monitoring and evaluation (ADB 1998).

The monitoring and evaluation of projects according to the ADB's policies should include:

- budget and timeframe: whether the resources are being allocated on time and if land has been acquired and occupied in time for project implementation;
- delivery of entitlements: whether all APs received entitlements according to the numbers and categories of loss set out in the entitlement matrix; if all AP received payment on time, including compensation to business and wage earners affected by the project; and if relocation sites have been developed as per agreed standards;
- consultation, grievances, and special issues; and
- livelihood development.

It can therefore be said that the confirmation methods of compensation by the ADB are basically similar to those of the World Bank. The independent or external monitoring agents employed by project proponents are tasked with the same assignments and submission of

compliance monitoring reports. An independent land appraiser or a specialist in property appraisal is employed particularly to confirm the means of compensation and property valuation or land pricing.

There are significant gaps between GoN regulations and ADB guidelines:

- Avoidance or minimization of involuntary resettlement is not included in the Land Acquisition Act.
- The Land Acquisition Act has no provision to conduct a social impact assessment in the proposed project areas.
- The GoN does not require the preparation of a Resettlement Plan.
- Under GoN guidelines, information dissemination is limited to legal notification.
- The GoN offers no compensation at replacement cost, the current compensation method follows negotiation, and it does not require that compensation should be paid prior to the project.
- Local GoN regulations do not consider livelihood restoration.
- The GoN has no monitoring requirement.

Table 8.2.2: ADB Projects with Resettlement Plan in Nepal

Project Name (ID)	Approval Date	Description
Kathmandu Sustainable Urban Transport Project (44058-013) http://www.adb.org/projects/44058-013/main	22 Jul 2010	The project consisted of developing traffic management measures; enhancing public transport services and facilities; implementing pedestrian priority areas; and promoting air quality improvements. The project was classified as Category B, with minimal resettlement impact.
Tanahu (Upper Seti) Hydropower Project (43281-013) http://www.adb.org/projects/43281-013/main	N/A	The project was classified as Category A for involuntary resettlement, as 758 households are expected to be affected by the project. Out of these, an estimated 86 households will be physically displaced and are expected to be relocated in their current villages. The implementation of the project will result in the acquisition of 112 ha and the leasing of 19 ha of private land.
Kathmandu Valley Urban Environment	1 Dec 2011	The project comprises the rehabilitation and new sewer connections, rehabilitation/construction of a new

<p>Improvement Project (43524-012) http://www.adb.org/projects/documents/kathmandu-valley-urban-environment-improvement-project</p>		<p>wastewater treatment plant, and the laying of interceptors in the banks of rivers in Kathmandu Valley. The project was classified as Category B for involuntary resettlement. There is no land acquisition on private properties envisaged under the proposed project activities. The project is not expected to involve any land acquisition as the laying of sewerage pipelines will be within public and /or government land. Any restrictions to access will be minimized and temporary impacts during sewer pipeline construction will be addressed through the resettlement plan.</p>
<p>Integrated Urban Development Project: Draft Resettlement Plans for Janakpur (42161-013) http://www.adb.org/projects/42161-013/main</p>	<p>14 Feb 2012</p>	<p>The project, which consists of integrated urban environmental improvements, including drainage systems, solid waste management facilities, and urban roads, will be implemented in Janakpur, Nepalgunj, and Siddharthanagar municipalities to provide with better access to municipal infrastructure and services in a socially inclusive manner. The project was classified as Category B, with minimal resettlement impact.</p>

Note: N/A: not available.

Source: ADB (2012c)

Case Study: Tanahu (Upper Seti) Hydropower Project (43281-013)

The Project was assigned Category A for involuntary resettlement. Land acquisition consisted of campsites, access roads, and a reservoir. The preliminary assessment indicated that about 758 households were expected to be affected by the project. Out of these, an estimated 86 households will be physically displaced and are expected to be relocated in their current villages. Ultimately, the implementation of the Project would result in the acquisition of 112 ha and the leasing of 19 ha of private land. However, in the case of the land to be leased, if the executing agency is unable to sign lease agreements with the landowners, the same is expected to be acquired through the negotiated replacement value of the land. Any additional land acquisition for the project or project component will follow the guidelines given in the resettlement plan. This also applies to the temporary acquisition of private land by contractors for project activities.

The livelihood of people in the area will also be affected by the project as approximately 151 ha

of agricultural land will be inundated which will lead to loss of crop production of around 660 tons per year. Agricultural enhancement programs will therefore be an important part of the mitigation and enhancement programs. Also, a survey to find suitable and sufficient land for relocation should be conducted with a detailed evaluation of the social, agricultural, and economic aspects as well as the willingness of affected people to buy it.

The resettlement plan was prepared to clearly state the specific measures that will be undertaken by the EA to reduce resettlement impacts of the Project. The resettlement plan also indicates or revises the number of persons and households affected by the Project. It is also important to note that no separate Indigenous People's Plan had been prepared for the Project. Considering that the indigenous peoples (IPs) are part of the mainstream population and form the majority of the affected households, specific actions and assistance has been incorporated in the RP itself. An Indigenous Peoples Planning Framework (IPPF) has been prepared for the Project. The project has been categorized as Category B with regard to the impacts on the IP population.

The resettlement plan was prepared following JICA guidelines and ADB policies in accordance with GoN regulations. However, several gaps between local regulations and JICA guidelines and ADB policies were identified. In the cases in which the GoN regulations and the agency's guidelines were different, JICA guidelines and ADB policies were used as benchmarks as they were considered most stringent and with more provisions to avoid or minimize negative impacts of the Project.

8.2.3 Indigenous Peoples

In its Safeguard Policy Statement (2009), the ADB defines IPs as a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:

- self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;
- customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- a distinct language, often different from the official language of the country or region.

The ADB Safeguard Policy (2009) covers ethnic minorities, indigenous peoples, and other disadvantaged groups. The policy ensures that these people should not be deprived from the

project benefits as they have had limited access to benefits previously though they were located in resource-based areas. Because of their unique culture and social characteristics, they should have equal opportunity to participate in and gain from the project activities.

The Policy underscores the requirements that borrowers or clients are required to meet in delivering indigenous peoples safeguards to projects supported by ADB, for:

- undertaking the social impact assessment and planning process;
- preparing social impact assessment reports and planning documents;
- disclosing information and undertaking consultation, including ascertaining consent of affected Indigenous Peoples community to selected project activities;
- establishing a grievance mechanism; and
- monitoring and reporting.

In line with the Policy, it is necessary to undertake a social impact assessment as part of the project design to assess potential project impacts, both positive and adverse, on indigenous peoples. If the social impact assessment identifies indigenous peoples specifically as a significantly and adversely affected population, an Indigenous Peoples Plan (IPP) acceptable to the ADB must be prepared. The IPP should include a framework for continued consultation with the affected indigenous peoples' communities during project implementation that specifies measures to ensure that indigenous people receive culturally appropriate benefits; identifies measures to avoid, minimize, mitigate, or compensate for any adverse project impacts; and includes culturally appropriate grievance procedures, monitoring, and evaluation arrangements as well as a budget and time bound actions for implementing the planned measures.

There are no specifications under Nepal's national laws that consider the impact of projects on indigenous peoples; as a result, minority leaders have limited opportunities to participate in the discussion at the planning and implementation stages of development projects. Because they have few opportunities to formulate and implement policies to strengthen their social position, indigenous peoples and ethnic minority groups have weak political clout and little means to defend their basic rights. Given the lack of local regulations regarding indigenous peoples, the ADB conducts impact assessments to follow its own operational policy.

Table 8.2.3: ADB Projects with Indigenous Peoples Plan in Nepal

Project Name (ID)	Approval Date	Description
Tanahu (Upper Seti) Hydropower Project (43281-013) http://www.adb.org/projects/43281-013/main	N/A	This project combines involuntary resettlement planning with indigenous peoples planning. The key reason for combining the two is the majority of project-affected persons (75%) are Janajatis and the project impacts on them arise from land losses which are mutually negotiated between the executing agency and project-affected households. During socioeconomic surveys, census, and consultations, Janajati populations in the project areas were directly consulted by the EA and consultants to check whether they claimed any project-affected land as their own land or any land they cultivated without title as their ancestral domain.
Secondary Towns Integrated Urban Environmental Improvement Project – Biratnagar Municipality (36188-023) http://www.adb.org/projects/36188-023/main	Jul 6, 2010	The project will include drainage and sanitation including two wastewater treatment plants (stabilization pond and reed bed treatment), public and school toilets, and storm water drainage as well as roads and lanes including upgrading of roads, footpaths, and walkways. The project was classified as Category B with the impacts on indigenous peoples limited to a small number of involuntary resettlement and/or land acquisition.
Roads Connectivity Sector I (37266-032) http://www.adb.org/projects/37266-032/main	Aug 10, 2006	The project's main objective is to improve road connectivity in northern Nepal to reduce the isolation of remote rural communities, mostly in the hilly region, by enhancing the access of the poor to basic services, employment opportunities, and service centres of health and education in major towns and district headquarters. The project was classified as Category B to have limited impacts on indigenous peoples.

Note: N/A: not available.

Source: ADB (2012c)

Case Study: Tanahu (Upper Seti) Hydropower Project (43281-013)

The Tanahu Hydropower Project is located on the Seti River banks, in the Bhimad Village Development Committee¹ (VDC) and Kahun Shivapur VDC areas, near Damauli, the district capital of Tanahu District. In Nepal, Janajati are recognized by domestic laws as indigenous/tribal people, and their presence has been noted in the Project areas. These tribal communities trigger the ADB's safeguard policy requirements pertaining to IPs. Due to the nature of the Project and the identification of potential affected people, an Indigenous Peoples Planning Framework (IPPF) was prepared. The IPPF provides policy and procedures to screen project impacts on indigenous peoples (IPs) and to prepare an appropriate planning document, the Indigenous Peoples Plan (IPP), to safeguard their rights in accordance with domestic laws, the ADB's Safeguard Policy Statement (SPS) (2009), and the JICA Guidelines for Environmental and Social Considerations (2010). The initial project assessment identified that the majority of the project-affected persons (76%) are nationally identified Janajatis (indigenous peoples) but with sources of livelihood, family types, and educational attainment that are similar to non-Janajati households. Cash compensation at replacement cost based on the negotiated settlement was provided to those who would have to physically relocate because of the Project as no physically displaced household wanted land-for-the-land lost to the Project. The Project will benefit both affected Janajati and non-Janajati households.

Nepal's Land Acquisition Act does not require a social impact assessment to identify the potential impacts and risks of the project. However, to meet the ADB's requirements, a socioeconomic survey and census was conducted based ADB's guidelines. Additionally, in order to minimize the impact from the project, a total of 12 consultations in the form of informal discussions, meetings, and group discussions were conducted to understand affected persons' concerns.

8.2.4 Monitoring

Upon its reorganisation in 2002, the ADB established arrangements for compliance by monitoring projects with its safeguard policies. With the support of the Environment and Social Safeguard Division, the ADB's Chief Compliance Officer is responsible for advising management and operations departments on safeguard compliance and related operational procedures and guidelines. Compliance with safeguard policies is monitored throughout the project cycle. If a project poses risks of noncompliance, actions to ensure compliance are recommended at the Management Review Meeting, and project compliance is reviewed again at a Staff Review Committee meeting. Operations departments take steps to ensure that

outstanding safeguard requirements are met before Board approval. As stated in the ADB Safeguard Policy Statement (SPS), the ADB assumes the responsibility for conducting due diligence and for reviewing, monitoring, and supervising projects throughout the ADB's project cycle in conformity with the principles and requirements embodied in the SPS (ADB 2009a). Likewise, the ADB requires borrowers/clients to follow SPS Section 57, which requires them to:

- establish and maintain procedures to monitor the progress of implementation of safeguard plans;
- verify compliance with safeguard measures and progress towards intended outcomes;
- document and disclose monitoring results and identify necessary corrective and preventive actions in the periodic monitoring reports;
- follow up on these actions to ensure progress towards the desired outcomes;
- retain qualified and experienced external experts or qualified NGOs to verify monitoring information for projects with significant impacts and risks;
- use independent advisory panels to monitor project implementation for highly complex and sensitive projects; and
- submit periodic monitoring reports on safeguard measures as agreed with the ADB.

In the case of the Tanahu (Upper Seti) Hydropower Project, three kinds of environmental monitoring activities were planned: baseline, compliance, and impact monitoring. Baseline monitoring collects time-series data to enhance knowledge of the baseline conditions. Compliance monitoring verifies that the prescribed mitigation and enhancement measures are being properly carried out. Impact monitoring focuses on key indicators to assess whether the impacts of the project involving change to the baseline conditions have been accurately predicted and whether the mitigation and enhancement measures are sufficient and effective (ADB 2009b).

The project proponent should maintain daily records of the mitigation, implementation, and monitoring work during the construction phase to demonstrate compliance with the EMP. In the Tanahu (Upper Seti) Hydropower Project, the Environmental Monitoring Sub-Unit (EMSU) was planned to carry out monitoring work and prepare bi-monthly monitoring reports during the construction phase. The EMSU also maintains the records of any corrective actions recommended to the contractor and its performance. After approval by the project manager, the bi-monthly reports produced by the EMSU are distributed to the stakeholders for their comments and suggestions. The EMSU will compile the Final Environmental Monitoring Report of the construction phase within three months of the construction completion and will

submit the report to the project manager. The project manager will distribute the report to stakeholders to get feedback and provide the database of environmental management work on the project for future use (ADB 2009b).

For land acquisition and involuntary resettlement, there are currently no particular regulations specifying the implementation of involuntary resettlement monitoring in Nepal, although the ADB policy requires the borrower to prepare and disclose semi-annual monitoring reports. Therefore the ADB conducts monitoring activities based on its own safeguard policy.

8.2.5 Information Disclosure

According to the ADB's 2009 SPS, the borrower/client will submit to the ADB the following documents for disclosure on the ADB's website (ADB 2009a):

- a draft full EIA draft (including the draft EMP) at least 120 days prior to the ADB Board consideration, and/or environmental assessment and review frameworks before project appraisal, where applicable;
- the final EIA/IEE;
- a new or updated EIA/IEE and corrective action plan prepared during project implementation, if any; and
- environmental monitoring reports.

The ADB specifies that the borrower/client will provide relevant environmental information, including information from the documents, in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and other stakeholders. The ADB specifies that the borrower/client will provide relevant environmental information, including information from the documents, in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and other stakeholders. In the case of Tanahu (Upper Seti) Hydropower Project, a public consultation during the scoping phase of the project, a public hearing, and stakeholder meetings were organised and conducted to collect concerns and suggestions from the public (ADB 2009a).

The main objectives of the public consultation during the scoping phase were to:

- Provide information about the project to the public and the Village Development Committees (VDCs)/municipalities to be affected; and
- Request the people, organisations, NGOs and VDCs/municipalities concerned to send comments and suggestions regarding the project. (ADB 2009a)

The primary objective of the public hearing was to inform the public about the project and collect feedback about concerns and views. To give people notice of the public hearing, a fifteen-day notification was made in a national daily newspaper requesting the VDCs/municipalities as well as schools, hospitals, health posts, and concerned individuals or organisations in the project area to suggest in written form the proposed project's possible impacts on the environment. The major findings of the EIA study were circulated before the hearing as a in the Nepali language (ADB 2009a).

Stakeholder meetings were conducted three times over the course of the project formulation. Before the stakeholder meeting, notices were published in a national daily newspaper and a local newspaper. A radio programme and local TV programme also announced the meetings. Invitation letters were sent to the affected VDCs, ministries, local government organisations, political parties, NGOs, media, universities and other relevant stakeholders. Furthermore, a copy of the Public Notice was posted in several villages of the affected VDCs requesting them to participate. In each stakeholder meeting, Nepali brochures summarizing the results of an environmental study were distributed to the participants (ADB 2009a).

For land acquisition and involuntary resettlement, the Land Acquisition Act has a provision for informing the stakeholder about the details of land to be acquired by the government, but it is missing an explicit provision for the preparation or disclosure of involuntary resettlement planning information to project-affected persons. The ADB policy requires disclosing both draft and final resettlement plans. Therefore the ADB conducts information disclosure activities based on its own safeguard policy.

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TABLE A-1

Major Acts and Rules Related to Environmental and Social Considerations in Nepal

No.	Name	Year
General		
1	Environment Protection Act, 2053	1997
2	Environment Protection Rules, 2054	1997
3	Buffer Zone Management Rules, 2052	1996
4	Essential Goods Protection Act, 2012	1955
5	National Parks and Wildlife Conservation Act, 2029	1973
Pollution and Conservation		
1	Ozone Depleting Substances Consumption (Control) Rules, 2057	2001
2	National Parks and Wildlife Conservation Act, 2029	1973
3	Buffer Zone Management Rules, 2052	1996
4	Climate Change Policy, 2067	2011
5	National Wetlands Policy, 2059	2003
Health		
1	Drug Investigation and Inspection Rules, 2040	1983
2	Drugs Advisory Council and Drugs Advisory Committee Formation Rules, 2037	1970
3	Drug Category Rules, 2043	1986
4	Drug Registration Rules, 2038	1981
5	Drug Act, 2035	1978
6	Health Services Rules, 2055	1999
7	Kidney Transplantation (Regulation and Prohibition) Rules, 2058	2002
8	Nepal Health Professional Council Rules, 2056	1999
9	Nepal Medical Council Rules, 2024	1964
10	Ayurveda Medical Council Act, 2034	1977
11	B.P. Koirala Institute of Health Sciences Act, 2049	1993
12	B.P. Koirala Memorial Cancer Hospital Act 2053	1997
13	Human Body Organ Transplantation (Regulation and Prohibition) Act, 2055	1988
14	Infectious Disease Act 2020	1964
15	Karnali Academy of Health Sciences Act, 2068	2011
16	Martyr Gangalal National Heart Disease Centre Act, 2057	2000
17	Narcotic Drugs (Control) Act, 2033	1976
18	National Academy of Medical Sciences Act, 2063	2006
19	Nepal Health Professional Council Act, 2053	1997
20	Nepal Health Research Council Act, 2047	1991
21	Nepal Health Service Act, 2053	1997
22	Nepal Medical Council Act, 2020	1964
23	Nepal Nursing Council Act, 2052	1996
24	Nepal Pharmacy Council Act, 2057	2000
25	Patan Academy of Health Sciences Act, 2064	2008
26	Drug Control Strategy, 2010	1983

No.	Name	Year
27	National Ayurveda Health Policy, 2052	1996
28	National Health Policy, 2048	1991
29	National Policy for Drug Control, 2063	2006
Food and Consumer Protection		
1	Food Rules, 2027	1970
2	Food Act, 2052	1966
3	Mother's Milk Substitutes (Control of Sale and Distribution) Rules, 2051	1994
4	Mother's Milk Substitutes (Control of Sale and Distribution) Act, 2049	1992
5	Animal Slaughterhouse and Meat Inspection Acts, 2055	1999
6	Essential Commodities Control (Authorization) Act, 2017	1961
7	Consumer Protection Act, 2054	1998
8	Liquor Act, 2031	1974
9	Iodized Salt (Production, Sales and Distribution) Act, 2055	1998
10	National Dairy Development Board Act, 2048	1992
11	National Tea and Coffee Development Board Act, 2049	1993
Occupational Rights and Safety		
1	Labour Rules, 2050	1993
2	Labour Act, 2048	1992
3	Industrial Trainee Training Act, 2039	1982
4	Diplomatic Privilege ad Immunities of the Foreign States and Representatives Act, 2027	1970
5	Foreign Employment Rules, 2064	2008
6	Foreign Employment Act, 2064	2007
7	Labour and Employment Policy, 2062	2006
8	Employee Provident Fund Act, 2019	1962
9	Local Development Training Academy Act, 2049	1993
10	National Human Rights Commission Act, 2068	2012
11	Retirement Fund Act, 2042	1985
12	Remuneration and Facilities of Authorities and Members of Parliament Act, 2052	1996
13	Remuneration and Facilities of the Ministers Act, 2049	1993
14	Remuneration, Condition of Service and Facilities of Secretary General and Secretary of Legislation-Parliament, 2055	1998
15	Remuneration, Condition of Service and Facilities of the Attorney General, 2052	1996
16	Remuneration, Condition of Service and Facilities of the Authorities of the Constitutional Body Act, 2053	1997
17	Remuneration, Condition of Service and Facilities of the Justices of the Supreme Court Act, 2026	1969
18	Remuneration, Condition of Service and Facilities of Judges of Court of Appeal and District Court Act, 2048	1992
19	Security of the Health Workers and Health Organization Act, 2066	2009
20	Work Operation Fund Act, 2043	1986
21	Working Journalists Act, 2051	1993
22	Industrial Policy, 2011	

No.	Name	Year
23	Labour and Employment Policy, 2062	2006
24	Human Trafficking and Transportation (Control) Rules, 2065	2008
25	Trade Union Act, 2049	1992
26	Trade Union Rules, 2050	1993
Public Safety and Dangerous Substances		
1	Explosives Act, 2018	1961
2	Iodized Salt (Production, Sales and Distribution) Act, 2055	1998
3	Poisons Act, 2019	1963
4	National Nuclear Policy, 2064	2007
Displacement, Relief and Rehabilitation		
1	Legal Aid Rules, 2055	1998
2	Legal Aid Act 2054	1997
3	Local Self Government Rules, 2056	1999
4	Local Self-governance Act, 2055	1999
Land Use, Administration and Management		
1	House and Land Tax Rules, 2020	1963
2	House and Land Tax Rules, 2024	1967
3	House and Land Tax Act, 2019	1962
4	Land (Survey) Rules, 2058	2001
5	Rules on Exemption of Stream Cut, Land Slide Decay, River Cut and Alluvial Soil and Registration of the More Cultivated Land in the Land Contract Status, 2021	1964
6	Ukhada Rules, 2021	1965
7	Ukhada Act, 2021	1964
8	Act Relating to Land of Jhora Area, 2028	1971
9	Jhora Area Land Act, 2048	1971
10	Land (Survey and Measurement) Act, 2019	1963
11	Land Acquisition Act, 2034	1977
12	Land Revenue Act, 2034	1978
13	Lands Act, 2021	1964
14	Pasture Land Nationalization Act, 2031	1974
15	Road Board Act, 2058	2002
Agriculture and Agro-Chemicals		
1	Irrigation Rules, 2056	2000
2	Pesticide Rules, 2050	1994
3	Pesticide Act, 2048	1991
4	Plant Protection Rules, 2066	2010
5	Plant Protection Act, 2064	2007
6	Agricultural Research Council Act, 2048	1992
7	Agriculture and Forestry University Act, 2067	2010
8	Seed Act, 2045	1988
9	Irrigation Policy, 2060	
10	National Agricultural Policy, 2004	

No.	Name	Year
Water Resources		
1	Drinking Water Rules, 2055	1998
2	Drinking Water Service Charge (Recovery) Rules, 2050	1994
3	Water Resources Rules, 2053	1993
4	Water Resources Act, 2049	1992
5	Water Supply and Management Board Act, 2063	2006
6	Nepal Water Supply Corporation Act, 2045	1989
7	Water Tariff Fixation Commission Act, 2063	2006
8	Water Tax Act 2023	1996
9	Local Self Governance Rules, 2056	1999
10	Local Self Governance Act, 2055	1999
Fishery		
1	Aquatics (Contract) Rules, 2019	1962
2	Aquatic Animal Protection Act, 2017	1960
3	Feed Act, 2033	1976
Forestry		
1	Forest Rules, 2051	1995
2	Forest Act, 2049	1993
3	Agriculture and Forestry University Act, 2067	2010
4	Private Forests Nationalization Act, 2013	1957
5	National Parks and Wildlife Conservation Act, 2029	1973
Wildlife and Domestic Animal		
1	Animal Health and Livestock Services Rules, 2056	1999
2	Animal Health and Livestock Services Acts, 2055	1999
3	Animal Slaughterhouse and Meat Inspection Acts, 2055	1999
4	Feed Act, 2033	1976
5	National Parks and Wildlife Conservation Act, 2029	1973
6	Veterinary Council Act, 2055	1999
Energy and Mineral Resources		
1	Electricity Leakage Control Rules, 2059	2002
2	Electric Rules, 2050	1993
3	Electric Act, 2049	1992
4	Electric Tariff Fixation Rules, 2050	1994
5	Electricity Theft Control Act, 2058	2002
6	Minerals Survey (Allowance and Privilege) Rules, 2024	1967
7	Mines and Minerals Rules, 2056	1999
8	Mines and Minerals Act, 2042	1985
9	Petroleum Industry (Income Tax) Rules, 2041	1985
10	Petroleum Rules, 2041	1985
11	Petroleum Act, 2040	1983
12	Nepal Electricity Authority Act, 2041	1984
13	Hydropower Development Policy, 2058	2001

No.	Name	Year
Rural and Urban Planning and Protection		
1	Armed Police Force Rules, 2060	2001
2	Armed Police Force Act, 2058	2001
3	Domestic Violence (Crime and Punishment) Act, 2019	1962
4	Domestic Violence (Offence and Punishment) Rules, 2067	
5	Domestic Violence (Offence and Punishment) Act, 2066	2009
6	Police Rules, 2049	
7	Police Act, 2012	1955
8	Peace Fund (Operation) Rules, 2065	2008
9	Private Financing in Build and Operate of Infrastructures Rules, 2064	2007
10	Private Financing in Build and Operate of Infrastructures Act, 2063	2006
11	Social Security Fund (Management and Operation) Rules, 2067	2011
12	Army Act, 2063	2006
13	Building Act, 2055	1998
14	Bretton Woods Agreement Act, 2018	1961
15	Development Board Act, 2013	1956
16	Greater Janakpur Area Development Council Act, 2055	1998
17	Guthi Corporation Act, 2033	1976
18	Immovable Property Requisition Act, 2013	1956
19	Immovable Property Requisition Rules, 2016	1960
20	Industrial Enterprises Act, 2049	1992
21	Industrial Enterprises development Institute Act, 2053	1996
22	International Centre for Integrated Mountain Development Act, 2040	1983
23	Lumbini Development Trust Act, 2042	1985
24	National Calamity (Relief) Act, 2039	1982
25	Pashupati Area Development Trust Act, 2044	1987
26	Ownership of Joint Housing Act, 2054	1997
27	Poverty Alleviation Fund Act, 2063	2006
28	Public Road Act, 2031	1974
29	Regional Development Plans (Implementation) Act, 2013	2056
30	Solid Waste (Management and Resource Mobilization) Act, 2044	1987
31	Soil and Watershed Conservation Act, 2039	1982
32	Town Development Act, 2045	1998
33	Town Development Fund Act, 2053	1997
34	Foreign Aid Policy, 2002	
35	Rural Energy Policy, 2006	
36	Trade Policy, 2009	
Transportation and Safety		
1	Civil Aviation Rules, 2051	1996
2	Civil Aviation Act, 2015	1959
3	Motor Vehicles and Transportation Management Rules, 2054	1997
4	Motor Vehicles and Transportation Management Act, 2049	1993

No.	Name	Year
5	Motor Vehicles Tax Act, 2031	1974
6	Ship Registration Rules, 2028	1972
7	Ship Registration Act, 2027	1971
8	Multimodal Transportation of Goods Act, 2063	2006
9	Nepal Airlines Corporation Act, 2019	1963
10	Nepal Civil Aviation Authority Act, 2053	1996
11	Nepal Ship (Registration and Logbook) Act, 2017	1961
12	Railways Act, 2020	1963
Cultural and Natural Heritage		
1	Ancient Monuments Preservation Rules, 2046	1989
2	Ancient Monument Preservation Act, 2013	1956
3	National Trust for Nature Conservation Act, 2039	1982
Vulnerable Group		
1	Child Labour (Prohibition and Regulation) Rules, 2061	2006
2	Child Labour (Prohibition and Regulation) Act, 2056	2000
3	Children Act, 2048	1992
4	Children's Rules, 2051	1995
5	Compensation Relating to Torture Act, 2053	1993
6	Juvenile Justice Procedural Rules, 2063	2006
7	Begging (Prohibition) Act, 2018	1962
8	National Woman Commission Act, 2063	2006
9	Protection and Welfare of the Disabled Persons Act, 2039	1982
10	Senior Citizens Act, 2063	2006
11	Social Welfare Act, 2049	1992
Miscellaneous and Others		
1	Births, Deaths and Other Personal Events (Registration) Rules, 2034	1977
2	Births, Deaths and Other Personal Events (Registration) Act, 2033	1976
3	Civil Service Rules, 2050	1993
4	Civil Service Act, 2049	1993
5	Civil Rights Act, 2012	1955
6	Commission for the Investigation of Abuse of Authority Rules, 2059	2002
7	Customs Rules, 2065	2007
8	Financial Procedure Rules, 2064	2007
9	Foreign Investment Tax Rules, 2020	1963
10	Gorkhapatra Corporation Rules, 2021	1965
11	Government Cases Rules, 2055	1999
12	Government of Nepal (Allocation of Business) Rules, 2069	2012
13	Health Tax (Smoking and Liquor Charge) Fund Rules, 2051	1994
14	Higher Secondary Education Rules, 2052	1996
15	Honorary Consul Rules, 2039	1982
16	Immigration Rules, 2051	1994
17	Income Tax Rules, 2059	2002

No.	Name	Year
18	Insurance Rules, 2049	1993
19	Insurance Act, 2049	1992
20	International Development Association's Membership Acquisition Act, 2019	1962
21	International Finance Corporation's Membership Acquisition Act, 2022	1965
22	International Financial Transaction Act, 2054	1998
23	Investment Board Act, 2068	2010
24	Marriage Registration Rules, 2028	1971
25	Local Body Financial Administration Rules, 2064	2007
26	Mountaineering Expedition Rules, 2059	2002
27	Nepal Citizenship Rules, 2063	2006
28	Nepal Education Services (Formation, Groups and Class Division and Appointment) Rules, 2050	1993
29	Non-Resident Nepali Rules, 2066	
30	Non-Resident Nepali Act, 2064	2008
31	Press Council (Working Procedures) Rules, 2049	1993
32	Public Debt Rules, 2059	2003
33	Public Procurement Rules, 2064	2007
34	Nepal Standards (Certification Mark) Act, 2037	1980
35	Nepal Special Service Act, 2042	1985

Source: Nepal Law Commission (2011)

TABLE A-2

Status of Nepal with Regard to Major International Conventions, Protocols and Treaties Related to Environmental and Social Considerations

International agreement	Signature	Ratification	Accession	Succession	Acceptance	Provisional Application
Convention on the High Seas	29 Apr 1958	28 Dec 1962				
Optional Protocol of Signature concerning the Compulsory Settlement of Disputes	29 Apr 1958*					
Constitution of the United Nations Industrial Development Organization	11 Aug 1983	6 Dec 1983				
International Tropical Timber Agreement, 1994						23 May 1997
Constitution of the Asia-Pacific Telecommunity	15 Sep 1976	12 May 1977				
Convention and Statute on Freedom of Transit			22 Aug 1966			
Agreement establishing the International Fund for Agricultural Development			5 May 1978			
Convention on the Prevention and Punishment of Crimes against Internationally Protected Persons, including Diplomatic Agents			9 Mar 1990			
International Convention on the Suppression and Punishment of the Crime of Apartheid			12 Jul 1977			
Convention on Transit Trade of Land-locked States	9 Jul 1965	22 Aug 1966				
Vienna Convention on Diplomatic Relations			28 Sep 1965			
Customs Convention on the Temporary Importation of Private Road Vehicles			21 Sep 1960			
United Nations Convention against Corruption	10 Dec 2003	29 Mar 2011				
Convention concerning Customs Facilities for Touring			21 Sep 1960			
Slavery Convention, signed at Geneva on 25 September 1926 and amended by the Protocol			7 Jan 1963			
Convention on the Political Rights of Women			26 Apr 1966			
Constitution of the World Health Organization					2 Sep 1953	

International agreement	Signature	Ratification	Accession	Succession	Acceptance	Provisional Application
Convention for the Suppression of the Traffic in Persons and of the Exploitation of the Prostitution of Others			10 Dec 2002			
International Covenant on Economic, Social and Cultural Rights			14 May 1991			
Agreement establishing the Asian Development Bank	4 Dec 1965				21 Jun 1966	
Convention on Biological Diversity	12 Jun 1992	23 Nov 1993				
Convention on the Prevention and Punishment of the Crime of Genocide			17 Jan 1969			
Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction	19 Jan 1993	18 Nov 1997				
Agreement establishing the Asia-Pacific Institute for Broadcasting Development	15 May 1980	11 Sep 1980				
Kyoto Protocol to the United Nations Framework Convention on Climate Change			16 Sep 2005			
Convention on the Rights of the Child	26 Jan 1990	14 Sep 1990				
Montreal Protocol on Substances that Deplete the Ozone Layer			6 Jul 1994			
Vienna Convention for the Protection of the Ozone Layer			6 Jul 1994			
International Convention against Apartheid in Sports	24 Jun 1986	1 Mar 1989				
Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment			14 May 1991			
Agreement establishing the Common Fund for Commodities	7 Sep 1981	3 Apr 1984				
United Nations Framework Convention on Climate Change	12 Jun 1992	2 May 1994				
United Nations Convention on the Law of the Sea	10 Dec 1982	2 Nov 1998				
Convention on the Safety of United Nations and			8 Sep 2000			

International agreement	Signature	Ratification	Accession	Succession	Acceptance	Provisional Application
Associated Personnel						
International Convention for the Suppression of the Financing of Terrorism			23 Dec 2011			
Vienna Convention on Consular Relations			28 Sep 1965			
Convention on the Privileges and Immunities of the Specialized Agencies			23 Feb 1954			
Convention on the Privileges and Immunities of the United Nations			28 Sep 1965			
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade			9 Feb 2007			
Convention on the International Maritime Organization					31 Jan 1979	
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal			15 Oct 1996			
International Convention on the Elimination of All Forms of Racial Discrimination			30 Jan 1971			
United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances			24 Jul 1991			
Convention on psychotropic substances			9 Feb 2007			
International Covenant on Civil and Political Rights			14 May 1991			
Convention on the Elimination of All Forms of Discrimination against Women	5 Feb 1991	22 Apr 1991				
Stockholm Convention on Persistent Organic Pollutants	5 Apr 2002	6 Mar 2007				
United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa	12 Oct 1995	15 Oct 1996				
WHO Framework Convention on Tobacco Control	3 Dec 2003	7 Nov 2006				
Intergovernmental Agreement on the Asian Highway	26 Apr 2004	14 Jun 2010				

International agreement	Signature	Ratification	Accession	Succession	Acceptance	Provisional Application
Network						
International Convention Against the Taking of Hostages			9 Mar 1990			
Intergovernmental Agreement on the Trans-Asian Railway Network	10 Nov 2006	6 Mar 2012				
Convention on the Rights of Persons with Disabilities	3 Jan 2008	7 May 2010				
Convention on the International Trade in Endangered Species of Wild Fauna and Flora			18 Jun 1975			
Single Convention on Narcotic Drugs, 1961, as amended by the Protocol amending the Single Convention on Narcotic Drugs, 1961			29 Jun 1987			

Note: * Definitive signature

Source: UN (2012)

TABLE A-3

Nepal National Ambient Air Quality Standards vs. WHO Guidelines Values

Parameter	Averaging Time	Nepal ($\mu\text{g}/\text{m}^3$)	WHO ($\mu\text{g}/\text{m}^3$)
TSP	24 hours	230	–
PM ₁₀	1 year	–	20
	24 hours	120	50
PM _{2.5}	1 year	–	10
	24 hours	–	25
SO ₂	1 year	50	–
	24 hours	70	20
	10 minutes	–	500
NO ₂	1 year	40	40
	24 hours	80	–
	1 hour	–	200
CO	8 hours	10,000	–
	1 hour	–	–
	15 minutes	100,000	–
O ₃	8 hours	–	100
Pb	1 year	0.5	0.5 ^b

Notes: TSP: total suspended particulates; PM₁₀: particulate matter with diameter less than 10 μm , PM_{2.5}: particulate matter with diameter less than 2.5 μm .

Sources: WHO (2005); ADB and CAI-Asia Center (2006)

TABLE A-4

Nepal National Drinking Water Standards vs. WHO Guideline Values

No.	Category	Parameter	Unit	Nepal	WHO
1	Physical	Turbidity	NTU	5 (10)	10
2		pH		6.5–8.5*	6.5–8.5(A)
3		Colour	TCU	5 (15)	<15
4		Taste & Odour		Non-objectionable	NA
5		Total Dissolved Solids	Mg/L	1000	600
6		Electrical conductivity	$\mu\text{s}/\text{cm}$	1000	NA
7	Chemical	Iron	mg/L	0.3 (3)	0.3
8		Manganese	mg/L	0.2	0.4
9		Arsenic	mg/L	0.05	0.01
10		Cadmium	mg/L	0.003	0.003
11		Chromium	mg/L	0.05	0.05
12		Cyanide	mg/L	0.07	0.0006
13		Fluoride	mg/L	0.5–1.5*	1.5
14		Lead	mg/L	0.01	0.01
15		Ammonia	mg/L	1.5	0.06
16		Chloride	mg/L	250	NA
17		Sulphate	mg/L	250	500
18		Nitrate	mg/L	50	50

No.	Category	Parameter	Unit	Nepal	WHO
19		Copper	mg/L	1	2
20		Total Hardness (as CaCO ₃)	mg/L	500	300
21		Calcium	mg/L	200	100–300
22		Zinc	mg/L	3	4
23		Mercury	mg/L	0.001	0.006
24		Aluminium	mg/L	0.2	0.2
25		Residual Chlorine**	mg/L	0.1–0.2*	NA
26		Microbiology	E. Coli	MPN/100ml	0
27	Total Coliform		MPN/100ml	0 in 95% samples	NA

Notes: NA: Not available; * These values show lower and upper limits; Values in parenthesis refers the acceptable values only when alternative is not available.

Source: Ministry of Physical Planning and Works (2005); WHO (2011)

TABLE A-5

Tolerance Limits for Industrial Effluents Discharged into Inland Surface Waters (Generic) vs. IFC Standards

Characteristics	Tolerance Limit	IFC Standards
Total Suspended solids, mg/L, Max	30–200	50
Particle size of total suspended particles	Shall pass 850-micron Sieve.	
pH	5.5 to 9.0	6.0-9.0
Temperature	Shall not exceed 40 degree C in any section of the stream within 15 meters down-stream from the effluent outlet.	
Biochemical oxygen demand (BOD) for 5 days at 20°C, mg/L, Max	30-100	50
Oils and grease, mg/L, Max	10	10
Phenolic compounds, mg/L, Max	1	0.5
Cynices (as CN) mg/L, Max	0.2	0.1
Sulphides (as S), mg/L, Max	2	1
Radioactive materials:		
a. Alpha emitters, c/mL, Max	10 ⁻⁷	
b. Beta emitters, c/mL, Max	10 ⁻⁸	
Insecticides	Absent	
Total residual chlorine, mg/L	1	0.2
Fluorides (as F), mg/L, Max	2	20
Arsenic (as As), mg/L, Max	0.2	0.1
Cadmium (as, Cd), mg/L, Max	2	0.1
Hexavalent chromium (as Cr), mg/L, Max	0.1	0.1
Copper (as Cu), mg/L, Max	3	0.5
Lead (as Pb), mg/L, Max	0.1	0.1
Mercury (as Hg), mg/L, Max	0.01	0.01
Nickel (as Ni), mg/L, Max	3	0.5

Selenium (as Se), mg/L, Max	0.05	0.1
Zinc (as Zn), mg/L, Max	5	2
Ammonical nitrogen, mg/L, Max	50	
Chemical Oxygen Demand, mg/L, Max	250	250
Silver, mg/L, Max	0.1	0.5

Sources: GoN (2001); IFC (2013)

TABLE A-6

Tolerance Limits for Industrial Effluents Discharged into Inland Surface Water (Tanning Industry)

Characteristics	Tolerance Limit
Colour and odour	Absent**
Total dissolved solids, mg/L, Max	2100
Suspended solids, mg/L, Max	100
Biochemical oxygen demand (5 days at 20°C) mg/L, Max	100
Chloride (Cl), mg/L, Max	600
Hexavalent chromium (as Cr), mg/L	0.1
Total Chromium, mg/L, Max	2
Sulphides (as S), mg/L, Max	2
Sodium %, Max	60
Chemical oxygen demand mg/L, Max	250
pH Value	6.0–9.0

** For colour and odour, no requirement have been laid down standard but it is recommended that, as far as practicable, colour and unpleasant odour should be absent in the standard.

Source: GoN (2001)

TABLE A-7

Tolerance Limits for Industrial Effluents Discharged into Inland Surface Water (Wool-processing Industry)

Characteristics	Tolerance Limit
Suspended solids, mg/L, Max	100
Biochemical oxygen demand (5 days at 20°C) Mg/L, Max	100
Oil and grease, mg/L	10
Chemical oxygen demand, mg/L	250
Total Chromium, mg/L, Max	2
Sulphides (as S), mg/L, Max	2
Phenolic compounds, mg/L, Max	5
pH value	5.5 – 9.0
Temperature degree C	40

Source: GoN (2001)

TABLE A-8

Tolerance Limits for Industrial Effluents Discharged into Inland Surface Water (Fermentation Industry)

Characteristics	Tolerance Limit
pH	5.5-9.0
TSS, mg/L, max	100
BOD (5 days at 20°C) mg/L, Max	60

Source: GoN (2001)

TABLE A-9

Tolerance Limits for Industrial Effluents Discharged into Inland Surface Water (Vegetable Ghee and Oil Industries)

Characteristics	Tolerance Limit
BOD (5 days at 20°C) mg/L, Max	100
COD, mg/L, Max	250
pH	6.0 – 9.0
Oil and grease, mg/L, Max	10
Nickel, mg/L, Max	3

Source: GoN (2001)

TABLE A-10

Tolerance Limits for Industrial Effluents Discharged into Inland Surface Water (Paper and Pulp Industries)

Characteristics	Tolerance Limit
pH	5.5 – 9.0
Suspended solid, mg/L	100
BOD (5 days at 20°C) mg/L, Max	100

Source: GoN (2001)

TABLE A-11

Tolerance Limits for Industrial Effluents Discharged into Inland Surface Water (Dairy Industries)

Characteristics	Tolerance Limit
pH	5.5 – 8.5
TSS, mg/L, max	150
BOD (5 days at 20°C) mg/L, Max	100
Oil and grease, mg/L, Max	10
COD, mg/L, Max	250

Source: GoN (2001)

TABLE A-12

Tolerance Limits for Industrial Effluents Discharged into Inland Surface Water (Sugar Industries)

Characteristics	Tolerance Limit
pH	5.5 – 8.5
TSS, mg/L, max	100
BOD (5 days at 20°C) Mg/L, Max	100
COD, mg/L, Max	250

Source: GoN (2001)

TABLE A-13

Tolerance Limits for Industrial Effluents Discharged into Inland Surface Water (Cotton textile Industries)

Characteristics	Tolerance Limit
pH	6.0 – 9.0
TSS, mg/L, max	150
BOD (5 days at 20°C) Mg/L, Max	100
COD, mg/L, Max	250

Source: GoN (2001)

TABLE A-14

Tolerance Limits for Industrial Effluents Discharged into Inland Surface Water (Soap Industries)

Characteristics	Tolerance Limit
BOD (5 days at 20°C) Mg/L, Max	100
COD, mg/L, Max	250
pH	6.0 – 9.0
TSS, mg/L, Max	200
Oil and grease, mg/L, Max	10
Phenolic compound, mg/L, Max	1

Source: GoN (2001)

TABLE A-15

Tolerance Limits for Industrial Effluents Discharged into Public Sewage

Characteristics	Tolerance Limit
Total Suspended solids, mg/L, Max	600
pH	5.5–9.0
Temperature, °C, Max	45
Biochemical oxygen demand (BOD) for 5 days at 20°C, mg/L, Max	400
Oils and grease, mg/L, Max	50
Phenolic compounds, mg/L, Max	10
Cynides (as CN), mg/L, Max	2
Sulphides (as S), mg/L, Max	2

Chloride (Cl), mg/L, Max	1000
Insecticides	Absent
Sulphates (SO ₄), mg/L, Max	500
Fluorides (as F), mg/L, Max	10
Arsenic (as As), mg/L, Max	1
Cadmium (as, Cd), mg/L, Max	2
Total Chromium, mg/L, Max	2
Copper (as Cu), mg/L, Max	3
Lead (as Pb), mg/L, Max	0.1
Mercury (as Hg), mg/L, Max	0.01
Nickel (as Ni), mg/L, Max	3
Selenium (as Se), mg/L, Max	0.05
Zinc (as Zn), mg/L, Max	5
Ammonical nitrogen, mg/L, Max	50
Chemical Oxygen Demand, mg/L, Max	1000
Silver, mg/L, Max	0.1
Total Dissolved Solids, mg/L, Max	2100
Mineral Oils, mg/L, Max	10
Inhibition of nitrification test at 200ml/L	< 50%

Source: GoN (2001)

TABLE A-16

Tolerance Limits for Wastewater Discharged into Inland Surface Waters from Combined Wastewater Treatment Plant

Characteristics	Tolerance Limit
Total Suspended solids, mg/L, Max	50
Particle size of total suspended particles	Shall pass 850-micron Sieve.
pH	5.5–9.0
Temperature	Shall not exceed 40 degree C in any section of the stream within 15 meters down-stream from the effluent outlet.
Biochemical oxygen demand (BOD) for 5 days at 20°C, mg/L, Max	50
Oils and grease, mg/L, Max	10
Phenolic compounds, mg/L, Max	1
Cynides (as CN), mg/L, Max	0.2
Sulphides (as S), mg/L, Max	2
Radioactive materials:	
a. Alpha emitters, c/mL, Max	10 ⁻⁷
b. Beta emitters, c/mL, Max	10 ⁻⁸
Insecticides	Absent
Total residual chlorine, mg/L	1
Fluorides (as F), mg/L, Max	2
Arsenic (as As), mg/L, Max	0.2
Cadmium (as, Cd), mg/L, Max	2
Hexavalent chromium (as Cr), mg/L, Max	0.1

Copper (as Cu), mg/L, Max	3
Lead (as Pb), mg/L, Max	0.1
Mercury (as Hg), mg/L, Max	0.01
Nickel (as Ni), mg/L, Max	3
Selenium (as Se), mg/L, Max	0.05
Zinc (as Zn), mg/L, Max	5
Ammonical nitrogen, mg/L, Max	50
Chemical Oxygen Demand, mg/L, Max	250
Silver, mg/L, Max	0.1

Source: GoN (2001)

TABLE A-17

Sampling Methods for Measuring Water Quality

	Prescribed ISO Standard Numbers
Guidance on the design of sampling programs	5667 (1)
Guidance on sampling techniques	5667 (2)
Guidance on the preservation and handling of samples	5667 (3)
Guidance on sampling of wastewaters	5667 (10)

Source: GoN (2001)

TABLE A-18

Analysing Methods for Testing Water Quality

Parameters	Prescribed ISO Standard Numbers
Total Suspended solids, mg/L, Max	11923
pH	10523
Biochemical oxygen demand (BOD) for 5 days at 20°C, mg/L, Max	5815
Oils and grease, mg/L, Max	9377 (1,2,4)
Phenolic compounds, mg/L, Max	14402 / 6439
Cyanides (as CN), mg/L, Max	6703 (1)
Sulphides (as S), mg/L, Max	10530
Chloride (Cl), mg/L, Max	10304 (2) / 9297
Insecticides	6468
Sulphates (SO ₄), mg/L, Max	10304 (2)
Fluorides (as F), mg/L, Max	10304 (1)
Arsenic (as As), mg/L, Max	11885/11969/6595
Cadmium (as Cd), mg/L, Max	5961/8288
Total Chromium, mg/L, Max	9174/11083
Copper (as Cu), mg/L, Max	8288/11885
Lead (as Pb), mg/L, Max	8288/11885
Mercury (as Hg), mg/L, Max	5666
Nickel (as Ni), mg/L, Max	8288 /11885
Selenium (as Se), mg/L, Max	9965/11885
Zinc (as Zn), mg/L, Max	8288/11885

Ammonical nitrogen, mg/L, Max	11905 (1)/5664
Chemical Oxygen Demand, mg/L, Max	ISO/DIS 15705 / 6060
Silver, mg/L, Max	11885
Mineral Oils, mg/L, Max	9377 (1,2,4)
Inhibition of nitrification test*	9509

Notes:

To supplement the analysing of the wastewater for various parameters, a Nitrification test can be conducted. The test gives information on the general characteristics of the wastewater in relation to the possible effects of the wastewater on the biological processes that takes place in the wastewater treatment plant.

The Nitrification test provides data on the inhibitory effect of a sample of the wastewater on a specified population of nitrification bacteria. The inhibitory effect of the wastewater on the nitrification processes should be less than 50% in 200 mL/L solution of the wastewater. The test is described in the ISO 9509:1989 standard. However this standard does not take a possible loss of Nitrate during the test into account. In addition the specified minimum oxygen concentration of 2 mg/L is similarly too low, as the nitrification process will be substantially inhibited at such a concentration of oxygen.

It is therefore recommended to use an oxygen concentration of at least 6 mg/l during the test and to analyse for ammonium-N as well as for nitrate and nitrite-N when industrial wastewater is tested.

Source: GoN (2001)

TABLE A-19

Nepal's Ambient Air Quality Standards vs. WHO Guidelines ($\mu\text{g}/\text{m}^3$)

Parameter	Averaging time	Nepal ($\mu\text{g}/\text{m}^3$)	WHO ($\mu\text{g}/\text{m}^3$)
TSP	1 year	–	–
	24 hours	230	–
PM ₁₀	1 year	–	20
	24 hours	120	50
SO ₂	1 year	50	–
	24 hours	70	20
NO ₂	1 year	40	40
	24 hours	80	–
CO	8 hours	10,000	10,000
	15 minutes	100,000	–
Pb	1 year	0.5	0.5

Notes: TSP = total suspended particulates; PM₁₀ = particulate matter with diameter less than 10 micro metres.

Source: ADB and CAI-Asia Center (2006); WHO (2005)

TABLE A-20

Chimney Height and Emission Standard in Brick kiln Industry

No.	Types of Kiln	Suspended Particulate Matter (Maximum Limit)	Heights of Chimney (Minimum Limit)
1	Bull's Trench Kiln, Forced Draught (Fixed Chimney)	600 mg/Nm ³	17 metres
2	Bull's Trench Kiln, Natural Draught (Fixed Chimney)	700 mg/Nm ³	30 metres
3	Vertical Shaft Brick Kiln (VSBK)	400 mg/Nm ³	15 metres

Notes:

- 1) Value of suspended particulate matter shall be calculated considering reference oxygen concentration as 10%.
- 2) Chimney height shall be measured from ground level.

Source: GoN (2001)

TABLE A-21

National Indoor Air Quality Standards, 2009

In exercise of the power conferred by Rule 15 of the Environment Protection Rules, 1997, the Government of Nepal has set the following National Indoor Air Quality Standards, 2009. These Standards shall commence on such date, as the Ministry may, by a notification published in the Nepal Gazette, appoint.

Pollutant	Maximum Concentration	
	Averaging Time	Level
PM ₁₀	24-hour	120 µg/m ³
	1-hour	200 µg/m ³
PM _{2.5}	24-hour	60 µg/m ³
	1-hour	100 µg/m ³
Carbon monoxide (CO)	8-hour	9 ppm (10 mg/m ³)
	1-hour	35 ppm (40 mg/m ³)
Carbon dioxide (CO ₂)	8-hour	1,000 ppm (1,800 mg/m ³)

Notes:

- 1) Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m³), and micrograms per cubic meter of air (µg/m³).
- 2) The use of PM_{2.5} value is preferred.
- 3) No need to monitor/measure both PM₁₀ and Particulate Matter PM_{2.5}. In accordance with the World Health Organization (WHO) Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide, 2005, the PM_{2.5} values can be converted to the corresponding PM₁₀ values by application of a PM_{2.5}/ PM₁₀ ratio of 0.5.
- 4) Averaging time can be fixed as per convenience.
When one-hour averaging time is chosen, monitoring should be done during cooking time.
- 5) When eight-hour averaging time is taken, monitoring should cover cooking time too.
- 6) Monitoring of Carbon dioxide is to ensure the adequacy of the ventilation of the monitoring sites.

Source: Nepal Health Research Council (2009)

TABLE A-22

IUCN Categories

EXTINCT (EX)	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
EXTINCT IN THE WILD (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
CRITICALLY ENDANGERED (CR)	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see another table below), and it is therefore considered to be facing an extremely high risk of extinction in the wild.
ENDANGERED (EN)	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see another table below), and it is therefore considered to be facing a very high risk of extinction in the wild.
VULNERABLE (VU)	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see another table below), and it is therefore considered to be facing a high risk of extinction in the wild.

Source: IUCN (2001)

TABLE A-23

IUCN Red List of Nepal (Animal)

No.	Scientific Name	English Name
Critically Endangered (CR)		
1	<i>Ardea insignis</i>	White-bellied Heron
2	<i>Aythya baeri</i>	Baer's Pochard
3	<i>Batagur kachuga</i>	Red-crowned Roofed Turtle
4	<i>Gavialis gangeticus</i>	Gharial
5	<i>Gyps bengalensis</i>	White-rumped Vulture
6	<i>Gyps tenuirostris</i>	Slender-billed Vulture
7	<i>Houbaropsis bengalensis</i>	Bengal Florican
8	<i>Porcula salvania</i>	Pygmy Hog
9	<i>Rhodonessa caryophyllacea</i>	Pink-headed Duck
10	<i>Sarcogyps calvus</i>	Red-headed Vulture
11	<i>Schizothorax nepalensis</i>	Snow Trout
12	<i>Schizothorax raraensis</i>	Rara Snowtrout
Endangered (EN)		
1	<i>Apodemus gorkha</i>	Himalayan Wood Mouse
2	<i>Axis porcinus</i>	Hog Deer
3	<i>Bubalus arnee</i>	Indian Water Buffalo
4	<i>Caprolagus hispidus</i>	Hispid Hare
5	<i>Clarias magur</i>	Wagur

No.	Scientific Name	English Name
6	<i>Cuon alpinus</i>	Dhole
7	<i>Elephas maximus</i>	Asian Elephant
8	<i>Falco cherrug</i>	Saker Falcon
9	<i>Indotestudo elongata</i>	Yellow-headed Tortoise
10	<i>Leptoptilos dubius</i>	Greater Adjutant
11	<i>Manis pentadactyla</i>	Chinese Pangolin
12	<i>Moschus chrysogaster</i>	Alpine Musk Deer
13	<i>Moschus fuscus</i>	Black Musk Deer
14	<i>Moschus leucogaster</i>	Himalayan Muskdeer
15	<i>Neophron percnopterus</i>	Egyptian Vulture
16	<i>Panthera tigris</i>	Tiger
17	<i>Panthera uncia</i>	Snow Leopard
18	<i>Pantholops hodgsonii</i>	Chiru
19	<i>Platanista gangetica</i>	Ganges River Dolphin
20	<i>Prionailurus viverrinus</i>	Fishing Cat
21	<i>Sterna acuticauda</i>	Black-bellied Tern
22	<i>Sypheotides indicus</i>	Lesser Florican
23	<i>Tor putitora</i>	Putitor Mahseer
Vulnerable (VU)		
1	<i>Aceros nipalensis</i>	Rufous-necked Hornbill
2	<i>Ailurus fulgens</i>	Red Panda
3	<i>Aonyx cinerea</i>	Asian Small-clawed Otter
4	<i>Aquila clanga</i>	Greater Spotted Eagle
5	<i>Aquila hastata</i>	Indian Spotted Eagle
6	<i>Aquila heliaca</i>	Eastern Imperial Eagle
7	<i>Arctictis binturong</i>	Binturong
8	<i>Bos gaurus</i>	Gaur
9	<i>Bos mutus</i>	Wild Yak
10	<i>Calicnemis nipalica</i>	
11	<i>Catreus wallichi</i>	Cheer Pheasant
12	<i>Chaetornis striata</i>	Bristled Grassbird
13	<i>Chloropetalia selysi</i>	
14	<i>Chrysomma altirostre</i>	Jerdon's Babbler
15	<i>Clangula hyemalis</i>	Long-tailed Duck
16	<i>Crocodylus palustris</i>	Mugger
17	<i>Cyprinion semiplotum</i>	Assamese Kingfish
18	<i>Emberiza aureola</i>	Yellow-breasted Bunting
19	<i>Ficedula subrubra</i>	Kashmir Flycatcher
20	<i>Francolinus gularis</i>	Swamp Francolin
21	<i>Gallinago nemoricola</i>	Wood Snipe
22	<i>Geoclemys hamiltonii</i>	Black Spotted Turtle
23	<i>Grus antigone</i>	Sarus Crane
24	<i>Haliaeetus leucoryphus</i>	Pallas's Fish-eagle
25	<i>Hardella thurjii</i>	Crowned River Turtle
26	<i>Leptoptilos javanicus</i>	Lesser Adjutant
27	<i>Lutrogale perspicillata</i>	Smooth-coated Otter

No.	Scientific Name	English Name
28	<i>Melursus ursinus</i>	Sloth Bear
29	<i>Mulleripicus pulverulentus</i>	Great Slaty Woodpecker
30	<i>Myotis sicarius</i>	Mandelli's Mouse-eared Myotis
31	<i>Nanorana minica</i>	
32	<i>Nanorana rostandi</i>	
33	<i>Neofelis nebulosa</i>	Clouded Leopard
34	<i>Nilssonia hurum</i>	Indian Peacock Softshell Turtle
35	<i>Ophiophagus hannah</i>	King Cobra
36	<i>Pardofelis marmorata</i>	Marbled Cat
37	<i>Ploceus megarhynchus</i>	Yellow Weaver
38	<i>Prinia cinereocapilla</i>	Grey-crowned Prinia
39	<i>Puntius chelynooides</i>	Dark mahseer
40	<i>Python bivittatus</i>	Burmese Python
41	<i>Rhinoceros unicornis</i>	Indian Rhinoceros
42	<i>Rucervus duvaucelii</i>	Barasingha
43	<i>Rusa unicolor</i>	Sambar
44	<i>Rynchops albicollis</i>	Indian Skimmer
45	<i>Saxicola insignis</i>	White-throated Bushchat
46	<i>Schizothorax richardsonii</i>	
47	<i>Scutigera nepalensis</i>	
48	<i>Tetracerus quadricornis</i>	Four-horned Antelope
49	<i>Tricula mahadevensis</i>	
50	<i>Turdoides longirostris</i>	Slender-billed Babbler
51	<i>Ursus thibetanus</i>	

Source: IUCN (2012)

TABLE A-24

IUCN Red List of Nepal (Plant)

No.	Scientific Name	English Name
Endangered (EN)		
1	<i>Andrewsianthus ferrugineus</i>	
2	<i>Diplocolea sikkimensis</i>	
3	<i>Taxus contorta</i>	
4	<i>Taxus wallichiana</i>	Himalayan Yew
Vulnerable (VU)		
1	<i>Cycas pectinata</i>	
2	<i>Dalbergia latifolia</i>	Indonesian Rosewood
3	<i>Scaphophyllum speciosum</i>	
4	<i>Takakia ceratophylla</i>	
5	<i>Ulmus wallichiana</i>	

Source: IUCN (2012)

TABLE A-25

CMS-Listed Animals in Nepal

No.	Appendix	Class	Order	Family	Species
1	I	Mammalia	Carnivora	Felidae	<i>Uncia uncia</i>
2	I	Mammalia	Artiodactyla	Bovidae	<i>Bos grunniens</i>
3	I	Reptilia	Crocodylia	Gavialidae	<i>Gavialis gangeticus</i>
4	I/II	Mammalia	Cetacea	Platanistidae	<i>Platanista gangetica gangetica</i>
5	I/II	Aves	Anseriformes	Anatidae	<i>Marmaronetta angustirostris</i>
6	I/II	Aves	Anseriformes	Anatidae	<i>Aythya baeri</i>
7	I/II	Aves	Anseriformes	Anatidae	<i>Aythya nyroca</i>
8	I/II	Aves	Falconiformes	Accipitridae	<i>Haliaeetus albicilla*</i>
9	I/II	Aves	Falconiformes	Accipitridae	<i>Haliaeetus leucoryphus</i>
10	I/II	Aves	Falconiformes	Accipitridae	<i>Neonophron percnopterus</i>
11	I/II	Aves	Falconiformes	Accipitridae	<i>Aquila clanga</i>
12	I/II	Aves	Falconiformes	Accipitridae	<i>Falco cherrug</i>
13	I/II	Aves	Falconiformes	Falconidae	<i>Falco naumanni</i>
14	I/II	Aves	Passeriformes	Emberizidae	<i>Emberiza aureola</i>
15	II	Mammalia	Chiroptera	Vespertilionidae	<i>Miniopterus schreibersii</i> (only African populations)
16	II	Mammalia	Perissodactyla	Equidae	<i>Equus hemionus</i>
17	II	Mammalia	Artiodactyla	Bovidae	<i>Ovis ammon</i>
18	II	Aves	Ciconiiformes	Ciconiidae	<i>Ciconia nigra</i>
19	II	Aves	Ciconiiformes	Ciconiidae	<i>Ciconia ciconia</i>
20	II	Aves	Ciconiiformes	Threskiornithidae	<i>Platalea leucorodia</i>
21	II	Aves	Falconiformes	Pandionidae	<i>Pandion haliaetus</i>
22	II	Aves	Falconiformes	Accipitridae	<i>Aviceda jerdoni</i>
23	II	Aves	Falconiformes	Accipitridae	<i>Aviceda leuphotes</i>
24	II	Aves	Falconiformes	Accipitridae	<i>Pernis ptilorhyncus</i>
25	II	Aves	Falconiformes	Accipitridae	<i>Milvus milvus</i>
26	II	Aves	Falconiformes	Accipitridae	<i>Milvus migrans</i>
27	II	Aves	Falconiformes	Accipitridae	<i>Gyps fulvus</i>
28	II	Aves	Falconiformes	Accipitridae	<i>Aegyptius monachus</i>
29	II	Aves	Falconiformes	Accipitridae	<i>Circaetus gallicus</i>
30	II	Aves	Falconiformes	Accipitridae	<i>Circus aeruginosus</i>
31	II	Aves	Falconiformes	Accipitridae	<i>Circus cyaneus</i>
32	II	Aves	Falconiformes	Accipitridae	<i>Circus macrourus</i>
33	II	Aves	Falconiformes	Accipitridae	<i>Circus melanoleucos</i>
34	II	Aves	Falconiformes	Accipitridae	<i>Circus pygargus</i>
35	II	Aves	Falconiformes	Accipitridae	<i>Accipiter badius</i>
36	II	Aves	Falconiformes	Accipitridae	<i>Accipiter virgatus</i>
37	II	Aves	Falconiformes	Accipitridae	<i>Accipiter nisus</i>
38	II	Aves	Falconiformes	Accipitridae	<i>Accipiter gentilis</i>
39	II	Aves	Falconiformes	Accipitridae	<i>Buteo buteo</i>
40	II	Aves	Falconiformes	Accipitridae	<i>Buteo rufinus</i>
41	II	Aves	Falconiformes	Accipitridae	<i>Buteo hemilasius</i>
42	II	Aves	Falconiformes	Accipitridae	<i>Aquila rapax</i>

No.	Appendix	Class	Order	Family	Species
43	II	Aves	Falconiformes	Accipitridae	<i>Aquila nipalensis</i>
44	II	Aves	Falconiformes	Accipitridae	<i>Aquila chrysaetos</i>
45	II	Aves	Falconiformes	Accipitridae	<i>Hieraaetus pennatus</i>
46	II	Aves	Falconiformes	Accipitridae	<i>Spizaetus nipalensis</i>
47	II	Aves	Falconiformes	Falconidae	<i>Falco tinnunculus</i>
48	II	Aves	Falconiformes	Falconidae	<i>Falco amurensis</i>
49	II	Aves	Falconiformes	Falconidae	<i>Falco columbarius</i>
50	II	Aves	Falconiformes	Falconidae	<i>Falco subbuteo</i>
51	II	Aves	Falconiformes	Falconidae	<i>Falco severus</i>
52	II	Aves	Falconiformes	Falconidae	<i>Falco cherrug</i>
53	II	Aves	Falconiformes	Falconidae	<i>Falco peregrinus</i>
54	II	Aves	Falconiformes	Falconidae	<i>Falco pelegrinoides</i>
55		Aves	Strigiformes	Strigidae	<i>Ninox scutulata</i>
56		Aves	Strigiformes	Strigidae	<i>Asio otus</i>
57		Aves	Strigiformes	Strigidae	<i>Asio flammeus</i>

Source: CMS (2012)

TABLE A-26

CITES-Listed Animals and Plants in Nepal

No.	Phylum	Class	Order	Family	Scientific Name
Animals (Appendix I)					
1	CHORDATA	MAMMALIA	PRIMATES	CERCOPITHECIDAE	<i>Semnopithecus ajax</i> (Pocock, 1928)
2					<i>Semnopithecus entellus</i> (Dufresne, 1797)
3					<i>Semnopithecus hector</i> (Pocock, 1928)
4					<i>Semnopithecus schistaceus</i> (Hodgson, 1840)
5			LAGOMORPHA	LEPORIDAE	<i>Caprolagus hispidus</i> (Pearson, 1839)
6			CETACEA	PLATANISTIDAE	<i>Platanista gangetica</i> (Roxburgh, 1801)
7			CARNIVORA	AILURIDAE	<i>Ailurus fulgens</i> (F. G. Cuvier, 1825)
8				CANIDA	<i>Canis lupus</i> (Linnaeus, 1758)
9				URSIDAE	<i>Melursus ursinus</i> (Shaw, 1791)
10					<i>Ursus arctos</i> (Linnaeus, 1758) <i>ssp. isabellinus</i> (Horsfield, 1826)
11					<i>Ursus thibetanus</i> (G. Cuvier, 1823)
12				VIVERRIDAE	<i>Prionodon pardicolor</i> (Hodgson, 1842)
13				FELIDAE	<i>Catopuma temminckii</i> (Vigors & Horsfield, 1827)
14					<i>Neofelis nebulosa</i> (Griffith, 1821)
15					<i>Panthera pardus</i> (Linnaeus, 1758)
16					<i>Panthera tigris</i> (Linnaeus, 1758)
17					<i>Pardofelis marmorata</i> (Martin, 1837)
18					<i>Prionailurus bengalensis</i> (Kerr, 1792)
19					<i>Uncia uncia</i> (Schreber, 1775)
20			PERISSODACTYLA	RHINOCEROTIDAE	<i>Rhinoceros unicornis</i> (Linnaeus, 1758)
21			ARTIODACTYLA	SUIDAE	<i>Sus salvanius</i> (Hodgson, 1847)
22				MOSCHIDAE	<i>Moschus chrysogaster</i> (Hodgson, 1839)
23					<i>Moschus fuscus</i> (Li, 1981)
24					<i>Moschus leucogaster</i> (Hodgson, 1839)
25				CERVIDAE	<i>Axis porcinus</i> (Zimmermann, 1780)
26					<i>Rucervus duvaucelii</i> (G. Cuvier, 1823)

No.	Phylum	Class	Order	Family	Scientific Name
27				BOVIDAE	<i>Bos gaurus</i> (C. H. Smith, 1827)
28					<i>Bos mutus</i> (Przewalski, 1883)
29					<i>Capricornis thar</i> (Hodgson, 1831)
30					<i>Naemorhedus goral</i> (Hardwicke, 1825)
31					<i>Ovis ammon</i> (Linnaeus, 1758)
32					<i>Ovis ammon</i> (Linnaeus, 1758) <i>ssp. hodgsonii</i> (Blyth, 1841)
33		AVES	ANSERIFORMES	ANATIDAE	<i>Rhodonessa caryophyllacea</i> (Latham, 1790)
34			GRUIFORMES	PHASIANIDAE	<i>Catreus wallichii</i> (Hardwicke, 1827)
35					<i>Lophophorus impejanus</i> (Latham, 1790)
36					<i>Tetraogallus tibetanus</i> (Gould, 1854)
37					<i>Tragopan melanocephalus</i> (Gray, 1829)
38			GRUIFORMES	GRUIDAE	<i>Grus nigricollis</i> (Przevalski, 1876)
39				OTIDIDAE	<i>Ardeotis nigriceps</i> (Vigors, 1831)
40					<i>Houbaropsis bengalensis</i> (Gmelin, 1789)
41			CORACIIFORMES	BUCEROTIDAE	<i>Aceros nipalensis</i> (Hodgson, 1829)
42					<i>Buceros bicornis</i> (Linnaeus, 1758)
43		REPTILIA	CROCODYLIA	GAVIALIDAE	<i>Gavialis gangeticus</i> (Gmelin, 1789)
44			SERPENTES	PYTHONIDAE	<i>Python molurus</i> (Linnaeus, 1758)
Animals (Appendix I/r)					
1	CHORDATA	MAMMALIA	CARNIVORA	URSIDAE	<i>Ursus arctos</i> (Linnaeus, 1758) <i>ssp. isabellinus</i> (Horsfield, 1826)
2		AVES	FALCONIFORMES	ACCIPITRIDAE	<i>Aquila heliaca</i> (Savigny, 1809)
3					<i>Haliaeetus albicilla</i> (Linnaeus, 1758)
4				FALCONIDAE	<i>Falco jugger</i> (Gray, 1834)
5					<i>Falco pelegrinoides</i> (Temminck, 1829)
6					<i>Falco peregrinus</i> (Tunstall, 1771)
Animals (Appendix I/w)					
1	CHORDATA	MAMMALIA	CARNIVORA	MUSTELIDAE	<i>Lutra lutra</i> (Linnaeus, 1758)
2			PROBOSCIDEA	ELEPHANTIDAE	<i>Elephas maximus</i> (Linnaeus, 1758)
3			ARTIODACTYLA	BOVIDAE	<i>Pantholops hodgsonii</i> (Abel, 1826)
4		REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Geoclemys hamiltonii</i> (Gray, 1831)

No.	Phylum	Class	Order	Family	Scientific Name
5					<i>Melanochelys tricarinata</i> (Blyth, 1856)
6					<i>Pangshura tecta</i> (Gray, 1831)
7				TRIONYCHIDAE	<i>Aspideretes gangeticus</i> (Cuvier, 1825)
8					<i>Aspideretes hurum</i> (Gray, 1831)
9			CROCODYLIA	CROCODYLIDAE	<i>Crocodylus palustris</i> (Lesson, 1831)
10			SAURIA	VARANIDAE	<i>Varanus bengalensis</i> (Daudin, 1802)
11					<i>Varanus flavescens</i> (Hardwicke & Gray, 1827)
12			SERPENTES	PYTHONIDAE	<i>Python molurus</i> (Linnaeus, 1758) <i>ssp. molurus</i> (Linnaeus, 1758)
Animals (Appendix II)					
1	CHORDATA	MAMMALIA	SCANDENTIA	TUPAIIDAE	<i>Tupaia belangeri</i> (Wagner, 1841)
2			CHIROPTERA	PTEROPODIDAE	<i>Pteropus giganteus</i> (Brünnich, 1782)
3			PRIMATES	CERCOPITHECIDAE	<i>Macaca assamensis</i> (McClelland, 1840)
4					<i>Macaca mulatta</i> (Zimmermann, 1780)
5			PHOLIDOTA	MANIDAE	<i>Manis pentadactyla</i> (Linnaeus, 1758)
6			RODENTIA	SCIURIDAE	<i>Ratufa bicolor</i> (Sparrman, 1778)
7			CARNIVORA	CANIDAE	<i>Canis lupus</i> (Linnaeus, 1758)
8					<i>Cuon alpinus</i> (Pallas, 1811)
9				URSIDAE	<i>Ursus arctos</i> (Linnaeus, 1758)
10				MUSTELIDAE	<i>Aonyx cinerea</i> (Illiger, 1815)
11					<i>Lutrogale perspicillata</i> (I.Geoffroy Saint-Hilaire, 1826)
12				FELIDAE	<i>Felis chaus</i> (Schreber, 1777)
13					<i>Prionailurus viverrinus</i> (Bennett, 1833)
14			PERISSODACTYLA	EQUIDAE	<i>Equus kiang</i> (Moorcroft, 1841)
15			ARTIODACTYLA	MOSCHIDAE	<i>Moschus chrysogaster</i> (Hodgson, 1839)
16					<i>Moschus fuscus</i> (Li, 1981)
17		AVES	CICONIIFORMES	CICONIIDAE	<i>Ciconia nigra</i> (Linnaeus, 1758)
18				THRESKIORNITHIDAE	<i>Platalea leucorodia</i> (Linnaeus, 1758)
19				PHOENICOPTERIDAE	<i>Phoenicopterus ruber</i> (Linnaeus, 1758)
20			ANSERIFORMES	ANATIDAE	<i>Anas formosa</i> (Georgi, 1775)
21					<i>Sarkidiornis melanotos</i> (Pennant, 1769)

No.	Phylum	Class	Order	Family	Scientific Name
22			FALCONIFORMES	PANDIONIDAE	<i>Pandion haliaetus</i> (Linnaeus, 1758)
23				ACCIPITRIDAE	<i>Accipiter badius</i> (Gmelin, 1788)
24					<i>Accipiter gentilis</i> (Linnaeus, 1758)
25					<i>Accipiter nisus</i> (Linnaeus, 1758)
26					<i>Accipiter trivirgatus</i> (Temminck, 1824)
27					<i>Accipiter virgatus</i> (Temminck, 1822)
28					<i>Aegyptius monachus</i> (Linnaeus, 1766)
29					<i>Aquila chrysaetos</i> (Linnaeus, 1758)
30					<i>Aquila clanga</i> (Pallas, 1811)
31					<i>Aquila hastata</i> (Lesson, 1834)
32					<i>Aquila nipalensis</i> (Hodgson, 1833)
33					<i>Aquila pomarina</i> (Brehm, 1831)
34					<i>Aquila rapax</i> (Temminck, 1828)
35					<i>Aviceda jerdoni</i> (Blyth, 1842)
36					<i>Aviceda leuphotes</i> (Dumont, 1820)
37					<i>Butastur teesa</i> (Franklin, 1831)
38					<i>Buteo buteo</i> (Linnaeus, 1758)
39					<i>Buteo hemilasius</i> (Temminck & Schlegel, 1844)
40					<i>Buteo rufinus</i> (Cretzschmar, 1827)
41					<i>Circaetus gallicus</i> (Gmelin, 1788)
42					<i>Circus aeruginosus</i> (Linnaeus, 1758)
43					<i>Circus cyaneus</i> (Linnaeus, 1766)
44					<i>Circus macrourus</i> (S. G. Gmelin, 1770)
45					<i>Circus melanoleucos</i> (Pennant, 1769)
46					<i>Circus pygargus</i> (Linnaeus, 1758)
47					<i>Elanus caeruleus</i> (Desfontaines, 1789)
48					<i>Gypaetus barbatus</i> (Linnaeus, 1758)
49					<i>Gyps bengalensis</i> (Gmelin, 1788)
50					<i>Gyps fulvus</i> (Hablizl, 1783)
51					<i>Gyps himalayensis</i> (Hume, 1869)

No.	Phylum	Class	Order	Family	Scientific Name
52					<i>Gyps tenuirostris</i> (G. R. Gray, 1844)
53					<i>Haliaeetus leucoryphus</i> (Pallas, 1771)
54					<i>Haliastur indus</i> (Boddaert, 1783)
55					<i>Hieraaetus fasciatus</i> (Vieillot, 1822)
56					<i>Hieraaetus kienerii</i> (Geoffroy Saint-Hilaire, 1835)
57					<i>Hieraaetus pennatus</i> (Gmelin, 1788)
58					<i>Ichthyophaga humilis</i> (Müller & Schlegel, 1841)
59					<i>Ichthyophaga ichthyaeus</i> (Horsfield, 1821)
60					<i>Ictinaetus malayensis</i> (Temminck, 1822)
61					<i>Milvus migrans</i> (Boddaert, 1783)
62					<i>Milvus milvus</i> (Linnaeus, 1758)
63					<i>Neophron percnopterus</i> (Linnaeus, 1758)
64					<i>Pernis ptilorhynchus</i> (Temminck, 1821)
65					<i>Sarcogyps calvus</i> (Scopoli, 1786)
66					<i>Spilornis cheela</i> (Latham, 1790)
67					<i>Spizaetus cirrhatus</i> (Gmelin, 1788)
68					<i>Spizaetus nipalensis</i> (Hodgson, 1836)
69				FALCONIDAE	<i>Falco amurensis</i> (Radde, 1863)
70					<i>Falco cherrug</i> (Gray, 1834)
71					<i>Falco chicquera</i> (Daudin, 1800)
72					<i>Falco columbarius</i> (Linnaeus, 1758)
73					<i>Falco naumanni</i> (Fleischer, 1818)
74					<i>Falco severus</i> (Horsfield, 1821)
75					<i>Falco subbuteo</i> (Linnaeus, 1758)
76					<i>Falco tinnunculus</i> (Linnaeus, 1758)
77					<i>Microhierax caerulescens</i> (Linnaeus, 1758)
78			GALLIFORMES	PHASIANIDAE	<i>Ithaginis cruentus</i> (Hardwicke, 1821)
79			GRUIFORMES	GRUIDAE	<i>Grus antigone</i> (Linnaeus, 1758)
80					<i>Grus grus</i> (Linnaeus, 1758)
81				OTIDIDAE	<i>Sypheotides indicus</i> (J. F. Miller, 1782)

No.	Phylum	Class	Order	Family	Scientific Name
82			PSITTACIFORMES	PSITTACIDAE	<i>Psittacula cyanocephala</i> (Linnaeus, 1766)
83			STRIGIFORMES	TYTONIDAE	<i>Phodilus badius</i> (Horsfield, 1821)
84					<i>Tyto alba</i> (Scopoli, 1769)
85					<i>Tyto capensis</i> (A. Smith, 1834)
86				STRIGIDAE	<i>Asio flammeus</i> (Pontoppidan, 1763)
87					<i>Asio otus</i> (Linnaeus, 1758)
88					<i>Athene brama</i> (Temminck, 1821)
89					<i>Athene noctua</i> (Scopoli, 1769)
90					<i>Bubo bubo</i> (Linnaeus, 1758)
91					<i>Bubo coromandus</i> (Latham, 1790)
92					<i>Bubo nipalensis</i> (Hodgson, 1836)
93					<i>Glaucidium brodiei</i> (Burton, 1836)
94					<i>Glaucidium cuculoides</i> (Vigors, 1831)
95					<i>Glaucidium radiatum</i> (Tickell, 1833)
96					<i>Ketupa flavipes</i> (Hodgson, 1836)
97					<i>Ketupa zeylonensis</i> (Gmelin, 1788)
98					<i>Ninox scutulata</i> (Raffles, 1822)
99					<i>Otus bakkamoena</i> (Pennant, 1769)
100					<i>Otus spilocephalus</i> (Blyth, 1846)
101					<i>Otus sunia</i> (Hodgson, 1836)
102					<i>Strix aluco</i> (Linnaeus, 1758)
103					<i>Strix leptogrammica</i> (Temminck, 1831)
104			CORACIIFORMES	BUCEROTIDAE	<i>Anthracoseros albirostris</i> (Shaw & Nodder, 1807)
105			PASSERIFORMES	MUSCICAPIDAE	<i>Leiothrix argenteauris</i> (Hodgson, 1837)
106					<i>Leiothrix lutea</i> (Scopoli, 1786)
107				STURNIDAE	<i>Gracula religiosa</i> (Linnaeus, 1758)
108		REPTILIA	TESTUDINES	GEOEMYDIDAE	<i>Batagur dhongoka</i> (Gray, 1835)
109					<i>Batagur kachuga</i> (Gray, 1831)
110					<i>Pangshura smithii</i> (Gray, 1863)
111					<i>Pangshura tentoria</i> (Gray, 1834)

No.	Phylum	Class	Order	Family	Scientific Name
112				TESTUDINIDAE	<i>Indotestudo elongata</i> (Blyth, 1853)
113				TRIONYCHIDAE	<i>Chitra indica</i> (Gray, 1831)
114					<i>Lissemys punctata</i> (Lacépède, 1788)
115			SERPENTES	PYTHONIDAE	<i>Python molurus</i> (Linnaeus, 1758)
116				COLUBRIDAE	<i>Ptyas mucosus</i> (Linnaeus, 1758)
117				ELAPIDAE	<i>Naja kaouthia</i> (Lesson, 1831)
118					<i>Naja naja</i> (Linnaeus, 1758)
119					<i>Ophiophagus hannah</i> (Cantor, 1836)
120	ARTHROPODA	INSECTA	LEPIDOPTERA	PAPILIONIDAE	<i>Teinopalpus imperialis</i> (Hope, 1843)
121					<i>Troides aeacus</i> (C. & R. Felder, 1860)
122					<i>Troides helena</i> (Linnaeus, 1758)
Animals (Appendix II/r)					
1	CHORDATA	AVES	PSITTACIFORMES	PSITTACIDAE	<i>Psittacula cyanocephala</i> (Linnaeus, 1766)
Animals (Appendix II/w)					
1	CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	<i>Lynx lynx</i> (Linnaeus, 1758)
2		AVES	GRUIFORMES	GRUIDAE	<i>Anthropoides virgo</i> (Linnaeus, 1758)
3			PSITTACIFORMES	PSITTACIDAE	<i>Loriculus vernalis</i> (Sparman, 1787)
4					<i>Psittacula alexandri</i> (Linnaeus, 1758)
5					<i>Psittacula eupatria</i> (Linnaeus, 1766)
6					<i>Psittacula himalayana</i> (Lesson, 1832)
7		REPTILIA	SERPENTES	PYTHONIDAE	<i>Python molurus</i> (Linnaeus, 1758) <i>ssp. bivittatus</i> (Kuhl, 1820)
8				COLUBRIDAE	<i>Elachistodon westermanni</i> (Reinhardt, 1863)
9		AMPHIBIA	ANURA	RANIDAE	<i>Euphlyctis hexadactylus</i> (Lesson, 1834)
10					<i>Hoplobatrachus tigerinus</i> (Daudin, 1802)
Animals (Appendix III)					
1	CHORDATA	MAMMALIA	CARNIVORA	CANIDAE	<i>Vulpes vulpes</i> (Linnaeus, 1758)
2				MUSTELIDAE	<i>Martes foina</i> (Erxleben, 1777)
3					<i>Mustela erminea</i> (Linnaeus, 1758)
4				HERPESTIDAE	<i>Herpestes javanicus</i>

No.	Phylum	Class	Order	Family	Scientific Name
					(É.GeoffroySaint-Hilaire, 1818)
5		REPTILIA	SERPENTES	COLUBRIDAE	<i>Xenochrophis piscator</i> (Schneider, 1799)
6				VIPERIDAE	<i>Daboia russelii</i> (Shaw & Nodder, 1797)
Animals (Appendix III/r)					
1	CHORDATA	MAMMALIA	CARNIVORA	CANIDAE	<i>Vulpes vulpes</i> (Linnaeus, 1758) ssp. <i>montana</i> (Pearson, 1836)
2				MUSTELIDAE	<i>Martes foina</i> (Erxleben, 1777) ssp. <i>intermedia</i> (Severtzov, 1873)
3					<i>Mustela altaica</i> (Pallas, 1811)
4					<i>Mustela erminea</i> (Linnaeus, 1758) ssp. <i>ferghanae</i> (Thomas, 1895)
5					<i>Mustela kathiah</i> (Hodgson, 1835)
6					<i>Mustela sibirica</i> (Pallas, 1773)
Animals (Appendix III/w)					
1	CHORDATA	MAMMALIA	RODENTIA	SCIURIDAE	<i>Marmota himalayana</i> (Hodgson, 1841)
2			CARNIVORA	CANIDAE	<i>Canis aureus</i> (Linnaeus, 1758)
3					<i>Vulpes bengalensis</i> (Shaw, 1800)
4				MUSTELIDAE	<i>Martes flavigula</i> (Boddaert, 1785)
5				VIVERRIDAE	<i>Paguma larvata</i> (C. E. H. Smith, 1827)
6					<i>Paradoxurus hermaphroditus</i> (Pallas, 1777)
7					<i>Viverra zibetha</i> (Linnaeus, 1758)
8					<i>Viverricula indica</i> (É. Geoffroy Saint-Hilaire, 1803)
9				HERPESTIDAE	<i>Herpestes edwardsi</i> (E.Geoffroy Saint-Hilaire, 1818)
10					<i>Herpestes javanicus</i> (É. Geoffroy Saint-Hilaire, 1818) ssp. <i>auropunctatus</i> (Hodgson, 1836)
11					<i>Herpestes urva</i> (Hodgson, 1836)
12			ARTIODACTYLA	BOVIDAE	<i>Antilope cervicapra</i> (Linnaeus, 1758)
13					<i>Bubalus arnee</i> (Kerr, 1792)
14					<i>Tetracerus quadricornis</i> (de Blainville, 1816)
15		AVES	GALLIFORMES	PHASIANIDAE	<i>Tragopan satyra</i> (Linnaeus, 1758)

No.	Phylum	Class	Order	Family	Scientific Name
Plants (Appendix I)					
1			ORCHIDALES	ORCHIDACEAE	<i>Paphiopedilum insigne</i> (W.Wall ex Lindl.) (Pfitzer)
2					<i>Paphiopedilum venustum</i> (Wall. ex Sims) (Pfitzer ex Stein)
Plants (Appendix II)					
1			ORCHIDALES	ORCHIDACEAE	<i>Aerides multiflora</i> (Roxb.)
2					<i>Aerides odorata</i> (Lour.)
3					<i>Anoectochilus roxburghii</i> (Wallich) (Lindley)
4					<i>Aphyllorchis parviflora</i> (King & Pantl.)
5					<i>Ascocentrum ampullaceum</i> (Lindl.) (Schltr.)
6					<i>Bulbophyllum careyanum</i> (Spreng.)
7					<i>Bulbophyllum hirtulum</i> (Ridley)
8					<i>Bulbophyllum hookeri</i> (Duthie) (J.J. Smith)
9					<i>Bulbophyllum odoratissimum</i> (Lindl.)
10					<i>Bulbophyllum polyrhizum</i> (Lindley)
11					<i>Bulbophyllum secundum</i> (Hook.f.)
12					<i>Calanthe alismaefolia</i> (Lindley)
13					<i>Calanthe alpina</i> (Hook.f.)
14					<i>Calanthe biloba</i> (Lindl.)
15					<i>Calanthe brevicornu</i> (Lindley)
16					<i>Calanthe chloroleuca</i> (Lindl.)
17					<i>Calanthe densiflora</i> (Lindl.)
18					<i>Calanthe herbacea</i> (Lindley)
19					<i>Calanthe mannii</i> (Hook.f.)
20					<i>Calanthe odora</i> (Griff.)
21					<i>Calanthe pachystalix</i> (Rchb.f.)
22					<i>Calanthe plantaginea</i> (Lindley)
23					<i>Calanthe puberula</i> (Lindley)
24					<i>Calanthe sylvatica</i> (Thouars) (Lindl.)

No.	Phylum	Class	Order	Family	Scientific Name
25					<i>Calanthe ricarinata</i> (Lindley)
26					<i>Calanthe triplicata</i> (Willeme.) (Ames)
27					<i>Chiloschista usneoides</i> (D. Don) (Lindley)
28					<i>Chusua roborowskyi</i> (Maxim.) (P. Hunt)
29					<i>Coeloglossum viride</i> (L.) (Hartm.)
30					<i>Coelogyne barbata</i> (Griff.)
31					<i>Coelogyne corymbosa</i>
32					<i>Coelogyne fimbriata</i> (Lindl.)
33					<i>Coelogyne flaccida</i> (Lindley)
34					<i>Coelogyne nitida</i> (Wallich ex Don) (Lindley)
35					<i>Coelogyne prolifera</i> (Lindley)
36	TRACHEOPHYTA	PTERIDOPSIDA	CYATHEALES	CYATHEACEAE	<i>Cyathea chinensis</i> (Copel. 1909)
37					<i>Cyathea khasyana</i> (Moore ex Kuhn 1869) (Domin 1929)
38					<i>Cyathea spinulosa</i> (Wallich ex. Hook. 1844)
39				CYCADACEAE	<i>Cycas ectinata</i> (Buch.-Ham.)
40			ORCHIDALES	ORCHIDACEAE	<i>Cymbidium aloifolium</i> (L.) (Sw.)
41					<i>Cymbidium bicolor</i> (Lindl.)
42					<i>Cymbidium bicolor</i> (Lindl.) <i>ssp. obtusum</i> (Du Puy & P.J.Cribb)
43					<i>Cymbidium cyperifolium</i> (Wall. ex Lindl.)
44					<i>Cymbidium cyperifolium</i> (Wall. ex Lindl.) <i>ssp. cyperifolium</i>
45					<i>Cymbidium devonianum</i> (Paxton)
46					<i>Cymbidium eburneum</i> (Lindl.)
47					<i>Cymbidium elegans</i> (Lindl.)
48					<i>Cymbidium erythraeum</i> (Lindl.)
49					<i>Cymbidium faberi</i> (Rolfe)
50					<i>Cymbidium faberi</i> (Rolfe) <i>var. szechuanicum</i> (Y.S.Wu & S.C.Chen)
51					<i>Cymbidium hookerianum</i> (Rchb.f.)
52					<i>Cymbidium iridioides</i> (D.Don)
53					<i>Cymbidium lancifolium</i> (Hook.)

No.	Phylum	Class	Order	Family	Scientific Name
54					<i>Cymbidium macrorhizon</i> (Lindl.)
55					<i>Cypripedium cordigerum</i> (D. Don)
56					<i>Cypripedium elegans</i> (Rchb.f.)
57					<i>Cypripedium guttatum</i> (Sw.)
58					<i>Cypripedium himalaicum</i> (Rolfe ex Hemsl.)
59					<i>Dendrobium amoenum</i> (Wallich ex Lindley)
60					<i>Dendrobium anceps</i> (Sw.)
61					<i>Dendrobium aphyllum</i> (Roxb.) (C. Fischer)
62					<i>Dendrobium aureum</i> (Lindley)
63					<i>Dendrobium bicameratum</i> (Lindley)
64					<i>Dendrobium candidum</i> (Wallich ex Lindley)
65					<i>Dendrobium capillipes</i> (Rchb.f.)
66					<i>Dendrobium chrysanthum</i> (Wall.)
67					<i>Dendrobium chryseum</i> (Rolfe)
68					<i>Dendrobium chrysotoxum</i> (Lindley)
69					<i>Dendrobium clavatum</i> (Lindley ex Wallic)
70					<i>Dendrobium crepidatum</i> (Lindley & Paxton)
71					<i>Dendrobium cretaceum</i> (Lindley)
72					<i>Dendrobium cumulatum</i> (Lindley)
73					<i>Dendrobium denneanum</i> (Kerr)
74					<i>Dendrobium densiflorum</i> (Wallich ex Lindley)
75					<i>Dendrobium denudans</i> (D. Don)
76					<i>Dendrobium devonianum</i> (Paxton)
77					<i>Dendrobium eriiflorum</i> (Griffith)
78					<i>Dendrobium farmeri</i> (Paxton)
79					<i>Dendrobium fimbriatum</i> (Hook.)
80					<i>Dendrobium formosum</i> (Roxb. ex Lindl.)
81					<i>Dendrobium gibsonii</i> (Lindley)
82					<i>Dendrobium griffithianum</i> (Lindl.)
83					<i>Dendrobium heterocarpum</i> (Lindley)

No.	Phylum	Class	Order	Family	Scientific Name
84					<i>Dendrobium longicornu</i> (Wall. ex Lindl.)
85					<i>Dendrobium monticola</i> (P.Hunt & Summerh.)
86					<i>Dendrobium moschatum</i> (Buch.-Ham.) (Sw.)
87					<i>Dendrobium nobile</i> (Lindley)
88					<i>Dendrobium nobile</i> (Lindl.) var. <i>nobile</i>
89					<i>Dendrobium peguanum</i> (Lindley)
90					<i>Dendrobium porphyrochilum</i> (Lindley)
91					<i>Dendrobium primulinum</i> (Lindley)
92					<i>Dendrobium pulchellum</i> (Roxb. ex Lindley)
93					<i>Dendrobium tortile</i> (Lindley)
94					<i>Dendrobium transparens</i> (Wallich ex Lindley)
95			LILIALES	DIOSCOREACEAE	<i>Dioscorea deltoidea</i> (Wallich ex Kunth)
96			ORCHIDALES	ORCHIDACEAE	<i>Diplomeris hirsuta</i> (Lindley)
97					<i>Epipogium roseum</i> (D. Don) (Lindley)
98					<i>Eulophia explanata</i> (Lindley)
99			EUPHORBIALES	EUPHORBIACEAE	<i>Euphorbia fusiformis</i> (Buchanan-Hamilton ex D.Don)
100					<i>Euphorbia royleana</i> (Boiss)
101			ORCHIDALES	ORCHIDACEAE	<i>Galearis spathulata</i> (Lindley) (P.F. Hunt)
102					<i>Gastrochilus dasypogon</i> (Lindl.) (Kuntze)
103					<i>Gastrodia elata</i> (Blume)
104				GNETACEAE	<i>Gnetum montanum</i> (Markgraf)
105			ORCHIDALES	ORCHIDACEAE	<i>Goodyera biflora</i> (Lindley) (Hook.f.)
106					<i>Habenaria arcuata</i> (Lindley) (Hook.f.)
107					<i>Habenaria latilabris</i> (Hook.f.)
108					<i>Habenaria pubescens</i> (Lindley)
109					<i>Hemipilia cordifolia</i> (Lindley)
110					<i>Herminium duthei</i> (Hook.f.)
111					<i>Herminium jaffrevanum</i> (King & Pantl.)
112					<i>Herminium mackinnonii</i> (Duthie)
113					<i>Herminium pugioniforma</i> (Lindley ex Hook.f.)

No.	Phylum	Class	Order	Family	Scientific Name
114					<i>Herminium quinquelobum</i> (King & Pantl.)
115					<i>Liparis nervosa</i> (Thunb.) (Lindley)
116					<i>Liparis olivacea</i> (Lindley)
117					<i>Liparis petiolata</i> (D. Don) (Hunt & Summerh.)
118					<i>Liparis platyrachis</i> (Hook.f.)
119					<i>Listera nepalensis</i> (Balakr.)
120					<i>Listera tenuis</i> (Lindley)
121					<i>Malaxis tamurensis</i> (Tuy.)
122			PAPAVERALES	PAPAVERACEAE	<i>Meconopsis regia</i> (G. Taylor)
123			DIPSACALES	VALERIANACEAE	<i>Nardostachys grandiflora</i> (DC.)
124			ORCHIDALES	ORCHIDACEAE	<i>Neottia listeroides</i> (Lindley)
125					<i>Neottianthe secundiflora</i> (Hook.f.) (Schltr.)
126					<i>Oberonia micrantha</i> (King et Pantling)
127					<i>Oreorchis porphyranthes</i> (Tuy.)
128					<i>Paphiopedilum insigne</i> (W.Wall ex Lindl.) (Pfitzer)
129					<i>Paphiopedilum venustum</i> (Wall. ex Sims) (Pfitzer ex Stein)
130					<i>Pecteilis triflora</i> (D. Don) (Tang & Wang)
131					<i>Phaius woodfordii</i> (Hook.) (Merrill)
132			SCROPHULARIALES	SCROPHULARIACEAE	<i>Picrorhiza kurroo</i> (Royle ex Benth.)
133			ORCHIDALES	ORCHIDACEAE	<i>Pleione coronaria</i> (P.J.Cribb & C.Z.Tang)
134					<i>Pleione hookeriana</i> (Lindl.) (B.S.Williams)
135					<i>Pleione humilis</i> (J.E.Sm.) (D.Don)
136					<i>Pleione maculata</i> (Lindl.)
137					<i>Pleione praecox</i> (J.E.Sm.) (D.Don)
138				PODOCARPACEAE	<i>Podocarpus nerifolius</i> (D.Don in Lambert)
139			RANUNCULALES	BERBERIDACEAE	<i>Podophyllum hexandrum</i> (Royle)
140			GENTIANALES	APOCYNACEAE	<i>Rauwolfia serpentina</i> (Benth. ex Kurz)
141			ORCHIDALES	ORCHIDACEAE	<i>Rhynchostylis retusa</i> (Blume)
142					<i>Schoenorchis gemmata</i> (Lindl.) (J.J.Sm.)

No.	Phylum	Class	Order	Family	Scientific Name
143					<i>Sunipia racemosa</i> (Smith) (Tang & Wang)
144				TAXACEAE	<i>Taxus wallichiana</i> (Zucc.)
145			ORCHIDALES	ORCHIDACEAE	<i>Thelasis pygmaea</i> (Lindley)
146					<i>Vanda alpina</i> (Lindley)
147					<i>Vanda coerulescens</i> (Griff.)ssp. <i>boxallii</i> (Rchb.f.)
148					<i>Vanda cristata</i> (Lindl.)
149					<i>Vanda pumila</i> (Hook.f.)
150					<i>Vanda stangeana</i> (Rchb.f.)
151					<i>Vanda tessellata</i> (Roxb.) (Hook. ex G.Don)
152					<i>Vanda testacea</i> (Lindl.) (Rchb.f.)
153					<i>Vandopsis undulata</i> (Lindl.) (J.J. Sm.)
Plants (Appendix III)					
1				GNETACEAE	<i>Gnetum montanum</i> (Markgraf)
2			PAPAVERALES	PAPAVERACEAE	<i>Meconopsis regia</i> (G.Taylor)
3				PODOCARPACEAE	<i>Podocarpus neriiifolius</i> (D.Don in Lambert)
4			TROCHODENDRALES	TETRACENTRACEAE	<i>Tetracentron sinense</i> (Oliver)

Source: UNEP (2012)

TABLE A-27

Species Listed on National Parks and Wildlife Conservation Act, 1973

English Name	Scientific Name
Mammals	
Assamese Monkey	Macaca assamensis
Pangolin	Manis crassicaudata and Manis pentadactyla
Hispid Hare	Caprolagus hispidus Gangetica
Dolphin	Platanista gangetica
Grey Wolf	Canis lupus
Himalayan Brown Bear	Ursus arctos
Red Panda	Ailurus fulgens
Lingsang	Prionodon pardicolor
Striped Hyena	hyaena hyaena
Leopard Cat	Felis(Prionailurus) bengalensis
Lynx	Lynx lynx
Clouded Leopard	Neofelis nebulosa
Tiger	Panthera tigris tigris
Snow Leopard	Uncia uncia
Wild Elephant	Elephas maximus
One-horned rhinoceros	Rhinoceros unicornis
Pygmy Hog	Sus salvanius
Musk Deer	Moschus chrysogaster
Swamp Deer	Cervus duvaucelii
Gaur	Bos gaurus
Wild Yak	Bos grunniens (mutus)
Wild Buffalo	Bubalus arnee
Great Tibetan Sheep	Ammon hodgsonii
Tibetan Antelope	Pantholops hodgsoni
Black buck	Antelope cervicapra
Four-horned Antelope	Tetracerus quadricornis
Birds	
Black Stork	Ciconia nigra
White Stork	Ciconia ciconia
Sarus Crane	Grus antigone
Cheer Pheasant	Catreus wallichii
Impeyon pheasant	Lophophorus impejanus
Crimson-horned Pheasant	Tragopan satyra
Bengal Florican	Houbaropsis bengalensis
Lesser Florican	Eupodotis indica
Giant Hornbill	Buceros bicornis
Reptiles	
Python	Python molurus Gharial
Crocodile	Gavialis gangeticus
Golden Monitor Lizard	Varanus flavescens

Source: GoN (1973)

TABLE A-28

Schedule 1 of the EPR: Projects Requiring Initial Environmental Examination (IEE)

A. Forest Sector	
1.	Plantation of indigenous plants of a single species in a single block of 50 to 100 hectares in the Terai and 25 to 50 hectares in the Hills.
2.	Plantation of such imported species of plants as are deemed suit for the purpose, following their test in the concerned place, on a single block of 10 to 50 hectares in the Terai and 5 to 25 hectares in the Hills.
3.	Handover of forests with an area ranging between 25 to 100 hectares in the Terai and 5 to 25 hectares in the Hills as leasehold forests.
4.	Clear feeling or rehabilitation of national forests with an area of not more than 5 hectares.
5.	Establishment of sawmills which could to process 5000 to 50,000 cubic feet of timber per year.
6.	Collection of 5 to 50 tons of forest products other than timer per year.
7.	Establishment or expansion of national parks, wildlife sanctuaries and conservation areas or environmental conservation Zones.
8.	Extraction of the foots of trees which have been failed removal of leaves (in such a manner as to turn trees into stumps), extraction of seeds of lichens or orchids from trees and collection of Salk (shores robust) seeds.
9.	Formulation of watershed management plans.
10.	Construction of new botanical gardens or zoos outside the forest areas by the public or private Sector.
11.	Resettlement of imported wild animals of different species.
12.	Preparation of management plans of national parks, wild life sanctuaries, conservation Ares and their buffer zones or launching of development and construction activities specified in such plans.
13.	Establishment of medicinal herbs centers for the commercial production of medicinal herbs and aromatic plants in public scrublands.
14.	Commercial collection or industrial processing of non-polluting medicinal herbs and aromatic plants.
15.	Construction of forest paths up to 5 kilometer long and of fire protection lines up to 10 kilometers long.
16.	Collection of boulders, gravel and sand and extraction of coal and other minerals from forest areas.
B. Industrial Sector	
1.	Production of alcohol by the process of blending and establishment of distilleries equipped with boiling and fermentation facilities with a production capacity of 5,00,000 liters per day.
2.	Establishment of acid, alkali and primary chemical industries with a production capacity of 5, 00,000 liters per day.
3.	Establishment of acid, alkali and primary chemical industries with a production capacity of 100 metric ton per day.
4.	Processing of leather not more than 5000 sq. ft. per day.
5.	Establishment of electroplating and galvanizing industries.
6.	Establishment of cooking natural gas refilling, filling, production and distribution

	industries.
7.	Establishment of boulder crushing industries.
8.	Establishment of paints industries.
9.	Establishment of dairy processing industries.
10.	Establishment of industries producing lubricant by the process of blending, reprocessing or reclamation.
11.	Establishment of industries manufacturing foam.
12.	Establishment of industries manufacturing dry or wet cell (battery).
13.	Establishment of crude sugar or sugar industries with a production capacity of 3000 metric tons per day.
14.	Establishment of thread and clothes dyeing, printing and laundry industries (including carpets) except traditional cottage industries.
15.	Establishment of pulp and paper industries, except traditional cottage industries, with a production capacity of 100 metric tons per day.
16.	Establishment of bricks and tiles industries with a production capacity of 10 million units per year.
17.	Establishment of cement industries with a production capacity of 30 metric ton per hour based on limestone and with a production capacity of 50 metric tons per hour based on clinker.
18.	Establishment of quick/slaked lime industry producing 50 metric tons per day.
19.	Establishment of pharmaceutical industries.
20.	Establishment of industries manufacturing chemical fertilizers (blending) and pesticides (blending).
21.	Establishment of plastic industries (based on waste plastic as raw materials).
22.	Establishment of matches industries.
23.	Establishment of industries relating to auto workshop (except 2 Wheelers).
24.	Establishment of industries producing and processing coke and briquette from coal.
(b)	Establishment of the following industries having investment of total fixed capital exceeding NPR One million.
1.	Plastic processing (except processing waste materials).
2.	Processing and production of tires, tubes and rubber.
3.	Soap (including detergents and cleaning shampoos).
4.	Photo processing.
5.	Foundry.
6.	Production of cigarettes, bidi (tobacco rolled in leaf) tobacco, betel Rules.
7.	Slaughter house.
8.	Glass (plane glass)
9.	Food processing.
10.	Relating to metal (including remelting, reenrolling and fabrication).
11.	Bitumen and bitumen emulsion.
12.	Cold storage.
13.	Threading.
14.	Vegetable ghee, oil.
15.	Herbal processing.
16.	Productions of different items from bone, horn and foot root.
17.	Rosin turpentine, veneer and catechu.
18.	Fish and meat processing.

19.	Production of packaging materials.
20.	Plotter feeds.
21.	Machine soap.
C. Mining Sector	
(a)	Excavation of mines through relocation and resettlement of permuted residence up to more than 100 people.
(b)	Relating to Open Mine and Under Ground Mined:
1.	Excavation of metallic minerals in small scale.
2.	Excavation of the other industrial minerals in small scale except precious stones semiprecious stones and abrasive minerals from among the classified industrial minerals for the industrial purpose.
3.	Excavation of non-moralistic metallic in small scale.
4.	Excavation of industrial precious and semiprecious stones and abrasive minerals with a production capacity of 50 to 100 grams per day.
5.	Establishment of coal mines in small scale.
6.	Excavation of construction oriented minerals in small scale.
7.	Excavation of highly precious valuable stone and semi-valuable stone minerals with a production capacity of 50 to 100 grams per day.
8.	Production of natural gases in very small and small scale.
(c)	Relating to other Mines
1.	Extraction of 10 to 50 cubic meters of sand, gravel and soil from river beds per day.
2.	Extraction of 50 to 100 grams of precious value and semi-value stone minerals per day through placer or dredging techniques.
D. Road Sector	
1.	Construction of the following roads: (a) District roads, (b) Urban roads, (c) Rural roads and (d) Small feeder roads.
2.	Construction of 1 to 5 kilometres long ropeway.
3.	Construction of 1 to 5 kilometres long cable car routes
4.	Construction of major bridges.
5.	Constructions of tunnels.
6.	Improvement, up grading and reconstruction of national highways and feeder roads.
E. Water resources and energy sector	
1.	Supply of electricity through the constructions of transmission lines of from 33 to 66 KV capacity.
2.	Operation of rural electrification projects of 1 to 2 MW.
3.	Operation of electricity generation projects from 5MW capacity.
4.	Under the new systems of irrigation: (a) Irrigating 25 to 2,000 hectares in the Terai, (b) Irrigating 15 to 500 hectares in the Hill Valley, (c) Irrigating 10 to 200 hectares in the Hilly and mountainous areas a steep gradient.
5.	Under the rehabilitated systems of irrigation: (a) Irrigating more than 500 hectares in the Terai, (b) Irrigating more than 200 hectares in the hill valleys and (c) Irrigating more than 100 hectares in the hilly a steep gradient and mountainous.
6.	Any water resources development activity which displaces from 25 to 100 persons from permanent residence.
7.	Control of floods through dams in the Terai.
8.	Control of river of more than 1 kilometre length.
Note: Any rehabilitation project which includes additional irrigated areas, new sources of	

water, watershed management or changed channel lines shall be considered to be a new system.	
F. Tourism Sector	
1.	Establishment and operation of hotel with Fifty to Hundred beds.
2.	Extension of the areas of the existing airports.
3.	Opening of new areas for the promotion of tourism.
4.	Operation of rafting activities on any river having fish or other aquatic life.
5.	Operation of new golf courses and organized form of water sports.
6.	Promotion of tourism in a number exceeding Ten Thousand per year at an altitude above 5,000 meters.
7.	Disposal and management of waste emitted from trekking points.
G. Drinking water	
1.	Collection of rain-water in an area of not more than 200 hectares, and use of water sources (spring and wet-lands) located within the same area.
2.	Surface water source with not more than 4 cubic ft. safe yield and supply of not more than Fifty percent of the water during the dry season.
3.	Processing of water at the rate of Ten to Twenty Five liters per second.
4.	Recharging up to 50 percent of the total aquifer for the development of underground water sources.
5.	Construction of not more than 1 kilometre long tunnels for carrying water.
6.	Displacement of not more than One Hundred persons for operating a water supply scheme.
7.	Settlement of no more than Five Hundred persons on the upper reaches of water sources.
8.	Supply of drinking water to a population ranging between 2,000 and 20,000.
9.	Supply of drinking water to a population ranging between 10,000 and 100,000 upon connecting new sources.
10.	Installation of more than 20 kilometres long electricity transmission lines for pumping or processing water and consumption of more than 1 MW of electricity.
11.	River training and diversion activities over an area of more than 1 kilometre.
H. Waste Management	
1.	Waste Management activities to be undertaken with the objective of providing services to a population ranging between 2,000 and 10,000.
2.	Following activities relating to waste emitted from houses and residential areas: (a) Filling of land with 100 to 1,000 tons of waste a year, (b) Activities relating to transfer stations and resource recovery areas spread over up to 3 hectares, (c) Selecting, picking, disposing, and recycling waste through chemical, mechanical or biological techniques in an area up to 2 hectares, (d) Activities relating to compost plants in an area ranging between 1 and 5 hectares, (e) Operations of sewerage schemes.
I. Agricultural Sector	
1.	Clearing of national forests covering up to 1 hectare in the Hills and 5 hectares in the Terai, and using then for agricultural purposes.
2.	Following Construction activities: (a) (Deleted by the 1st amendment) (b) Construction of 1 to 5 kilometres long agricultural road, (c) Construction activities for farming 2,000 to 5,000 domestic fowls, (d) Construction activities for farming big cattle numbering between 100 and 500, (e) Construction activities for farming small cattle (sheep and goats) numbering between 1,000 and 5,000, (f) Establishment of agricultural wholesale

	markets in urban areas.
3.	Following activities relating to toxic Substances (only those which are listed): (a) Import of One to Ten tons of toxic Substances, (b) Sale, supply storage and disposal of 100 kg to 1 ton of toxic substances, (c) Uses of 100 kg to 1 ton of toxic substances in a single area.
4.	Establishment of the following agro based industries to dispose of polluted Substances mixed with dangerous toxins: (a) Milk-processing industries with a capacity up to 26,000 liters a day, (b) Such, agro based industries as those producing jam, jelly, squash and juice, (c) Cheese industries, (d) Baby food industries, (e) (Deleted by the 1st amendment) (f) (Deleted by the 1st amendment).
5.	(Deleted by the 1st amendment)
6.	Commercial fish-farming in an area of more than 1 hectare.
J. Others	
	Operation of any plan, project or programme of any development work physical activity or land use Except the proposals mentioned in Clause (A) to Clause (I) and those below the standard of such proposals as well as the proposals below the standards of those mentioned in Schedule-2 with a cost of NPR 10 millions to 100 millions.

Source: Ministry of Law, Justice and Parliamentary Affairs (2001)

TABLE A-29

Schedule 2 of the EPR: Projects Requiring Environmental Impact Assessment (EIA)

A. Forest Sector	
1.	Plantation of indigenous plants of a single species in a single block covering an areas of more than 100 hectares in the Terai and 50 hectares in the Hills.
2.	Plantation of such imported species of plants as are deemed suitable for the purposes, following their test, in the concerned place, in an area of more than 50 hectares in the Tarai and 25 hectares in the Hills.
3.	Handover of forests with as area of more than 100 hectares in the Terai and 25 hectares in the Hills as leasehold forests.
4.	Clear felling or rehabilitation of forests with an area of more than 5 hectares.
5.	Establishment of sawmills processing more than 50 cft. of timber per year.
6.	Collection of forest related products except more than 50 tons of woods.
7.	Formulation and implementation of forest management plans.
8.	Clearing of publics' forests and establishment of new medical herbs centre for commercial production.
9.	Rosin and turpentine, rubber, plywood and veneer, catechu, and timber based matches, pulp and paper industries to be established within 1 km inside the forest area which depend on forests for their raw material and use processing techniques and cardamom and medium and large tea industries which use large quantities of firewood.
10.	Commercial and industrial processing of medicinal herbs and aromatic plants which emit garbage and pollution.
11.	Establishment of sawmills, bricks and tiles factories and tobacco processing industries within Five Km. from the forest boundaries.
12.	Establishment of hotels, resorts, safaris, educational institution, hospital and industries of other construction activities inside forest areas, national parks sanctuaries,

	conservation areas, buffer zones and environment conservation zones.
B. Industrial Sector	
1.	Establishment of distilleries equipped with boiling and fermentation facilities with a production capacity of more than 500,000 liters per day.
2.	Establishment of breweries and wineries equipped with fermentation facilities with a production capacity of more than 500,000 liter per day.
3.	Production of primary chemicals such as corrosive, acid and alkali etc. (except citric Tartaric, acetic, acid.) with a production capacity of more than 100 metric tons per day.
4.	Processing of hides more than 500 sq. ft. per day.
5.	Production of chemical fertilizers and pesticides except produced through welding process.
6.	Establishment of mineral based industries with a investment of more than NPR 50 millions fixed capital.
7.	Production of petro chemical and processing (diesel, kerosene, lubricant plastics, Synthetic rubbers etc.)
8.	Production of ferrous and non-ferrous metals (except resoling, remelting and fabrication) by the process of primary smelting.
9.	Establishment of industry producing more than 3,000 metric ton of rude sugar and sugar per day.
10.	Establishment of cement industries with a production capacity of more than 30 metric tons per hour based on line stone and with a production capacity of more than 50 metric tons per hour based on clinker.
11.	Establishment of lime industries having production capacity of more than 50 metric tons per day.
12.	Production of asbestos.
13.	Establishment of radio active emission (nuclear and automatic processing) industries.
14.	Production of primary compound (Bulk drugs) for medicine.
15.	Production of extremely hazardous substances such as isocyanine, mercury compound etc.
16.	Production of ammunitions and explosives including gunpowder except than the production made by Nepal Army or Nepal police forever or to be established by them.
17.	Establishment of industries of pulp or paper with a production capacity of more than One Hundred metric tons per day.
18.	Establishment of brick and tiles industries with a production capacity of more than 10 million pieces per year.
19.	Chemical processing of bones.
C. Mining Sector	
(a)	Relocation or resettlement of permanent residence of more than 100 people for the purpose of mine excavation.
(b)	Operation of all underground mining activities located at the main boundary thrust and central boundary thrust zone.
(c)	In case of relating to Open Mines or Underground Mines:
1.	Excavation of metallic mineral substance in medium and large scale.
2.	Excavation of non-metallic mineral substances in medium and large scale.
3.	Excavation of other medium and large-scale industrial minerals except precious stone, semi-precious stone, abrasive minerals from among the industrial minerals classified for the purposes of industrial use.

4.	Excavation of medium and large-scale coal mines.
5.	Excavation of construction-oriented minerals of medium and large scale.
6.	Excavation of highly valuable semi precious minerals with a production capacity of more than 100 grams per day.
7.	Production of natural gas in medium and large scale.
8.	Excavation of radioactive minerals in any scale.
9.	Excavation of minerals in any scale.
10.	Excavation of crude oil in any scale.
11.	Excavation of industrial, precious, semi-precious stones and abrasive mineral with production capacity of more than 100 grams per day.
(d)	Relating to other Mines:
1.	Extraction of sand, gravel and soil at the rate of more than 50 cubic meters per day from the surface of river and revolute.
2.	Extraction of highly precious and semi-precious minerals at the rate of more than 100 grams per day through player and dredging technique.
D. Road Sector	
1.	Construction of the following roads: (a) national highways, (b) main feeder roads.
2.	Construction of more than 5 kilometres long ropeway.
3.	Construction of more than 5 kilometres long cable car routes.
E. Water resources and energy sector	
1.	Supply of electricity through installation of transmission lines of more than 66kV capacity.
2.	Operation of more than 6 MW (Rural electrification projects).
3.	Operation of electricity generation projects with a capacity of more than 5 MW.
4.	Generation of more than 1 MW (Diesel or the heat electricity).
5.	Under the new systems of irrigation: (a) Irrigating more than 2,000 hectares in the Tarai, (b) Irrigating more than 500 hectares in the hill valleys, (c) Irrigating more than 200 hectares in the hill areas with a steep gradient and Mountain areas.
6.	Any water resources development activity which displaces more than 100 people with permanent residence.
7.	Construction of multipurpose reservoirs.
8.	Inter-basin water transfer and use.
F. Tourism Sector	
1.	Establishment and operation of hotels with more than 100 beds.
2.	Establishment and development of new airports.
3.	Rafting arrangement for more than 200 persons per year on a single river.
4.	Dispatch of more than 2,000 tourists and their assistants per year for trekking in a single area.
5.	Development and construction of any infrastructure for the promotion of adventure tourism in high mountainous areas.
6.	Operation of house boats on lakes.
G. Drinking water	
1.	Collection of rainwater in an area of more than 2,000 hectares and use of water sources (springs/wetlands) located within the same area.
2.	Surface water sources with more than 1 cft. safe yield, and the use of its entire part during the dry season.
3.	Water processing at the rate of more than 25 liters per second.

4.	Recharging of more than 50% of the total aquifer for the development of underground water sources.
5.	Construction of more than 1 km. long water tunnels.
6.	Displacement of more than 100 persons for the operation of water supply scheme.
7.	Settlement of more than 50% on the upper reaches of water sources.
8.	Supply of drinking water to a population of more than 2,000.
9.	Supply of drinking water to a population of more than 100,000 upon connecting of new sources.
10.	Over mining of biologically or chemically polluted point and non-point sources or underground water sources that may be affected by them.
11.	Operation of multi-purpose projects relating to sources of drinking water which consumes the sources at the rate of more than 25 liters per second.
H. Waste management	
1.	Waste management activities to be undertaken with the objective of providing services to a population of more than 10,000.
2.	Following activities relating to waste emitted from houses and residential areas: (a) Filling of land with more than 1,000 tons of waste per year, (b) Activities relating to transfer station and resources recovery areas spread over an area of more than 3 hectares, (c) Selecting, picking, disposing and recycling wastes through chemical, mechanical or biological techniques in an area spread over more than 2 hectares, (d) Activity relating to compost plants spread over an area of more than 5 hectares, (e) Burying of waste emitted from an urban area with a population of at least 10,000.
3.	Following construction activities relating to hazardous waste of the following nature in any scale: (a) Construction of waste plant, (b) Construction of waste recovery plant, (c) Constructing of a site for filling accumulating or burying waste, (d) Construction of a site to store the waste, (e) Construction of a waste treatment facility.
4.	Following activities relating to lethal waste: (a) Emission and management of any radio active Substance with a half age exceeding 25 years, (b) Emission and management of any lethal chemical with 30 lethal dose, (c) Final disposal management of biological lethal substances emitted from Health Center, Hospital, or Nursing Home with at least 25 beds, (d) Any activity relating to 1 hectare or more of land and energy for the purpose of incinerating or recycling any lethal substance
I. Agriculture Sector	
1.	Clearing of forest covering more than 1 hectare in the Hills and 5 hectares in the Terai and using it for agricultural purposes.
2.	Following activities relating to construction: (a) (Deleted by the 1st amendment) (b) Construction of more than 5 kilometres long agricultural roads, (c) Construction activities for farming more than 5,000 domestic fowls, (d) Construction activity for farming more than 500 big cattle, (e) Construction activity for farming more than 5,000 small cattle (sheep and goats), (f) Urbanization plan in cultivable lands.
3.	Following activities relating to toxic Substance (only those which are listed): (a) Import of more than 10 tons of a toxic substance, (b) Sale, supply, storage and disposal of more than 1 ton of a toxic substance, (c) Use of more than 1 ton of a toxic substance in a single area, (d) Activities relating to insecticide plants or toxic substances.
J. Health Sector	
1.	Operation of hospitals or nursing homes with more than 25 beds, or medical profession (study and teaching also).

K. Place Restriction	
	If any proposal is to be implemented in the following Areas:
1.	Historical, cultural and archeological sites.
2.	Environmentally weak and wet Areas.
3.	National parks, wild life sanctuaries and conservation areas.
4.	Semi-arid, mountainous and Himalayan regions.
5.	Flood prone and other dangerous areas.
6.	Residential, school and hospital areas.
7.	Areas with main sources of public water supply.
8.	(Deleted by the 1st amendment)
L. Others	
	Operation of any plan, project or programme relating to any developmental work, physical activity or change in land use except the proposals mentioned in Clause (A) to Clause (K) and those below the standards of such proposals as well as the proposals below the standards of those mentioned in schedule-1 with a cost of more than 100 millions.

Source: Ministry of Law, Justice and Parliamentary Affairs (2001)

TABLE A-30

Schedule 3 of the EPR: Work-schedule of IEE

1.	Name and address of the individual or institution preparing the report
2.	Proposal's <ul style="list-style-type: none"> (a) General introduction (b) Relevancy of the proposal
3.	Procedure to be adopted while preparing the report
4.	Policies, laws, rules and manuals to be taken into account while preparing the report
5.	Preparation of the Report <ul style="list-style-type: none"> (a) Time (b) Estimated budget
6.	(Deleted by the 1st amendment)
7.	Specific impact o f the implementation of the proposal on the environment <ul style="list-style-type: none"> (a) Social and economic (b) Cultural and physical (c) Chemical (d) Biological
8.	Alternatives for the implementation of the proposal <ul style="list-style-type: none"> (a) Design (b) Project site (c) Technology, procedure of operation, time schedule, raw materials to be used (d) Other matters
9.	Matters concerning the prevention of the impact of the implementation of the proposal on the environment
10.	Matters to be monitored while implementing the proposal
11.	Other necessary matters

Source: Ministry of Law, Justice and Parliamentary Affairs (2001)

TABLE A-31

Schedule 4 of the EPR: Work-schedule of EIA

<ol style="list-style-type: none">1. Name and address of the individual or institution preparing the report2. General introduction of the proposal3. Data needed, for the preparation of the report and procedure of collecting them4. Policies, laws, rules and manuals to be taken into account while preparing the report.5. Preparation of the Report<ol style="list-style-type: none">(a) Time(b) Budget(c) Necessary Experts6. Scope determined for the preparation of the report7. Impact on the environment of the implementation of the report<ol style="list-style-type: none">(a) Social and economic(b) Cultural and physical(c) Chemical(d) Biological8. Other alternatives for the implementation of the proposal<ol style="list-style-type: none">(a) Design(b) Project site(c) Technology, procedure of operation, time-schedule and raw materials to be used(d) Environment management system(e) Whether or not the risks resulting from the implementation of the proposal can be accepted(f) Other matters9. Measures to remove any negative impact that may be noticed while implementing the proposal10. Particulars of the cost and returns of the proposal11. Matters to be monitored while implementation the proposal12. Relevant information, reference lists, annexes, maps, photographs, tables and charts, graphs and questionnaires to be mentioned at the time of preparing the report

TABLE A-32

Schedule 5 of the EPR: Matters to be Mentioned in an IEE Report

<ol style="list-style-type: none">1. Name and address of the individual or institution preparing the report2. Summary of the proposal (To briefly mention the following matters in regard to the possible impact of the implementation of the proposal on the environment)<ol style="list-style-type: none">(a) Objectives of the proposal(b) Impact on land-use(c) Adverse impact on the environment, impact on human life and population pressure(d) Damage to be suffered by local goods or objects(e) Other necessary matters3. The following matters must be explicitly mentioned in respect to the proposal<ol style="list-style-type: none">(a) Type of proposal<ol style="list-style-type: none">(1) Processing(2) Manufacturing(3) Installation(4) Service delivery(5) Others

- (b) If related to delivery. the nature and type of good to be delivered.
 - (c) Proposal's
 - (1) Installed capacity
 - (2) Number of house to be operated per day or year
 - (d) Materials to be used (quantity and year to be monitored)
 - (e) Emission resulting from the implementation' of the proposal (The time of operation and the consequent volume of emission to be specified)
 - (1) Solid
 - (2) Liquid
 - (3) Gas
 - (4) Noise
 - (5) Dust
 - (6) Others
 - (f) Energy to be used
 - (1) Type
 - (2) Source
 - (3) Volume of consumption (per hour, day and year)
 - (g) Manpower requirements
 - (h) Resources required for the implementation of the proposal
 - (1) Total capital
 - (2) Working capital
 - (3) Land area
 - (4) Buildings and their types
 - (5) Machinery and tools
 - (6) Others
 - (i) Detailed particulars of the area where the project is to be implemented
 - (1) Maps
 - (2) Population and condition relating to settlements in the area, as well as in the nearby areas
 - (3) Particulars of any sensitive things or objects, if any located close to the area where the proposal is to be implemented
 - (4) Current situation
 - (5) Sources of waste
 - (6) Arrangements made for disposing or processing water
 - (7) Paths for movement in the area where the proposal is to be implemented
 - (j) Manufacturing processes
 - (k) Other necessary matters
4. Impact of the implementation of the proposal on the environment
- (a) Impact on the social, economic and cultural spheres
 - (1) Impact on human health
 - (2) Degradation of cultivable land
 - (3) Destruction of forests
 - (4) Changes in social, cultural and religious norms and values
 - (5) Others
 - (b) Biological impact
 - (1) Population
 - (2) Flora and fauna
 - (3) Natural habitats and communities
 - (c) Physical impact

- (1) Land
 - (2) Atmosphere
 - (3) Water
 - (4) Noise
 - (5) Man-made objects
 - (6) Others
5. Alternatives for the implementation of the proposal
 - (1) Design
 - (2) Project site
 - (3) Processes, time-schedules
 - (4) Raw materials to be used
 - (5) Others
 6. Measures to reduce control the implementation of the proposal on the environment
 7. Matters to be monitored while implementation
 8. Other necessary matters

Notes: Data, maps, photographs, tables, 'charts, graphs, etc. shall be enclosed, as required, while preparing the report.

Source: Ministry of Law, Justice and Parliamentary Affairs (2001)

TABLE A-33

Schedule 6 of the EPR: Matters to be Mentioned in an EIA Report

1. Name and address of the individual or institution preparing the report
2. Summary of the Proposal: To mention the following matters in regard to the possible impact of the implementation of the proposal on the environment
 - (a) Objectives of the proposal
 - (b) Impact on land-use
 - (c) Adverse impact on the environment, impact on human life, and population pressure
 - (d) Damage to be suffered by local goods or objects
 - (e) Other necessary matters
3. Summary of the report: Brief particulars of the matters mentioned in the report relating to the EIA
4. Particulars of the proposal
 - (a) To specify the technical, geographical, environmental, economic, social, cultural and physical aspects of the proposal
5. Basic information relating to the proposal: To mention basic information about the geo-physical, cultural, biological, and social and economic conditions of the area to be assessed, as well any possible change that may occur there before the implementation of the proposal, according to the nature of the proposal. In case there are any date which are not available or any subject which cannot be covered by the study, they too should be mentioned.
6. Identification of Environmental Impact: To mention the possible positive and negative impact on the following spheres of the environment while implementing the proposal, and estimate and specify the volume of possible impact according to time and work schedule as far as possible.
 - (a) Geographical area likely to have positive or negative impact of the implementation of the project, and their time-schedule
 - (b) Impact of waste and pollution to be emitted through the implementation of the proposal
 - (c) Direct, indirect and cumulative impact of the implementation of the proposal on the environment
7. Analysis of the alternatives for the proposal: The following matters are to be analysed
 - (a) Matters concerning the design of the proposal, project site, technology, operation procedure, time-schedule

and raw materials to be used.

- (b) Comparison is to be made on the basis of the fixed and working capital, local suitability, institutional training and supervision needed for the implementation of the proposal, and the environmental cost and returns and economic significance of each alternative measure are to be analysed as far as possible.
 - (c) Short, medium and long-term adverse impact of the implementation of the proposal.
 - (d) Sources of energy to be used for the implementation of the proposal, and measures to be adopted for saving such energy.
 - (e) Analysis of the consequences of the non-implementation of the proposal.
8. Measures to reduce environmental impact
- (a) To mention practical preventive measures to be adopted for all activities which could have a negative impact on the environment
 - (b) In case the environmental impact cannot be fully avoided through preventive measures, arrangements made for payments of compensation shall be mentioned. The effectiveness of the preventive measures shall be analysed from the viewpoint of their cost on the basis of a comparison with other possible alternatives.
 - (c) The effectiveness of the preventive measures shall be analysed from the viewpoint of their cost on the basis of a comparison with other possible alternatives.
9. To mention matters concerning EMPs.
10. Review of policy and legal provisions: To review the related policies, laws, and rules on the basis of the nature and scale of the proposal. If any policy or legal provision needs to be reformed, to specify the same.
11. Monitoring of the proposal: To mention the procedure of monitoring the impact of the implementation of the proposal on the environment, as well as the monitoring agency, time-schedule, monitoring and evaluation indicators, etc.
12. To mention the format and relevancy of environmental examinations
13. Reference materials: To make a list of publications quoted as references while preparing the report in the following manner:
- (a) Author
 - (b) Date of publication
 - (c) Title of the material quoted
 - (d) Name of publication or journal which is quoted
 - (e) Year, volume, number, etc. (if any).
 - (f) Page number
14. To include the following particulars in the Annexes
- (a) Maps relating to the composition of land, geographical location, land-use and land-capacity, and other maps related to the study.
 - (b) Aerial photographs, as far as possible of the proposal implementation site and the surrounding areas.
 - (c) Questionnaires or lists of subject matters used for field research.
 - (d) Such matters connected with the evaluation of the environmental impact as charts and photographs.
 - (e) Hydrological and climatic data (by arranging them serially according to the period).
 - (f) Data relating to flora and fauna of the proposal implementation site.
 - (g) Geological and risk evaluation data (if available).
 - (h) Information relating to the quality of air and water and the noise level before and after the operation of the project (if available).
 - (i) Matrix or serial graphs relevant to the EIA.
 - (j) Such audio-visual supports as maps, slides, records and video films.
 - (k) Cropping techniques and data relating to livestock farming, soil features and quantity of chemical fertilizers used.
 - (l) List of written reference materials used at the time of preparing the study report.
 - (m) List of invitees and participants, and records of discussions, meetings and gatherings among the concerned

agencies, and brief particulars of monitoring operations.

- (n) List of names individuals and institutions comprising the study team involved in the preparation of the environmental impact assessment report.
- (o) Names, address and telephone numbers of individuals and institutions contacted in the course of the study.

Source: Ministry of Law, Justice and Parliamentary Affairs (2001)

TABLE A-34

Schedule 7 of the EPR: Industries Requiring Certificates of Pollution Control

1. Relating to production of liquor through blending process and distilleries with facilities of boiling and fermentation.
2. Relating to brewery and Winery with facilities of fermentation.
3. Relating to production of primary chemicals such as corrosive, acid, alkali (except citric, tartaric, acetic, acid. etc.).
4. Hide processing.
5. Relating to electro plating and galvanizing
6. Refilling, filling, production and distribution of cooking, natural gas.
7. Relating to boulder crushing.
8. Relating to paintings.
9. Relating to milk processing.
10. Production of lubricants through the process of blending reprocessing or reclamation.
11. Relating to production of foam.
12. Production of dry or well cell (battery).
13. Production of crude sugar or sugar.
14. Relating to thread, textile painting, dyeing or washing (including carpets) except traditional cottage industries.
15. Relating to pulp or paper except traditional cottage industries.
16. Relating to bricks, tiles, etc.
17. Relating to cement based on limestone or clinker.
18. Relating to lime production.
19. Relating to medicines.
20. Production of chemical fertilizer (blending) and pesticides (blending).
21. Relating to plastic (based on waste plastic).
22. Relating to matches.
23. Relating to auto workshop (except 2 wheelers).
24. Relating to production and processing of coke and Briquette from coal
25. Relating to plastic processing (except scraps processing).
26. Production and processing of tyres, tubes ad rubber.
27. Relating to soap (including detergent and cleaning shampoo).
28. Relating to photo processing.
29. Relating to foundry.
30. Production of cigarettes, bidi tobacco in life, tobacco, betel nuts.
31. Relating to slaughter house
32. Relating to glass (palm dars).
33. Relating to food processing.
34. Relating to metallic (including re-melting, rerolling, and fabrication).
35. Relating to bitumen and bitumen emulsion.
36. Relating to cold storage.

37. Relating to threading.
38. Relating to vegetable ghee and oil.
39. Relating to herbal processing.
40. Relating to production of different items from bone, horn and foot root.
41. Relating to rosin turpentine, veneer and catechu.
42. Relating to fish processing.
43. Relating to production of packaging materials.
44. Relating to poultry feeds.
45. Relating to machine shop
46. Relating to production of chemical fertilizers and pesticides except produced through welding techniques.
47. Relating to mineral based industries having fixed investment of more than NPR 50 million.
48. Production and processing of petro chemicals (production of diesel, kerosene, lubricants, plastic, synthetic rubber, etc.)
49. Production of ferrous and non-ferrous (except rerolling, re-melting, and fabrication) metal through smelting process.
50. Production of asbestos
51. Relating to emission of radioactives (nuclear and atomic processing).
52. Production of primary chemicals (bulk drugs) for medicine.
53. Relating to extremely hazardous substances such as isocyanine, mercury compound, etc.
54. Production of ammunitions and explosives including gunpowder.
55. Relating to chemical processing of bones.

Source: Ministry of Law, Justice and Parliamentary Affairs (2001)

TABLE A-35

Main Nepal Caste and Ethnic Groups with Regional Divisions and Social Groups (from 2001 Census)

	Main Caste/Ethnic Groups (7)	Caste/Ethnic Groups with Regional Divisions (11) and Social Groups (103) from 2001 Census
Caste Groups	1. Brahman/Chhetri	1.1 Hill Brahman Hill Brahman
		1.2 Hill Chhetri Chhetri, Thakuri, Sanyasi
		1.3 Tarai/Madhese Brahman/Chhetri Madhesi Brahman, Nurang, Rajput, Kayastha
	2. Tarai/Madhese Other Castes	2.1 Tarai/Madhese Other Castes Kewat, Mallah, Lohar, Nuniya, Kahar, Lodha, Rajbhar, Bing, Mali Kamar, Dhuniya, Yadav, Teli, Koiri, Kurmi, Sonar, Baniya, Kalwar, Thakur/Hazam, Kanu, Sudhi, Kumhar, Haluwai, Badhai, Barai, Bhediyar/ Gaderi
	3. Dalits	3.1 Hill Dalit Kami, Damai/Dholi, Sarki, Badi, Gaine, Unidentified Dalits
3.2 Tarai/Madhese Dalit Chamar/Harijan, Musahar, Dushad/Paswan, Tatma, Khatwe, Dhobi, Baantar, Chidimar, Dom, Halkhor		
Adivasi/Janajatis	4. Newar	4 Newar Newar
	5. Janajati	5.1 Hill/Mountain Janajati Tamang, Kumal, Sunuwar, Majhi, Danuwar, Thami/Thangmi, Darai, Bhote, Baramu/Bramhu, Pahari, Kusunda, Raji, Raute, Chepang/Praja, Hayu, Magar, Chyantal, Rai, Sherpa, Bhujel/Gharti, Yakha, Thakali, Limbu, Lepcha, Bhote, Byansi, Jirel, Hyalmo, Walung, Gurung, Dura
		5.2. Tarai Janajati Tharu, Jhangad, Dhanuk, Rajbanshi, Gangai, Santhal/Satar, Dhimal, Tajpuriya, Meche, Koche, Kisan, Munda, Kusbadiya/Patharkata, Unidentified Adibasi/Janajati
Other	6. Muslim	6 Muslim Madhesi Muslim, Churoute (Hill Muslim)
	7. Other	7 Other Marwari, Bangali, Jain, Punjabi/Sikh, Unidentified Others

(Bennett et al. 2008)

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