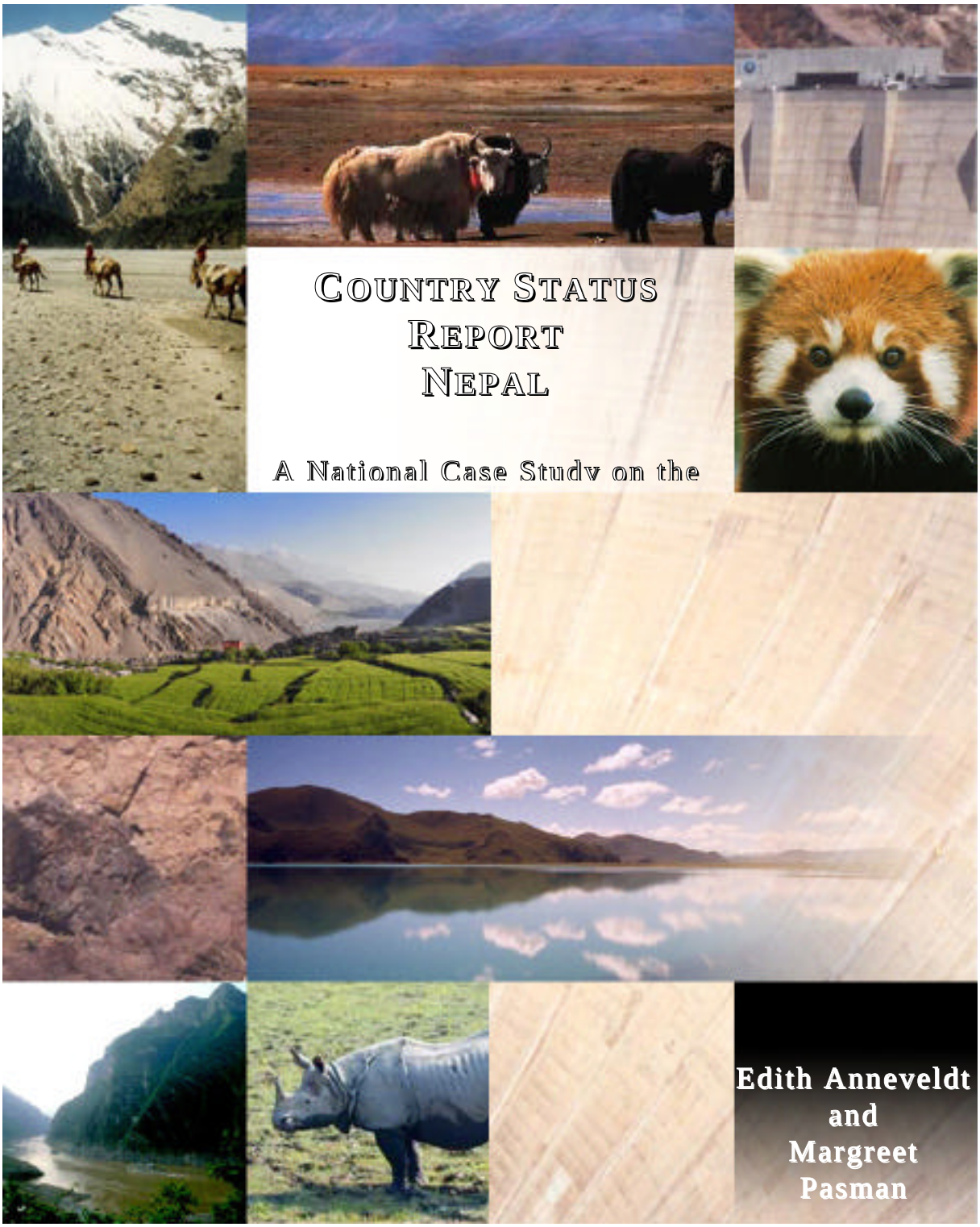

Country Status Report Nepal

A National Case Study on the

Edith Anneveldt
and
Margreet Pasman

For the IAIA backed Action Programme on Biological Diversity and Impact Assessment
under the UNEP/UNDP/GEF Biodiversity Planning Support Programme

April 2001, Kathmandu, Nepal

Country Status Report
Nepal

A National Case Study on the Integration of Biodiversty into EIA

Edith Anneveldt and Margreet Pasman
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Photographs: Edith Anneveldt, Stefan Gorzula and Margreet Pasman

Foreword

Biodiversity is a global asset of tremendous value to present and future generations, since it is vital to humanity's economic and social development and, indeed, its very survival. Biodiversity is decreasing at an alarming rate due to the impact of the growing human population and increasing resource consumption rates. This has been recognised at a global level, which resulted in the negotiation of the United Nations Convention on Biological Diversity (CBD), in 1992. One of the articles of the Convention, Article 14, recognises Environmental Impact Assessment (EIA) as an important decision-making process towards the protection of biodiversity.

The General Environment Facility (GEF) financed Biodiversity Planning Support Programme (BPSP), which is jointly implemented by the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP) aims to provide assistence to national biodiversity planners in developing and implementing biodiversity related strategies, plans, programmes and policies. As such, it also aims to assist countries in implementing biodiversity concerns in the national EIA system.

At present, EIA policy and practice fail to adequately incorporate biodiversity considerations in the process of EIA. Furthermore, there exists inadequate knowledge on how this is best achieved. The UNEP Task Manager for BSPS has therefore commissioned a series of national case studies (Country Status Reports) on the integration of biodiversity in Environmental Impact Assessment. These case studies are undertaken under the Action Programme for Biological Diversity and Impact Assessment (which also includes Stategic Impact Assessment, undertaken for plans, programmes and policies) which is backed by the International Association for Impact Assessment (IAIA). Evaluation of the case studies undertaken for a number of countries in different regions, will serve as a framework for further activities of the programme with a goal of strengthening the role of biodiversity in Impact Assessment as well as strenghtening the capacity to incorporate biodiversity considerations in IA.

The South Asian Kingdom of Nepal, with its unique geographical position and altitudinal and climatic variations, is one of the world's countries rich in biodiversity. Realising the value of its biological assets, it ratified the CBD on November 23, 1993. It entered into force on February 21, 1994, shortly after Nepal institutionalised a national EIA sytem. Therefore, Nepal was well suited to be subjected to a national case study on the integration of biodiversity in EIA.

This study was undertaken by Edith Anneveldt and Margreet Pasman, students of Animal Management (a B.Sc. (Hons) program) at the Van Hall Institute in Leeuwarden, The Netherlands. As such, we completed a four-month internship at the Regional Environment Assessment Program (REAP) of IUCN Asia, Nepal. During this internship, we studied the EIA guidelines of six South Asian countries on the extent to which they addressed biodiversity concerns. With the knowledge so gained, we set out to prepare a Country Status Report on Nepal.

We would especially like to thank the following persons from which we received ample help during the preparation of this report:

- Dr. Stefan Gorzula; Environmental Advisor, Private Sector Hydropower Development Project (PSHDD) by DoED/USAID/IRG.
- Dr. Ram B. Khadka; President of the National EIA Association (NEIAA) Nepal, Dean of the School for Environmental Management and Sustainable Development (SchEMS), Kathmandu, Nepal.
- Dr. Parvaiz Naim; Coordinator Regional Environment Assessment Program (REAP), IUCN Asia, Kathmandu, Nepal.
- Mr. Batu K. Uprety; Ecologist, Environmental Impact Assessment Section, Environment Division, Ministry of Population and Environment (MoPE), Kathmandu, Nepal.
- Dr. Uday R. Sharma; Joint Secretary, Environment Division, Ministry of Forest and Soil Conservation, Kathmandu, Nepal.
- Dr. Pralad Yonzon; Team Leader Resources Himalaya, Kathmandu, Nepal.

We are tremendously grateful for their contribution. We also thank everyone else who in some way or another has been helpful to us.

We sincerely hope this report will contribute in making biodiversity an issue to be given the attention it deserves in EIA's worldwide.

Edith Anneveldt and Margreet Pasman
Kathmandu, Nepal
April 2001

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ABBREVIATIONS

ACA	Annapurna Conservation Area
BSC	Biodiversity Steering Committee
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
DDC	District Development Committee
DFRS	Department of Forest Research
DNPWC	Department of National Parks and Wildlife Conservation
DPF	Department of Plant Resources
EIA	Environmental Impact Assessment
EPA	Environment Protection Act
EPR	Environment Protection Rules
GEF	Global Environment Facility
GIS	Geographic Information System
HMG/N	His Majesty's Government/Nepal
IBN	Institute of Biodiversity Nepal
ICIMOD	International Centre for Integrated Mountain Development
IUCN	World Conservation Union
LKHEP	Langtang Khola Hydroelectric Project
LNP	Langtang National Park
KMTNC	King Mahendra Trust for Nature Conservation
MFSC	Ministry of Forest and Soil Conservation
MoPE	Ministry of Population and Environment
MWSDB	Melamchi Water Supply Development Board
MWSP/WTP	Melamchi Water Supply Project/Water Treatment Plant
NBAP	National Biodiversity Action Plan
NBSC	National Biodiversity Steering Committee
NBU	National Biodiversity Unit
NCS	National Conservation Strategy
NPC	National Planning Commission
NPWCA	National Parks and Wildlife Conservation Act
NTFP	Non-Timber Forest Product
PRA	Participatory Rural Appraisal
SWWR	Shivapuri Watershed & Wildlife Reserve
UMHEP	Upper Modi Hydro-Electricity Project
UNDP	United Nationas Development Programme
UNEP	United Nations Environment Programme
VDC	Village Development Committee

INTRODUCTION

1.1 General Environmental Condition

From north-west to south-east Nepal stretches about 855 km and in width it varies from around 145 km to 241 km. The total land area is 147,181 square kilometers. Nepal consists broadly of five physiographic regions (see Annex 1), which occur in the following order from south to north: the Terai (14 % of the total land area); the Siwaliks (13 %); the Midhills (30 %); the High Mountains (20 %) and the High Himalayas (23 %) (Shreshta, 1999).

Due to the great range of altitude(Terai: 100 m above sea level and the Mount Everest: 8848 m above sea level), Nepal has a wide range of climatic conditions, from hot monsoon/tropical in the Terai to arctic in the High Himalayas. This results in many different climates, habitats, flora and fauna (MFSC, 2000). In the physiographic regions of Nepal a total amount of 136 ecosystems are present (Belbase, 1999).

Land use types are classified into three broad categories, i.e. agricultural land, forest land and other lands, including wetlands, shrublands, non-cultivated lands and water. Of this, around 4.27 million hectares consist of forest (29 % of the total land area), 1,56 million ha (10.6 %) of shrubland and degraded forest, 1.75 million ha (12 %) of grassland, 3.0 million ha (21 %) of farmland and about 1.0 million ha of uncultivated inclusions (MFSC, 2000). The forest types include tropical, sub-tropical, temperate and alpine forest.

1.2 Biodiversity Richness and Special Features

In terms of species richness at the global level, Nepal falls in the 25th position, while at the continental level Nepal falls in the 11th position (MoPE (a), 2000). Out of top 10 biodiversity hotspot countries of Asia, Nepal stands at the 5th, 9th and 10th position on respectively species diversity of birds, mammals and angiospermic flowering plants (MoPE (b), 2000).

Of the world's total landmass Nepal only covers about 0.03 per cent and 0.3 per cent of Asia. Of the world's total land surface area Nepal covers only 0.1 per cent. Nevertheless, it harbours about 2 per cent of the flowering plants, 3 per cent of the pteridophytes, and 6 per cent of bryophytes of the world's flora (MoPE (a), 2000) (see Annex II).

From Nepalese flora over 1,000 species of angiosperms have been described. Also, a total of 93 plant species with "nepalensis" epithet are recorded and of them, 32 species are endemic to Nepal. 60 non-endemic and 47 endemic plant species are documented under the threatened category (MoPE (a), 2000).
Roughly stated is that 5,400 species of vascular plants have been recorded, of which more than 700 species are of value for medicinal purposes. 5,175 species of flowering plants have been listed and in 1993 a study of the endemic and endangered plants of Nepal has shown that approximately 246 species of flowering plants are endemic to Nepal (MoPE (b), 2000). Of the non-flowering plants 248 species are endemic to Nepal (MoPE (a), 2000) and of them 8 species are suspected to be extinct (Shreshta, 1999), 1 species is endangered, 7 species are vulnerable and 31 fall under the IUCN rare species category. Of the non-endemic plants, 22 species are considered rare, 12 species are listed under the endangered category and 11 species are considered vulnerable. HMG has given legal protection status to 13 plant species under the Forest Regulations, 1995 (see Annex III)(MoPE (a), 2000).

Hotspots of endemic flora in Nepal Himalayas includes the Annapurna Conservation Area, which records 55 species, followed by Dhorpatan Wildlife Reserve with 36 species. Also Shey Phoksindo National Park (30 sp.), Langtang National Park (15 sp.) and Makalu-Barun National Park (7 sp.) are hotspots (MoPE (b), 2000).

Nepal is comparatively rich in faunal species. Over 4.3 per cent of the world's mammals and 8.5 per cent of the world's birds are found in Nepal (see Annex IV). Of the birds two species, the Spiny babbler (*Turdoides nipalensis*) and the Nepal wren babbler (*Pnoepyga immaculata*) and only one mammal, the Himalayan field mouse (*Apodemus gurkha*), are endemic to Nepal (MoPE (a), 2000).
In Nepal a total of 645 species of butterflies have been recorded. Of these 29 species are considered endemic, 142 as threatened and 12 as endangered. Of the about 5.052 recorded species of insects, so far 5 species have been recorded endemic (MoPE (b), 2000). Some special features are the giant atlas moth (*Attacus atlas*), which is the largest moth in the world and the wild honeybee (*Apis laboriosa*), which is the earth's largest honeybee (Shreshta, 1999). 185 species of fish have been recorded, out of which 8 species are considered endemic, 9 vulnerable and 24 rare. About 43 species of amphibians, out of which 9 endemic have been recorded, as well as 100 species of reptiles, of which 2 are considered endemic. Similarly, 144 species of spiders have been recorded in the areas ranging from 1,000 m to 6,500 m altitude (MoPE (a), 2000).

844 species of birds have been recorded in Nepal. Of these 11 species are considered to be extinct, 2 are endemic, 22 species are listed under the IUCN threatened species category, and 40 species in the CITES appendices (MoPE (b), 2000). Of the birds of Nepal, the bar-headed goose is the highest flying bird, the bearded vulture has the broadest wingspan, the saras crane is the tallest bird and so on (Shreshta, 1999).
Of the 185 mammals that are present in Nepal, the two largest orders, Carnivora and Rodentia, both consist of 43 species, of which one rodent species is endemic to Nepal. 3 mammal species are considered extinct. HMG has given legal protection status to 27 species of mammals, 9 species of birds and 3 species of reptiles under the National Parks and Wildlife Conservation Act, 1973 (see Annex V). 28 species of mammals are considered threatened, as well as 22 species of birds, 9 species of reptiles and 2 species of invertebrates (MoPE (a), 2000). The most well-known of the endangered mammals are the one-horned Indian rhinoceros, the Bengal tiger, the red panda, the snow leopard, and the musk-deer (Shreshta, 1999).

As far as domestic plants and animals in Nepal are considered, over 400 species of agro-horticultural crops and about 200 species of vegetables have been recorded (MoPE (a), 2000).

1.3 Main Threats and Development Pressures

There are several threats and development pressures to the biodiversity of Nepal, caused by the cumulative effects of socio-economic status, ecological degradation and political instability (MFSC, 2000).

A major threat factor is represented by the Nepalese human population. According to the 1991 population census, the total population of Nepal was around 18.5 million and the population in the year 2000 was estimated at 22 million (MFSC, 2000). More than half (53 per cent) of this population lies under the absolute poverty line and is about to double in the next 26 years (MoPE (a), 2000). Poverty has causal effects on population and vice versa, which contributes to environmental deterioration. Fast growth of the population caused an increase in demand for fuel wood, timber, fodder and land to grow more food (MFSC, 2000).

Non-timber forest products are threatened by deforestation, habitat degradation and unsustainable harvesting. Major threats to some protected areas are grazing all year around, poaching for high value products, illegal timber harvesting and unsustainable tourism. Rangelands are suffering from an enormous grazing pressure and wetland biodiversity is threatened by encroachment of wetland habitat, unsustainable harvesting of wetland resources, industrial pollution, agricultural run-off, the introduction of exotic and invasive species into wetland ecosystems, and siltation. Mountain biodiversity is suffering due to ecological fragility and instability of high mountain environments, deforestation, poor management of natural resources, and inappropriate farming practices (MFSC, 2000).
Agrobiodiversity is under threat due to use of high yielding varieties, destruction of natural habitat, overgrazing, land fragmentation, commercialisation of agriculture and the extension of modern high-yielding varieties, indiscriminate use of pesticides, population growth and urbanisation, and changes in farmer's priorities (MFSC, 2000).

More factors for loss of biodiversity include landslide and soil erosion, pollution, fire, overgrazing, introduction of alien species, illegal trade, hunting and poaching (MFSC, 2000).

2 National Biodiversity Action Plan

2.1 Process of Developing the NBAP

Nepal was the 35th country to ratify the Convention on Biological Diversity (CBD) on November 23, 1993 and it entered into force on February 21, 1994. In fulfilment of its obligations as one of the Contracting Parties to the CBD, signed by 154 nations at the UN conference on Environment and Development in Rio de Janeiro in June 1992, Nepal had to develop a national biodiversity action plan integrating the conservation of biological diversity and the sustainable use of its components into relevant sectoral and cross-sectoral plans, programs and policies. Initially, a detailed analysis and review of existing conservation plans, policies, legislation, and institutions was conducted to assess existing conservation mechanisms. Nepal exercised to prepare the National Biodiversity Action Plan (NBAP) from a grant of Global Environment Facility (GEF) of the United Nations Development Program through the implementing agency, the Ministry of Forests and Soil Conservation (MFSC). The NBAP thus prepared provides a blueprint to fulfil the obligations of the Convention and achieve its goal.

An intensive screening procedure was held between various organisations. These organisations were screened twice and both times Resources Nepal (nowadays Resources Himalya) turned out to be the most suitable for the preparation of the NBAP. There was a budget of 300.000 USD, of which they only used 230.000 USD. Also, they finished 2 months before the end of the agreed period of two years. After finishing the first draft some disagreement with the government caused Resources Nepal to withdraw itself from the process of developing the NBAP, which resulted in a delay in the whole process.

Mr. M. Zimsky reviewed the draft prepared by Resources Nepal and he also incorporated additional ideas. The revised draft was sent to experts and several suggestions were further incorporated. A team of the Institute of Biodiversity Nepal (IBN) finally updated the draft, filled the gaps, finalised project concepts and brought the NBAP to its present shape. As such it was submitted to the Ministry of Forests and Soil Conservation for final review.

Guidelines (Guide for the countries preparing national biodiversity strategies and action plans (1999), developed by UNDP/GEF, New York) for the preparation of effective national biodiversity strategy and action plans have been followed to prepare the NBAP.

In order to identify biodiversity conservation issues throughout the country, five regional workshops were held by Resources Nepal, representing all 75 districts of Nepal. Participants at these workshops represented District Development Committees, NGOs, INGOs, Sectoral Government Agencies and Community Based Organisations. These in-depth, district level interactions helped in identification and prioritisation of conservation issues. Concerns raised were then presented to national-level, inter-sectoral government agencies, professional societies, NGOs and INGOs to explore opportunities to enhance biodiversity conservation within and outside the protected area system.

The NBAP is also the result of extensive consultations with government representatives at management levels, as well as subject experts and international scientists. Eight national level expert workshops were held on protected areas, community forests, non-timber forest products, plant resources, rangeland biodiversity, wetland biodiversity, and agrobiodiversity (crops and livestock genetics).

Altogether, 254 government officials, 43 technical experts, 9 international experts, 104 NGOs, 25 INGOs, and 75 District Development Committees were consulted during the course of developing the NBAP. Three field surveys to monitor biodiversity were conducted, and 43 technical papers, a GIS manual and a GIS publication on the protected areas were published. This technical information was incorporated for the development of the NBAP to strengthen the technical and scientific basis of many of the recommended actions.

2.2 Adoption at National Government Level

At the time of writing this report the NBAP still has not been adopted at the national government

which concluded that it was an intricate document. Representatives of donor agencies in this committee emphasised the need for grassroot consulation.
In cooperation with the United Nations Development Programme (UNDP) several persons from nine districts in Nepal are now trained to carry out a ten days Participatory Rural Appraisal (PRA) process, in which the ideas of the NBAP will be presented to different people from those nine districts, under which the villagers. The outcome of this PRA process will be compiled and included in the final NBAP. The whole process should take place in the next months, and the NBAP is supposed to be completed and adopted before the Rio +10 meeting in South Africa, in June 2002.

2.3 Progress in Implementing the NBAP

Since the NBAP of Nepal is still in draft form and has not yet been adopted, nothing can be said about the progress in its implementation. Self-evidently nothing can be said about any problems encountered. Section 2.7, however gives several constraints on effectively managing biodiversity in Nepal which have been mentioned by the NBAP itself. They probably will have an effect on the implementation of the NBAP, and are therefore worth mentioning.

2.5 Main Goal and Objectives

The main goal of the NBAP is to provide an operational planning framework for conservation of biological diversity, maintenance of ecological processes and systems, and ensuring equitable sharing of benefits.

The NBAP aimed to integrate the conservation and sustainable use of components of biodiversity as a part of development by analysing the current state of knowledge on biodiversity, thorough review of biodiversity related documents, strategies, development plans, programs, institutional arrangements, and policies. By identifying important policy and planning gaps, constraints of resources, facilities, and policy implementation, and of current practices of conservation, and assessing further needs. By identifying current pressures and threats on biodiversity and future trends, assessing the present and future value of biodiversity to humanity in the country. By identifying the conservation priorities and time frame for research, management and investments. By assessing the cost scale of conserving biodiversity in the country and developing long-term strategies, project concepts for 13 years (2000-20012), implementation methods, monitoring and evaluation system for biodiversity conservation.

The objectives do not directly include targets for habitats or species, but they do include the identification of current pressures and threats on biodiversity and the assessment of the present and future value of biodiversity to humanity.

2.6 The Responsibilities for Implementation

The overall responsibility for the implementation of the NBAP will lie with the Ministry of Forests and Soil Conservation (MFSC) in its role as the national focal point for the Convention on Biological Diversity. Five key departments (Forests, National Parks and Wildlife Conservation, Plant Resources, Forest Research and Survey, Soil Conservation and Watershed Management) and two divisions (Monitor and Evaluation, and Planning) in the MFSC will be primarily responsible for program implementation, monitoring and evaluation.

The National Biodiversity Steering Committee (NBSC) will facilitate inter-sectoral co-ordination during NBAP implementation and oversee monitoring and evaluation. This committee shall be chaired by the Secretary of the Ministry of Forest and Soil Conservation and members should represent concerned institutes, experts, NGOs, INGOs and stakeholders.

The National Biodiversity Unit (NBU) will act as the secretariat for the NBSC and will serve as the mechanism for sharing experiences between government line agencies, NGOs and the private sectors during NBAP implementation. The NBU will also prepare status reports to be submitted to the Secretariat of the CBD at the end of years 3, 8 and 13 of the implementation process.

Biodiversity Action programs that lie outside the mandate of the MFSC will be implemented by the relevant Ministries and line agencies. Action programs in agrobiodiversity conservation and wetland

related activities will be implemented by the Ministry of Agriculture and Livestock Services, Fisheries Division and the Ministry of Water Resources.

The Environment Division of the Ministry of Population and Environment will play and important role for the long-term implementation of biodiversity conservation in Nepal, through the application of the National Environment Act, 1996 and Environment Protection Regulations, 1997. The rigorous implication of Environmental Impact Assessment (EIA) will be essential for eliminating and mitigating potential threats to biodiversity due to development projects.

The Department of Plant Resources (DPR) and Department of Forest Research (DFRS) in collaboration with research institutes will continue to conduct floral and faunal inventories and research in sustainable harvesting techniques.

The non-governmental community will continue to be a central player in biodiversity conservation in Nepal during NBAP implementation.

The King Mahendra Trust for Nature Conservation (KMTNC), IUCN/Nepal, The Mountain Institute and the World Wildlife Fund will join HMG/N for implementation of integrated conservation and development projects, as well as in other specific areas. Concerned national NGOs and CBOs will be mobilised to undertake conservation and development activities. The International Centre for Integrated Mountain Development (ICIMOD) will contribute its expertise in the implementation of integrated mountain development action programs.

The Institute of Science and Technology (IOST), the Institute of Forestry (IOF), and the Institute of Agriculture and Animal Sciences (IAAS) of Tribhuvan University will be engaged in biodiversity research independently or in collaboration with government line agencies. Other research institution that will support the implementation of programs in biodiversity conservation include the Royal Nepal Academy of Science and Technology.

The National Agriculture Research Council, the National Agriculture Research Institute and the National Animal Science Research Institute will address crop and livestock species genetic diversity in their research programs. The Agriculture Botany Division will be responsible for the conservation of food plant genetic resources.

The Central Zoo will serve as the *ex-situ* centre for conservation of endangered fauna. The Royal Botanical Garden and Conservatories at Brindavan, Tistung and Mai Pokhari will serve as *in-situ* and *ex-situ* centres for plant conservation.

2.7 Possible Constraints on Implementation

Severe monetary constraints in general exist in almost all programs to effectively manage biodiversity. Among others, the major constraints include lack of trained staff, research infrastructure, logistic support and incentives. The main gaps include lack of baseline information and integrated management in many programs, and adequate representation of Midhills ecosystems and transboundary protected areas are lacking.

2.7.1 Financial Gap

First of all there is a financial gap with regard to the amount of financial resources required for the full implementation of biodiversity programs for the next five years in Nepal. The determination of this financial gap is the result of an estimation of the available project resources, and the additional amount needed for the effective conservation of biodiversity in Nepal. The difference is considered as the financial gap. Assessing this gap has been extremely difficult, because of lack of data and prior studies on this subject, since this has been the first analysis of this kind. Many assumptions where used in analysing these data. The total amount currently spent (1999-2003) on biodiversity conservation in Nepal is approximately $ 96.5 million. Approximately $ 221.9 million is needed to more effectively manage biodiversity. This results in the financial gap, which is $ 125.4 million. It is assumed that the Nepal Biodiversity Trust Fund would be an initial step in helping to bridge this gap and ensure protection of biodiversity in Nepal.

2.7.2 Major Constraints and Gaps for Different Ecosystems

Nepal's biodiversity is sustained by different biodiversity ecosystems, including forests, rangeland, wetlands, and mountains. Protected areas, agrobiodiversity and livestock genetics are considered here as well. For each of these systems the different constraints are outlined in the next section.

a) Forests

Government managed forests are forests managed by His Majesty's Government (HMG), which have production as main objective. Leasehold forests are forests handed over as a leasehold forest to any institution established under current law, industry based on forest products or communities, for purposes such as production of forest products for sale or use, operation of agro-forestry, tourism and farms of insects and wildlife in a manner conductive to the conservation and development of forests.
A major constraint in these category of forests is lack of programs, financial and human resources in setting aside a large portion of forest area for protection forest and for the sustainable production of forest products. Furthermore, the sustainable use of only particular products can have a negative effect on biodiversity conservation.

In relation to community and private forests major constraints are a scattered area, population pressure and a priority in peoples' needs, which all make biodiversity conservation very difficult.

In case of the collection of Non-Timber Forest Products (NTFPs) several constraints are identified. People involved in the regulation of NTFPs collection and export have difficulties in identifying NTFPs species, especially medicinal and aromatic plants. Many internationally traded commodities have not been subject of proper scientific identification. NTFPs whose underground parts (root, rhizome, tuber) and barks are collected (often with medicinal plants) are adversely affected by uncontrolled harvesting, sometimes resulting in radical depletion. Medicinal plants which are currently being used in Nepal by local communities for traditional medicinal practice, and for Ayurvedic medicinal healthcare, were also indiscriminately harvested for export to fulfil a national and international demand, and finally, lack of management technology on other non-timber forest products is also a major constraint.

b) Rangelands

For rangelands even more constraints have been identified. There is a lack of feeling responsibilities for management of community pasture lands, since they are considered as common property. Problems due to this are overgrazing and deterioration. The traditional systems of managing pastureland are not taking into account the increasing number of livestock and the declining productivity of this type of land. The number of the livestock per unit of pastureland are high compared to the carrying capacity. The legume component, which is important for quality feed as well as to improve fertility in the pasturelands, is very low. Major constraints regarding forage development include lack of suitable improved forage species of many rangeland areas, lack of technologies for lower-cost forage establishment, high cost of forage deeds and fertilisers, insufficient extension staff, and poor communication between experts and managers. Of the ecological processes of high-altitude grasslands not is much known, which is a major issue. Finally, the high cost of development and poor representation of grassland in the tropical to temperate zone are major constraints to the conservation of the rangelands as well.

c) Wetlands

In Nepal, there is no institution having clear mandates for wetland management. The conservation and sustainable use of wetlands are hindered by weak institutional coordination. A lack of an effective legal and policy framework is the result of anomalies in existing laws. Finally, most of the wetlands are owned by more people, which impedes uniform policy and management prescriptions.

d) Mountain biodiversity

Major constraints on the conservation of mountain biodiversity are a difficult terrain, harsh environmental condition and lack of facilities in the mountains. They make implementation of programs very difficult.

e) Protected areas

Severe monetary constraints exist in research and management in the Department of National Parks and Wildlife Conservation (DNPWC). This, of course, is a major constraint on their output. Beside that, the management capability is still limited, due to e.g. insufficient staff and research infrastructure. A lack of logistic support and proper incentives results in a poor staff attendance in remote protected areas. Furthermore, field-based staff are the least trained and the most inadequately funded among HMGN agencies.

f) Agrobiodiversity

In case of crops, the present germplasm bank facility is not adequate and requires upgrading. There are financial, technical and personnel constraints in characterisation and conservation at different commodity research stations.

With regard to livestock there is, from an institutional point of view, a distinct need for a focal point to facilitate effective management and sustainable use of indigenous animal genetic resources and endangered breeds of livestock.

3 EMERGENCE OF POLICY AND LEGISLATION ON EA IN NEPAL

3.1 Policy on EA

Nepal started its planned process of development in 1956, when the First Five Year Plan (1956-1961) was launched. The Sixth Five Year Plan (1980-1985) was the first to emphasise the need for EIA for major infrastructure projects and committed to adopt a policy for the integration of environmental aspects during the construction of large-scale projects. During this plan period, His Majesty's Government (HMG) established a project entitled "Environmental Impact Study Project" (EISP) under the Ministry of Forest and Soil Conservation in 1982. During 1982 to 1988, EISP prepared draft documents on environmental policy, environmental act and guidelines and conducted EIA on several ongoing infrastructure projects in order to know the extent of impacts and their possible mitigation measures. Also, several workshops and seminars were conducted, both at national and regional (development regions) level, in order to create awareness on environmental protection amongst planners, administrators, decision-makers, politicians and local communities and to provide initial knowledge on EA. However, the efforts at project level became ineffective, due to lack of interest of the decision-makers and the politicians (Bhattarai, 1999).

Findings of the study, however, did prompt HMG to further elaborate environment friendly policies in the Seventh Five Year Plan (1985-1990), which was the first to consider the environment as a distinct component in the planning process. For the first time a national level policy on environment management was incorporated. Policy commitments were made in this Plan to carry out EIA for all major development projects related to the sectors of tourism, water resources, transportation, urbanisation, agriculture, forestry and industry. The plans and programmes formulated in the Seventh-year Plan were of great significance to environmental protection in Nepal. Unfortunately, implementation of environmental programmes, such as the EIA policy stated in the Seventh Five Year Plan, were not realised to the extent previewed, largely due to the lack of coordination among sectoral programmes, insufficient skilled manpower, a lack of appropriate legislation and funds and, above all, a lack of appropriate institutional arrangement. EIA was carried out for some development projects in hydro-power development, irrigation and drinking water schemes and road construction. These studies were not undertaken as a mandatory requirement of His majesty's Government of Nepal, though, but rather as a requirement stipulated by loan and donor agencies.

The Eighth Five Year Plan (1991-1995) and the Nepal Environmental Policy and Action Plan (1993) re-emphasised the need for an EIA system to integrate environmental concerns into the development process. The Eight Five Year Plan anticipated the establishment of a national system for EIA and stipulated that EIAs be conducted at the stage of feasibility study.

3.2 EA Guidelines

During the Seventh Year Plan period his Majesty's Government developed and endorsed the National Conservation Strategy (NCS). The NCS proposed a conservation agenda for sustainable management of natural resources and the protection of the environment. The NCS for Nepal was prepared jointly by the National Planning Commission (NPC) and IUCN, as an inter-sectoral umbrella policy at the national level for addressing environmental issues during the development process. The NCS encompassed all the essential elements of sound resource management with wise use, protection, preservation and restoration. It stated that development projects which are needed to meet the basic needs of the Nepalese people, may produce significant detrimental social and/or environmental impacts and that a statement concerning such effects will have to prepared and reviewed before implementation (Bhattarai 1999).
In accordance with the recommendations of the Resource Planning Section of the NCS, a national system of environmental impact assessment was developed under the *National Conservation Strategy Implementation Project* by the NPC, in collaboration with The World Conservation Union (IUCN). The lack of such a system was the main constraint in translating the plans and policies of the Seventh Five Year Plan into the actual preparation of EIAs.

Firstly, National EIA Guidelines were prepared through a participatory approach by forming an intersectoral environment core group of multidisciplinary expertise from various environment-related institutions. The National Guidelines established the overall policy, framework, and format on which sectoral EIA Guidelines were to be based. They were endorsed in September 1992 and gazetted in July 1993. In 1995 two different sectoral guidelines, The Forestry and Industry Guidelines were endorsed and gazetted. Beside these guidelines, guidelines covering water resources, roads, mining, landfill sites, tourism and urban development have been prepared under the NCS Implementation Project, but they are still in draft form. Please refer to Annex VI for an abstract of the National, Industry and Forestry Guidelines.

3.3 EA Legislation

There already existed some legislation pertaining to the use and conservation of natural resources and the environment such as: The Forest Act (1961), National Parks and Wildlife Conservation Act (1973), Soil and Water Conservation Act (1982), Water Resources Act (1992), Electricity Act (1992) and the Tourism Act. But, since they are concerned of their sector only, it was difficult to orchestrate to a common goal (environmental protection). Moreover, this type of legisation is, by definition, more utilization oriented than conservation oriented. Realizing the inability of such scattered sector-specific environmental protection legislation, the NPC and IUCN (again under the *National Conservation Strategy Implementation Project)* drafted an umbrella legislation. However, though the draft legislation underwent a series of modifications, revisions and amendments, it did not have the opportunity for submission in parliament (Khadka, 2000).

At the same time, the supreme court in connection with the case of Godawari Marble Industry, realized the need of enactment of an umbrella legislation for environmental protection relating to water, air and noise pollution. A strong letter was issued to the government of Nepal to formulate effective and comprehensive environmental legislation for the country (Khadka, 2000).

Real progress was underway with the establishment of the Ministry of Population and Environment (MoPE) (see Annex VII for an overview of its responsibilities). In a joint effort with IUCN, the Environment Protection Act (EPA 2053[1]) was drafted by MoPE, which recognised the interdependence of the environment and sustainable development. It was enforced in 1996. The Act entailed a provision for drafting of regulations, which were enforced as Environment Protection Rules (2054) in 1997. Within two years of its enforcement amendments were made (2055). The key components of EPA are: the consideration of IEE, EIA, pollution control, environmental conservation area, establishment of environment funds, establishment of laboratories, and provisions for the compensations of environmental damages.

4 The EA System of Nepal

4.1 General

From the moment the National, Forestry and Industry Guidelines were gazetted, IEE/EIA was mandatory for the governmental sector, not the private sector. When the EPR were enforced, they made IEE/EIA mandatory for both governmental and private sector proposals. The private sector was now to comply with national standards as well, instead of only those of donor agencies. The already existant guidelines no longer carry any legal status, since they were not enshrined in the EPR.

Furthermore, as they are now, they are not in line with the EPR. Therefore, practioners solely refer to the EPR. The guidelines merely serve a procedural function, e.g. they are being used by most practioners as a framework for the overall EIA process, which is set out in detail (only) in the guidelines (see Annex VI). For screening, scoping and TOR reference is made to the EPR, which contain provisions on these steps of the EA process. Reference is also made to the EPR for the format of IEE and EIA reports and the format of TOR for IEE and EIA, for the EPR provide these formats in schedules. The guidelines mentioned in paragraph 4.1.2, which were developed prior to the enforcement of the EPR, shall have to be reviewed by the concerned agencies. So far, new guidelines in line with the EPR have only been developed for the Hydropower sector (accounting for most of the EIAs in Nepal) under the *Private Sector Hydropower Development Project*, initiated by United States Agency for International Development(USAID). At this moment, they are still in draft form. The following section outlines the EIA system as reflected in EPA and EPR Please refer to Annex XI for a flow diagram of the approval process.

4.2 The EA System according to EPA and EPR

4.2.1 EA Application

The EPA and EPR carry the following definition of the term proposal: "(...) a proposal prepared in regard to the carrying out of such development work, physical activity that may bring about change in the existing environmental conditions or any plan, project or program which changes the landuses".
Formulation and implementation of forest management plans, formulation of watershed management plans, preparation of management plans of national parks, wildlife sanctuaries, conservation areas and their bufferzones are the (only) non-project-type activities which are to be found within the EPR schedules indicating proposals requiring IEE or EIA.
However, although there is provision for carrying out EA for plans and programs, in practice this is never done, mainly because of a lack of trained human resources within the relevant government agencies. The only management plan ever to have undergone SEA was the Bara Forest Management Plan in the early eighties, which was subjected to SEA by Finnida and IUCN. This SEA has never undergone the governmental approval process though.

Thus in practice, EA in Nepal is merely focussed on project-type activities. EA is applied to the following categories of projects: forestry, industry, mining, roads, water resources, energy, tourism, drinking water, waste management, agriculture, health (only EIA) and any project to be implemented in a sensitive area (only EIA).

4.2.2 EIA

Project screening in Nepal is a remarkably simple procedure. On the basis of the schedules provided by the EPR any project proponent can determine whether or not EIA is required without the need for technical know-how. Schedule 2 (see Annex VIII), clauses A to K, states those proposals that require EIA. As by first amendment of the EPR (1999), clause L states that any proposal with a cost of more than NRS[2] 100 million also requires EIA, except those mentioned in Schedule 2 clauses A to K and those below the standard of these proposal, as well as those below the standards of those mentioned in Schedule 1 (projects requiring IEE).
Whereas clauses A to J of schedule 2 list the proposals itself, most of which accompanied by thresholds, (as do clauses A to I of schedule 1), clause K of schedule 2 lists the following sensitive areas:

1. Historical, cultural and archeological sites
2. Environmentally weak and wet areas
3. National parks, wildlife sanctuaries and conservation areas
4. Semi-arid, mountaineous and Himalayan regions
5. Flood prone and other dangerous ares
6. Residential, school and hospital areas
7. Areas with main sources of public water supply

Proposals to be implemented in these areas thus require EIA. These sensitive areas have not been demarkated and gazetted as such, except for the protected areas of Nepal, amongst which one Ramsar site (see Annex IX for an overview of Nepal's protected areas).

[2] *NRS = Nepalese Rupees ; 1 NRS= 0,014 USD (per 5 April 2001)*

In case EIA is required, the proponent is to publish a notice in any national level newspaper, requesting the Village Development Committee[3] or Municipality where the proposal is to be implemented, as well as the schools, hospitals, health posts and concerned individuals or institutions of that area, to offer in writing their suggestions as to the possible impacts of the implementation of the proposal on the environment (EPR rule 4.1). Recently MoPE has issued a format for publishing a public notice, which covers almost all the concerns to be raised by the above stakeholders. Anyone who wishes to, may offer his opinion within 15 days from the date of publication of the notice to the concerned proponent (EPR rule 4.2). In practice, however, some proponents decide to organise scoping meetings at the central level as well as in the local area, to which the environmental groups, governmental institutions and all other stakeholders are invited to attend. Rural appraisal methods are also sometimes applied in scoping.

Thereupon, the proponent himself prepares a scoping report which is to be submitted to the concerned agency (which depends on the sector the project falls under, e.g Ministry of Forests and Soil Conservation, Ministry of Industry etcetera; (please refer to Annex X for an overview of ministries and departments with EIA responsibilities), along with the received opinions and suggestions of the stakeholders as mentioned in EPR rule 4.1 (EPR rule 4.3) The concerned agency reviews the scoping report and forwards it to MoPE along with its comments (EPR rule 4.4). Thereupon, MoPE determines the scoping report as proposed or in the revised form (EPR rule 4.5). Subsequently, the proponent shall have to prepare TOR in the format as indicated in Schedule 4 of EPR (see Annex XII) on the basis of determination of scope made by MoPE and shall have to submit the TOR to MoPE (EPR rule 5.2). MoPE may make minor changes or revisions in the TOR (EPR rule 5.3). The proponent can speed matters by submitting both the scoping report, accompanied by the comments of the concerned agency, and the TOR to MoPE at the same time, which may approve them at the same time, as provided for by EPR rule 5.2 after first amendment.

Once the TOR have been approved, the proponent is to prepare the report in the format as indicated in Schedule 6 of the EPR (EPR rule 7.1). Whilst preparing the report, the proponent has to conduct a public hearing about the proposal at the area of Village Development Committee or Municipality where the proposal is to be implemented and collect opinions and suggestions (EPR rule 7.2). Rule 8 en 9 of EPR have been repealed by first amendment whereby they have become optional. These rules pertained to disclosure of the draft report to local institutions, community offices, Village Development Committees or Municipalities.

Upon completion of the report, the proponent is to submit 15 copies of the report along with a recommendation of the concerned Village Development Committee or Municipality to the concerned agency (EPR rule 10). The concerned agency will review the report and send 10 copies of the report, along with its suggestions to MoPE (EPR rule 11.1). Upon receipt of the report, MoPE issues a public notice in any one daily newspaper, so as to enable the general public to comment on the report within a period of 30 days from the first day of publication (EPR rule 11.2). Any comments need to be sent to MoPE within this 30-day time period (EPR rule 11.3). If such comments are received, the report shall be examined in the light of these comments (EPR 11.4). In case MoPE has decided to from a review committee, the committee's comments will be taken into account at the same time (EPR rule 11.4). According to sub-section 4 of section 6 of the EPA MoPE may form such a committee, generally referred to as the EIA Suggestion Committee. This committee is chaired by the Joint-Secretary of the Environment Section of MoPE and further consists of up to three representatives of the concerned ministry, a representative of the proponent, up to three government nominated experts and the Chief of MoPE's EIA Section. This committee usually is also involved in reviewing the scoping report and the TOR of the particular project. Use of this committee is being made as of January 1999, mainly for large-scale development projects. Since the enforcement of the EPR 38 scoping reports, 29 TOR and 12 EIA reports (industry, roads, hydropower, pesticide handling) have been approved by MoPE up till now. No proposals have been rejected. The first EIA report under the EPR was not approved untill the end of 1999, mainly due to the fact that MoPE was not yet adequately organised for the approval process.

Where review of the report shows that implementation of the project will have no substantial adverse impact on the environment, the Ministry shall grant approval for its implementation (EPR rule 11.4). The Ministry should do this within 60 days of receipt of the report (EPR rule 11.5). When there is special reason for the Ministry not to have the project approved within these 60 days, the Ministry has an additional 30 days for approval (EPR rule 11.6).

It is mandatory that the proponent complies with the matters mentioned in the report as well as the conditions prescibed by the concerned agency or MoPE, while implementing the project (EPR rule 12). The concerned agency is responsible for monitoring (EPR rule 13.1). In cases where it is found in the course of carrying out monitoring that the actual impact is higher than the one specified in the report, the concerned agency shall issue necessary directives to the proponent to adopt measures to reduce or control such impacts. The proponent is to comply with such directives (EPR rule 13.2). The concerned body shall also inform the Ministry about the directives issued to the proponent (EPR rule 13.3).
MoPE is responsible for auditing, which is to be undertaken two years after the project has become operational (EPR rule 14).

4.2.3 IEE

Those projects requiring IEE are listed in schedule 1 of the EPR (see Annex XIII), clause A to I. As by first amendment of the EPR (1999) clause J states that IEE is also required for those proposals that cost between NRS 10 million and hundred million, except those mentioned in clauses A to I of schedule 1 and those below the standard of these proposals, as well as those below the standards of the projects mentioned in schedule 2 (projects requiring EIA).

As by first amendment of the EPR the provision for scoping of IEE has been removed. Therefore, the project proponent only has to submit the TOR for approval to the concerned agency, in the format as indicated in schedule 3 (see Annex XIV) (EPR rule 5.1). It is the concerned ministry that approves of the TOR, MoPE is not involved in IEEs. The concerned agency may make minor changes or revision to the TOR (EPR rule 5.3).

Upon approval of the TOR the proponent is to prepare the IEE report in the format as indicated in schedule 5 (EPR rule 7.1). Whilst preparing the report the proponent is to affix a notice in the concerned Village Development Committee or Municipality, office of the District Development Committee or Municipality, school, hospital and health post, requesting the concerned individuals and institutions to offer their written opinions and suggestions within 15 days with regard to the possible impact of the implementation of the proposal on the environment and prepare a public enquiry of that deed. The same 15 days notice also has to be published in a national level daily newspaper. The opinions and suggestions so received should be included in the report (EPR rule 7.2).

After completion of the IEE report, the proponent has to submit 15 copies of the report for approval to the concerned agency, along with a recommendation of the concerned Village Development Committee or Municipality (EPR rule 10). In case the concerned body, after review of the report, agrees that there are no substantial negative impacts on the environment, the concerned body will grant approval within 21 days from the date of its receipt (EPR rule 11). So far, approximately 35 IEE reports have been legally approved since the enforcement of the EPR.

In case where the concerned agency finds it necessary to also carry out EIA for the proposal, the concerned agency may issue out an order to carry out EIA (EPA section 6). The proponent is to fulfill all the formalities as laid down by the Rules for preparation of an EIA report (EPR rule 6).

Please refer to the following documents for a more detailed description of the EA system of Nepal:

- Bhattarai, S., 1999. *Evolution and the status of Environmental Assessment (EA) in Nepal – Draft.* IUCN, Kathmandu, Nepal.
- Khadka, R.B., 2001. *Environmental Impact Assessment: Concept and Practice – Draft.* School of Environmental Management and Sustainable Development (SchEMS), Kathmandu, Nepal.
- Khadka, R.B., S. Gorzula and S. Malla (eds), 2000. *Environmental Impact Assessment for Hydropower Project in Nepal (Results of One-day SWOT Analysis).* NEIAA Nepal and IRG/USAID, Kathmandu, Nepal.

5 The EA System of Nepal in Practice

5.1 General

The EA system of Nepal has only recently come off the ground properly with the enforcement of the Environment Protection Rules (EPR) in 1997, which made IEE/EIA mandatory for the governmental as well as the private sector. Prior to this, IEE/EIA was mandatory only for the governmental sector, eversince the enforcement of the National Guidelines (1993). With such a short history of practice it is inevitable that the system is not yet entirely as it should be. Nepal is slowly but surely learning by doing. Much has already been achieved in this short period of time, but there still remains much to be improved. The following sections give an outline of the major constraints on proper implementation of the EA system. These constraints have been listed per category, so as to make matters more comprehensible.

5.2 Major Constraints on Implementation of the EA System

5.2.1 EIA in general

Even though EIA has become mandatory under the EPA, many private sector and governmental developers still escape their responsibility. Many a project in Nepal which was supposed to undergo EIA, has not. National EIA requirements are only structurely complied with in those cases where projects are to undergo EIA as per donor agency requirement.

5.2.2 IEE in general

Although the EPA contain a provision which states that the concerned agency which is responsible for approval of the IEE, may order the proponent to carry out EIA if this is deemed necessary, in practice IEE is never followed up by an EIA. Proponents are sure to cover up any significant adverse impacts, if likely.

Furthermore, there is no provision in the EPA to conduct IEE in order to ascertain the need for EIA. Under the current practice IEE is only applied to those proposals that are likely to have minimal adverse impact on the environment and for which mitigation measures may be prescribed easily. Categories of such proposals are given in clauses A to I of Schedule 1 of the EPR (see Annex XIII). If a proposal does not fall within any of these categories, the cost of the proposal is the determining factor as per clause J. So IEE is only conducted as required by the Schedules in the EPR..

The format for IEE reports given in the EPR (see Annex XV) is not comprehensive and merely provides a general framework for matters to be mentioned in the report. Added to the fact that there are no guidelines for conducting IEE (even the National Guidelines do not treat this matter), the treatment of subject matters in IEE in some cases is too brief, whereas in others it is similar to an EIA. Furthermore, the current format is predominantly based on industrial projects. The parameters and processes considered do not suit sectors such as forestry and hydropower.

5.2.3. Screening

Although the current screening system is easy to use and does not require any cumbersome administrative procedures, it has some major disadvantages. The thresholds applied to the projects in the EPR schedules have been applied for convencience sake and have no scientific basis. For instance, hydropower projects generating between 1 and 5 Megawatt need to undergo an IEE. However, projects generating less than 1 Megawatt need not undergo IEE, neither do they need to have a license for implementation. However, in some cases a hydropower project generating less than 1 Megawatt affects the downstream through a significant diversion of water flow. Under the current system such adverse impacts are not recognized.

Any proposal that is not listed under the categories in the schedules, is screened on the basis of its cost, as the recently inserted clauses J and L of respectively the schedules for proposals requiring IEE and EIA require (Annex XIII and VIII respectively). However, it might very well be that a project with a cost of less than NRS 10 million, which according to the above clauses need not undergo IEE nor EIA, causes significant advers impacts on the environmnent. Again, this is not recognized under the current system.

The sensitive areas listed in Schedule 2 (Annex VIII) have not been demarkated and gazetted as such, apart from the protected areas. There are no criteria to determine whether an area where a proposal is to be implemented, falls under any of these areas. This might very well lead to proposals being implemented in an area which should have been considered a sensitive area.

5.2.4 Scoping

Under the current system the responsibility of scoping lies with the project proponent himself. This introduces the danger of bias taking place, due to which important issues might very well be overlooked.

The proponent is obliged to publish a notice in a daily newspaper. However, newspapers may not reach the remote areas of Nepal in time or not at all, possibly leaving the local people unaware of the proposal and/or unable to respond within the 15-day period prescribed by EPR. Past experiences have shown that almost negligible or low responses have been received by the local stakeholders. Since this is the only mandatory way of involving the public, essential contributions of local stakeholders might be missed out on.

The EPR do not provide a generic format for developing scoping reports, leaving proponents in the dark as to which issues should be included in the report. In practice the volume of scoping reports varies between 5 and 45 pages. Furthermore, there are no scoping guidelines (apart from those recently developed by the hydropower sector). Neither are there any review criteria for scoping nor trained human resources within the authorising agencies (again apart for the hydropower sector where the concerned agency has developed such criteria). Scoping exercise at present is unsystematic and taking place merely to fulfill legal requirements, passing by the essence of the scoping exercise.

The EPR do not provide a time frame for the approval of the scoping report upon its submission to the concerned agency. This is an impedement to the process and has caused private sector proponents to suffer.

5.2.5 Terms of Reference

The format for developing TOR as provided in Schedule 4 of EPR (Annex XII) is incomprehensive and lacks several important components to be considered in the EIA process. The scoping exercise is the basis for developing TOR, but in the present format there is no mention of scoping output. Furthermore, there is no provision to include new issues likely to emerge at a later stage of the process. The removal of scoping from IEE has adverse implications for the development of TOR for IEE.

There are no review criteria for TOR nor trained human resources within the authorising agencies. Together with the fact that anyone in the market is eligible to conduct an IEE or EIA, the development of TOR is unsystematic and undertaken with the mere intention of getting project approval, such as is the case for scoping.

5.2.6 The EIA Report

Under the current system IEE or EIA report preparation can be undertaken by anyone considering themselves to be an EA expert. This has given rise to several shortcomings in the reports. Multidisciplinary subjects are often not integrated in a balanced matter. For example, if physical scientists dominate the EA team, the thrust of the total report is more inclined towards physical aspects. Likewise, if the team leader is a biologist, more emphasis appears to be given to biological science. Furthermore, cause and effect relationships between the one discipline and the other are often not analysed, such as the effect of changed chemical water composition on the aquatic animal and plant species present. Also, no linkage is made between the same component at different stages to be prescribed in the report, such as the present condition, the affected future condition and the condition after the improvement of that particular component.

There is a tendency of producing voluminous reports, which could often be reduced to only 50 per cent of the original volume if irrelevant matters were to be removed. This has become a common practice, since authorising agencies which review the report then tend to have the impression that the EA team has done proper work.

Executive summaries are often too technical and/or cover matters which are irrelevant. Furthermore, there is no legal requirement for providing an executive summary in Nepali, in order to enable local people to read it. Recently, though, MoPE has been obligating proponents to do so and it will be enshrined in the EPR as soon as possible. The format for EIA reports given in the EPR (see Annex XVI) is not comprehensive enough for proper report preparation.

Whilst preparing the report, the proponent is supposed to conduct a public hearing about the proposal at the area of Village Development Committee or Municipality where the proposal is to be implemented and collect opinions and suggestions as per EPR rule 7.2. There is no mention, however, as to at which stage of report preparing the proponent is required to do so. Anyway, in practice this is never done. When preparing the report the EIA team is focussing its attention entirely on the EIA study, for which time limitations are always apparant. Therefore, a public hearing is conducted after completion of the report, at which the results of the study are presented to the local stakeholders. This also provides the opportunity for obtaining a letter of recommendation from the concerned Village Development Committee or Municipality which the proponent is required to send along with the report to the concerned agency for review as per EPR rule 10. Disadvantage of this practice is that local stakeholders do not get a chance to contribute to the EIA study, for instance during the process of attaching significance to identified impacts.

With regard to the stage of attaching significance to impacts, it deserves mentioning that this stage is never elaborated in detail and is merely based on the subjective insights of the practioners themselves. The Langtang Report described in paragraph 7.7 can be considered as an exception. One cause of this might be that this stage has not been described by any of the guidelines published, which are still used by most practioners as a framework for conducting EIA. A chapter on identification of impacts is immediately followed by a chapter on impact mitigation.

EIA recommendations obtained from VDC and Municipalities are not integrated in the actual project implementation. This implies that report preparation has become a mere fulfillment of a legal requirement, surpassing the essence of preparing an EIA report.

In most cases, the National EIA Guidelines 1993 are followed while conducting EIA, except for those matters which are covered by the EPR, since these guidelines briefly outline the relevant steps of the process. However, there still are some flaws to these guidelines. One is the ommitance of the stage of 'attaching significance' to impacts. A chapter on identification of environmental impacts is immediately followed by a chapter on mitigation measures. As a consequence, this important stage is in most cases not adequateley covered in the EIA reports, which seriously impedes the decision-making process. Also, the guidelines lack precise methods and approaches to be adopted for the preparation of EIA reports, such as methods for collecting baseline information, analysis and prediction of impacts, public hearing and consultation etcetera.

The Ministry should grant approval for implementation within 60 days of receipt of the report (EPR rule 11.5). When there is special reason for the Ministry not to have the project approved within these 60 days, the Ministry has an additional 30 days for approval (EPR rule 11.6). In practice approval of most EIA reports is done in 90 instead of 60 days, there always being some reason for delay. Occassionally, even the period of 90 days is exceeded. Although the proponent has a right to take MoPE to court, such time-consuming action is never undertaken.

According to sub-section 4 of section 6 of the EPA MoPE may form a report review committee, which in practice is also involved in reviewing the scoping report and TOR. This is done especially in large-scale projects. The review committee is formed entirely on an ad hoc basis. Relevant experts of governmental and non-governmental organisation are called in for review meetings at the last moment and receive relevant information on the project only during the meeting. As such, they are not knowledgeable enough about the projects and its possible impacts on the environment. Furthermore, most of the participants lack adequate knowledge on EIA in general. Moreover, there are no review guidelines to assist them. All these constraints seriously impede the decision-making process.

5.2.7 Mitigation Measures

Due to a lack of guidelines for applying mitigation measures, mitigation measures proposed to overcome impacts are often not in coherence with the impacts identified. Therefore, integrating them in the project
design is difficult.

Under the current system, monitoring, which is the responsibility of MopE, is never undertaken. As a result, mitigation measures proposed are often not implemented, which of course causes adverse impacts on the environment in spite of EIA report preparation.

5.2.8 Monitoring and auditing

There are no proper guidelines for implementing monitoring and auditing. Although under the current practice, in the majority of cases a chapter on monitoring and auditing is included in the report, as per the requirement of EPR, the monitoring activities are not well connected with mitigation measures, impacts identified and the baseline condition. Furthermore, in most cases, the indicators for monitoring and auditing are not given. Additionally, the schedules, plans and responsibilities are not given.

Monitoring is the responsibility of the concerned agency. However, at present institutional capacity is lacking. Also, there is no capability of analysis and recording of monitoring information within the concerned agencies and there exist no standards for compliance enforcement. As a result, monitoring is never undertaken, hence neither is auditing. Even so, if monitoring were undertaken by the concerned agencies, MoPE, which is responsible for subsequent auditing, would lack institutional capacity and capability. As a result, proponents omit implementation of recommendations by VDC's, Municipalities and the authorising agencies as well as mitigation measures.

5.3 Consideration of Biodiversity under the Current System

As appears from matters discussed above, the present Nepali EA system is far from perfect. EA is still regarded as a cumbersome process which is only to be undergone in order to meet legal requirements. As a result, most proponents will only stick to the the bare minimum requirements as reflected by the EPR. Where possible, proponents will escape their responsibilities in the knowledge that they will not be recalled by the authorising government agencies.
Proponents as well as practioners and authorising agencies lack any understanding of the essence of EIA. Furthermore, in a developing country such as Nepal, environmental concerns are all too easily overridden by economic considerations.

At present, biodiversity is not adequately integrated in the Nepali EA system. MoPE, which is responsible for implementing the provisions and obligations arising from international agreements and conventions on the environment and thus for integrating provisions of the CBD in the Nepali EA system, considerably lacks capacity and capability to do so. At present, they are far too occupied with handling ongoing EA matters and perfecting the current EA system.
Another major constraint to adequate integration of biodiversity is the lack of inter-sectoral coordination within the government and the tendency of each ministry to regard itself as the most competent. Under the current system it is MoPE which has the mandate for final approval of scoping reports, TOR and EIA reports. This is particularly disadvantageous where projects subject to EIA in biodiversity rich areas such as forests and protected area are concerned. As these areas fall under the Ministry of Forest and Soil Conservation, which has considerable more expertise on biodiversity than MoPE, their views should be duely taken into account. In practice however, this is not done to the extent desirable (see also paragraph 6.1).

6 The EA System and Biodiversity

6.1 Screening

Under the current system biodiversity is not an issue in determining the need for EA. The need for IEE or EIA is merely based on the Schedules provided by the EPR. If a project is not listed amongst any of the project categories given in the Schedules, it is the cost of the project which determines the need for an IEE or EIA. The categories of proposals requiring IEE or EIA listed in the EPR reflect the 'usual' proposals with known impacts on the environment. As mentioned earlier, the thresholds given for some of the proposals, however, have no scientific basis, but were only applied for the sake of convenience. So it might very well be that projects which are now considered to have little impact on the environment, because they do no not exceed a certain threshold, in practice do have a major impact on biodiversity.

Since the schedules are decisive on the need for IEE or EIA there is never any question as to whether IEE or EIA is deemed necessary on the basis of other considerations, such as the conservation of biodiversity. In theory, IEE's undertaken on the basis of the Schedules in the EPR, could very well lead to the conclusion that an EIA is necessary, for instance because there appear to be likely impacts on biodiversity. In practice, however IEE's are never followed up by EIA., since proponents are sure to cover up any likely serious adverse impacts of the proposal or remaining uncertainties, which justify the need for EIA.

Consideration for sites which are important from a biodiversity point of view is only given through a list of sensitive areas in the EPR Schedule stating proposals which require EIA. Any proposal to implemented in such an area in any case needs to undergo EIA. None of the sensitive areas listed, however, have been demarkated and gazetted as such, except for the protected areas, amongst which one Ramsar site and two World Heritage sites. Several wetland sites are awaitening inclusion in the RAMSAR list and one national park is in the process of inclusion as a World Heritage Site. There exist no criteria with regard to the other sensitive areas mentioned, e.g. criteria on the grounds of which an area should be considered as sensitive. In practice, therefore, the only sensitive areas to be considered are protected areas. Several projects have been located in conservation areas and wildlife reserves. So far, only one (hydropower) project has been located in a national park. This project, however was subject to EIA anyway, on the basis of the fact that it was listed under the 'Water Resources and Energy Sector' category of the EIA Schedule in the EPR. Even though it is located within a protected area, however, the agency responsible for protected areas (Ministry of Forest and Soil Conservation - MFSC), has little say in the appoval of the proposal. The Ministry of Water Resources, after all, is the concerned agency for the hydropower sector. It is this ministry that initially approves of the scoping report, the TOR and the EIA report, after which these are passed on the MoPE, which is responsible for the final approval. The Ministry of Forest and Soil Conservation is to be consulted and to this end is often included in the Review Committee. However, it is up to MoPE whether their suggestions are taken into account. The Ministry of Forest and Soil Conservation is only to approve of a study being undertaken in the park and site clearance before project implementation. This construction has often impeded the whole process, when the Ministry of Forest and Soil Conservation declines the request for site clearance after the proponent has received approval for implementation by MoPE.

6.2 Scoping

Scoping and subsequent prepation of TOR are the responsibility of the proponent. It is obvious that, under such a condition, bias is bound to take place as to which matters receive due attention.

At present, there is insufficient biodiversity related information available to practioners. Biodiversity has not been comprehensively studied in terms of coverage accros Nepal and investigations within the floral and faunal taxa. The government agencies mandated with conducting flora and fauna studies are inadequately financed and under-staffed.
The biggest achievement in collecting biodiversity related information was done under the Biodiversity Profiles Project, jointly executed by the Department of National Parks and Wildlife Conservation (under MFSC) and the Dutch Government. This resulted in a series of 16 volumes, covering the enumeration of some groups of flora and fauna, biodiversity assessments of several forest ecosystems, biodiversity profiles of several physiographic zones and a red data book of the fauna of Nepal. All information gathered has been centered in a Biodiversity Database System. Furthermore, maps providing a classification of nearly all of Nepal's ecosystems (except for aquatic ecosystems) with their biological communities were digitised into a Geographical Information System (GIS). The NBAP was prepared mainly on the basis of information gathered during this project.
However, the BPP's work covered only the higher animal groups of fishes, reptiles, amphibians, birds and mammals. Butterflies were included, for information on this insect-group is easily available. The Midhills, the zone richest in biodiversity and inhabited by the greater part of the Nepali population, was not extensively covered due to time and financial limitations. This is the most significant area in terms of EIA's being performed. Genetic diversity was not studied and information on this level of biodiversity is generally poor, be it on wild or agricultural species. With regard to the protected areas of Nepal, some documentation of flora and fauna have been undertaken under several projects, however comprehensive documentation for each protected area have yet to be undertaken (MFSC, 2000). There also still is a major lack of information with regard to wetlands, which together represent 25 per cent of Nepal's biodiversity (MFSC, 2000). The rangelands of Nepal often tend to receive little attention and information on this ecosytem type is still minimal.
Besides the fact that much information is still lacking, the exchange of information is not well established. Results of other scientist's work in languages other than Nepali or English is not easily accessable. There also is an inadequate flow of information that often leads to duplication of work. At least eleven databases are in operation in Nepal with data input from different conservation organisations. A number of these databases are duplicates. A mechanism needs to be developed to strengthen the existing information and network facilities and to make the information more user-friendly (MFSC, 2000). In order to be of any use to EIA practioners, information on biodiversity should entail a comprehensive inventory of flora and fauna, including micro-organisms of a given area, with their scientific and local names, locality, distribution, habitat, biology, role in the ecosystem and status. Special attention should be given to rare and endangered species, which at present have not been sufficiently studied.

Lists of protected animals under the National Parks and Wildlife Act are available, as well as lists of protected plant species under The Forestry Act, but the occurence of their habitats is usually not known. Furtermore, the list of protected animals is in need of updating, since it has not been reviewed since 1973.
With the little secondary information available and the lack of understanding of biodiversity which many practioners have, much is dependent on the issues raised by the local people. However, these issues mostly pertain to socio-economic matters and in very few cases to specific species/habitats or other biodiversity issues. Only in cases where local people rely heavily on a particular species, for instance on fisheries, these species are considered.

TOR therefore tend to be very generic in nature. Open ended questions such as 'evaluate the impact on wildlife in the project area' are very common. Only endangered, rare and in some cases endemic species specifically are mentioned in TOR., usually in the sense that they have to be identified within the project area. Sensitive species, indicator species, keystone species etcetera are never considered. Generally, only the species level is considered. With regard to ecosystem level, mostly only habitats of 'wildlife' are considered, although in most cases only those of endangered species. The ecosytem level is rarely addressed in TOR and if it is, impacts thereon cannot not be retrieved in the actual EIA report. The same goes for the mention of biodiversity in the TOR. This implicates that practioners are merely using the term to satisfy desicion-makers, but that they have no idea of the concept. The genetic level is never addressed. Only the compositional component of biodiversity is given any attention.

Structural and functional components are neglected. Furthermore, it is not unusual for scoping issues and TOR to be copied from other reports form similar projects and/or project areas.
With such generic TOR, the actual EIA study depends heavily on the experience of the specialists and their understanding of what needs to be addressed.

6.3 Impact Prediction

At present, biodiversity data are inadequate for meaningfull assessment. Secondary information if at all available is hard to retrieve in the short period of time available to most practitioners and most information used is seriously out of date.
Even the most basic information is therefore to be gathered during field studies. However, due to time contraints important species and other aspects might easily be overlooked. There is little chance of these matters being discovered by authorising agencies, since they themselves lack adequate information relevant to biodiversity, besides the fact that they lack the capability and capacity to thoroughly review an EIA report on biodiversity issues.

Biodiversity impacts identified usually relate to species, with the emphasis on rare and endangered species as included in the IUCN Red Data Books, CITES lists and the national list of protected species. On the ecosystem level, mostly only impacts on habitats of identified species, with the emphasise on rare and endangered species, are identified. Impacts are hardly ever elaborated. It is merely stated whether there are or there are not any impacts. Impacts are not even given per species identified, but for the group of species as a whole ('wildlife'). Ecosystem functioning, crucial to the maintenance of biodiversity is never studied, nor are impacts on genetic diversity. Intensity of study appears to be greater for important ecosystems such as protected areas. The importance of many other ecosystems with regard to biodiversity is yet to be established.

6.4 Mitigation

In most cases, if impacts on biodiversity, or rather biodiversity issues, such as species and habitats have been identified, the impacts are usually disgarded for their 'low' significance. As mentioned earlier, the stage of attaching significance to impacts is a stage which is not regarded as very important. Judgement is merely based on the subjective judgement of the practioners. In most cases only impacts on biological resources important to the livelyhood of local communities are being considered for mitigation, although even here chances are being missed. The Kali Gandaki hydropower project for instance, was implemented without a fishladder, depriving local fishermen of their source of income. Very few projects have specified mitigation measures for impacts on biodiversity. Those mitigation measures that have been specified relate mainly to fishladders, compensation for deforested land through new plantations and mitigation of disturbances during the construction phase.

It is mandatory that the proponent complies with the matters mentioned in the report as well as the conditions prescibed by the authorising agencies, while implementing the project (EPR rule 12). This means the proponents is also obligated to implement prescribed mitigation measures. Compliance should be checked when monitoring the project, which is the responsibility of the concerned agency (EPR rule 13.1). Lack of capacity and capability within these agencies, however, have resulted in the fact that up untill now monitoring (and subsequent auditing) has not been undertaken for any project. Some proponents have omitted implementing mitigation measures. Other mitigation measures have simply become defunct. At present, there are no standards for compliance enforcement.

Even under ideal circumstances, lack of relevant biodiversity data on which to base mitigation measures would hinder proper mitigation of biodiversity impacts. Neither does the NBAP, in its current form, provide any targets on which to base mitigation measures, since no tangible objectives are given which could be used to this end. EIA in itself is hardly addressed in the NBAP. The only 'gap' identified with regard to EIA pertains to EIA legislation. It is stated that "the Act is very conservative in relation to public participation, which is absolutely contrary to what was proposed by the experts who drafted the Environment Protection Bill" (MFSC, 2000). No strategies or actions, however, are given to overcome this discrepancy.
The NBAP does, however, identify necessary actions with regard to the conservation and sustainable use of biodiversity which are relevant to the EIA process, such as the establishment of a comprehensive biodiversity database entailing all information relevant to EIA practioners. Special emphasis is being given to rare, endangered, endemic species and keystone species. Also, it

emphasises the need to extend the current array of protected areas, including many undisturbed areas in the Midhills threatened by human activities. This would mean that these areas would be demarkated and gazetted, thereby making EIA mandatory for projects which are to be located within these areas, whether small or large-scale.

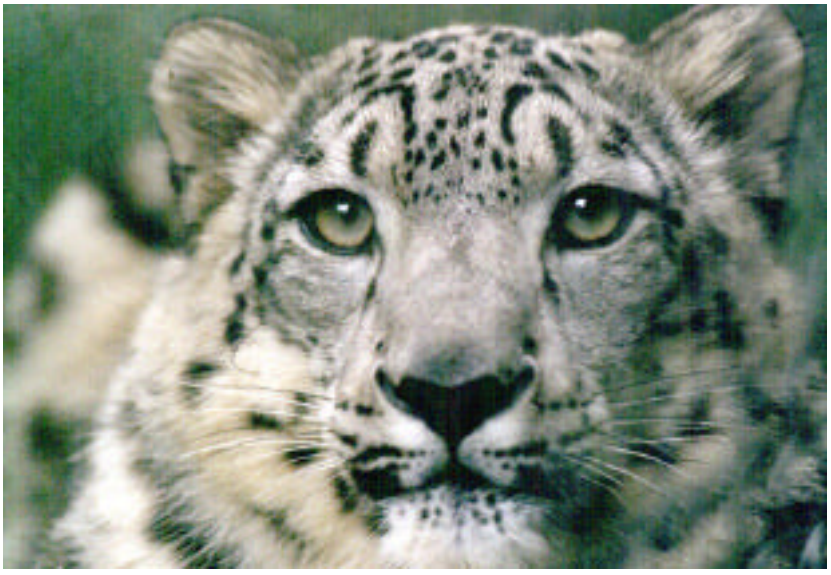
6.5 Review

In case of IEE, the TOR (scoping is not required) and the actual report are reviewed by the concerned agency. In case of EIA the scoping report, the TOR and the actual EIA report are reviewed by the concerned agency and MoPE respectively. MoPE has the mandate of final approval.
None of the above agencies have any review criteria whatsoever. Only the newly developed scoping guidelines for the hydropower sector, which are still in draft form, contain a matrix of 'major environmental indicators' to be used by the proponent itself and the concerned agency. This checklist contains issues relevant to biodiversity, such as endangered and endemic species, species of biomedical interest, fisheries and forest products. However, from a biodiversity point of view merely going through this list will not guarantee adequate coverage of biodiversity-related issues.

At present, biodiversity does not seem to be an important issue in decision-making. MoPE lacks the capability and capacity to adequately address the coverage of biodiversity in EIA as do most of the concerned agencies when it comes to approving IEE's. Furthermore, chances for safeguarding biodiversity are often missed when suggestions and recommendations of the Ministry of Forestry, responsible for most areas with high biodiversity, are put aside by MoPE, which has the mandate on final approval of EIA. Furthermore, in a developing country such as Nepal it is almost inevitable that biodiversity issues are overriden by economic interests.

6.6 Monitoring and Auditing

Biodiversity monitoring *perse* has never been recommended. Any monitoring activities with regard to biodiversity, if recommended at all, relate to biodiversity issues, mainly species abundance. However, indicators prescribed are vague and tend to not provide the information necessary for adequate monitoring.



7 Case Studies

In order to provide illustrative examples of the EIA practice in Nepal, we examined three EIA report, as well as the accompanying

scoping reports and TOR. Availability was restricted to two reports in the Water Resources Sector and one in the Physical Planning Sector. Both reports in the Water Resources Sector relate to hydropower projects. In a sense, this is representative for Nepal since most EIA's conducted so far have been conducted for hydropower projects. Besides this, hydropower projects entail many aspects which are also seen in other individual projects. Such as there is the fact that hydropower projects are both point and band projects at the same time. Furthermore, tunnelling and excavations have to be undertaken, as well as the creation of necessary infrastructure. Hydropower projects are often situated in remote areas, which are often important from a biodiversity point of view. This makes them very suitable for a case study on biodiversity coverage in EIA.

7.1 Location

a) Upper Modi Hydro-Electricity Project (UMHEP; October, 2000) is located in the Western Development Region of Nepal, in the Kaski District, Gandaki Zone. The location of the project site is about 8 km north of Nayapool, along the Pokhara – Baglung highhway, at a distance of 38 km from Pokhara.
b) Langtang Khola Hydroelectric Project (LKHEP; March, 2001) is located in Rasuwa District, Bagmati zone of Nepal. The project site is located about 58 km north of Trisuli Bazar, along the Trisuli - Somdang road which is at a distance of 105 km from Kathmandu.
c) Malamchi Water Supply Project/Water Treatment Plant (MWSP/WTP; January 2000) is located in Mahankal Village of Sundarijal Village Development Commitee, Katmandu District, Central Development Region, Nepal. It lies approximately 20 km to the north east of Kathmandu City Centre near the headwater of the Bagmati river, at elevations ranging from 1,400 m to 1,450 m above sea level.

7.2 Proponent

a) The proponent of this project is GITEC Nepal Private Limited (GNPL). GNPL is a private company registered with His Majesty's Government of Nepal (HMGN), Ministry of Industry, on 2nd Shrawan (mid-July to mid-August), 2056 in accordance with the Company Act of 2053.
b) Kantipur Hydropower Company, Nepal (KHCP) is the proponent of Langtang Khola Hydroelectric Project (LKHEP). KHCP is a private company registered with His Majesty's Government of Nepal, Ministry of Industry, in the year 2056 in accordance with the Company Act 2053.
c) The proponent is the Melamchi Water Supply Development Board (MWSDB), which is responsible for the financial arrangement and execution of construction works of the MWSP/WTP component and subsequent management and operation.

7.3 Proposal

a) The salient features of the UMHEP include a 10 m high diversion weir, a 3.2 km long headrace tunnel, a surface type power station with 2 generating sets of 7 MW each, a 5.5 km long permanent access road, a 4 km long 132 kV single circuit Modi River – Pokhara transmission line and a complex of accommodation of staffs.
b) The salient features of the LKHEP include a 8 m high diversion weir, a 2.8 km long headrace tunnel, an underground type of powerhouse with 3 generating sets of 3.5 MW each, a 2.8 km long access road, and a complex for accommodation of staffs.
c) The proposed proposal is the Water Treatment Project (WTP), one of the main components of the MWSP. This component mainly comprises two sub-components, namely Water Treatment and Sludge Treatment. After completion this project will treat the 170 MLD water (510 MLD in the third stage of the project) to bring it within the WHO drinking water standard and meet the increasing demand of water in the Kathmandu Valley in a environmentally sound manner.

7.4 Alternatives

Alternatives were considered for all projects but in none of these options any *detailed* implications for biodiversity where taken into account. MWSP/WTP, however, provides alternatives, of which Construction Work Scheduling Alternatives of the WTP takes the pressure on flora and fauna by over influx of workers in the area into account. LKHEP provides an alternative route, to avoid and

minimize possible loss of vegetation cover, and maintain the status of habitat/species diversity at the Langtang National Park. It is stated that the 'consideration of this alternative route will be appropriate' and 'this alternative alignment features some advantages such as low vegetation cover, low biodiversity, (…) and above all lying outside the national park boundaries.' However, it is also stated that 'economically it may cost an extra bridge and compensation of private ownership lands', which probably will have been a reason to ignore this alternative. LKHEP also considers to find a more suitable site for staff quarter construction. This provides advantages for the workers, because the proposed site happens to be affected by upstream flash flood with sedimentation, to which they add that an accompanying advantage is the fact that loss of biodiversity will be minimum. However, the main reason for considering this alternative was of a physiological nature. This means it can not be said that biodiversity considerations were really taken into account.

7.5 Characteristics of Proposed Development Area in Terms of Biodiversity

a) The UMHEP is situated within the Annapurna Conservation Area (ACA), and therefore it can be considered as an area important from a biodiversity point of view. ACA is Nepal's largest protected area (7,629 square km), and the altitude varies from 1,000 – 8,000 m, which results in an entire habitat gradient from sub-tropical to perennial snow.
In terms of biodiversity, ACA is well known for its species diversity of plants and animals. So far, a total of 1,226 species of plants have been reported in this region, and 55 species (22 percent) of the total endemic plant species of Nepal can be found here. However, none of the endemic species are found at the project site. About 101 species of mammals including many rare and endangered species can be found in the conservation area, as well as 38 breeding bird species belonging to a group which is at risk in Nepal. No endemic animal species are present in the project area. The total amount of bird species in ACA is 478. 55 percent of the bird and mammal species reported in Nepal is found in the ACA region. The Modi Khola, one of the major rivers in the district and future part of the project is well known for its fish diversity and is considered as the spawning ground for several fish species.

b) The location of LKHEP falls within Langtang National Park and Wildlife Conservation area (1,710 square km). Langtang National Park (LNP) represents the best example of graded climatic condition, extends its northern border to the Tibetan plateau, and represents a meeting point between Indo-Himalayan range, which holds the habitat for unique plants and animals. The complex topography and geology with sharp altitudinal gradients (Mid-hill to Alpine) have produced a rich biodiversity. LNP records indicate that there are 1,000 species of plants, of which 15 are endemic, 246 species of birds and 46 species of mammals. Most of the common and resident birds and a number of wild animals prefer forest habitat. 9 species of mammals are also included in the protected list of HMG, all of which are registered under CITES (2 cat. II, rest I), and five of which are included in the IUCN Red Data Book (3 V, 2 E, 1 I). Some of the birds species are included in the IUCN Red Data Book as well. Although, the construction site of LKHEP does not contain the core habitat for wildlife, it is reported that some mammals and birds visit the area time and again and use it as a passageway. However, 11 species of wild mammal and 26 species of birds are reported to exist in the project site, out of which 8 species of mammals and 5 species of birds are listed in IUCN Red Data Book, CITES list and HMG protection category.
Three species of fish are said to be vulnerable or rare by Biodiversity Profiles Project 1995, and possibilities of occurrence of other 19 species of fish in Langtang Khola indicates the significance of river ecosystem in the protect area.
In the LNP many plant species exist which have been listed in the protected list of HMG, of which a few are present in the project area. In total 108 plants species present in the project area are being utilised for ethno-botanical purposes. Records show that the proposed access road has high plant diversity with a total of 92 species noted whereas the headwork site and the powerhouse site have 60 and 66 species respectively.

c) MWSP/WTP lies 50 m southerly of the Shivapuri Watershed and Wildlife Reserve (SWWR). SWWR is divided into a protected area of 97,37 square km and an additional 118,64 square km is managed as a buffer zone. This watershed area is the true presentation of the Midhills in the protected area system. 40 percent of the drinking water of the Kathmandu Valley is provided by this watershed. Forest diversity is high (6 different types of forest) and these forests cover 39 percent of the land, on which 16 endemic plants occur. A total of 129 species of mushroom, 150 species of butterfly of which many endemic and rare, 9 species of birds which are considered endangered or vulnerable, and 19 species of mammals occur. This area is especially known for its species of mammals, birds and plants and their significance which occur in the IUCN Red Data Book and/or CITES and/or HMG's list of protected species.

So, obviously all three projects lie within areas known for their high biodiversity value.

7.6 Biodiversity Data and Information Sources

All three projects were located in or in the vicinity of a protected area. These areas already have to a certain extent been studied, which makes review of literature an important information source. However, available information mainly pertains to general species occurrence. Distribution patterns are hardly known.

a) UMHEP
For the assessment of the biological environment for UMHEP relevant information from a previous EIA report was consulted, as well as different maps of the project area and adjoining districts. Other previous literatures, reports and investigations on the fauna of the regions were also consulted and reviewed. In order to fill data gaps, different techniques of field survey were used to identify the rare plant species, as well as to collect ethno-botanical information, primary data on the wildlife, and information on the status, distribution, and abundance of fish fauna. Data recorded from the field were compared with those from the secondary sources and the species list was tallied with the list of endangered and protected species of Nepal (CITES, IUCN Red Data Book, HMG/Nepal's list of protected animals).

b) LKHEP
Data on physical and natural resources was collected from primary and secondary sources. The secondary sources include topo-sheet map, recent aerial photographs and studies made at different times. Arial photographs were utilised to determine, amongst others, natural resources. First all the required information was investigated by consulting relevant literatures, and later filled up with ground truth verification by field observation covering all of the potential impact areas. Information on vegetation and animal species was compared with that of the secondary sources and the species list was tallied with the list of endangered and protected species of Nepal.

c) MWSP/WTP
The data and information on (components of) biodiversity provided in this report is based on field inspections, literature review and public consultation. A series of study reports on MWSP/WTP existed already and these were consulted for this report. Field surveys were conducted in case where secondary information was lacking. The vegetation structure and diversity of the project influenced zone was recorded, as well as the faunal diversity and an assessment of fauna habitats and migration pattern was made. Various checklists, matrix and questionnaires were used to collect the required database for EIA considerations.

7.7 Biodiversity in the EIA Process

- Screening

According to the screening system in Nepal, projects listed in Schedule 2 of the EPR, 1997, require an EIA to be undertaken. Each of the projects was listed in this schedule, on one or more grounds. No potential impacts on biodiversity are taken into account in this schedule. However, two of these projects are located in a sensitive area, which requires for an EIA to be undertaken on this ground as well. According to the EPA 1997, biodiversity can be a ground for demarcating an area as protected area, but it cannot be concluded that the areas reflected in these case studies have been given this status on this ground per se.

- Scoping

Only one scoping report identifies biodiversity per se as a priority issue to be taken into account in the EIA study. The other two do, however, mention some biodiversity related issues, mainly at species level and with regard to composition. In most cases it remains restricted to impacts on common, rare, endangered and threatened species and their habitats or ecology, or to impacts which are very general, like the impacts on the National Park area, or the possible impacts on terrestrial and aquatic flora and fauna, and fisheries and their habitats. An issue which is considered most relevant and important in all three EIA scoping reports is the impacts of labourers on wildlife during the construction phase, due to possible illegal fishing, hunting and poaching in the protected area.

In two cases the TOR shows exactly the same features as the issues identified during scoping. However, the MWSP/WTP shows a list with main tasks for EIA, which is relatively comprehensive, but again only biodiversity related issues are mentioned here.

Worth mentioning is the fact that all reports base the identification of critical issues, amongst others, on legislative requirements. The MWSP/WTP report provides a list with international agreements and conventions relating to wildlife, natural habitat and biodiversity to be reviewed in the context of potential impacts of the project on SWWR wildlife and habitats. However, only RAMSAR, CITES and the World Heritage Convention are mentioned here. The Convention on Biological Diversity is absent, although biodiversity is mentioned in the actual EIA study.

Another thing worth mentioning is that, while reviewing the scoping phase, it became clear that the reports of LKHEP and UMHEP show many similarities in the priority issues identified during scoping, as well as in the TOR. In other words, for scoping and TOR copies are made from one report to the other. Striking is that the report to have been prepared last, left out only one issue in their biological/biodiversity issues: the 'loss of forest and biodiversity'.

- Impact Assessment

In all reports the term 'biodiversity' is mentioned in one way or another, but again mainly the impacts on biodiversity related impacts are considered. Here also, it focuses on the species level and composition, as outlined in the scoping phase and TOR. Only rarely the effect of changes in the physiological environment on vegetation and, for instance, habitat loss for animal species is made, but only in the most obvious cases and in most general terms.
The construction phase is considered the stage with most impacts on wildlife and their habitat, due to illegal hunting and poaching activities by work force

The LKHEP report is the only report which has paid comprehensive attention to the attachment of significance to impacts. After values have been ascribed to extent, magnitude and duration, the total score of numerical value of prediction of each impact was multiplied by a corresponding importance weightage.
This weightage was determined during a consultative meeting with local people, local agencies, NGO's and experts. The numerical values thus obtained were ranked for their consideration for mitigation. Impacts on biodiversity components were ranked between 10 and 13, where 1 reflects top priority. Matters related to socio-economic impacts rated highest. It must be mentioned that, according to people involved in the EA practice, this is the first case in which determination of significance is approached in this manner.
In the other cases determination of significance of impacts was based on the subjective judgement of the working team members only. Each impact is judged for its magnitude, extend and duration in terms of a low, moderate or high value.

Biodiversity is mentioned in attaching significance to impacts in the reports of MWSP/WTP and LKHEP, but in all cases the impacts on it were not considered significant. MWSP/WTP has even mentioned significance in terms of loss of genetic and biological diversity in relation to disturbances to 'wildlife' during the construction phase. However, nowhere else in the report genetic diversity can be retrieved. In the summarised table provided in the report of MWSP/WTP the impact on biodiversity has not been included. It is not clear whether the impacts on biodiversity have actually been assessed in the EIA study.

Again the two hydroelectricity power reports show many similarities, due to copying of information from one document into the other.

- Mitigation

Biodiversity per se was not addressed in this stage of the EIA process. The mitigation measures are mainly specified to the saving of 'plant, forest and wildlife species' and their habitats. Some examples of mitigation measures in the assessed EIA reports are avoidance, compensatory plantation, awareness programs, pool and weir type of fish ladder, fish trapping and trucking programme and policy against the hunting, trapping or harassing the wildlife by labour workers during the construction phase.

- Monitoring

In this stage biodiversity per se again was not addressed. Of the three types of monitoring - baseline, compliance and impact monitoring-, only the first and the last mentioned types took biodiversity related issues into account. The issues which were required to be monitored focussed only on species and their habitats. Some examples are the monitoring of the mitigation measures mentioned earlier

· Auditing

None of the reports required biodiversity to be taken into account in assessing the actual impacts of the project on the environment. Some indicators are provided with regard to the biological environment, such as the increase of the sales of medicinal herbs, animals and the number of cut tree stumps, as well as the deterioration of the forest, the decrease of frequency of wild animal and birds sightings in the project area, etcetera.
In the MWSP/WTP the important phase of auditing is shortly described in the TOR, but then was not included in the main report.

7.8 Survey Techniques

A multidisciplinary team of experts was compiled to undertake the EIA study for the two hydroelectricity power projects. This team included, with regard to biodiversity and biodiversity related issues, an ecologist, a forest and vegetation expert and a fish and wildlife specialist. This would probably be the best approach, since the expert and the specialist have specific knowledge on species and their behaviour and the ecologist is aware of the different ecological processes. Together they should be able to properly identify biodiversity (related) issues. The third project made use of a few environmental specialists, since the EIA study was to be based primarily on the already accomplished environmental studies, their review and updates.
As for the survey techniques, different techniques have been used to identify vegetation, forest, wildlife, fish and birds. However, no sensible conclusions can be drawn from the information provided on surveys in the EIA reports, since no information is provided on timing or duration, only on the type of technique used and the size of samples.
The key methods of primary data collection for the two hydroelectricity power projects are transects (some vertical transects, laid between use and weir sites), extensive field visits and observations made in the field, digitising maps and plots (preparation of field maps showing the location of study), Participatory Rural Appraisal and questionnaire survey . Striking is, however, that even in this case the methods are copied from one report into the other.
The MWSP/WTP project only conducted limited fieldwork, and no methods are described.

7.9 The Actual or Likely Outcome in Terms of Biodiversity Impacts

According to the outcomes of the EIA study as described in the reports, most impacts of these projects are likely to be of low significance to biodiversity. Impacts on biodiversity, however, cannot merely be determined by identifying impacts on rare and endangered species. Other species important to the assessment of impacts on biodiversity, as for instance indicator, sensitive and keystone species should also have been considered, as well as communities and their interrelationships, at the least. As it appears, it is most likely that several impacts have been overlooked and that those identified are of greater significance then has now been determined for the three projects examined. However, on the basis of data presented in the reports, in general as well as the primary and secondary data on biodiversity related issues, and currently existent data on biodiversity in the project areas, it is impossible to draw any sensible conclusions as to the more likely outcomes in terms of biodiversity impacts. The actual outcome cannot be determined since noneof the projects have been monitored, nor of course has auditing taken place.

8 Future Actions to Improve Integration of Biodiversity in EA

8.1 Improvements in the Institutional Framework

At present, the institutional framework is not properly suited to adequately integrate biodiversity strategies into the EA system. Many different agencies are involved in the EA process, most of which lack both capacity and capability. Furthermore, inter-agency coordination, which is vital to the proper functioning of the EA system, is minimal.

8.1.1 Agencies Best Suited to Integrate Biodiversity Concerns into the EA System

With regard to safeguarding biodiversity from adverse impacts caused by development activities, the National Biodiversity Unit within the Ministry of Forest and Soil Conservation would probably be the agency most suitable to organise proper integration of biodiversity in EA. The NBU was formed in 1997 as a national focal point for the CBD. It is expected to function as a connecting link to facilitate sharing of information and experiences among and between government line agencies, non-governmental organisations and the private sector. The NBU is envisaged to provide a supportive role in the process of implementing the CBD in Nepal and to oversee such implementation(MFSC, 2000). The NBU consists of members of several different government line-agencies, WWF, IUCN and the Nepal Forum for Environmental Journalists. It is guided by a sixteen member Biodiversity Steering Committee (BSC).

Since Article 14 calls for the application of EIA in the conservation and sustainable use of biological diversity, the NBU should focuss its attention on integration of biodiversity concerns in the EA system as well. Currently, MoPE has the legal mandate to implement the provisions of and obligations arising from international agreements, treaties and conventions on the environment. It is also responsible for the EA system. As such, MoPE has the legal mandate for integrating biodiversity concerns in the EA system of Nepal. However, at present, MoPE lacks the capability and capacity to do so. The NBU could therefore play a vital role in improving the existing EA system for as far as biodiversity is concerned. As it already serves as a focal point for the CBD it can take into account all the knowledge gained under the in the NBAP prescribed action programs. With the inclusion of representatives of each line-agency concerned with authorisation of IEE/EIA it could take into account EA consideration of each individual sector. Inclusion of members from local authorities, which is already recommended by the NBAP, would make it even more suitable for handling EIA matters. Currently, each sector has its own way of approaching the EA process. With proper coordination, a more systematic approach could be obtained. In close cooperation with MoPE it could review the existing EA system and provide for the proper consideration of biodiversity. Ideally, HMG would express its willingness to see to integration of biodiversity in the existing legal system by means of its Tenth Five Year Plan (2002-2007).

8.1.2 Inter-agency Coordination

In order to secure inter-sectoral coordination (not only with regard to biodiversity, but with regards to all environmental aspects) while reviewing the current system and while implementing it, the Environmental Protection Council (EPC) could play a vital role. The EPC was established in 1992 and has carried out several important activities during its first two years. It was on the advice of this council that HMG ratified the CBD. The Environment Protection Act 1996 provides for the EPC to be established as a statutory body, providing policy guidance and suggestions to HMG and to ensure coordination amongst different agencies. However, the Act does not provide for composition, power and functions of the EPC. Although the EPC is constituted under the chairmanship of the Prime Minister and seven independent experts members, their powers, functions and terms of office are nowhere mentioned, not even in the EPR. Anyway, at present the EPC is non-functional. It would be very advisable for this council to be re-established in order to secure interagency coordination, a lack of which is currently impeding the proper functioning of the EA system.

8.2 Improvements in Legislation and Guidelines

Under the current system, use is being made of the EPR as well as the existant guidelines. The EPR are referred to in order to fulfil legal requirements. The guidelines are used as a framework for the overall process, where matters have not been covered by the EPR. Both EPR and guidelines, however, lack important directives for EIA practioners in order for them to adequately cover alle relevant aspects of the process, be it with regard to biodiversity or any other aspect. Furthermore, it is most of all a confusing situation, especially considering the fact that many practioners in Nepal are not familiar enough with good EA practice and need comprehensive guidance on the process.

8.2.1 Current Use of EPR and Guidelines

As it stands now, practioners refer to the EPR for the screening process. The process (and schedules) given in the guidelines, which differs from that of the EPR, is no longer in place.

With regard to scoping, practioners refer to the EPR in order to fulfil the legal requirement of public participation and for the review procedure. The guidelines are referred to for a brief explanation of the scoping process. However, neither the EPR nor the guidelines make any mention of environmental matters to be considered when scoping, nor are there any review criteria given for the scoping report. The EPR provide schedules with a format of TOR for both IEE and EIA which differ considerably from those in the guidelines. The formats given as schedules in the guidelines, however, have of course been overruled by those of the EPR. The latter, however, as the schedules in the guidelines, merely provide a broad framework and do not give any details as to the baseline conditions and environmental issues to be presented in the TOR.

With regard to the EIA report preparation, the guidelines merely give a very brief description of impacts (extent, magnitude, duration, cumulative impacts) categories of impacts (biological, physicochemical, socio-economical and cultural) and methods for impact prediction. IEE report preparation is not considered. The schedule given for EIA report preparation in the guidelines, which lacks detail, has been overruled by that of the EPR. The EPR give schedules for both EIA and IEE report preparation. However, both the schedules lack any details as to matters to be described in the report. With regard to the biological environment, the IEE format demands a description of impacts on population, flora, fauna, natural habitats and communities, which of course can be interpreted in a very broad sense. The EIA format merely demands description of direct, indirect and cumulative of the implementation of the proposal on the environment, open to even broader interpretation. The EPR are again referred to for legal requirements on public participation and review procedures. The guidelines give a description of stages in the EIA process in which the public is to be consulted, but of course this has been overruled by legal requirements of public participation in the EPR. The guidelines nor the EPR give any explanation on matters to be considered in public participation practices as mandatory under the EPR, although MoPE has recently published a format on matters to be considered in public notices. Proper conductance of public hearings, however, is not given anywhere. The stage of attaching significance to impacts has been completely left out of the guidelines. The EPR does not mention this important aspect of IEE/EIA report preparation either.

A brief description of mitigation measures is given by the guidelines. However, no specifics are given

as to matters to be considered when mitigating significant adverse impacts. The EPR merely give the legal requirement of implementing mitigation measures.

With regard to monitoring and auditing, the guidelines briefly state the purpose of these procedures. No distinction is made between peformance, baseline and compliance monitoring. Furthermore, no details are given as to matters to be considered when monitoring and auditing (for instance the use and nature of indicators). The EIA report format in the EPR merely gives the requirement of mentioning the monitoring procedure in the EIA report.

Apart from formats for IEE TOR and report in the EPR, the IEE process has not been covered by the guidelines nor the EPR.

Furthermore, the sectoral guidelines in their present form hardly differ from the national guidelines and from each other. The most significant difference between them relates to the schedules of categories requiring IEE or EIA, for these are general in the National guidelines and related to the sectors in the sectoral guidelines. Apart from that no sector-specific matters are addressed, except from an indicative list of potential adverse impacts of other sectoral activities on the forestry sector in the Forestry Guidelines.

8.2.2 Resolving the Discrepancy between EPR and Guidelines

There is the possibility of developing new sectoral guidelines (there is no need for national guidelines given the EPR) which elaborate matters mentioned in the EPR (yet are still in line with them) and integrate those matters which are not adequately covered by the guidelines. However, in order to make sure they are complied with, they would need to be enshrined in the EPR. This also entails gazetting the guidelines, which has several disadvantages. One of which is that the contents of the guidelines is usually reduced to some 50 per cent of the original. Matters considered to be irrelevant, such as for instance flowdiagrams or matters which are already covered elsewhere, such as prevailing law and legislation given in annexes, are taken out before gazetting and the language tends to become more formal. The hydropower sector, which currently faces this problem after having completed several new guidelines for this sector, has considered circumventing this problem by both gazetting and publishing them, so as to make sure that the proponent obtains all necessary information provided by the guidelines and at the same time, is legally obliged to comply with them.

There is another major constraint with regard to the guidelines, however. Most of the practioners make use of the English version of the guidelines. However, although this language is widely spoken, it is not considered an official language. As to article 6.1 of the Constitution of Nepal the Nepali language in the Devanagari script is the official language of the nation of Nepal. As a consequence, non of the English guidelines are considered legally binding.

Matters are worsened by the fact that, mainly because of the nature of the Nepali language, the English version is considerably different from the Nepali version. The usual practice is that the guidelines are drafted in English, translated in Nepali for gazetting, after which these now Nepali guidelines are officially re-translated in English. This new English version of the guidelines tends to differ considerably from the original English version. Unfortunately, there is no way of circumventing this problem.

In order to circumvent all of the above described problems, it would be most feasible to just publish the guidelines and regard them as a mere manual, as the hydropower sector is now thinking of doing. This does implicate, however, that they are not legally binding and that matters which are not covered by the EPR, yet which are by the guidelines, cannot be ordered to comply with by the authorising agencies. This then calls for an extensive review of the EPR. The ideal situation would be for the EPR to cover all matters relevant for proper conducting of EIA, including the coverage of biodiversity issues. The different sectoral guidelines to be newly developed can then address the different stages of the process and sector specific matters, again including biodiversity issues. Guidelines should be developed for both EIA and IEE, since the latter are lacking at the moment. They should include the approval process for the relevant sector, sector specific matters to be addressed in scoping, TOR and IEE/EIA report, public consultation practices, impact prediction and analysis methods, matters relating to mitigation measures, monitoring and auditing, relevant laws, rules, directives and policies etcetera. Ideally, the document would give examples of worst and bad practices. Review of the existing legislation and the development of new guidelines with regard to biodiversity could be done in close cooperation between the NBU and MoPE.

8.2.3 Changes in Legislation Relevant to the Integration of Biodiversity into EA

At present, the current system of EA in Nepal has many imperfections in general, most of which also affect the proper consideration of biodiversity in EA. However, there are some flaws which have a particular negative effect on the consideration of biodiversity and which, therefore, have been listed below.

- The present screening system is not suited for the consideration of biodiversity issues. Proposals are subjected to IEE or EIA merely on the basis of categories and cost as reflected in the schedules of the EPR. If a project happens to not fall within these schedules, the consideration of sensitive areas is the only way to safeguard biodiversity from adverse impacts. At present, the only sensitive areas to be taken into account are the protected areas as demarkated and gazetted by HMG. Yet, there are still many sensitive areas within the Kingdom of Nepal which deserve to be demarkated and gazetted, such as many yet undisturbed areas and protected and religious forests. Also, there are many sites which merit the status of protected area, such as a large array of wetlands and several Midhills ecosystems which are as yet underrepresented in the protected area system. However, much research is yet to be done in order to identify the biodiversity value of these areas. The action programs as proposed by the NBAP could provide useful outcomes to this end.

- The consideration of cost of the proposal as a screening criterion should be removed. This holds no basis whatsoever. Proposals which do not fall within the categories as given for IEE and EIA should be subjected to IEE in order to ascertain the need for an EIA.

- In an ideal situation, scoping would be applied as a screening mechanism in order to determine the need for IEE or EIA, which is not only dependant on the thresholds given for the categories in the schedules, but also on the proposed project site.

- Scoping and development of TOR should become the responsibility of the concerned agency in order to reduce the possibility of bias which is currently prevelant in a situation where the proponent itself is responsible for scoping and TOR.

- The EPR should entail a format for scoping reports, which should incorporate biodiversity issues.

- The TOR formats for IEE/EIA in the EPR should be reviewed in order to be developed in more detail, including details on biodiversity issues. Mention should be made of the link between scoping output and TOR and there should be provision to include new issues which arise at a later stage.

- The need for IEE to undergo a scoping process should be re-established.

- Public participation in scoping should not only entail affixing a public notice in VDC's, Municipalities and at concerned institutions in the project area, but more participatory approaches, such as Participatory Rural Appraisal.

- The formats for IEE and EIA reports in the EPR should be reviewed and developed in more detail, incorporating biodiversity issues.

- Public consultation during the stage of attaching significance to impacts should be made mandatory, so as to ensure that the values of local people are taken into account where biodiversity and any other environmental impacts are concerned.

- Disclosure of the draft IEE and EIA reports should be made mandatory again, so as to be enable local stakeholders to express their concerns. Also, a ton-technical summary in Nepali should be made mandatory.

- Standards for compliance enforcements should be developed, so as to make sure that recommendations from VDC's, Municipalities and authorising agencies, including mitigation measures, are properly implemented and monitored.

8.2.4 Major Constraints to Integration of Biodiversity into the EA

Even if the legislation and guidelines would be reviewed in such a way that biodiversity issues are duely taken into account, there would still be two major constraints to proper integration of biodiversity into the EA system.

First of all, there is a serious lack of information to be used by practioners and concerned agencies. Without adequate knowledge of the biodiversity in a given area, assessments and mitigation measures will not reach the standard required for the conservation and sustainable use of biodiversity. The NBAP has proposed several action programs with a goal of collecting biodiversity data, but this process may take several years.

Another major constraint is the lack of human resources within the authorising agencies. Even if the system were to provide adequate guidance on the consideration of biodiversity and sufficient information would be available, this would still impede the process. This goes especially where the implementation of mitigation measures, monitoring and auditing are considered. Without sufficient human resources, authorising agencies will never be able to see to the proper application of these components of the EA process. Furthermore, it would be very unlikely that government agencies would ever proceed to carrying out Strategic Environmental Assessment under such circumstances.

9 CONCLUSION

It seems as though the Convention on Biological Diversity has not had a major influence on the national EA system and vice versa, the EA system on the implementation of the CBD. When the CBD was enforced in the country (February 1994) the National EIA Guidelines had just been issued (July 1993). It is therefore not surprising that biodiversity considerations were not incorporated in these guidelines. However, the Forestry and the Industry Guidelines, which were issued in 1995, also failed to address biodiversity concerns. Although biodiversity *perse* was mentioned in the introduction to the Forestry Guidelines and in an indicative list of potential adverse impacts of other sectoral activities on the forest sector, the guidelines themselves are, just as those for the industry sector, almost entirely similar to the National Guidelines. There was yet another chance to integrate biodiversity into the EA system, years after the enforcement of the CBD, when the EPR were developed, which were enforced in 1997. However, the EPR as well failed to incorporate biodiversity concerns.

Under the current circumstances biodiversity receives very little attention indeed. This is mainly due to a lack of proper guidelines, which are invaluable to a country where most of the practitioners are not familiar with the concept of biodiversity, incomprehensiveness of the schedules in the EPR and flaws in the EPR itself. Other major contraints are a lack of capability and capacity within the authorising agencies, a lack of coordination amongst them and a serious lack of biodiversity data which are suitable to EA practitioners.

Much is yet to be done before biodiversity will receive adequate attention in development activities. Hopefully the NBAP will provide impetus to national desicion-makers for considering biodiversity in all environment related activities, including EA. Although the NBAP itself unfortunately does not address integration of biodiversity into EA, it does propose action plans which outcomes might be valuable to EA practitioners. If hands are joined between those who provide support to implementation of the CBD and those who are responsible for the national EA system, Nepal's biodiversity might finally receive the attention it deserves in development activities.

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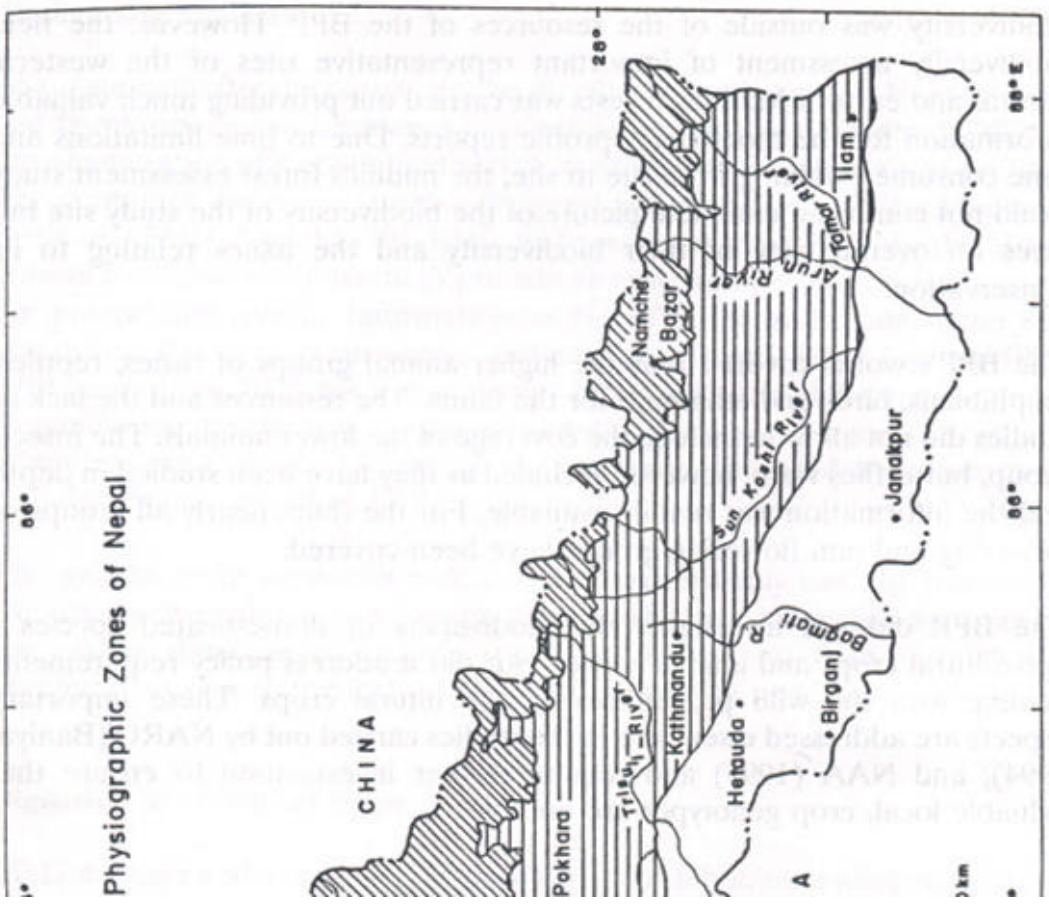
Annexes

Annex XIV Schedule 3, EPR, 1997

Annex XV Schedule 5, EPR, 1997

Annex XVI Schedule 6, EPR, 1997

Annex I The Physiographic Zones of Nepal



ANNEX II NEPAL'S SHARE IN PLANT SPECIES

Table 1: Nepal's Share in Plant Species (in number)

	Families	**Nepal**			**World**	**Nepal's share (%)**
Groups		*Genera*	**Species**	**Endemic species**	*Species*	
Algae	50	150	687	13	> 40,000	1.72
Fungi	80	552	1,922	150	> 70,000	2.38
Lichen	30	79	471	48	> 17,000	2.77
Bryophytes	78	180	853	37	> 14,000	6.09
Pteridophytes	31	103	383		> 12,000	3.19
Flowering plants*	213	1,496	5,833	246	> 250,000	2.07

Note: * Angiosperm and gymnosperms
Source: MoPE (a), 2000

Annex III Plant Species and Forest Products Legally Protected under the Forest Regulations, 1995

Table 3: Plant Species and Forest Products legally protected under the Forest Regulations, 1995

***Botanical name* and Forest Resource**	**Vernaculair name**	**Family**	**IUCN Status**	**CITES Code**
A. Ban on collection, use, sale, distribution, transportation and export				
1. Cordiceps sinensis	Yarsa gumba	Clavicipitaceae		
2. Dactilorhiza hatagirea	Panch Ounle	Orchidaceae		II
B. Ban on export except processed in the country and issued permission from the Dept. of Plant Resources				
1. Abies spectabilis	Talis patra	Pinaceae		
2. Cinnamomum glaucescens	Suganda Kokila	Lauraceae		
3. Lichen spp	Jhyau			
4. Nardostachys grandiflora	Jatamansi *	Valerianaceae	V	
5. Rauvolfa serpentina	Sarpaganda, harbaruwa	Apocynaceae	E	II
6. Asphaltum (rock exudate)	Silajit			
7. Taxus buccata subsp. *Wallichiana*	Loth salla	Taxaceae		II
8. Valerina jatamansii	Sugandabala	Valerianaceae		
C. Timber trees ban for transportation, export and felling				
1. Acacia catechu	Khayer	Leguminosae	T	
2. Michelia champaca	Champ	Magnoliaceae	E	
3. Shorea robusta	Sal. Sakhuwa	Dipterocarpaceae		

Source: NBAP, 2000.(* Product processed in the country can be exported abroad when issued permission from the Ministry of Forest and Soil Conservation).

IUCN Threat category: (E=Endangered; T=Threatened; V=Vulnarable).

Annex IV Nepal's Share in Animal Diversity

Table 2: Nepal's Share in Animal Diversity (in number)

	Animal Species		*Nepal's*	**Endemic**
Groups	**World**	**Nepal**	**share (%)**	**species**
Arthropods/insects	> 1,000,000	5,052	0,44	4
Butterfly		645		29
Moth		> 6,000		
Other than insects	> 190,000	144*		108
Fresh water fishes	> 85,000	185	0,21	8
Herpetofauna				
Amphibians	> 4,000	43	1,07	9
Reptiles	> 6,500	100	1,53	2
Birds	> 9,881	847	8,57	2
Mammals	> 4,327	185	4,27	1

Note: * Spiders only
Source: MoPE, 2000

Annex V Protected Animal species of Nepal under National Parks and Wildlife Conservation Act, 1973

Table 4: Protected Animal species of Nepal under National Parks and Wildlife Conservation Act, 1973

Scientific Name	Local Name	Common Name	IUCN Status	CITES Code
Mammals				
01. Ailurus fulgens	Hobrey	Red panda	V	I
02. Antilope cervicapra	Krishnasagar	Black buck	V	III
03. Bos gaurus	Gauri gai	Gaur	V	I
04. Bos mutus	Yak	Wild yak	E	I
05. Bubalus arnee	Arna	Wild water buffalo	E	III
06. Canis lupus	Bwanso	Tibetan wolf	V	I
07. Caprolagus hispidus	Hispid kharayo	Hispid hare	E	I
08. Cervus duvauceli	Barasingha	Swamp deer	E	I
09. Elephas maximus	Hathii	Asiatic elephant	E	I
10. Felis lynx		Lynx	E	II
11. Hyaena hyaena	Hundar	Striped hyena		
12. Macaca assamensis	Assame rato bandar	Assamese monkey		
13. Manis crassicaudata	Salak	Indian pangolin		II
14. Manis pentadactila	Salak	Chinese pangolin		II
15. Moschus chrisogaster	Kasturi	Musk deer	E	I
16. Ovis ammon	Nayan	Great Tibetan sheep		I
17. Panthera tigris	Bagh	Bengal tiger	E	I
18. Panthera uncia	Hiun chituwa	Snow leopard	E	I
19. Panholops hodgsoni	Chiru	Tibetan antilope		I
20. Pardofelis nebulosa	Dwanshe chituwa	Clouded leopard	V	I
21. Platanista gangetica	Sauns	Gangetic dolphin	V	I
22. Prionailurus bengalensis	Chari bagh	Leopard cat		I
	Silu	Spotted linsang		I
23. Prionodon pardicolor	Gainda	Asian one-horned	E	I
24. Rhinoceros unicornis	Pudke bandel	rhinoceros	Ex(?)	I
25. Sus salvanius	Chauka	Pigmy hog	V	III
26. Tetracerus quadricornis	Himali rato bhalu	Four-horned antilope		I
27. *Ursus arctos*	Thulo dhanesh	Brown bear		I
Birds	Cheer	Giant hornbill	E	I
01. Buceros bicornis	Seto saras	Cheer pheasant		
02. Catreus wallichii	Kalo saras	White stork		II
03. Ciconia ciconia	Khar mujur	Black stork	E	I
04. Ciconia nigris	Saras	Bengal florican		II
05. Eupodotis bengalensis	Danfe	Common crane		I
	Sano khar mujur	Impeyan pheasant	E	II
06. Grus grus (G. Antigone)	Munal	Lesser florican		III
		Cimson-horned peasant		
07. Lophophorus impejanus	Ghadial gohi		E	I
08. Sypheotides indica	Ajingar	Gharial	V	I
09. *Tragopan satyra*	Sun gohori	Asiatic rock python	I	I
Reptiles		Golden monitor lizard		
01. Gavialis gangeticus				
02. Python molurus				
03. *Varamus flavescens*				

Source: NBAP, 2000. IUCN Threat category: (E=Endangered; Ex=Extinct; I=Indeterminate; V=Vulnarable), CITES Code: (Appendix – I, II, III).

Annex VI Summaries of EIA Guidelines Nepal

National EIA Guidelines (1993), prepared under the *National Conservation Strategy Implementation Project* by the National Planning Commission, HMG Nepal in collaboration with The World Conservation Union (IUCN), Kathmandu, Nepal.

These guidelines are intended to be used by project proponents, government officials, consultants, project implementers and the general public. These guidelines provide a brief outline of the steps to be considered in the EIA process. The sequential steps of the EIA process given in these guidelines are as follows:

- Screening
- Scoping
- TOR
- Identification of Environmental Impact (including methods for impact identification and comparison and a method for impact ranking)
- Impact Mitigation Measures
- Review of Draft EIA Report
- Environmental Impact Monitoring
- Environmental Impact Auditing
- Community Participation

The following schedules are to be found within the National Guidelines:

- Schedule 1: Projects Requiring Initial Environmental Examination
- Schedule 2: Projects Requiring Environmental Impact Assessment
- Schedule 3: Environmental Impact Assessment Based on Project Sites
- Schedule 4: Format of Terms of Reference
- Schedule 5: Environmental Impact Assessment Report Format
- Schedule 6: Format of Environmental Impact Assessment Report Annexes

EIA Guidelines for the Forestry Sector (1995), prepared under the *National Conservation Strategy Implementation Project* by the Ministry of Forestry and The National Planning Commission in collaboration with IUCN, Kathmandu, Nepal.

These guidelines facilitate the sustainable use of forest resources for socio-economic development and for meeting basic needs of communities for forest products. The Guidelines try to promote the increase of the social and cultural acceptability of a proposal, its economic feasibility and environmental benevolence.
Like the National Guidelines they are intended to be used by project proponents, government officials, consultants, project implementers and the general public. The sequential steps of the EIA process to be followed are the same as outlined in the National Guidelines, except for 'Environmental Impact Auditing' and 'Public Participation'. The following schedules are to be found within the Forestry Guidelines:

- Schedule I: Proposals Not Requiring Initial Environmental Examination and Environmental Impact Assessment
- Schedule II: Proposals Requiring Initial Environmental Examination Report
- Schedule III: Proposals Requiring Environmental Impact Assessment
- Schedule IV: Format of Terms of Reference
- Schedule V: An Indicative List of Potential Adverse Impacts of Other Sectoral Activities on the Forestry Sector

EIA Guidelines for the Industry Sector (1995), prepared under the *National Conservation Strategy Implementation Project* by the Ministry of Industry and The National Planning Commission in collaboration with IUCN, Kathmandu, Nepal.

Like the National and Forestry Guidelines they are intended to be used by project proponents, government officials, consultants, project implementers and the general public. These guidelines are also applicable in obtaining permission in diversification and expansion of existing industries coming under Annex-2 of the Industrial Enterprises Act, 1992.
The sequential steps outlined in these guidelines are similar to those in the National Guidelines. The following annexes are to be found in the Industry Guidelines:

- Annex 1: Industries Requiring Permission (subject to IEE, E.A..)
- Annex 2: Projects Requiring Environmental Impact Assessment
- Annex 3: Environmentally Sensitive Areas
- Annex 4: Format of Initial Environmental Examination Report
- Annex 5: Format of Terms of Reference
- Annex 6: Format of Environmental Assessment Report

Annex VII Responsibilities of MoPE

The Ministry of Population and Environment (MoPE) was established on 13 December 1995. The primary functions of the Ministry relate to the following:

- Environmental conservation.
- Pollution control.
- Environmental standards enforcement and monitoring.
- Environmental Impact Assessment.

The specific functions of the Ministry are as follows:

- Amend as necessary, existing policy and action plans, and formulate new ones on the main aspects of environmental conservation.
- Formulate, refine and implement EIA guidelines.
- Establish an environmental legislative framework.
- Implement the provisions of and obligations arising from international agreements, treaties and conventions on the environment.
- Conduct studies and research on environmental matters, and conduct or participate in related training.
- Identify pollution indicators and indices to set standards.
- Prepare an annual “State of the Environment Report” to disseminate information on the status of environment in

Source: Khadka, 1996

ANNEX VIII SCHEDULE 2 , EPR, 1997

Schedule - 2
(Pertaining to Rule 3)
Proposals Requiring Environmental Impact Assessment

A. Forest Sector:

1) Plantation of indigenous plants of a single species on a single block covering an area of more than 100 hectares in the Tarai and 50 hectares in the hills.
2) Plantation of such imported species of plants as are deemed suitable for the purpose 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 an area of more than 100 hectares in the Tarai 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 saw-mills processing more than 50,000 cft. of timber per year.
6) Collection of more than 50 tons of forest products other than timber per year.
7) Formulation and implementation of forest management plans.
8) Clearing of public forests and establishment of new medicinal herbs centers for commercial production.
9) Rosin and turpentine, rubber, plywood and veneer, catechu, and timber-based matches, pulp and paper industries to be established within one kilometer inside the forest area which depend on forests for their raw materials 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 saw-mills, bricks and tiles factories, and tobacco processing industries within 5 kilometers from the forest boundaries.
12) Establishment of resorts, hotels, safaris, educational institutions, hospitals and industries or 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 liters per day.
3) Production of primary chemicals such as corrossive acid and alkali etc. (except citric tartaric, acetic, acid etc.) 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 fixed investment of more than Rs. 50 millions.
7) Production of petro chemicals and processing (diesel, kerosene, lubricants, plastics, synthetics rubbers etc.).
8) Production of ferrous and non ferrous metals (except rerolling, remelting and febrication) by the process of primary smelting.
9) Establishment of industry producing more than 3000 metric tons of crude sugar and sugar per day.
10) Establishment of ciment industries with a production capacity of more then 30 metric tons per hour based on lime stone and with a production capacity of more than 50 metric tons per hour based on clinkor.
11) Establishment of lime industries with a production capacity of more than 50 metric tons per day.
12) Production of asbestos.
13) Establishment of radio active emission (nuclear and automic processing) industries.
14) Production of primary compound (Bulk drugs) for medicines.
15) Production of extremely hazardous substances such as Isocynite, mercury compound etc.
16) Production of ammunitions and explosives including gunpowder.

17) Etablishment of industries of pulp or paper with a production capacity of more than 100 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) Relating to Open Mines or Underground Mines:
1) Excavation of metallic mineral substances 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, abressive minerals from among the classified industrial minerials for industrial purposes.
4) Excavation of medium and large scale coal mines.
5) Excavation of construction-oriented minerals in medium and large scale.
6) Excavation of highly precious, precious, valuable and semi-valuable 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 radio active minerals in any scale.
9) Excavation of asbestos minerals in any scale.
10) Excavation of crude oil in any scale.

11) Excavation of industrial, precious, semi-precious stones and abressive minerals with a 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 beds of river and revolutes.
2) Extraction of highly precious and semi -precious minerals at the rate of more than 100 grams per day through placer 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 kilometers long ropeways.
3) Construction of more than 5 kilometers long cable car routes.

E. Water Resources and Energy Sector:

1) Supply of electricity through the installation of transmission lines of more than 66 kv. capacity.
2) Operation of more than 6 mva 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 thermal electricity.
5) Under the new systems of irrigation:
(a) Those irrigating more than 2000 hectares in the Tarai.
(b) Those irrigating more than 500 hectares in the hill valleys.
(c) Those irrigation more the 200 hectares in the hill and mountain areas with a steep gradient.
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 arrangements for more than 2000 persons per year on a single river.
4) Dispatch of more than 2000 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 rain-water in an area of more than 200 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 percent of the total aquifer for the development of underground water sources.
5) Construction of more than 1 kilometer long water tunnels.
6) Displacement of more than 100 persons for the operation of water supply schemes.
7) Settlement of more than 500 persons on the upper reaches of water sources.
8) Supply of drinking water to a population of more than 20,000.
9) Supply of drinking water to a population of more than 100,000, and connection 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 using water sources at the rate of more than 25 liters per second.

H Waste Management:

1) Waste management activities to the 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 1000 tons of waste per year.
b) Activities relating to transfer stations and resource recovery areas spread over an area of more than 3 hectares.
c) Selecting, picking, disposing and recycling waste through chemical, mechanical or biological techniques in an area spread over more than 2 hectares.
d) Activities 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 a waste plant.
b) Construction of a waste recovery plant.
c) Construction of a site for filling, accumulating or burying waste.
d) Construction of a site for storing 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 centers, hospitals or nursing homes with at least 25 beds.
d) Any active relating to one hectare or more of land and energy for the purpose of incinerating or recycling any lethal substance.

I. Agricultural Sector:

1) Clearing of forests covering more than 1 hectare in the hills and 5 hectares in the Tarai and using them for agricultural purposes.
2) Following activities relating to construction:

a) !.....
b) Construction of more than 5 kilometers long agricultural roads.

c) Construction activities for farming more than 5000 domestic fowls.
d) Construction activities for farming more than 500 big cattle.
e) Construction activities for farming more than 5000 small cattle. (sheep and goats).
f) Urbanization plan in cultivable lands.

3) Following activities relating to toxic substances (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:

1) Operation of hospitals or nursing homes with more than 25 beds, or medical profession (study and teaching also).

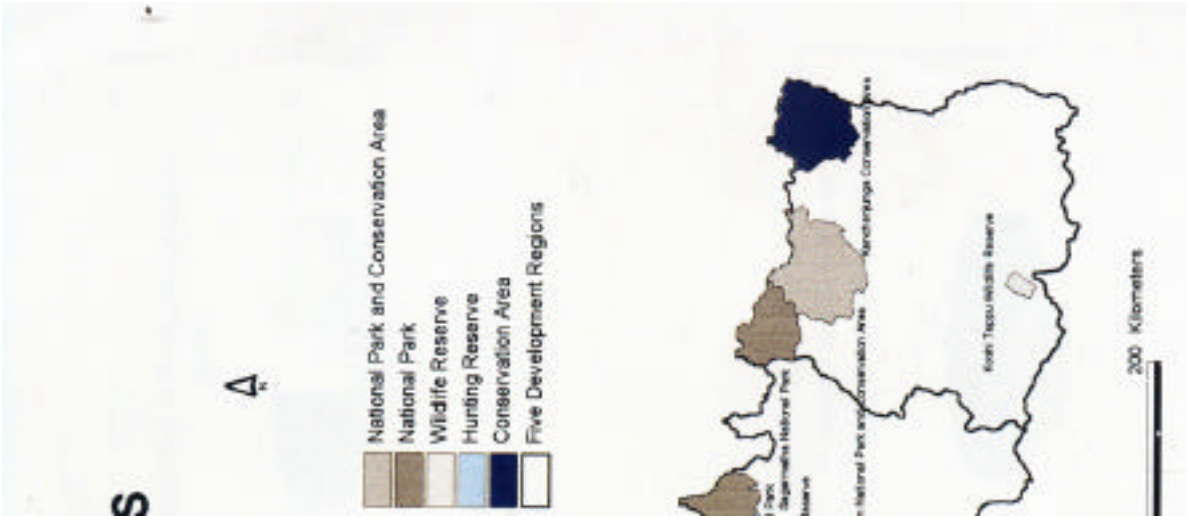
K. If any proposal is to be implemented in the following areas:

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) !.....

L. Operation of any planning, project or programme relating to any developmental work, physical activities 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: MoPE, 1997

Annex IX The Protected Areas of Nepal



Annex X An Overview of Ministries and Departments with EIA Responsibilities

The **Ministry of Forests and Soil Conservation** (MFSC) is responsible for formulation and implementation of policies, programmes, legislation and guidelines for:

- Conservation, management and sustainable use of forest products of legally categorised forests (government forests, religious forests, community forests, leasehold forests, private forests)
- Land sue, forest survey, conservation of national parks, wildlife reserves and hunting reserves
- Soil and watershed conservation and development
- Plants and medicinal plants, royal botanical gardens, herbarium conservation, and
- Conservation and balance of natural environment

As per the Business Allocation Rules of 2000, there are number of other Ministries and Departments who are directly or indirectly involved in environmental matters, including EIA process. This is summarised in the next table:

Table 5: Ministries and Departments with EIA Responsibilities

SN	Ministry	Major Functions	Department
1	· Agriculture and Cooperatives	· Conduct of research and usage of knowledge of agriculture chemistry and soil; · Development of agriculture technology, compost and chemical fertilisers; · Quality certification of agricultural seeds, plants, livestock and fishes	· Agriculture · Livestock Services · Nepal Agriculture Research Council
2	· Industry, Commerce and Supply	· Set standard of the products, and promote technology development and technology transfer, including in the field of environment	· Industry · Standards and Metrology · Mines and Geology · Cottage and Small Industry
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 of 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 and Technology	· 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 Services
8	· Physical Planning and Works	· Integration of bio-engineering techniques	· Roads · Housing and Urban Development
9	· Education and Sports	· Environmental education	
10	· Labour and Transport	· Occupational health and Safety Vehicular pollution control	· Labour · Transport management
11	· Local Development	· Local development	·
12	· Culture	· Cultural heritage, eco-tourism	· Archaeology

	Tourism and Civil Aviation		· Tourism Promotion Board
13	· Water Resources	· Integration of EIA and other aspects of environment in water resources and energy projects	· Electricity Development · Irrigation · Water and Energy Commission · Electricity Authority

Source: Khadka, 2001

ANNEX XI APPROVAL PROCESS FOR IEE AND EIA

(Pursuant to Rules 3 to 14 of the Environmental Protection Rules, 1997)

Prescribed Proposal

Proponent releases the **15 days Public Notice** to let the people know about the proposal (Rule 4.1)

Proponent prepares the Scoping Report and submits it for determination to the Concerned Agency (Rule 4.3)

MoPE determines the Scoping Report as proposed or in the revised form (Rule 4.5)

Concerned Agency sends the Scoping Report to MoPE for determination

MoPE may approve the TOR for the EIA study along with the Scoping Report (Rule 5)

Concerned Agency approves the **TOR** for the IEE study (Rule 5)

Proponent prepares the draft EIA report as per TOR and conducts a **public hearing** at the site (Rule 7)

Proponent prepares the IEE report, open for public for 15 days (Rule 7) and the process for approval, with a **letter of recommendation of the concerned VDC or municipality** (Rule 10)

Proponent submits **15 copies of the final EIA report** to the Concerned Agency with a **recommendation letter** of the VDC or municipality (Rule 10)

Concerned Agency **approves the IEE report** within 21 days upon its receipt (Rule 11.1)

Concerned Agency shall send **within 21 days 10 copies** with its suggestions to MoPE for approval of the EIA report (Rule 11.1)

MoPE may form a Review Committee (Rule 11.4)

MoPE issues a 30 days public notice or **public review** of the final EIA report (Rule 11.2)

MoPE shall approve the EIA report **within 60 days** (Rule 11.5) or **within 90 days** upon its receipt (Rule 11.6)

Concerned Agency is responsible for environmental monitoring (Rule

MoPE is responsible for Environmental Auditing (Rule 14)

ANNEX XII SCHEDULE 4, EPR, 1997

Schedule - 4
(Pertaining to Rule 5)
Work-Schedule Relating to Environmental Impact Assessment

1) Name and address of the individual or institution preparing the report.

2) General introduction of the proposal:

3) Data needed for the preparation of the report, and procedure of collecting them:

4) Policies, laws, rules and manuals to be taken into account while preparing the report.

5) Preparation of the Report:
   a) Time
   b) Estimated budget
   c) Necessary Experts

6) Scope determined for the preparation of the report.

7) Impact on the environment of the implementation of the report:
   a) Social and economic
   b) Cultural and physical
   c) Chemical
   d) Biological

8) Other alternatives for the implementation of the proposal:
   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 matters.

9) Measures to remove any negative impact that may be noticed while implementing the proposal.

10) Particulars of the cost and returns of the proposal.

11) Matters to be monitored while implementing the proposal.

12) Relevant information, reference lists, annexes, maps, photographs, tables and charts, graphs and questionnaires to be mentioned at the time of preparing the report.

ANNEX XIII SCHEDULE 1, EPR, 1997

Schedule - 1
(Pertaining to Rule 3)

Proposals Requiring Initial Environmental Examination

A. Forest Sector

1) Plantation of indigenous plants of a single species on a single block of 50 to 100 hectares in the Tarai and 25 to 50 hectares in the hills.
2) Plantation of such imported species of plants as are deemed suitable for that purpose following their test in the concerned place, on a single block of 10 to 50 hectares in the Tarai and 5 to 25 hectares in the hills.
3) Handover of forests with an area ranging between 25 to 100 hectares in the Tarai and 5 to 25 hectares in the hills as leasehold forests.
4) Clear felling or rehabilitation of national forests with an area of not more than 5 hectares.
5) Establishment of saw-mills processing 5,000 to 50,000 cubic feet of timber per year.
6) Collection of 5 to 50 tons of forest products other than timber per year.
7) Establishment or expansion of national parks, wildlife sanctuaries and conservation areas, or environmental conservation zones.
8) Extraction of the roots of trees which have been felled, 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 Sal (Shorea robusta) seeds.
9) Formulation of watershed management plans.
10) Construction of new botanical gardens or zoos outside forest areas in 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 areas, 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 kilometer long.
16) Collection of boulders, gravel and sand and extraction of coal and other minerals from forest areas.

B. Industrial Sector:

(a)

1) Production of alcohal by the process of blending and establishment of distilleries equiped with boiling and fermentation facilities, with a production capacity of 5,00,000/- liters per day.
2) Establishment of breweries and wineries equiped with fermentation facilities with a production capacity of 500,000/- 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 hides 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 indusries.
10) Establishment of industries producing lubricant by the process of blending reprocessing or reclamation.
11) Establishment of industries manufacting 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 cloths 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 ciment industries with a production capacity of 30 metric tons per hour based on lime-stone 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 (bases 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 Rs. 1 million.

1) Plastic processing (except processing waste materials).
2) Processing and production of tyres, tubes and rubber.
3) Soap (including detergents and clearing shampoos).
4) Photo processing.
5) Foundry.
6) Production of cigarettes, bidi (tobacco rolled in leaf) tobacco, betel rults.
7) Slaughter house.
8) Glass (plane glass)
9) Food processing.
10) Relating to metal (including remelting, rerolling, and fabrication).
11) Bitumen and bitumen emulsion.
12) Cold storage.
13) Threading.
14) Vegetable ghee, oil.
15) Herbal processing.
16) Production 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) Poultry feeds.
21) Machine shop.

C. Mining Sector:

(a) Excavation of mines through relocation and resettlement of permanent residence of not more than 100 people.

(b) Relating to Open Mine and Under Ground Mine:

1) Excavation of metallic minerals in small scale.
2) Excavation of the other industrial minerals in small scale except precious stones semiprecious stones and abressive minerals from among the classified industrial minerals for the industrial purpose.
3) Excavation of non-metallic minerals in small scale.
4) Excavation of industrial precious and semiprecious stones and abrassive minerals with a production capacity of 50 to 100 grams per day.
5) Establishment of coal mines in small scale.
6) Excavation of constrution oriented minerals materials in small scale.
7) Excavation of highly precious, precious, valueable 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 meter of sand, gravel and soil from river beds per day.
2) Extraction of 50 to 100 grams of precious, valuable and semi-valuable 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
   (d) Small feeder roads
2) Construction of 1 to 5 kilometers long ropeways.
3) Construction of 1 to 5 kilometers long cable car routes.
4) Construction of major bridges.
5) Construction of tunnels.
6) Improvement of the standard, rehabilitation and reconstruction of national highways and feeder roads.

E. Water Resources and Energy Sector:

1) Supply of electricity through the installation of transmission lines of not more than sfrom 33 kv to 66 kv capacity.
2) Operation of rural electrification projects of 1 to 6 mva.
3) Operation of electricity generation projects of 1 to 5 mw capacity.
4) Under the new systems of irrigation:
   (a) Those irrigating 25 to 2000 hectares in the Tarai,
   (b) Those irrigating 15 to 500 hectares in the hill valleys,
   (c) Those irrigating 10 to 200 hectares in the hill and mountain areas with a steep gradient.
5) Under the rehabilitated systems of irrigation:
   (a) Those irrigating more than 500 hectares in the Tarai.
   (b) Those irrigating more than 200 hectares in the hill valleys.
   (c) Those irrigating more than 100 hectares in the hill and mountain areas with a steep gradient.
6) Any water resources development activity which displaces not more than sfrom 25 persons to 100 persons with permanent residence.
7) Control of floods through dams in the Tarai.
8) Control of rivers over an area of more than one kilometer.

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 hotels with 50 to 100 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 water sports.
6) Promotion of tourism in a number exceeding 10,000 per year at an altitude above 5000 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 (springs and wet-lands) located within the same area.
2) Surface water sources with not more than 1 cubic ft. safe yield, and supply of not more than 50 percent of the water during the dry season.
3) Processing of water at the rate of 10 to 25 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 one kilometer long tunnels for carrying water.
6) Displacement of not more than 100 persons for operating a water supply scheme.
7) Settlement of not more than 500 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, and connection of new sources.
10) Installation of more than 20 kilometers long electricity transmission lines for pumping or processing water, and consumption of more than one mw of electricity.
11) River training and diversion activities over an area of more than one kilometer.

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 1000 tons of waste a year.
   (b) Activities relating to transfer stations and resource recovery areas spread over not more than 3 hectares.
   (c) Selecting, picking, disposing, and recycling waste through chemical, mechanical or biological techniques in an area of not more than 2 hectares.
   (d) Activities relating to compost plants in an area ranging between 1 and 5 hectares.
   (e) Operation of sewerage schemes.

I. Agricultural Sector:

1) Clearing of national forests covering not more than 1 hectare in the hills and 5 hectares in the Tarai, and using them for agricultural purposes.
2) Following activities relating to construction:
   a) !.....
   b) Construction of 1 to 5 kilometers long agricultural roads.
   c) Construction activities for farming 2000 to 5000 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 1000 and 5000.
   f) Establishment of agricultural wholesale markets in urban areas.
3) Following activities relating to toxic substances (only those which are listed):
   a) Import of 1 to 10 tons of toxic substances.
   b) Sale, supply, storage and disposal of 100 kg. to 1 ton of toxic substances.
   c) Use of 100 kg. to 1 ton of toxic substances in a single area.
4) Establishment of the following agro-based industries which do not dispose of polluted substances mixed with dangerous toxins:
   a) Milk-processing industries with a capacity of not more than 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) !.....
   f) !.....
5) !.....
6) Commercial fish-farming in an area of more than 1 hectare.
7) Operation of any planning, project or programme of any development work, physical activities or change in land use aexcept the proposals mentioned in Clause (A) to Clause (I) and those below the standards of such proposals as well as the proposals below the standards of those mentioned in Schedule-2 with a cost of Rs. 10 millions to hundred millions.

ANNEX XIV SCHEDULE 3, EPR, 1997

Schedule - 3
(Pertaining to Rule 5)
Work-Schedule of Initial Environmental Examination

1) Name and address of the individual or institution preparing the report:

2) proposal's:
   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:
   a) Time:
   b) Estimated budget:

6) !.....

7) Specific impact of the implementation of the proposal on the environment:
   a) Social and economic:
   b) Cultural and physical:
   c) Chemical:
   d) Biological:

8) Alternatives for the implementation of the proposal:
   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

10) Matters to be monitored while implementing the proposal.

11) Other necessary matters.

ANNEX XV SCHEDULE 5, EPR, 1997

Schedule - 5
(Pertaining to Rule 7)
Maters to be Mentioned While Preparing Reports Relating to Initial Environmental Examination

1) Name and address of individual or institution preparing the report:

2) 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):
   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) The following matters must be explicitly mentioned in respect to the proposal:
   a) Type of proposal,
      (1) Processing,
      (2) Manufacturing,
      (3) Installation,
      (4) Service delivery,
      (5) Others.
   b) If related to delivery, the nature and type of goods to be delivered.
   c) Proposal's
      (1) Installed capacity
      (2) Number of hours to be operated per day or year.
   d) Materials to be used (quantity and year to be mentioned).
   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) Air,
      (4) Gas,
      (5) Noise,
      (6) Dust,
      (7) 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 water,
(6) Arrangements made for disposing or processing waste
(7) Paths for movement in the area where the proposal is to be implemented.

j) Manufacturing processes
k) Details of the technology
l) 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 or control the impact of the implementation of the proposal on the environment.

7) Matters to be monitored while implementing the proposal.

8) Other necessary matters.

Note: Data, maps, photographs, tables, charts, graphs, etc. shall be enclosed, as required, while preparing the report.

Schedule - 6

(Pertaining to Rule 7)

Matters to be Mentioned While Preparing Reports Relating to Environmental Impact Assessment

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 environmental impact assessment.

4) Particulars of the Proposal:
   a) To specify the technical, geographical, environmental economic, social, cultural and physical aspects of the proposal.
   b) To specify the objectives, working policies and work-schedules of the activities to be undertaken during each phase of the implementation 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 convered 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 schedules as far as possible:
   a) Geographical area likely to have positive or negative impact of the implementation of the protect, 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 analyzed:
   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 measures are to be analyzed 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 analyzed 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 analyzed from the viewpoint of their cost on the basis of a comparison with other possible alternatives.

9) To mention matters concerning environmental management plans.

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, lands-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 environmental impact assessment,
    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 of 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.