



Government of Nepal
Ministry of Forests and Soil Conservation
REDD-Forestry and Climate Change Cell
Babarmahal

Environmental Safeguards in Forestry Projects

Final Report

Submitted by

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The critical role of the environmental safeguard measures in enabling and sustaining forest resources and biodiversity is increasingly realized in Nepal. The REDD-Forestry and Climate Change Cell initiated this very important task of documenting environmental safeguards as contained in different instruments, realising the implementation status, and exploring ways to make the safeguards as essential components for benefiting from forests resources while promoting REDD activities in Nepal.

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Acronyms

ADB	Asian Development Bank
BZ	Buffer Zone
CFUG	Community Forest User Group
CHEP	Chameliya Hydro-electric Project
CO ₂	Carbon dioxide
dbh	Diameter at Breast Height
DDC	District Development Committee
DFO	District Forest Office
DNPWC	Department of National Parks and Wildlife Conservation
DoF	Department of Forests
DoI	Department of Irrigation
DOLIDAR	Department of Local Infrastructure Development and Agricultural Road
DoR	Department of Road
EA	Environment Assessment
EIA	Environmental Impact Assessment
EPA	Environment Protection Act
EPR	Environment Protection Rules
EU	European Union
FINNIDA	Finish International Development Agency
FISP	Fattepur Irrigation Sub-Project
GESU	Geo-Environment and Social Unit
GoN	Government of Nepal
HEP	Hydroelectric Project
HMG	His Majesty's Government (then)
IEE	Initial Environmental Examination
IUCN	International Union for the Conservation of Nature and Natural Resources
M&E	Monitoring and Evaluation
MoE	Ministry of Energy
MoEST	Ministry of Environment, Science and Technology (then)
MoFALD	Ministry of Federal Affairs and Local Development
MoFSC	Ministry of Forests and Soil Conservation
MoPPW	Ministry of Physical Planning and Works
MoSTE	Ministry of Science, Technology and Environment
NCS	National Conservation Strategy
NEA	Nepal Electricity Authority
NEPA	National Environmental Policy Act
NP	National Park
NPC	National Planning Commission
NTFP	Non-Timber Forest Product
OFMP	Operational Forest Management Plan
OP	Operational Plan
RoW	Right-of-Way
SEA	Strategic Environmental Assessment
SEIA	Sectoral Environmental Impact Assessment
SIA	Social Impact Assessment
ToR	Terms of Reference
UN	United Nations
UNEP	United Nations Environment Programme
US	United States
VDC	Village Development Committee
WWF	World-wide Fund for Nature (World Wildlife Fund)

Executive Summary

Increased pressure on forests and its products, national needs and commitments for the conservation of forest resources, and international obligation being a Party to legally binding and legally non-binding instruments encouraged the Government of Nepal (GoN) to develop a system that provides prior information on potential impacts of the proposals on forests and environment, and implement the environmental safeguards. The GoN approached to implement environmental safeguards to conserve forests and biodiversity by establishing protected areas or by introducing/ implementing administrative and regulatory measures or combination of both including institutional development and capacity building. In identifying and implementing environmental safeguards, a tool popularly known as Environmental Assessment (EA) was adopted as one of the major and instrumental safeguards to make the development proposals environment-friendly, cost-effective, socially acceptable, technically appropriate and sustainable.

Nepal used EA tool since 1980s through policies, expanded its use in 1990s through guidelines and laws, and approached for effective use through guides and manuals since 2000s. During the last 32 years, use of EA tool has been institutionalised and internalised. This tool provides ample opportunities to identify and propose impact-based environmental and social safeguards at its different stages. The Ministry of Forests and Soil Conservation (MoFSC) led in many respects in adoption and use of EA tool in Nepal. Now, EA (IEE or EIA) should be carried out legally for all prescribed proposals and get approval before their implementation. As of mid-January 2013, a total of 144 EIA reports have been approved by the Ministry of Science, Technology and Environment (MoSTE) and of them, 16 EIAs are related directly to forestry sector and additional 74 projects will either be implemented in forests or pass through forest areas, referred as non-forestry sector projects in this study. The IEE reports are approved by the concerned ministries (or departments based on delegated authority).

In order to benefit from EA in forestry sector and ensure conservation and management of forests and biodiversity, MoFSC made several initiatives between 2002 and 2005. It includes the approval of review guidelines, introduction of 'mother tree' concept, compensatory plantation at the rate of 1:25, improvement on data and information of forests in non-forestry sector proposals, and release of IEE manual for forestry sector. In 2007, the Government of Nepal made decision on working procedure to provide forest area for non-forestry sector uses. In addition, review of legal provisions and procedures as contained in the Forest Act (1993), National Parks and Wildlife Conservation Act (1973) and the Environment Protect Act (1996) indicate that environmental safeguards as included in the legislations provide ample opportunities to improve the forest conditions and conserve biodiversity. Similarly, existing legal provisions to provide forest area for the implementation of non-forestry sector projects call for effective compliance by the proponent to conserve forest resources. Although environmental grievances are in the low order, they could be addressed by enforcing the existing laws. Procedures for information sharing on environmental safeguards is also well documented in environmental laws.

Several institutions are engaged in reviewing, implementing and monitoring environmental safeguards. The MoFSC has necessary institutions up to the field level and it needs to internalise and institutionalise environmental monitoring. Similarly, concerned ministries and MoSTE should equally focus on ensuring implementation and monitoring of environmental safeguards.

This study has been carried out to 'produce a brief review document that includes critical evaluation of environmental and social safeguards initiatives adopted in forestry and forest-related projects in Nepal'. The specific tasks include review of forest-related environmental and social safeguard system adopted in Nepal such as in SEA, EIA and IEE and their implementation, identify data and capacity gaps and suggest ways forward for effective and efficient implementation of environmental safeguards in forestry sector projects. In order to meet this objective, and complete the tasks, approved IEE and EIA reports and available SEA reports were collected, reviewed and analysed, concerned officials were contacted to know implementation status, and this final report has been prepared.

Two EIA reports (SEA level) of the Master Plan for Forestry Sector, and Bara Forest Management Plan were reviewed. The SEA of Nepal Water Plan was also reviewed from forest and biodiversity lens. Four each of IEE and EIA reports of forestry sector were reviewed. Two point projects and four linear projects of non-forestry sector were also reviewed. Based on review information, implementation status of approved IEE and EIA reports of six projects has been analysed and included in this report. It provided information on 'what worked and what did not' and some level of accuracy on impact assessment.

This analysis indicates inadequate data and information in IEE and EIA reports to make them site specific. Some data are irrelevant, and IEE and EIA reports have not been able to link data and information with impacts, measures, and monitoring and auditing parameters. Documentation of these reports are also considered inadequate.

In forestry sector, there is no dearth of human resources as MoFSC and its Regional Training Centres including forestry projects have organised number of training and workshops on IEE and EIA. Furthermore, 3 credit hour course on EIA has been included at tertiary level in science stream in particular M.Sc. in environmental science, environmental management or natural resources management. In non-forestry sector, human resource gap needs to be fulfilled. Important thing is how to best utilise the available human resources.

In order to identify and implement environmental safeguards, it seems necessary to make efforts in improving the quality of report, institutionalising documentation, engaging the knowledge-based personnel, developing a system for regular interaction, making the review and monitoring results public and enforcing the legal provisions in forestry sector proposals. In case of non-forestry sector proposals, MoFSC may wish to make efforts in integrating institutional responsibilities, providing technical support for activities implementation, establishing the monitoring team, making the monitoring report public, providing updates on importance of forests conservation, organising tripartite interactions and informing through timely decision.

Implementation of environmental safeguards does not cost much. The Upper Tamakoshi HEP has estimated approximately 1.5 percent and Kabeli B1 HEP has estimated about 1.3 percent of the total project cost for environmental management. In latter project, the total environment cost to total project benefits is only 0.21 percent. Hence, there are ample opportunities to refine environmental safeguards through IEE and EIA process and implement for legal compliance.

Review results provide opportunities to maximise the use of EA tool in identifying and implementing environmental safeguards. The following recommendations would further contribute to mainstreaming and implementing safeguard measures:

1. Improve data and information, and make environmental safeguards site-specific;
2. Replicate the success activities that reduce pressure on forests or ensure forest and biodiversity conservation;
3. Integrate environmental monitoring as a part of project implementation along with necessary budget including staff from forestry sector or independent forest professionals;
4. Conduct surveillance monitoring and instruct the project timely for any lapses;
5. Conduct awareness raising package from forestry lens to project management, consultant, contractor, and construction workers including local people;
6. Avoid disjointed information in IEE and EIA report.

It is expected that these recommendations would contribute to identify and select appropriate environmental safeguards and implement, monitor and refine them at frequent intervals to conserve forests and biodiversity.

Safeguarding The Resources

Unregulated human activities accelerated unsustainable use of natural resources and increased pollution level. Effects and impacts of unilateral and sector-approached economic and infrastructure developments on the environment were not realised. Initially, several countries put in place 'add-on' solution but benefits from such effects did not materialise to the desired extent.

In Nepal, management of natural resources, in particular the forests and water, dates back to several centuries. Forest was intact till 1960s. The Private Forests Nationalisation Act of 1956 introduced the concept of utilising forest area and its products for economic and infrastructure development. Forests were used as the 'Nature's free gift' or 'free of cost', and most of the economic and infrastructure projects were implemented in forest areas without implementing any environmental safeguards. Some development activities such as irrigation, transmission line, and road projects also used forest areas substantially. These activities including other anthropogenic factors resulted to deforestation and forest degradation.

Increased pressure from non-forestry sector proposals such as development of education and health facilities, barrack, infrastructure (road, irrigation, transmission line, electricity generation etc) has converted forest land into other land uses. As a result, Nepal is facing challenges to meet its twin objectives of: (i) national development needs sustainably using forests and its resources; and (ii) national and international commitments on natural resources and biodiversity conservation in broader sense.

Increased pressure on forests and its products, national needs and commitments for the conservation of forest resources, and international obligation to legally binding and legally non-binding instruments such as conventions (to which Nepal is a Party or a Member) encouraged Nepal to select and improve environmental safeguard measures since 1970s. This was approached by establishing protected areas or by introducing/implementing administrative and regulatory measures or combination of both including institutional development and capacity building. In identifying and operationalising environmental safeguards, Environmental Assessment (EA)¹ was adopted as one of the major and instrumental tools to make the development proposals environment-friendly and sustainable. This study focuses on review of facilitative measures and institutional strengthening to safeguard the forest resources.

1.1 Realisation of the Need for Environmental Safeguards

The fundamental goal of development is to improve people's living standard. Continued myopic decision on the implementation of developmental activities for short-term benefits has adversely affected the dynamic ecological system. Similarly, long-term economic growth as

¹ For this study, EA includes IEE, EIA, SIA or SEIA etc. Alternatively, EA refers here as a tool that assesses project-level environmental impacts and SEA assesses environmental impacts at '3P' level (policy, plan and programme).

envisaged an ever-lasting goal of successful development did not provide benefits sustainably due to lack of 'ex ante' environment safeguards. As environmental problems and catastrophe continued to affect life, life-supporting system, and property, people realised that development-induced environmental problems, if not addressed timely, could be counter-productive and would make the project outcome unsustainable. This contributed to think and concretise ideas and develop a process to keep the economic development up without damaging the resources and/or least degrading the environmental quality. In other words, concept of 'development without destruction' was rooted in project planning.

Developed countries started working to develop a tool that helps to make the development project environment-friendly, cost-effective, socially acceptable, and technically appropriate. This tool is popularly known as 'Environment Assessment'.

In Nepal, development projects also induced soil erosion and landslides in the upstream and sedimentation in the downstream resulting to increased damage from floods and decline in production and productivity of forests and agriculture. Following the UN conference on 'Human Environment' at Stockholm in June 1972, decision for the establishment of the United Nations Environment Programme (UNEP) in the fall of 1972 and engagement of the development partners in promoting environment-friendly development, Nepal took several measures to conserve forest resources, and realised the importance of integrating environmental aspects into development programmes and projects. This was further expanded taking into consideration the outcomes of the UN Conference on 'Environment and Development' in Rio de Janeiro in 1992 (Rio Declaration, Agenda 21 and legally non-binding forestry principles), and Johannesburg Summit on 'Sustainable Development' in 2002 (Johannesburg Plan of Action). The Rio Summit in 2012 is expected to promote greening the economy.

In 1960s, the Government of Nepal (GoN) introduced the concept of scientific management of forests, and in 1970s, pristine forests and natural areas were declared as protected areas in the form of National Parks, and Wildlife Reserves. In 1980s, concept of conservation area was emerged to promote and ensure people's participation in Nature conservation and management. Since 1980s, almost all periodical Plans focussed on the development, conservation, management and sustainable use of forests and its products. In addition, periodical plans also focused on institutional and programmatic measures to reduce soil erosion, landslides, floods and pollution.

Nepal further realised the importance of forest conservation in early 1970. The National Report to the *United Nations Conference on Human Environment* held at Stockholm, Sweden from 5 to 16 June 1972, shared with the international community 40 years back, states 'human encroachment in forest areas, whether or not controlled, leads to the decline of wildlife, for example, or the forced migration of indigenous jungle fauna to accommodate newcomers. Uncontrolled forest encroachment affects mostly in the Terai but controlled settlement also pays in its inevitable destruction of the forest ecosystems' (NPC, 1972). In order to address it, the Report states that private ownership of forest has been terminated, encroachment and

indiscriminate felling has been restricted legally, afforestation and reforestation have been a regular aspect of work along with informal 'forest festival' once a year, and reserves and wildlife sanctuaries have been established.

1.2 Genesis of Environmental Assessment System

Since 1960s, several countries and institutions started developing a tool that facilitates the identification of potential environmental impacts and avoids or mitigates significant adverse impacts. The US National Environmental Policy Act (NEPA), 1969 included the provisions for assessing environmental impacts of major federal actions affecting significantly the quality of human life and integrating environmental concerns more effectively and systematically. This Act entered into force on 1 January 1970.

Environmental Assessment has been popularly used as the creative process to manage the environmental resources, and to mitigate the adverse environmental impacts. This tool is used to: (i) identify and predict beneficial and adverse environmental impacts; (ii) evaluate the significance of identified and predicted impacts; (iii) recommend preventive, corrective or compensatory measures; (iv) inform stakeholders about the environmental implications; and (v) provide adequate information to decision-makers on the implementation of proposal (policy, plan, programme, project or activity) and in what form (Uprety, 2003). Identification, prediction and evaluation of impacts, and avoidance, minimization and compensation of significant impacts are the six key words frequently used while using this tool.

In 1970s, some high-income group countries such as Canada and Australia adopted EA as a regulatory procedure. Some developing countries Columbia and the Philippines also introduced EIA procedures in 1974 and 1979 respectively.

In 1980s, almost all the developed countries including Japan and EU Member States and developing countries adopted this tool. In 1990s, remaining countries started using this tool to address project-related environmental impacts. Adoption of EA was also made effective through non-legally and legally binding international instruments. For example, the World Conservation Strategy in 1980, prepared by IUCN, UNEP and WWF urged countries to adopt environmental assessment as an integral part of the planning of all major actions requiring governmental authorisation, and carry out EA at the same time as engineering, economic and socio-political assessments. The UNEP Governing Council in 1987 adopted the goals and 13 principles about the EIA. The Rio Declaration in 1992 included Principle on EIA which states that 'EIA, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant impact on the environment and are subject to a decision of a competent national authority'.

In addition to the non-legally binding instruments, the Convention on EIA in a transboundary context was adopted at Espoo, Finland in 1991. Although this Convention is applicable to EU Member States, it provided a basis to expand the use of EA, in particular EIA. Similarly, Article 14 of the Convention on Biological Diversity also provided a strong basis to Parties to the Convention to develop a system, and use EIA for biodiversity conservation. All these contribute

to use EA tool which provides ample opportunities to include environmental safeguards by complying with the national and international commitments on species and ecosystem and forests.

Understanding the benefits of this tool, Nepal introduced the concept of EA initially through the planning process – the periodical plan – in early 1980s. Its use was initially focussed in donor-supported programmes and projects. The EIA of Master Plan for Forestry Sector (MPFS) could be considered as a major breakthrough to address environmental concerns in forestry sector. In 1989, GoN approved the National Conservation Strategy (NCS) which, *inter alia*, focussed on need for establishing Assessment and Review Office (ARO) to promote socio-economic and environmental assessment and review process (HMG/IUCN, 1988). The NCS Implementation Project contributed to develop national EIA guidelines and EIA guidelines for different sectors till mid-1990s. The Nepal Biodiversity Strategy, 2002 equally focuses on carrying out EIA to conserve biodiversity.

The following figure illustrates process for carrying out EIA, and possible entry points to include environmental safeguards along with people's participation.

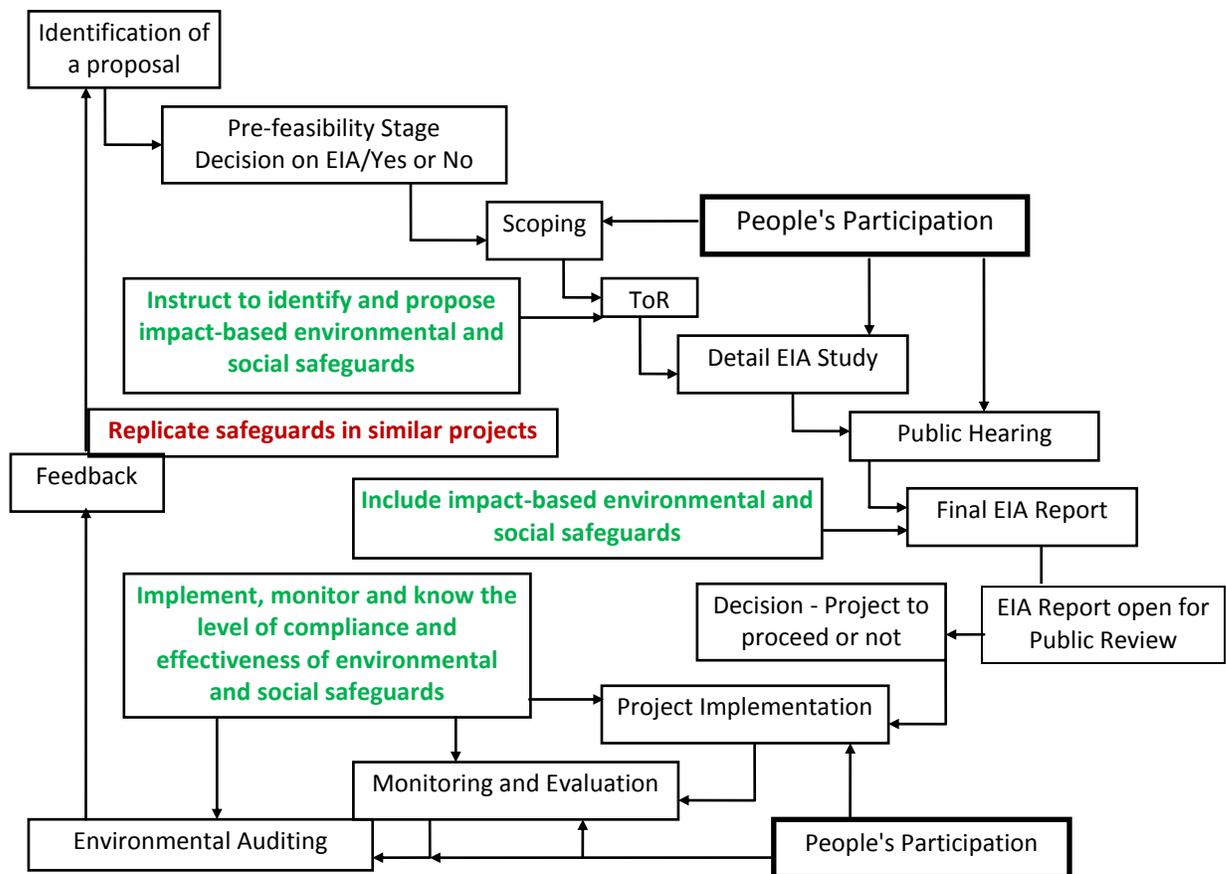


Figure 1. Addressing Environmental Safeguards through EIA Process

Source: Uprety, 2003.

1.2.1 Policy and Guidelines

Initially, Nepal used EA tool through policies, as contained in the periodical plans, and promoted its use by developing guidelines. The Sixth Plan (1980-'85) included a policy to carry out EIA of major infrastructure development projects for the first time in the planning history of Nepal. Since 1980s, each Plan included policies and activities to conduct EIA of major development projects to promote sustainable economic development and ensure natural resources management. The Eighth Plan (1992-'97), formulated after the reinstatement of democracy in Nepal, reiterated the need for carrying out EIA of both national and local level projects before implementation.

The periodical plans focussed in carrying out EIA and implementing EA recommendations till the Tenth Plan (2002-2007). The Tenth Plan also realised the need for Strategic Environment Assessment (SEA) and called for monitoring the implementation status of environmental safeguards as included in the approved EIA reports. The 11th and the current 12th Plans equally focus on environment monitoring as per the approved IEE and EIA reports, and initiate environmental auditing works.

In 1990, the Government started the preparation of the EIA guidelines through 'learning by doing' approach. The National EIA Guidelines (1993), and separate EIA Guidelines for Forestry and Industry Sectors (1995) were prepared and the process contributed a lot to understand this tool and conduct IEEs and EIAs and to mainstream environmental considerations into the development programmes and projects. These Guidelines were approved by the Government (cabinet decision) to streamline EIA process in Nepal.

The Ministry of Forests and Soil Conservation (MoFSC) prepared and used Review Guidelines for IEE and EIA of Forestry Sector, 2002 and IEE Manual for Forestry Sector, 2005. This user-friendly manual provides processes to prepare terms of reference (ToR) and IEE report. This manual is extensively used and greatly contributed to streamline IEE process in forestry sector. Other sectors also benefited from this manual and review process. The forest-related guidelines and manuals which are approved by the Government are as follows:

1. National EIA Guidelines, 1993
2. EIA Guidelines for Forestry Sector, 1995
3. Review Guidelines for IEE and EIA of Forestry Sector, 2002
4. IEE Manual for Forestry Sector, 2005
5. A Guide to Streamlining EIA Approval Process, 2006
6. A Guide to Environmental Management Plan of Hydropower Projects, 2006
7. A Guide to Environmental Monitoring of Hydropower Projects, 2006
8. A Guide to Environmental Auditing of Hydropower Projects, 2006

These guidelines, guides and manuals provide procedures to prepare quality EA reports, by identifying and predicting impacts and evaluating their significance, preparing practical environmental management plan, and process for conducting environmental monitoring and auditing as an integral part of EIA. The instruments have made a solid foundation to ensure

environmental and social safeguards in forests and forest-related development programmes and projects.

1.2.2 Legal Measures

In 1996, Environment Protection Act (EPA) was enacted which provides provisions to conduct EA (IEE and/or EIA) for prescribed proposals and for approval procedures. The Act empowers the concerned ministry (related to the proposal) to approve IEE reports and its ToR. For example, MoFSC approves ToR and IEE report of all forestry sector projects. The proposals requiring IEE level of study are listed in Schedule 1 of the Environment Protection Rules, 1997.

The Ministry of Science, Technology and Environment (MoSTE, and Ministry of Population and Environment at the time of Act enactment) is made responsible to approve EIA and its associated reports (Scoping document, and ToR) of all sectors. However, EIA and its associated reports should be forwarded by the concerned ministry (body) with its suggestions to the MoSTE for necessary approval. The concerned ministry is empowered for environmental monitoring of the proposal concerned, and MoSTE is responsible for environmental auditing after two years of service provided by the proposal based on the existing legal provisions.

The EPA, 1996 obliges the proponent to carry out IEE and/or EIA of the prescribed proposals, and no one should implement without getting approval from the competent authority. In case the proposal requiring IEE or EIA is implemented without necessary approval or violates the conditions of the approval, the prescribed authority may close down such act immediately or may punish up to NRs. 100,000/ according to the degree of offence (Section 18 of the EPA, 1996).

In a nutshell, Nepal has a well established legal system to include and implement environmental and social safeguards through EA process for the prescribed development proposals. In Nepal's case, EA includes physical, chemical, biological, social, economic and cultural aspects and this is working well from the last nearly one and half decade through the enforcement of EPA, 1996 and EPR, 1997. Nepal's legal system makes the EA report public and ensures peoples' participation at different stages of EA study and implementation of its recommendations (Figure 1). In other words, stakeholders and people, likely to be affected by the project activities, are fully aware, in principle, about the environmental and social safeguards and/or adverse impacts mitigation measures or the beneficial impacts enhancement measures to achieve the desired environmental goals from project implementation.

1.2.3 Approval Procedures

The IEE and EIA reports approval process are defined in the EPA, 1996 and EPR, 1997 (Annex 1 and 2; Uprety, 2003). In case of forestry project, MoFSC is responsible to approve the ToR for IEE study as proposed or in the revised form. The formats of the ToR and IEE reports are included in EPR's Schedules 3 and 5 respectively. However, the roles and responsibilities of MoFSC for the approval of the IEE report and ToR have been delegated to the Department of

Forests (DoF), and the Department of National Parks and Wildlife Conservation (DNPWC) to proposals related to their works.

Once competent authority receives the IEE report, it checks the legal requirements such as deed of public inquiry, 15-days public notice published in the national newspaper about the draft report, recommendation letter(s) of the Village Development Committee(s) or municipality(ies) where the proposal has been proposed for implementation, consistency in data and information with the approved ToR. If these legal requirements are complied with, the concerned department may approve the IEE report within 21 days from date of its receipt if the proposal will have no significant impact on the environment.

The MoFSC is responsible to conduct environmental monitoring during the implementation of the proposal and issue necessary directives to the proponent to adopt measures to reduce or control high level of impacts, if any. If it issues any directives, it should also inform MoSTE [then Ministry of Population and Environment (1995-2005) or Ministry of Environment, Science, Technology (2005-2009 and 2011-2012) or Ministry of Environment (2009-2011)].

In case of proposals requiring EIA, MoFSC, as the concerned body for forestry proposals, should review the Scoping Document, ToR and final EIA report and forward to MoSTE with its opinions and suggestions. It has the responsibility for monitoring and issuing directives, including informing the issued directives to MoSTE. The MoSFC also participates in the meetings of the EIA Report Suggestion Committee, formed by the MoSTE, in forestry proposals, or other proposals planned for implementation in the forest areas or proposal that passes through the forest area. Hence, MoFSC and its departments, having mandates for IEE report approval, have multiple opportunities to include environmental and social safeguards to make the forestry proposals and non-forestry sector proposals environment-friendly and sustainable and promote forest conservation.

From operational point of view, increased 'cut and paste' from similar reports has degraded the quality substantially and it encouraged the Government to establish a system and make the proponent and the consultant(s) responsible on the quality of their report. The MoSTE has introduced a 'declaration approach' last year to make the proponent and the consultant responsible on the contents of the EIA reports (Annex 3). It is expected that 'declaration approach' could contribute to improve the quality of report, and develop practical and proposal-based environmental safeguards which are easy and practical for implementation.

1.2.4 Legal Provisions and Procedures for Providing Forest Area for Non-Forestry Sector Activities

The Government of Nepal (GoN) has the land-ownership of all forests (Section 67 of the Forest Act, 1993) including community forests, leasehold forests and religious forests which are provided to communities or people for the conservation, management and sustainable use of forest and its products. The Section 68 of the Forest Act, 1993 empowers the GoN to provide parts of government-managed forests, protected forests, community forests, leasehold forests or religious forests for the implementation of national priority project(s), if there is no

alternative other than forest area for project implementation and if it does not adversely affect the environment significantly. The national priority could be determined by the National Planning Commission or the Council of Ministers but alternative to forest and significant adverse impacts on the environment could be determined and/or analysed and evaluated using the IEE or EIA tool.

Section 49 of the Forest Act 1993 prohibits a number of activities such as cultivation and construction of huts, grazing in designated forest area, collection, transportation and storage of forest products including stones, aggregates, sand and soil in forest areas. These regulated activities could also be considered as the safeguards for the conservation and management of forests and the environment.

The Rule 65 of the Forest Rules, 1995 obliges the project proponent to compensate the people and community for any damage that may occur during the implementation of the national priority project. The proponent should bear all costs related to site clearance (cutting and transporting forest products). The Rule 12 of the Forest Rules, 1995 also empowers the GoN to prohibit (ban), by publishing the notice in the Nepal Gazettee, the collection, utilisation, sale and transportation of designated forest products. These regulatory safeguards provide opportunities to conserve and manage forests.

Once the IEE or EIA report is legally approved (if it requires IEE or EIA study), the proponent requests the forestry organisation (MoFSC or DoF or District Forest Office, DFO) to provide forest area(s) for project implementation. This request is analysed and processed for necessary approval. In general, DFO will be engaged in delineating forest area required for project implementation, counting trees (to be taken out as a part of site clearance), quantifying species-wise forest products (as per the Forest Rules), analysing data and information and/or reviewing approved IEE or EIA report and process for necessary approval. It also marks the tree(s) to be felled down and keeps the record updated. The DoF further analyses the data and information and forwards to the MoFSC with its suggestion(s). The MoFSC further analyses and forwards to the Cabinet for necessary approval in the spirit of the Section 68 of the Forest Act, 1993. Once approved, DFO, as per the decision, will be involved in clearing the site and managing forest products. The DFO will also be involved in monitoring project activities on the forest area, as necessary, and environmental monitoring of the forestry component as mentioned in the IEE or EIA report. Hence, the competent forestry organisation will be engaged in ensuring implementation of environmental safeguards, and knowing their effectiveness. In case of forestry projects such as resin tapping or leaf or bark collection or collection of any forest product, the forestry organisation is fully engaged in environmental monitoring as per the provisions of the EPR, 1997.

1.2.5 Legal Provisions for Providing Protected Areas for Non-Forestry Sector Activities

If the development project is planned to be implemented in the protected area (National Park, Wildlife Reserve, Strict Nature Reserve, Conservation Area, Hunting Reserve or buffer zone), the National Parks and Wildlife Conservation Act, 1973 is attracted. Section 5 of this Act prohibits number of activities such as wildlife hunting, construction of house and hut,

cultivation and farming, grazing, collection of forest products, mining and quarrying, diversion of water from rivers and streams flowing from the protected areas and so on. However, the Act empowers to implement activities after getting necessary permission from the authorised officer. The National Parks and Wildlife Conservation Rules, 1974 and other Rules framed under this Act provide provision for the use of protected areas as per the decision of the GoN.

The Act has listed 26, 9 and 3 species of mammals, birds and reptiles as protected species. The Rules elaborates provisions for licensed hunting of wild animals. As per the legal provision for benefit sharing, about 30 to 50 percent of the total benefits should be provided for community development activities in the declared buffer zone areas. It also prioritises people's participation for the management of protected areas to reduce park-people conflicts.

The procedure for providing areas for non-forestry sector projects resembles as described in 1.2.4 but the concerned protected area office and the DNPWC will be fully involved in providing necessary suggestions and inputs for informed decision-making. In practice, protected areas are declared to conserve Nature, ecosystem and species of national and international significance. The regulatory and penalty provisions in protected areas are comparatively stringent as compared to using forest areas.

As the government organisations are established for the conservation, development, management and sustainable use of forests and its products, and management of the protected areas, regular activities and/or project activities implemented by the District Forest Officers and protected area offices are broadly environment-friendly. Any adverse impact noticed is addressed timely to reduce it. The IEE is required for the management plan of forests or protected areas, and IEE has contributed to make the plan environment-friendly.

1.2.6 Legal Provisions and Procedures for Addressing Grievances

The Forest Act, 1993 provides stringent penalty provisions and person committing such activity will be penalised based on the degree of offence. The Act provides provisions to examine such offence and penalised for non-compliance. For example, if a person commits to deforest, plough, cultivate to construct a house or hut in the forest area, the offender shall be penalised with a fine up to NRs. ten thousand or an imprisonment up to one year or both. The National Parks and Wildlife Conservation Act, 1973 has provisioned for penalty for any offence to the prescribed works in the laws. For example, if a person or institution is involved in killing, trapping and selling or buying products of the protected wildlife such as of rhinoceros, tiger, elephant, musk deer, snow leopard etc, s/he will be penalised from NRs. 50 to 100 thousands or 5 to 15 years of imprisonment or both. These penalty provisions and procedures are elaborated in the legislation.

Section 17 of the EPA provides provisions for compensation in case of any loss or damage as prescribed to the affected person due to pollution, sound, heat or wastes. The affected person should file application and the prescribed authority after necessary examination and if proved will instruct for paying compensation to the proponent who commits such acts. The Act has also provisioned for punishment for non-compliance of IEE and EIA related activities. Section

18 of the Act provisions that in case any person carries out any act without getting a proposal (related to IEE and EIA) approved or any act contrary to the approved proposal, the prescribed authority may stop such act immediately, and if any person or organization has done such act, may according to the degree of offence punish him/her with a fine up to 100 thousand rupees. However, the person who is not satisfied with the decision or order made by the prescribed authority may appeal to the concerned Appellate Court within thirty five days from the date of the decision or order (Section 19 of the Act).

The EPR, 1997 elaborates the provision for compensation and addressing the grievances (Rules 45 to 48). In case anyone wishes to realize compensation from any individual, institution or proponent under section 17 of the Act, s/he may submit an application to the concerned Chief District Officer (CDO) mentioning the type of loss and the amount of compensation sought. In such application, CDO shall conduct investigation, evaluate the actual loss and shall determine appropriate and reasonable amount of compensation accordingly. In case of difficulty in evaluating the compensation, CDO may seek guidance from the concerned body. The proponent shall pay the amount to the concerned individual or institution within 30 days from the date of determination of the amount. Failure to pay the amount of compensation within the prescribed time limit, CDO shall take action to pay from the property of the individual, institution or proponent in accordance with the existing laws.

In case any individual or institution takes any action without approval of IEE or EIA report, the concerned body and MoSTE have authority to punish him/her respectively. As of now, there are no registered cases for compensation. However, MoSTE has penalized the proponent in case of non-compliance of the EIA provision, i.e., if project requiring EIA has been implemented with approval of the EIA report.

1.2.7 Institutional Responsibilities

Depending upon the nature of the proposal/project, several institutions might be engaged in administering environmental safeguards in Nepal. The primary responsibility lies with the proponent to identify, select and implement the safeguard measures. The legislations also include prohibited actions (which might function as the safeguards) to ensure the implementation of environment-friendly measures.

Taking into consideration the project activities (to be implemented by forestry or non-forestry sector organisation), MoFSC and MoSTE could be considered as the principal institutions to ensure implementation of the environmental safeguards for the conservation, development, management and sustainable use of forest and its products.

The MoFSC with its five departments (DoF, DNPWC, Department of Soil Conservation and Watershed Management, Department of Forest Research and Survey, and the Department of Plant Resources) has key forestry related tasks such as: (i) conservation of Nature, soil, water and forest resources including biodiversity; (ii) management of forests and forest land; (iii) increase production from forests. The Business Allocation Rules, 2013 mandates MoFSC to formulate forest and soil conservation related policy, plan and programme, implementation

and monitoring and evaluation including conservation, utilisation and management of forests. It equally focuses on managing different types of forests, ecosystems and protected areas, Nature conservation and climate change related for forests. Its activities contribute substantially to meet the basic needs of forest products, increase agriculture and livestock production, enhance benefits from forest-based industries and tourism, and promote overall development of local and national economies. The MoFSC has parastatal organisations mandated for specific activities. The Forest Products Development Board is engaged particularly in producing and supplying timber logs and fuelwood. The Herbs Production and Processing Company Limited collect, cultivate, and process medicinal and aromatic plants, and produces essential oils. The Timber Corporation of Nepal is involved in producing and supplying sawn timber and supply of firewood to major consumption centres.

As mentioned above, the EPR 1997 mandates the MoFSC for environmental monitoring of the forestry sector project. However, it may also be engaged in monitoring (both compliance and impact) of the forestry components of non-forestry sector projects that will be implemented within, or pass through, the forest areas.

The MoSTE is responsible for improving the quality, and ensuring the conservation, of the environment with particular focus on pollution. The MoSTE is legally empowered to monitor and audit the environmental activities. Similarly, there are several government institutions which might affect forest area and its resource during the implementation of their projects in forests. For example, hydro-electricity generation, transmission line, irrigation or road project may directly or indirectly affect the forest area and its product. In this context, several organisations are engaged and should be continuously engaged in ensuring forest conservation and management. Review of institutional responsibilities indicate that institutions have yet to start environmental monitoring and once it is carried out preferably through project-based approach, it would be easier to understand 'what worked and what did not' and the effectiveness of the environmental safeguards as proposed in the EA reports. The institutional review informs that existing mandates could be effectively used to ensure implementation of environmental safeguards.

1.2.8 Information Sharing on Environmental Safeguards

Nepal's legal provisions on EA provide ample opportunities to engage stakeholders, and 'to be affected people and community' right from the preparation to the implementation of the IEE and EIA reports. In case of IEE, the proponent is made responsible to make the draft IEE report public to let the affected people and stakeholders know about the potential environmental impacts and safeguard measures. This is legally done by publishing a 15-days public notice in the national daily newspaper and by affixing a notice in the offices of the concerned VDC or municipality (where the project will be implemented), school, health post and District Development Committee. In addition, VDC or municipality also knows the environmental impacts and safeguard measures before issuing the recommendation letter(s) which should be submitted for necessary approval of the IEE report.

The EPA 1996 and EPR 1997 equally obliges the proponent to conduct a public hearing at the project site on the draft EIA report, and include recommendation letter(s) of the concerned VDC or municipality before the submission of the final EIA report for necessary approval. Upon the receipt of the EIA report, MoSTE, before its approval, must publish a 30-days public notice to make the EIA report public. It means, stakeholders and 'to be affected people and community' are, in principle, well informed about the nature of the project, potential impacts and safeguard measures to offset/mitigate the adverse environmental impacts that are likely to be generated from project implementation. In addition to these legal measures, affected local peoples and communities will also know the environmental safeguard measures during interactions, consultations, environmental monitoring and auditing processes. However, effectiveness of these provisions is yet to be evaluated through extensive field studies.

Information sharing and public involvement is promoted and ensured through diffusion and collection of information, and consultation and participation of the people during environmental scoping, IEE and EIA report preparation and finalisation, and approval processes. As mentioned above (1.2.6), affected person may file a case for legal treatment. Stakeholders and affected communities may also make liable the proponent in case of non-compliance of the safeguard measures. In a nutshell, EA ensures public involvement at its different stages and information sharing mechanism is legally ensured. However, some measures could be established for sharing environmental monitoring and auditing reports.

1.2.9 Status of EA Reports Approval

The EPA (1996) and EPR (1997) entered into force on 24 and 26 June 1997 respectively. Since mid-1997, Nepal started the use of EA tool legally and all IEE and EIA reports for the prescribed proposal were approved based on EPA and its Rules.

The MoSTE has approved 144 EIA reports for all sectors, in particular forestry, water resources, transport, education, health, industry, agriculture, and housing sectors as of 23 January 2013 (Annex 4). Based on the nature of the projects, sectoral projects as included in Table 1 have been or will be implemented in the forests areas or will pass through the forest areas. It shows that over 60 percent of total projects having approved EIAs will affect the forest areas directly or indirectly.

The Ministry of Energy (MoE) has approved IEE reports of 76 hydro-electricity generation projects (Annex 5). The Ministry of Federal Affairs and Local Development (MoFALD) has so far approved IEE reports of 350 proposals that require IEE level of assessment under its jurisdiction, of which 152 proposals are of road sector (Annex 6). Similarly, the Ministry of Physical Planning and Works (MoPPW) has approved 175 IEE reports (Annex 7). Some of them are for road sector – new or rehabilitation and maintenance projects. The Department of Forests (DoF) has approved IEE reports of mostly forest management scheme; collection and extraction of stones, gravel and sand; and collaborative forest management schemes. The Department of National Parks and Wildlife Conservation (DNPWC) has carried out IEE study of combined management plan of national park or wildlife reserve and buffer zone. As of January

2013, IEE reports of 13 National Parks (NP) and Buffer Zones (BZ) management plans have been approved (Annex 8).

Table 1: Sector Projects having Environmental Clearance for Implementation

SN	Particulars	Number	Remarks
1	Forestry Proposal	16	
Non-forestry proposals			
2	Irrigation	5	Some proposals will be implemented in forest areas and most of them will pass through the forest areas
3	Transmission line	11	
4	Road	14	
5	Hydro-electricity generation	43	
6	Health	1	
	Total	90	

Note: Based on Annex 4

1.2.10 Additional Initiatives on Safeguards

As described in 1.2.1 above, adoption and implementation of EA tool through policies in 1980s was the first step of approaching to make the development project environment-friendly. In 1987, an EIA study was carried out to identify potential impacts likely to occur from the implementation of the Master Plan for Forestry Sector and propose mitigation measures (MoFSC/ADB/FINNIDA, 1988). It was the first study conducted in Nepal at the Plan level and in the forestry sector.

The National EIA Guidelines (1993), and EIA Guidelines for Forestry (1995) as procedural guidelines contributed to identify and select impact-based environmental safeguards and facilitate their ground-level implementation to know what works and what does not. The Guidelines also contributed to conduct an EIA of Bara Forest Management plan in 1995 which is also of strategic level, in principle.

Section 68 of the Forest Act, 1993 provisions for providing forest area to implement national priority projects in case of no alternatives other than use of forest area by ensuring that the project does not affect the forest environment significantly. The latter two provisions could be known through EA process i.e., EA helps to analyse alternatives and select the best alternative, and it also helps to identify and predict the environmental impacts and evaluate their significance and take measures such as avoidance, mitigation and compensation to offset adverse impacts.

Along with EPA and EPR enforcement, human resources were developed through training and workshops, and review criteria were developed to ensure the quality of EA reports. The MoFSC was the leading institution in bringing EA into national policies, and developing and using EIA guideline and EA reports review guideline and IEE manual for forestry sector. One of the reasons might be the heavy pressure of development projects in forest areas as forest has

been continuously treated as the 'free resource'. This equally contributed to other sectors to focus on impact identification in forests and propose cost-based mitigation measures.

The MoFSC again took the lead role in streamlining EA process and improving quality of IEE and EIA including their associated reports (scoping document and Terms of Reference) by issuing Review Guidelines for IEE and EIA Reports of Forestry Sector (2002). Some of the additional initiatives MoFSC took are summarised below:

- a. In April 2003, MoFSC provisioned for the plantation of 25 saplings against the cutting of 1 tree, manage for 5 years and handover to local people for future management in proponent's cost in projects related to non-forestry sector including hydropower generation in order to comply with focus of maintaining 40 percent of the area under forest cover (as included in the Tenth Plan, and Budget Statement). Although severely criticized at the beginning from within and outside forestry sector, proponents understood its benefits from knowing the potential loss of number of trees and pole-sized trees and cost required for plantation and management. In due course of time, proponent calculated loss and damage to forest areas and its products and allocate required budget for compensatory plantation in IEE or EIA reports which facilitated for approval and implementation of 'no net loss' principle.
- b. In April 2004, MoFSC advised the then Ministry of Environment and Population (now MoSTE) for a provision of keeping 5 mother trees/ha having over 30cm diameter in its own clear felling project (forest clearance in Indrapur VDC) from biodiversity conservation perspectives. This introduced a concept of promoting forest regeneration.
- c. In February 2005, MoFSC brought all forest products extraction related ongoing and planned proposals under the EA system as per the EPA, 1996 and the EPR, 1997. The MoFSC introduced the concept of keeping 'mother trees' intact at the rate of 15 mother trees/hectare, also keeping mother trees in a distance of about 30m, and ensuring 5 ha plantation/district by the proponents having license to tap resin. Although number of mother trees was reduced to 5/ha, This decision provided a basis to enhance awareness on the importance of forests and forest products, and need for promoting regeneration for sustained supply of raw materials as well to forest-based industries.
- d. Understanding the pressure of non-forestry sector programmes and projects in forest areas, the Government of Nepal (cabinet decision) in April 2005 decided that proponent requiring forest area and felling of trees to implement any project must get approval from MoFSC prior to carry out IEE or EIA study. This decision provided MoFSC an opportunity to know in advance the nature and scale of projects proposed for implementation in forest areas or passes through forest areas and inform its concerned regional directorates and district forest offices to assist, when necessary, the proponent to quantify baseline data, and impacts with corresponding practical and implementable mitigation measures.
- e. In view of poor inclusion of baseline data and information in IEE reports of non-forestry sector projects planned for implementation in forest areas or that pass through the forest areas, MoFSC made a decision to encourage proponents to include necessary data and information on forests and forest products that will be affected by implementing the proposal. This was also in line with the Article 14 of the Convention on Biological Diversity

to which Nepal is a Party. In other words, it contributed to implement the Convention provisions and share information and experiences with the Parties. The requirements as included in the policy decision are annexed (Annex 9).

- f. In June 2005, MoFSC prepared and issued an IEE Manual for Forestry Sector to assist the proponent to prepare ToR and IEE report and also to assist review process. This contributed to bring forestry sector projects into the EA network and build capacity of the forestry officials in EA process.
- g. On 27 February 2007, GoN (Cabinet decision) decided a Working Procedure to provide forest area for use of non-forestry sector projects. The procedure mentioned, *inter alia*, (i) not to provide forest area to national non-priority projects and the Cabinet will decide on the national priority projects based on the concurrence of the National Planning Commission; (ii) provide minimum forest area only based on alternative analysis as most essential element of IEE or EIA study; (iii) include significant environmental impacts in small projects which need not undergo EA legally, and ensure that adverse impacts mitigation measures shall be fully implemented as proposed; (iv) manage for 5 years equal area of forest in the form of compensatory plantation in project's budget to be used by the service sector national priority projects (non-profitable) or provide equal amount to District Forest Office for plantation and maintenance for 5 years in case, proponent is unable to comply with it; (v) as (iv) for profit-oriented national priority projects but will be provided on lease and plantation at the rate of 1:25 for each tree of >10 cm diameter felled; (vi) implement compulsorily the mitigation measures as included in the approved IEE or EIA reports; and (vii) deposit budget received as per (iv) and (v) in the Government revenue account.
- h. In October 2012, GoN (Cabinet decision) issued Immediate Action Plan for Governance and Economic Improvement which mentioned to plant double number of saplings for each tree cut in areas designated by the MoFSC till the generation of 5000 MW of hydroelectricity, and provide permit to cut trees within 30 days from the date of request (if permission is not issued within 30 days, project can proceed considering as permit issued) for hydroelectric projects. This decision is expected to promote hydroelectricity generation and improve the electricity facility. It will hopefully take into consideration the other side of the coin, i.e. conservation of, and least damage to, forests and biodiversity.

1.3 Objectives of the Study and Specific Tasks

As per the ToR, the main objective of this study is to 'produce a brief review document that includes critical evaluation of environmental and social safeguards initiatives adopted in forestry and forest-related projects in Nepal'.

The ToR includes the following specific tasks:

- a. Review of forest-related environmental and social safeguard system adopted in Nepal such as in SEA, EIA and IEE;
- b. Stocktaking of previous impact studies related to implementation of SEA, EIA and IEE in forestry and forest-related projects;
- c. Identification of capacity gaps/lapses in implementing environmental and social safeguards in forestry and forest-related projects;

- d. Identification of data gaps and challenges in implementing safeguard mechanisms in forestry sector; and
- e. Suggestion on ways forward for effective and efficient implementation of environmental safeguards in forestry projects.

1.4 Methodology

In order to meet the objectives and accomplish the specific tasks mentioned above, approved IEE and EIA reports of the forests and forest-related projects including SEA report were reviewed. The following methods were employed for this study:

Information Collection: The list of approved IEE and EIA reports of forestry and forest-related sectors in particular the transportation and water resources sector were collected from the concerned ministries (such as MoPPW, MoE, MoFALD, MoSTE, DoF and DNPWC). The SEA of Nepal Water Plan, and EIA Bara Forest Management Plan and the Master Plan for Forestry Sector (SEA level) were also reviewed. In addition, major policy decisions related to forest development, conservation and management that promotes to select and include environment safeguards in IEE and EIA reports were also collected for review.

Report Review and Analysis: Based on the list of approved IEE and EIA reports and discussion with the concerned officials, sector-specific IEE or EIA reports were identified to know the level of environmental safeguards as included in the reports, and state of implementation of the safeguards in the form of environmental protection measures (benefit augmentation and adverse impacts mitigation measures) as included in these reports.

Consultation with Concerned Individuals: Based on the review information, environmental safeguards were documented and concerned officials involved in IEE and EIA reports review and approval processes were consulted. Implementation status of environmental protection measures were collected, reviewed and analysed for selected proposals.

Draft Report Preparation: This draft report has been prepared taking into consideration all elements of the tasks as specified in the ToR.

Report Finalisation: The draft report has been finalised based on the comments and suggestions received from the participants of the consultation programme organised by the REDD Forestry and Climate Change Cell on 6 March 2013, and discussion with the REDD officials on 9 April 2013.

Environmental Safeguard Measures and Their Implementation

The IEE and EIA, in principle, are project-specific assessments and should provide high level of details on impacts and mitigation measures including monitoring and auditing requirements. However, SEA is considered 'second-generation EIA' and provides impacts and corresponding safeguard measures at generic level.

As described in 1.2, the Government of Nepal has introduced number of safeguard measures to promote development, conservation, management and sustainable use of forest resources and ensure environmental sustainability. This chapter analyses the nature of safeguards proposed in the IEE and EIA reports, state of their implementation and data and capacity gaps. Analysis has been grouped for forestry sector and non-forestry sector proposals.

2.1 Forestry Sector Plans and Projects

Master Plan for Forestry Sector: Along with the policy inclusion of EIA in the Sixth and Seventh Plans, an EIA of Master Plan for Forestry Sector was carried out in 1987, and potential impacts that are likely to occur from the implementation of the proposed activities included in the Master Plan were identified and evaluated (HMG/ADB/FINNIDA, 1988; Annex 10). The EIA report mentioned that implementation of all programme components of the MPFS will have positive or favourable environmental impacts and/or no negative impact on the environment. Although, it is an EIA study, it is, by definition, of strategic level. The MPFS was partially implemented through regular government mechanism. As forest management programmes are environment-friendly in most cases, EIA study enhanced further understanding in the need for developing and conserving forests, and biodiversity at ecosystem, species and genetic levels.

Bara Forest Management Plan: An EIA study was carried out for this Plan in 1995 and environmental impacts of the Plan were identified and evaluated by using the National EIA Guidelines, 1993, and the EIA Guidelines for Forestry Sector, 1995. The Forest Management and Utilisation Development Programme prepared the operational forest management plan (OFMP) for the Bara District with management categories of production forest (even-aged and uneven-aged management), potential community forest, and protection forest. The proposed activities are immature thinning, seedling felling, regeneration felling, and selection felling. The EIA study (of strategic level) identified over 150 potential impacts and synthesised into 19 major issues and analysed based on best professional judgment attaching to magnitude, extent and duration of each positive and negative impact (IUCN Nepal, 1995). The EIA study concluded to implement the project (production forestry regime) with recommended changes in the management plan. It suggested to developing necessary baseline data so that production and conservation objectives can be properly implemented sustainably; ensuring that plans and actions are technically defensible and confirm to the principles of the World Conservation Strategy, National Conservation Strategy and the Rio

Declaration on Biodiversity, 1992; and proponent's plan will help to alleviate many social, economic and environmental problems and would be ecologically, socially and economically sound (IUCN Nepal, 1995). The recommended mitigation measures include, *inter alia*, design to control unregulated burning, grazing, fuelwood gathering and wood harvesting, design and inventory of environmentally sensitive areas, and incorporation of biodiversity and conservation principles into all harvesting and silvicultural activities. However, this plan, as proposed, was not implemented and Bara forest area was managed through general forestry management regime.

Similar study was carried out for Rautahat Forest Management Plan to integrate biodiversity and environment conservation aspects into the Plan. However, this Plan was also not implemented. Hence, Nepal has no experience on the effectiveness of environment protection measures in proposals having strategic level of environmental assessment. Although environmental studies of MPFS and Bara OFMP were mentioned as EIA, it is considered of Strategic Environmental Assessment (SEA) level as it is carried out for a policy, plan and programme, and adverse impacts assessed and mitigation measures proposed were also of strategic levels.

The following sections highlights the environmental safeguards proposed in selected IEE reports of forest management scheme, collaborative forest management scheme, extraction of sand, gravel and stone, and National Parks and/or Buffer Zone Management Plan, as sample cases.

Forest Management Scheme: The DoF has started development, conservation, management and sustainable use of forest resources by preparing and implementing forest management schemes. As per the EPR (1997), IEE should be approved before the implementation of such Scheme. As a case, approved IEE report of 5-year Forest Management Scheme of Dailekh district has been reviewed to understand the nature of activities of the scheme and environmental safeguards proposed to address potential adverse impacts likely to occur during the implementation of the scheme.

With the objectives of implementing the planned activities for the conservation, management and sustainable use of forest products of national, community and leasehold forests, and develop NTFPs through, *inter alia*, identification, mapping and management of special areas, IEE study has identified number of beneficial and adverse impacts. The Scheme also focuses on climate change particularly impact mitigation and adaptation (DFO, 2069). Implementation of management scheme would provide multiple benefits such as improvement in forest condition, increment in forest growing stock, biodiversity conservation, greenhouse gas absorption, and further improvement in socio-economic condition of the local people. In order to augment these impacts, the IEE report suggests to involving local people in forest conservation, provide training on forest products collection and transport, and control monoculture plantation in a large area with the estimated budget of NRs. 460,000 (Annex 11).

Number of likely adverse impacts such as soil erosion, soil compaction, landslides, river-bank cutting, and possible damage to small plants and animals including aquatic life from water pollution are included in the IEE report. It recommends to mobilising local people, managing regeneration with mother trees, burning or dumping of wastes and forest by-products, and providing skill training as mitigation measures with estimated budget of NRs 35,75,000. The report has proposed for baseline, compliance and impact monitoring without necessary budget for monitoring. As adverse impacts are minimal and beneficial impacts are high along with possibility of mitigating the adverse impacts, IEE report recommends to implementing the activities as included in the forest management scheme by ensuring the implementation of proposed benefits augmentation and adverse impacts mitigation measures.

Collaborative Forest Management Scheme: With the objectives of promoting sustainable and scientific management of forests, reducing ecological imbalance, ensuring easy supply of forest products to user groups and contributing to poverty reduction and national economy, DoF has prepared a 10-year collaborative forest management scheme for Kapilbastu district by involving about 15,940 households. The harvesting and forest management activities include, *inter alia*, regeneration felling, thinning and pruning, clearing, coppicing, and collection of dead and dying trees including conservation, fire line construction, afforestation, income generation, and NTFP production (Annex 12).

The DoF has approved its IEE report in January 2013 which includes beneficial and adverse impacts on physical, biological, and socio-economic and cultural aspects. Implementation of collaborative scheme would increase natural regeneration and number, size and density of different species, improve biodiversity condition including wildlife habitat, promote use of 5D (dead, dying, diseased, deformed and decayed/decaying) trees, reduce forest fire and increase water storage (DFO and KCFMG, 2068). Similarly, it will increase organic soil and its fertility, improve water holding capacity, develop greenery and reduce river-bank cutting. In addition, scheme implementation would increase seasonal employment and income of workers, improve livelihoods and economy. These impacts would be augmented by mobilising local people in collection and transportation of forest products, forest conservation and management, and NTFP entrepreneurship by investing NRs 61 lacs in the Scheme period. The IEE report also identified adverse impacts such as gully formation, CO₂ emission from forest fire, loss of trees, biodiversity and wildlife habitat, cattle grazing etc. These impacts will be mitigated through skill development and awareness raising on forest management, forest products harvesting technologies, plantation and selection of mother trees, habitat conservation etc. The IEE report estimated NRs 52 lacs for mitigation measures, and NRs. 10 lacs for environmental monitoring.

Extraction of River/Stream Sand, Gravel and Stone of Forest Area: As per the definition of forest law, extraction of sand, stone and gravels from river and stream within the forest area are used as forest products. The Bara District Forest Office prepared IEE report for the sustainable collection and extraction of sand, stone and gravel from Dudhaura and Balganga streams. It proposed to extract only 4 percent (105,000m³) of the total stock with strict regulatory provisions to avoid riverbank cutting places and within 15m both sides of stream-

banks, avoid extraction from areas having water, river flow zone, below water level, and extract from mapped areas, and rivers islands to regulate water flow.

The approved IEE report identified beneficial impacts such as decrease in riverbank cutting and protection of infrastructures and settlements, income and revenue generation, poverty reduction, sustainable supply of raw materials, and technology transfer (DFO, 2012). It proposed to enhance skill of collector (of sand, gravel and stone) and regulate collection from prescribed areas only. About 6 lacs has been proposed for augmenting beneficial impacts, particularly for skill development, bio-fencing, primary treatment, and awareness raising (Annex 13).

The identified and/or predicted adverse impacts are related to vehicular movement-induced impacts such as road damage, soil erosion, dust and noise, impact on parasites and aquatic life, microbial habitat and breeding, and accident during collection, loading and unloading of products. The mitigation measures include rotational collection and from 100m far from physical structures, prohibiting use of explosives, regulating entry to vehicles, plantation, health check-up, and security (providing helmet and primary health treatment facilities). A total of NRs. 6 lacs and 40 thousand have been proposed for mitigation measures such as soil conservation and gully control, road maintenance, awareness raising, sensitive area conservation, roadside plantation and security. The IEE report has also prescribed for environmental monitoring by allocating NRs. 3 lacs. This two year plan has included restrictive and prescriptive measures and their implementation would contribute for sustained use of construction materials, income and revenue generation.

National Park and Buffer Zone Management Plan: Established in 1973 in 932km², the Chitwan National Park aims to protect wildlife species through appropriate protection strategy and manage their habitat by applying science-based measures to maintain the world heritage value of the Park and to mainstream conservation for people's wellbeing (CNP, 2012). The IEE report was prepared and approved to manage National Park and its Buffer Zone. The Buffer zone has been categorised into conservation, sustainable use, and intensive use zones. Activities related to community development, biodiversity conservation, eco-tourism promotion, capacity building, and conflict minimisation have been proposed. As included in the IEE report, activity-based beneficial impacts are, *inter alia*, on enhancing protection system and importance of protected area conservation, reducing illegal activities, conserving wildlife, improving livelihoods, managing grasslands, increasing biodiversity, and decreasing human population pressure (Annex 14). The proposed benefits enhancement measures include river training works, awareness raising about electric fencing and its importance, promotion of local culture-based tourism, provision of immediate compensation for losses from wild animals, and also promotion of livelihood support activities with public participation.

The IEE report also predicted activity-based adverse impacts from the implementation of the management plan. They are habitat deterioration from unmanaged human population growth, park-people conflict, decrease in livestock due to controlled grazing in Park area,

trampling effect, and so on. The IEE report states that the management plan does not address issues related to wildlife victim, forest products required to growing population, strengthening the boundaries between the Park and the buffer zone, in-migration to buffer zone area and food insufficiency as fertile land is changed to other land uses including point and non-point sources of water pollution, solid wastes etc. The report has proposed mitigation measures related to proper compensation to protect people and reduce wildlife-human conflict, mapping of wildlife habitat, prohibition to the construction of huge infrastructure in National Park and Buffer Zone areas and encroachment, promoting the use of organic fertilisers, removal of illegal settlements, maintenance of air and noise standards related to brick factories, saw mill and other activities, application of bio-engineering technique to reduce flooding and erosion, crops cultivation undesired by the target animals, training and orientation to visitors for their safety and avoid disturbance to the wildlife. A total of 19 lacs has been proposed as mitigation cost for 4 years.

The IEE report proposed for revision of the Management Plan regarding systematic implementation of the guideline for the construction of cottage and other industries in buffer zone, operation of the saw mill outside 5km away from the forest area, banning of excessive excavation of sand, provision of relief for the loss of property, and management of solid wastes with people's participation, and reduction of human-wildlife conflict and habitat deterioration by encroachment. This indicates the important role IEE could play in refining management plan and making it environment-friendly and sustainable.

As mentioned above, EIA reports of 16 proposals related to the use of forest products such as resin, bark, leaves, and whole plants (sabai grass) have been approved as of January 2013. A number of EIA reports have been prepared and approved for resin tapping from pine trees and all reports are of similar quality. As case example, EIA of following proposals were reviewed:

Leaf Collection of *Taxus baccata*: The EIA on harvesting 400 metric tons leafy biomass of *Taxus baccata* annually from 9 hilly districts (Taplejung, Solukhumbu, Makawanpur, Rolpa, Rukum, Dailekh, Jajarkot, Bajhang and Bajura) was prepared by its proponent – Natural Flower and Herbal (P) Ltd – and was approved by MoSTE in 2008.

The EIA report documented positive impacts related to employment generation for leaf biomass collection and transportation, technology transfer, and revenue generation. It proposed enhancement measures such as priority employment to disadvantaged local people for leaf harvesting, interest free loan to 70 persons (one from each VDC) of the project area to support local business, training to over 300 local people on scientific techniques of leaf harvesting, involvement of over 212 workers in leaf harvesting to take responsibility of forest patrolling, and support to 18 Forest User Groups to prepare new operational plans (OPs) or for renewal of OPs.

Some negative impacts identified and predicted include formation of foot-trails and gullies in forests, deterioration of scenic beauty, damage to trees, disturbance to wildlife, possible

outbreak of fire, harm to biodiversity and possibilities of injuries and accidents to workers (NFHPL, 2008). In order to prevent, mitigate or compensate the adverse impact, EIA report proposed the measures such as construction of check dam and bioengineering works for gully control in forests, no over harvesting, no notch making in tree boles, no camping and littering inside forests, employment with safety equipment to only trained workers for leaf harvesting to save trees from damages and to keep 20% each of male and female unlopped as mother trees to ensure proper regeneration, plantation of 135 ha as compensatory measures, and prohibition to workers to smoke and lighten fire in the forests.

Additionally, leaf harvesting will not be done near identified religious or cultural heritage sites but financial support will be provided for their maintenance and renovation. A total of 15 lacs and 60 thousands have been estimated for augmentation measures, 35 lacs and 49 thousands for mitigation measures, 34 lacs for environmental monitoring and 7 lacs and 55 thousands for environmental auditing.

The then Ministry of Environment, Science and Technology (MoEST) approved with conditions the EIA report in June 2008. Some of the conditions include: (i) allocate additional budget for selection of plantation area, identification of species, and management of planted area and include all information in environmental monitoring and evaluation (M&E) report; (ii) implement environment management plan even allocating additional budget, and send M&E report annually to MoEST; and (iii) comply with all provisions and ensure people's participation and include such information in M&E report.

Sabai Grass Collection: The EIA report of Sabai grass collection from Banke, Dang, Kapilbastu, Arghakhanchi and Bara districts. Biological impacts were predicted on three broader issues – ecological balance, terrestrial fauna and habitat, and aquatic ecosystem and life. The predicted direct impacts are related to loss of ecological system, wildlife and NTFPs, illegal trafficking of NTFPs and timbers, over extraction of resources, loss of species diversity and genetic diversity, loss on feeding, hiding and nesting grounds of avian species, and impact on food web. Biological safeguards proposed in the EIA report are to leave about 10cm of the Sabai grass from the ground surface, harvest only up to 75% of the Sabai grass in any specific site and leave 25% uncut, restrict harvesting only through manual operation by using sickles, instruct to workers to harvest sensibly so that saplings of tree species are avoided from cutting as far as possible, and restrict on harvesting workers from illegal trafficking activities in and around the harvesting sites (SBPPNL, 2007).

The then MoEST approved its EIA report in August 2007 with conditions which are, in many respects, similar to collection of leafy biomass of *Taxus baccata* such as on allocation of additional budget, and compliance to legal and administrative provisions. Additional conditions include avoidance of sabai grass collection from environmentally important and sensitive areas, and religious places, and maintenance of biodiversity during grass collection.

Sukhani Martyr Memorial Park: An EIA study was carried out to develop the Sukhani Martyr Memorial Park in forests, Sanischare VDC, Jhapa district. Out of 22 ha of forest area requested

from the Government to develop park, 17 ha is occupied by forests including plantation area, 2 ha by lake (old course of stream), and remaining land as open degraded area, encroached agricultural land and access road. It proposed to maintain as jungle area, pond, parking and road (SUMMEF, 2008). The EIA study predicted to fell 22 pole-size trees, 356/ha of saplings to be destroyed by structures, effect on feeding ground and migratory route of certain mammalian wildlife, and pollution of pond water. It recommended to carry out compensatory plantation at the rate of 1:25 (more than 550 numbers of sal saplings or rubber plant will be planted).

The MoEST in July 2008 approved its EIA report by mentioning that proponent is primarily responsible for the implementation of the environmental management plan and compensatory plantation even with allocation of additional budget, submission of environmental M&E report to MoEST, and inform MoEST within three months after completion of project construction to facilitate for environmental auditing.

Lokta Collection: The Bhaktapur Craft Paper Ltd prepared lokta management plan and conducted EIA to collect more than 100 mt of lokta annually. The EIA report mentioned institutionalisation of lokta management, sustained availability of lokta for paper production, employment generation, and income sharing with government, forest user groups and local people as benefits. In order to enhance beneficial impacts, it proposed to fully implement the lokta management plan, take out bark from trees over 2m high, control inappropriate collection, and provide technical support to 8 CFUGs and lokta plantation in 10 ha of CFUGs (BCPL, 2008). The predicted adverse impacts that are likely to occur include soil erosion, skin allergy, pollution from caustic soda, fire hazard, illegal firewood collection, disturbance to wildlife habitat, and possible impact on biodiversity. The proposed mitigation measures are to construct check dam and conduct bio-engineering works, re-use of caustic soda mixed water, plant fast growing trees in private land (for firewood), provide conservation education about habitats and biodiversity. The EIA report includes Environment Management Plan and has estimated NRs. 6 lacs and 60 thousands for the implementation of augmentation measures, 12 lacs and 55 thousands for mitigation measures, and 9 lacs and 13 thousands for environmental monitoring.

The MoEST approved its EIA report in August 2008 with similar conditions as mentioned above for other forestry sector EIA reports.

In a nutshell, IEE and EIA reports of the forestry sector proposals are generic and non-site-specific impacts and provide broader guidance to make the proposal environment-friendly. The environmental safeguards are also generic and could be included as 'conditions' or 'code of conduct' while issuing permit(s) for the collections of forest products.

2.2 Non-forestry Sector Projects Planned for Implementation in Forest Areas

As mentioned above, a number of proposals requiring or not requiring environmental assessments are proposed to implement in forest areas or pass through forest areas. They are either point projects (such as hydro-electricity generation, construction of school or hospital

building or operation of quarry sites) or linear projects (such as irrigation, road or transmission line). Forest area will be lost as a part of site clearance. These projects are in general implemented by private sector or public institutions. Experience and practice shows that there is a high tendency to use forest area for the implementation of the project as there is no practice of compensating such land.

Nepal Water Plan: The SEA was carried out for 25-year Nepal Water Plan in 2003 while the Plan itself was finalised in 2004. The Plan was designed to, *inter alia*, promote the development of hydropower, irrigation, water-induced disaster management and drinking water programmes (WECS, 2004). The SEA report predicted impacts on: (i) water resources development 3Ps (policy, plan and programme) as written; (ii) water resources development 3Ps as implemented; and (iii) as suggested by Water Resources Strategy and sub-sector action plan (WECS, 2003). Uprety (2005) analysed the coverage of the Plan with focus on biodiversity conservation (Table 2).

Table 2. Impacts Consideration on Biological Resources

SN	Issues	As written in sub-sector 3Ps	WR 3 Ps as implemented	As proposed by WRS and sub-sector Action Plan
1	Forest and vegetation	<ul style="list-style-type: none"> Saves forest trees due to electricity generation and use 	<ul style="list-style-type: none"> Damage to biodiversity through habitat loss and inundation of forest area 	<ul style="list-style-type: none"> WRS does not provide specific measures for the protection and enhancement of forests and vegetation Sub-sector action plans are silent about plantation and re-vegetation activities
2	Wildlife and biodiversity	<ul style="list-style-type: none"> Commitment of the Tenth Plan on biodiversity conservation Development of database and habitat conservation 	<ul style="list-style-type: none"> BD not given proper attention Listing and description of plants and animals included in EIA report as ritual process 	<ul style="list-style-type: none"> Management of watershed and aquatic ecosystems realised with inadequate prescriptions Some measures proposed in Environmental Action Plan without programmes and activities
3	Protected areas (PAs)	<ul style="list-style-type: none"> Need for conservation of PAs as perceived in sectoral policies 	<ul style="list-style-type: none"> Approval required from MoFSC for the implementation of projects within PAs 	<ul style="list-style-type: none"> National Parks and Wildlife Reserves are not touched by WRS
4	Carbon emissions	<ul style="list-style-type: none"> Commitment on GHGs emission as a Party to UNFCCC 	<ul style="list-style-type: none"> No tangible activities formulated and implemented so far 	<ul style="list-style-type: none"> GHG issues not addressed

Note: PAs = Protected Areas; UNFCCC = UN Framework Convention on Climate Change; WR = Water Resources; WRS = Water Resources Strategy

Source: Uprety, 2005.

The SEA report summarises that clearing of huge area of forests will eliminate floristic composition, displace or fragment wildlife habitats, affect natural movement of wild animals, and also affect endangered, endemic, threatened and vulnerable plant species in the mid-

hills. The reservoir projects may emit greenhouse gases due to submergence of plant materials and destruction of biodiversity during production of 25,000MW of hydro-electricity in the Plan period (WECS, 2003). In order address these impacts, SEA report emphasises adoption of avoidance-compensation approaches, need for restoring similar critical habitats, and prohibiting touching of critical habitats. The mitigation measures as proposed in the SEA report are, *inter alia*, on compensatory plantation, making inventory of habitats, and conservation and management of biodiversity (Table 3).

Table 3. Mitigation Measures as Proposed in the SEA Report

SN	Biological Issues	Impacts Predicted	Recommended Mitigation Measures for 3Ps	Remark
1	Forests and vegetation	Deforestation, flood, erosion, and loss of rare and threatened plant species	Compensatory plantation (10 times of tree cut down), rehabilitation and conservation of habitat for rare and endangered species	Government decision on plantation (@ of 1:25 and management for five years for compensatory plantation)
2	Wildlife / biodiversity	Loss of wild animals, plants, rare and endangered species	Refer to Biodiversity Action Plan ² (BAP), 2000, and habitat restoration	Nepal Biodiversity Strategy 2002 under implementation but BAP not prepared
4	Effects on NPWR	Habitat loss of wildlife due to diversion of water upstream	Strictly follow National Park policies, legislation and regulation, and seek permission	Section 5 of the NPWC Act, 1973 prohibits to impound or divert water

Note: NPWC = National Parks and Wildlife Conservation, NPWR = NP and Wildlife Reserve
Source: Uprety, 2005.

In a nutshell, SEA of Nepal Water Plan attempted to provide generic level of information on likely impacts of water resources projects on forests and biodiversity, and options for mitigating the adverse impacts.

2.2.1 Point Projects

The IEE and EIA reports hydroelectricity generation were reviewed as point project for non-forestry sector project for the present study.

Kabeli B1 hydro-electricity project: Arun Kabeli Power Limited conducted IEE of Kabeli B1 hydro-electricity project of installed capacity 25MW in June 2012. The project has planned to use 30,692m² of forests, 9,127m² of Alaichi, 7,243m² of bare/bhir of private land; and 7,318m² of bare public land. The IEE study was carried out to: (i) study baseline status of physical, biological and socio-economic and cultural system in the project area; (ii) identify major physical, biological and socio-economic and cultural impacts of the project; (iii) identify positive impacts from the implementation of the project; (iv) suggest mitigation measures for avoiding/reducing the adverse effects; (v) provide information for decision-makers and concerned parties about the environmental cost for the implementation of mitigation

² The GoN initially drafted Biodiversity Action Plan in 2000 for discussion and the SEA team might have used that initial document. The GoN did not issue BAP but approved Nepal Biodiversity Strategy in 2002.

measures; and (vi) formulate cost-based monitoring plan. The physical, biological and socio-economic and cultural impacts were predicted for both construction and operation phases. The project activities will likely impact on legally protected species, biodiversity, forest area for project structures, disturb wildlife habitat and wildlife movement including in dewatered zone. Loss of 3.97 ha of forests, 319 seedlings/ha, 386 saplings/ha, and 373 trees >10 cm dbh (diameter at breast height) might occur in penstock alignment and service road, surge tank, and penstock alignment and service road of private forest and alainchi bari/private with direct loss of mixed broad leaved species such as sal and utis. The total loss of biomass will be 30m³ (AKPL, 2012).

In order to mitigate these impacts during the construction phase, it is proposed to provide special knowledge for conservation of rare, endangered and threatened species, minimise forest clearance, dump excavated spoil in access road and disposed slopes, cut tree of greater than 15cm dbh, conduct compensatory plantation (9,325 number of trees) at the rate of 1:25 at the open places and along the penstock alignment by involving local people, provide training to Community Forestry User Groups (CFUGs), reforest degraded areas and spoil disposal areas, prohibit illegal felling, discourage firewood collection for workers, prohibit labour camp inside the forest, and also prohibit wildlife poaching. During the operation phase, it is proposed to plant hedge type local species on the top of the penstock pipe. The IEE report includes NRs. 1,82,00,000/ for benefit enhancement and NRs. 2,36,65,689/ for mitigation measures. The total environmental cost (enhancement measures, mitigation measures, and monitoring) is calculated 1.3 percent of the total project cost, and the total environmental cost to total project benefit is only 0.21 percent.

Upper Tamakoshi Hydropower Project: An EIA of Upper Tamakoshi Hydropower Project with installed capacity of 309MW and with 60m long and height of 15m high dam from river bed was prepared in 2005. This project will cover 21.3 ha of surface area (reservoir). During EIA report preparation, a total of 277 plant species (98 species of trees, 70 species of shrubs, 72 species of herbs and grasses, 15 species of climbers, 13 species of ferns and 9 species of orchids) were recorded in the project area. Of them, 19 species were either endangered or protected. Twenty two species of mammals and 46 species of birds (mostly residential) were reported. Thirteen species belong to mammals included in the CITES appendices and 8 species of birds are either endangered or protected. The potential impacts, identified or predicted, on local forests are loss of more than 8,400 trees of various sizes with their standing wood volume, effects on 48 ha of forests including shrub-land assuming an average 20m wide right-of-way for access road, settling basin, spoil deposits, and road to surge tank (NEA, 2006).

The implementation of this Project will affect the existing terrestrial and aquatic ecosystems. Construction activities will disturb the wildlife habitat at headworks and powerhouse site and along the 28 km long access road. Heavy influx of outsiders will exert pressure on vegetation and forests and will decline Tree fern and orchids including rare plants of medicinal value. The Project will acquire 78ha of forest land for the construction of access road (36ha) and hydropower generation (12ha) component. Remaining 30ha of forest is marginal and degraded. In hydro-component, 2279 trees (767 pole-sized and 1512 above pole-sized) will be

cut down. Additional 8420 trees will be felled in access road and project facilities. Mature trees are 3808, 1362 and 120 trees belonging to national, community and private land and will be lost as a part of site clearance. The adjoining forests will likely be affected due to collection of timber, firewood and NTFPs.

During the construction period, the EIA report proposed, *inter alia*, to organise special instructional and awareness-raising trainings for workforce and local people to deter illegal poaching activities, ban purchase and sale of wildlife products in the project site, and establish wildlife conservation programmes in co-ordination with DNPWC. It proposed to adopt selected felling approach to minimize the loss of vegetation at the project construction site, utilise forest products from government-managed forest as per forestry regulations, hand-over products of community forests to the concerned CFUGs, and establish satellite nurseries one in each community forest.

The EIA report estimated NRs. 14 lacs and 70 thousands for training, conservation tours and expert fee to mitigate impacts on wildlife for the construction period. The Report proposed to provide compensation for lost trees to owner at the rate of NRs. 1000/matured tree, and NRs. 500/pole-sized tree. As a compensatory measure for the loss of trees and forest area due to site clearance, plantation at the rate of 1:25 is recommended. Estimated mitigation cost for trees lost and replacement plantation totals to NRs. 1 crore, 16 lacs and 62 thousands. The EIA study also proposed to establish Environment Management Unit to implement environment management plan (EMP). The NRs 25,62,00,000 or USD 3.6 million has been estimated for EMP implementation of the generation project. This cost includes mitigation and enhancement cost, monitoring cost and auditing cost. The total Environmental Management Cost for the entire project (generation plus transmission line) amounts to approximately 1.5 % of the total project cost (US \$ 338 million).

The MoEST approved its EIA report in August 2006 with conditions such as implementation of EMP in its own cost, attempt to avoid, mitigate and compensate environmental impacts during technical design, comply with legal provisions if attracted during project implementation, allocate additional budget for compensatory plantation, if required and manage for 5 years in its own cost. If area for plantation is not available, the proponent should conduct a study on economic value of ecological goods and services of forests and biodiversity that will be directly lost using appropriate methods and compensate to the owners of the forests (resources). Other conditions are of generic nature such as inclusion of EMP implementation in M&E report, inform MoEST within three months about the completion of the construction stage to facilitate for environmental auditing, ensure ecosystem restoration taking into consideration the inter-dependence and inter-relationship between hydroelectric project and watersheds, and conduct supplementary study before project construction in areas such as (i) loss of food grain production both in terms of yield (mt), (ii) loss of income in terms of source, amount and percentage, (iii) loss of existing livelihood, (iv) identification of resettlement area, (v) consideration of road geometry while transporting necessary equipment and possible impacts on Lamosangu road section (as raised during review and evaluation of the report).

2.2.2 Linear Projects

Linear projects include the construction and implementation of irrigation, transmission lines and road projects for the present purpose. Some IEE and EIA reports were reviewed to know the nature of environmental safeguards as included in IEE or EIA reports of non-forestry sector proposals. In general, irrigation projects are constructed by the Department of Irrigation (DoI), transmission line projects by the Nepal Electricity Authority (NEA), and road projects either by the Department of Road or Department of Local Infrastructure Development and Agricultural Road (DOLIDAR).

Jagati Police Station-Doleshwar-Ashapuri Road: The Ministry of Federal Affairs and Local Development approved the IEE report of 10 km long Jagati Police Station – Doleshwar – Ashapuri Road (upgrading) Sub-Project located at Bhaktapur recently. About 500m of road passes through the Soche Thulo Gaun community forests. The IEE was carried to identify impacts during construction and operation on the physical, biological, socio-economic and cultural environment of the Subproject area; recommend site-specific mitigation measures for adverse impacts, benefit augmentation measures for beneficial impacts; and prepare and implement environmental monitoring plan. The IEE report documents employment generation to about 70,862 and 18,981 man-days for unskilled and skilled persons, and skill development, easy accessibility, improvement of economic condition, promotion of agro-based industries, and social service facilities as beneficial impacts.

Major adverse impacts identified and predicted for construction stage include 0.04 ha of permanent loss of forest area, likely depletion of forests due to inappropriate spoil disposal and construction practices and the development of market centres, cutting of slopes and consequently disposal of soil and earthen material, quarries-induced erosion and landslides, and possible impacts on wildlife as workers might harass/hunt them. The road project during the operational stage might increase timber smuggling due to easy access and easy transportation facilities, disturb wildlife due to frequent movement of vehicles and horn blowing in forest area, illegal hunting, and depletion of forest resources and wildlife due to easy access and development of unplanned new settlement, bazaar area expansion and encroachment of the RoW (DDC, 2012).

The IEE report recommends to adopt labour-based, environment friendly and participatory (LEP) and contractor modality for road construction, conduct compensatory plantation of trees in forest areas at 1:25 ratio + 10 % and in private land at 1:1 ratio, ensure roadside tree plantation for greenery development, prohibit blowing horns in the dense forest areas, erect information signboard at potential areas of wildlife crossing, and conduct awareness training to driver to limit speed and horn use, take precaution while cutting slopes, dispose spoils and quarrying activities. The IEE report has proposed NRs. 6,24,83,443/ for the implementation and monitoring of mitigation measures (includes awareness and training, insurance, signboard, restoration or relocation of affected infrastructure, labour camp site management, bio-engineering/roadside tree plantation, spoils management, occupational health and safety

and central level monitoring) for minimizing adverse impacts and maximizing the beneficial impacts. For bio-engineering/roadside plantation alone, NRs. 80,34,779/ has been proposed.

Makalu Cement Factory Access Road: The Geo-Environment and Social Unit (GESU) of the Department of Roads prepared an IEE of Makalu Cement Factory Access Road (Kapilbastu-Arghakhachi districts). The 26km long road will start at Pipara Chowk (Kapilbastu) and end at Kamere (Arghakhachi) and is in the process for approval by the Ministry of Physical Planning and Works. The proposed road passes through the forests in Terai, Siwaliks and Mahabharat range. About 15km of road is new track. This district road will have formation width of 8m and carriage width of 6m with 15m right-of-way. The IEE report has grouped activities/issues and impacts/issues with corresponding mitigation measures. On forests and biological environment, the report identified disturbance to wildlife and habitat reduction as adverse impacts for construction stage, and easy access to poachers, illegal extraction of firewood and timber, and forest encroachment as adverse impacts for operation stage. It mentioned construction stage impact insignificant although road passes through forests, and operational stage impacts are significant.

Mitigation measures proposed include: (i) restriction on collection of firewood and forest product, and unnecessary gathering of people inside the forests; (ii) enforcement of law, vigilance and monitoring with community participation; and (iii) awareness raising and training to driver to limit speed and horn use (DoR, 2012).

Balanch-Attaiya 132 KV Transmission Line Project: The Nepal Electricity Authority conducted EIA of this 131km (new) long transmission line project to evacuate electricity to be generated by the Chameliya Hydroelectricity Project (CHEP) and by connecting CHEP switchyard to Attariya sub-station. The objectives of the EIA study are to: (i) establish the physical, biological, socioeconomic and cultural baseline conditions in the Project area; (ii) identify positive, adverse and cumulative impacts in terms of expected magnitude, extent and duration during the construction and operation of the Project; (iii) carry out alternative analysis; (iv) inform decision makers about likely implications of the implementation of the proposal; (v) suggest feasible mitigation measures for potential adverse impacts; (vi) prepare an environmental management plan and effective monitoring and auditing plans for the implementation of the Project; and (vii) recommend whether to implement the proposed Project.

The transmission line will affect the 139ha of forest (80ha to be cleared as a part of site clearance), 10km of barren lands, and 2km of thatch grass area on slopes at its different stretches out of 252ha of different land uses. About 90 percent of the forest clearance will be at Kailai district. Of this 80ha of forest clearance, 74ha (with 9967 number of trees) and 6ha (with 1320 number of trees) are under national forests and community forests respectively with total of 11,287 trees. The EIA report mentioned 1738 protected trees (*Shorea robusta*, *Acacia catechu* and *Bombax ceiba*). The project will adversely affect orchids, forest resources for firewood and timber for camp construction, NTFPs, wildlife habitat and its fragmentation. It also predicted possible impact on normal movement and feeding of mammals, hunting and

poaching by workforce during the construction stage. The EIA report has mentioned encroachment to nearby forest, emergence of new species, exploitation of NTFPs, and possible bird collision, and electrocution of birds as the operation stage adverse impacts. Impacts related to loss of forest, protected and threatened species as per CITES are evaluated highly significant (NEA and CHEP, 2008).

Environmental safeguards as proposed in the EIA report in the form of adverse impacts mitigation measures include, *inter alia*, to: (i) minimise tree harvest in gullies and fragile areas; (ii) keep smaller trees less than 8m high intact; (iii) avoid harvesting of shrubs and ground cover except in tower pad area; (iv) utilise harvested wood and forest products as per forest regulations; (v) cost of harvesting, logging and transporting tree to be provided to concerned agency (Rules 65 of Forest Rules, 2051); (vi) prohibit project workers to collect NTFPs; (vii) conduct compensatory plantation at the rate of 1:25 and plant 282,175 (11,287x25) in about 113ha of five project district including 7 community forests to be affected by the Project; (viii) provide financial assistance to CFUGs for capacity building, observation tours and planting medicinal species; (ix) grow native fruit trees, shrubs, medicinal plants and grass/fodder legumes in RoW with community participation; (x) provide financial assistance to DFO for implementation of forestry programmes such as compensatory plantation, re-vegetation, establishment of nursery etc.; (xi) conduct awareness programmes for wildlife conservation; and (xii) discourage workers for hunting and poaching of wildlife. The total cost for environmental management is NRs. 53.50 million which includes NRs. 48.41 million for impact mitigation, NRs. 3.23 million for environmental monitoring and NRs. 1.86 million for environmental auditing. The total environmental cost is 4.47 percent of the total estimated project cost.

Fattepur Irrigation Sub-Project: The Irrigation Development Project: Mid-Western Development Region, Department of Irrigation prepared an EIA report of Fattepur Irrigation Sub-Project (FISP) in 2000 with the objectives of providing irrigation facility to a provisional gross command area of about 3,000ha and provisional cultivable area of 2580ha. The main canal was 13.5km long with an idle length of 4.15km in forests. The right-of-way of the main canal will be maintained at 15 m on each side. As the whole canal passes through the Government-managed forest area, the canal construction may affect 1063 mature trees, 430 pole-sized trees, and about 1914 per ha of saplings in mixed hardwood forest. The number of seedling (<1m height) and saplings (>1m height and <12cm diameter) was estimated at about 2000 and 1100/ha respectively. Community forest was not handed in 2000. Local people depend on forests for meeting the demand for timber, fodder, firewood, medicine and food. About 77,000 cft of wood volume that will be extracted as a part of site clearance was proposed to provide to labour force at subsidized price, tea stalls and restaurants at market price (DoI, 2000).

The EIA report mentioned to plant about 7,500 tree saplings in 4.7 ha of land as compensatory plantation. Forestry officials should visit the construction site at national forest at regular interval to minimize illegal collection of forest products, and wildlife poaching or trapping. In order to ensure wildlife crossing, an addition cross point near the intake site was

recommended. It was considered that the canal system functions as a barrier for illegal collection of forest products and contributes to conserve the existing forest. The village roads planned for construction will minimize wildlife crossing in the forest area. The compensatory plantation will improve the forest conditions.

It was suggested to monitor the actual loss of forest area and quantity of wood extracted as a part of site clearance, utilization of timber and firewood, pressure of workers on natural forests, numbers of worker's huts and average amount of firewood consumed by a labour in a month, number of tea stalls and lodges operated in the project and their firewood requirement during the construction stage. The number of wild animals trapped or hunted, if any, condition of compensatory plantation, number of wild animals or cattle felled in the canal were proposed for monitoring during the operational stage.

Although, about 32 ha of the degraded forest was predicted to be lost as a part of site clearance, compensatory plantation double to the lost area was instructed for development in the project cost during the EIA report approval and handover to the communities for future management.

Review of environmental measures as included in the IEE and EIA report clearly indicates for compensatory plantation at the rate of 1:25 in the reports prepared after 2005. Previous reports also consider the importance of plantation and forest conservation but they did not clearly mention the area to be affected and number of saplings to be planted. Area of forest to be affected by project activities is also estimated in the recently prepared reports without details on how to get the forest area, and when to implement environmental safeguard measures.

2.3 Implementation Status

The approved IEE and EIA reports are legal documents and need to comply with. Once IEE or EIA reports are approved, firstly, environment protection measures should be integrated into project design as an in-built measure. Secondly, environmental monitoring provides opportunities to know the level of compliance, and effectiveness of the measures implemented. And then the environmental auditing provides information on the change between pre- and post-project conditions of the forests and the environment.

During the last one and half decade, IEE and EIA reports of about 1000 projects of different sectors might have been approved by competent authorities. Many of the hydro-electricity generation projects (HEPs) having IEE or EIA reports approved are yet to be implemented. Effective implementation of IEE approved HEPs alone could generate about 800MW and solve electricity shortage. Taking this into account, the following projects illustrate the level of implementation, and contribution of the environmental safeguards in 'safeguarding' the resources in particular the forests and biodiversity.

2.3.1 Point Projects

Modi Khola HEP: The NEA designed a run-of-river Modi Khola Hydroelectric Project with an installed capacity of 14.8 MW. The NEA prepared an EIA report in January 1996 before the enforcement of EPA, 1996 & EPR, 1997. It carried out environmental monitoring at later stage of construction, and prepared its environmental monitoring and auditing reports. This case is based on the auditing report.



Modi Khol HEP - Dam Site

The EIA report documented six types of forests namely (i) hill/riparian Sal forest, (ii) Chilaune-Katush forest, (iii) tropical mixed hardwood hill forest, (iv) chir pine forest, (v) riparian tropical hardwood forest, and (vi) Uttis forest in the project area. The EIA study predicted increased demand for forest products to a large number of workforce to be involved in the project construction stage and they will ultimately depend upon forests lying in and nearby the project site. The EIA report recommended to using felled trees for fuelwood, poles and timber. To compensate the loss of vegetation, plantation of indigenous plant species was recommended. Similarly, need for supplying LPG and kerosene was recommended to reduce possible forest encroachment and dependence of the construction workforce on forest products. The EIA report also recommended to prohibiting illegal hunting and poaching, and re-vegetating open spaces to restore wildlife habitat.

The environmental auditing focussed on replenishment of vegetation growth, impact of forest area clearance, compensatory plantation, and supply of forest products and compliance with the environmental requirements. As parts of mitigation measures, usage of kerosene was encouraged and/or enforced to reduce encroachment of forests and utilise forest products. Only negligible numbers of trees were cleared for the construction of different structures around the power generation site. *Shorea robusta* and *Bombax malabaricum* forest nearby the project site was recorded undisturbed in environmental monitoring and auditing reports. Felled trees were given to the concerned people. After the construction of project, around 3ha around the headwork, powerhouse and camp site was planted with indigenous species to compensate construction related loss. Similarly plants having reasonable soil-binding properties were planted to reinforce slope protection (engineering) measures (SRCL, 2002, Upreti, 2006).

Construction of new houses in the project area has not accelerated forest encroachment, and it was drastically reduced in the operational stage. Most of the tea stalls and restaurants were closed after the completion of project construction. Records of the local firewood depots indicated no significant increase in firewood and timber trade. Labourers used kerosene and its consumption reached up to 2500 litres/week during the construction phase. It has been reduced by 60 percent after the construction was over. None of the medicinal plants were

reported illegally collected or sold by the construction workers, i.e., project-induced trade of medicinal plants was not noticed as mentioned in the EIA report.

The auditing report clearly mentioned that the Project strictly prohibited hunting and trapping of wildlife, and no such events were recorded. Labourers were not involved in trading of wildlife and its products. No significant change in wildlife habitat was noticed.

Impact predicted and actual impacts observed differ in many cases and signals on the need for having quantitative baseline data and prediction as well. Mitigation measures proposed are not site-specific to deal with site-specific issues. Overall the project has considered forests and biodiversity conservation aspects, and efforts are appreciating.

Indrawati-III HEP: The National Hydropower Company (NHPC) Ltd., a private company, in February 1998 conducted IEE to generate 5 MW from the Indrawati River – the Indrawati III Hydroelectricity Project (HEP). The then Ministry of Water Resources issued the licence in October 2001 to generate 7.5 MW by approving the EIA report.

The EIA report identified and predicted impacts related to: (i) loss of forest cover at intake and access road (about 0.2 ha) – felling of 20 trees; (ii) loss of forest biomass (0.4 m³ and 0.349 m³ at intake and access road respectively); (iii) loss of some rare/endangered species, over exploitation of non-timber forest products, and increase in felling of trees (by the labourers); (iv) loss of grazing land (because of no practice on livestock stall-feeding); (v) and disturbance to non-residential wildlife and birds. The report has also included beneficial impacts such as increase in vegetation cover, decrease in dependency on fuelwoods, and conservation of riparian habitats.

In order to avoid or mitigate or compensate these impacts, the EIA reports recommended to: (i) count and mark trees and shrubs and obtain prior approval before felling, and also provide firewood and timber to construction workers at subsidised price to avoid or minimise firewood collection from the forests; (ii) keep mother trees intact to promote natural regeneration, and protect them for at least three years at proponent's cost; (iii) develop about 0.6 ha of compensatory plantation with locally available trees and shrubs which is three times the actual loss of forest area, and plant *Swertia chirata* and *Arundinaria nepalensis* in cleared sites, and *Alnus nepalensis* in the degraded hill slopes, and allocate fund for the plantation of 1500 trees/ha including its management and protection for about 3 years, and then handover to users for future management; (iv) provide at least five locally available saplings of trees or fruits to the affected owner; (v) provide fuel to the construction workers; (vi) support for forest regeneration programme in the immediate watershed of the project area; (viii) provide some counselling services for the promotion of agro-forestry, non-timber forest products, and horticultural crops cultivation by providing saplings and other incentives to the farmers; (ix) rehabilitate spoil disposal sites by planting indigenous plant species; and (x) monitor activities of the construction workers to control wildlife poaching, and avoid construction activities during wildlife movement time.

The Auditing Report concluded that the forest cover has not been recovered as stipulated in the EIA report. The Project had supported Golma Raja Golma Rani Community Forest Users' Group to establish plant nursery which does not exist now (MoEST, 2008). The right bank features rocky substrata with no submergence of trees and protected species. People believed that the impact on downstream aquatic and terrestrial flora was low.

Locals reported reduced sightings of wild animals in the project area. Infrastructure and higher intensity of light even during night time might be one of the causes for this change. Increased movement of vehicles plying has resulted in disturbance to the wildlife even during the day time. The approach for minimizing forest loss, support to two local community forests and establishment of plant nursery by involving the CFUGs are some of the remarkable achievements of the project for the conservation of natural resources. Some mitigation/benefit augmentation works are done though not committed in the EIA report.

This audit report recommended to: (i) replicate the approach adopted to maintaining minimum clear felling of trees; (ii) implement bioengineering works during construction stage or immediately after it; and (iii) integrate environmental monitoring as a major component of the project administration.

2.3.2 Linear Projects

Modi-Pokhara 132 KV Transmission Line: The NEA prepared an IEE report for 37km long transmission line (TL) in February 1999 to evacuate electricity generated in Modi Khola HEP. The proponent carried out environmental monitoring and auditing.

About 35 percent of 35.6 km new construction TL passes through forests. The EIA report recommended to minimising felling of trees and shrubs as far as possible and maintain only 5m strip at the valley and gully areas for wire stringing. It also recommended to planting indigenous species in 18 ha of area as compensatory plantation in the Project vicinity, and maintaining the dwarf variety of vegetation within the RoW in the forest area.

In TL component, clear felling of 5m strip was maintained in valley and gully areas. Felled tree products were given to the concerned CFUGs as incentives. About 18 ha of barren land within 12 different community forests were planted with the technical assistance of the District Forest Office. Dwarf variety of plant species was planted in the forest land below the conductor wherever possible. The most affected species were sallo and chilaune and a total 354 trees were felled down (ICN, 2000).



Modi Khola Transmission Line

As recommended in the EIA report, all areas occupied by 18m RoW were not cleared to string the conductor. Only trees lying within 18m RoW that directly affects the conductor and

transmission tower were cleared. Construction contractors and labourers were strictly instructed to use kerosene to meet their energy demand for cooking, and avoid use of forest products. 447 trees of various species having 10cm dbh were felled in whole TL alignment. No events of hunting and trapping of wildlife were recorded. The conductor has also provided a new resting habitat for rock pigeon and other bird species. Adoption of strict labour-based policy worked well to least damage forests (SRCL, 2002). No significant change in wildlife habitat was noticed, except habitat isolation.

The Project has planted a total of 576 saplings of 14 species at the office complex, 310 saplings of 3 species at the powerhouse site, and 1145 saplings of 11 species at the headwork site. Survival rate was 47, 78 and 67 percent for office complex, powerhouse and headworks sites respectively (SRCL, 2002). A total of 2031 saplings of 20 species were planted and the average survival rate was 63 percent.

Fattepur Irrigation Sub-Project: As mentioned in 2.2.2, a total of 1493 plants of different species were removed during the construction of the Project (Table 4) to construct about 4.15 km of idle length of the 13.5 km long main canal in forest area. The most affected species were *Adina cordifolia* and *Mallotus philippensis*. A total of 32 ha of forests was affected.



Intake of Fattepur Irrigation Project

The major structures that passed through the forests were main canal aquaduct, main canal super-passage, village road and bridge, escape structures, siphon of hume pipes, and inlet structures. Wildlife occurrence along the irrigation canal was not encouraging and the project did not affect the wildlife species and their population but it has affected their free movement.



Canal alignment in forests

Table 4: Species-Wise Tree Removal in the Phattepur Irrigation Sub-Project

SN	Name of Species	Local Name	Number of Trees Removed	Remark
1	<i>Acacia catechu</i>	Khayar	65	A total of 18575.21 cubic feet of timber wood extracted and about 2814 tons of firewood obtained Species which have no good quality timber kept under other category, and these species include <i>Mallotus philippensis</i> , <i>Eurya acuminata</i> , <i>Hymenodictyon excelsum</i> , <i>Schleichera oleosa</i> etc. for this project
2	<i>Adina cordifolia</i>	Karma	234	
3	<i>Shorea robusta</i>	Sal	4	
4	<i>Syzygium cumuni</i>	Jamun	69	
5	Other species		63	
6	All pole sized species		1058	
	Total		1493	

Source: Uprety, 2006

The Project provided funding to the District Forest Office (DFO), Banke for compensatory plantation and management. The DFO raised 104,000 saplings in May 2002 and planted in June-July in about 65 hectares of the forest area. Major species planted were *Dalbergia sissoo*, *Acacia catechu*, *Eucalyptus spp.* *Bombax ceiba*, and species of *Albizia* (local siris and Chinese siris).



Plantation in Forest Area

The saplings were very young during plantation, encroached by weeds, and survival rate was about 15 percent only. The plantation area was fenced and merged with the community forestry area. Although plantation is considered a failure in terms of species survival rate and species diversity, regeneration in the plantation site was encouraging due to fencing with indication of ineffective environmental compliance to restore ecological balance. The problem is also related to site selection.



Banepa-Sindhuli-Bardibas Road (Section II, Sindhuli Bazar-Khurkot Section): This 39 km. long Section starts at Sindhuli Bazar and ends at Khurkot. As mentioned in the approved EIA report (2000), out of 39 km. long road, a total of 19.66 km. of road passes through forest area. Out of this, 5.6 km of road passes through CFs and remaining 13.86 km from State-managed forests.



Difficult Terrain in BSRP: Section II

About 39,000 trees (of 59 ha) and 1.1 million ft³ of wood will likely to be affected assuming the clearance of 30m right-of-way (RoW) and possible loss of 13,000 trees by clearing only 10 m RoW and 0.3 million ft³ of wood. Possible loss of weights of stem, branch and leaf was estimated at 0.05 million tons, 0.03 million tons, and 0.9 million tons respectively. The EIA report proposed compensatory plantation double the forest areas to be cleared. Possible extraction of more forest products was noted for heating bitumen. It recommended to plant and conserve about 1 million indigenous plant species along the roadside, RoW, and farmlands as compensatory plantation to increase green cover.

About 20 km of natural wildlife habitat will be fragmented in mixed, sal dominated and pine forests at different stretches of road and it will likely disturb wildlife movement continuously. It is proposed to limit use of horn in forest areas, control poaching and regulate movement of

labour force and their dependents into the forest areas, and monitor activities of construction workers and officials to avoid or minimize wildlife harassment, trapping and poaching, if any. A total of NRs. 0.625 million was allocated for compensatory plantation with provisions for monitoring plant growth rates. A total of 12 man-months and NRs. 180,000/ was allocated for the forestry official for monitoring purposes. The EIA report focused on auditing of the impacts of forest clearance, compensatory plantation, and impacts on wildlife due to habitat fragmentation.

A total 4335 trees were marked for cutting and 2305 were felled as of December 2006. For example, at 0km to 12.5km, 1110 trees were marked for removal and only 610 trees were cut down by realigning the road in some portions in order to least affect the forests (Uprety, 2006). The Japanese consultant and the contractor were noted fully concerned with minimising the impacts of road construction on forest resources. Mitigation measures were implemented except the compensatory plantation in 2006 and planned for plantation in 2007. Wildlife chasing, harassing, hunting, and poaching were not reported during the construction of about 30 km of road. Some measures such as establishment of forest check posts and use of extracted forest products were not complied with. In a nutshell, road construction has affected forests greatly as part of site clearance.

In general, changes are noticed over the years on the saying 'once environment assessment (IEE or EIA) report is approved, environment is automatically managed'. Increased social responsibility of the proponents has encouraged for implementation of environmental safeguards. Proponents have complied with the requirements for compensatory plantation, and management of plantation areas is yet to be fully realised. Many of the impacts related to wildlife did not happen as predicted in the linear and point projects. This may be due to disjointed information in baselines, impacts and corresponding environment protection measures in the EIA report. Forest products obtained from community forests were given to the Community Forestry User Groups as an incentive.

In the Fattepur Irrigation Sub-Project, compensatory plantation was ineffective which might be related to size of saplings, site, ownership and approaching to compliance only. Although the project complied with the EIA recommendation, it was not found effective.

In BSRP, better planning and construction contributed to minimise loss of forest areas and trees. The project did not encourage use of timbers for construction (bridge/culvert) of wood frames. Collection of woods in steep slopes is costly and the project left the felled trees after cost calculation for collection of fallen trees and its sale price. This demonstrates the need for rethinking on location and landscape of the road alignment before proposing mitigation measures for specific impact.



Costly collection

Projects have demonstrated importance of forest management. Habitat fragmentation is a permanent effect in the dense forests. However, stringent monitoring will reduce wildlife chasing, harassing, poaching and hunting and illegal use of forest products.

Impact assessment needs relatively experienced, knowledgeable and skilful persons to ensure the nature of data and information required, analyse nature and significance of impacts likely to occur during project implementation (construction and operation, as appropriate) and type of environment protection measures proposed. In Nepal, IEE and EIA can be carried out by any individual or any organisation. This resulted to the preparation of under quality IEE and EIA reports. This problem has recently been addressed to make the experts and consulting firm responsible on quality and authenticity of the report (Annex 3).

Review of implementation status indicates the understanding on the need for least damaging the forest and its management. The projects have allocated necessary budget particularly for extraction of forest products and compensatory plantation. However, environmental monitoring is yet to be institutionalised.

2.3 Data and Capacity Gap

Data: During the last 15 years of enforcement of EPA and EPR, institutional strengthening and capacity building for EA tool, it is yet to know what is available and what is needed to bridge the gap in data, information, and capacity. As Nepal introduced and expanded the use of this tool through 'learning by doing' approach, qualitative assessment has shadowed the need for quantitative impacts.

Habitat fragmentation in the linear projects such as road and irrigation is unavoidable and is a permanent effect. Impacts predicted on wildlife were not substantiated with the baseline data and information. Institutionalisation of reporting system was inadequate and could not provide information on the level of compliance and non-compliance with mitigation measures and also effectiveness of implemented measures. Furthermore, it could not encourage proponents and legally responsible bodies for environmental monitoring and auditing. Based on this review, important data gaps are listed below:

Inadequate Data: In many IEE and EIA report and also in the SEA, baseline data was either lacking or inadequate to analyse environmental impacts quantitatively. The ToR provides opportunities to identify in advance the nature and quality of data required. As data and information collection is comparatively costly, important data were found also missed. Furthermore, inconsistencies on data and information prevail in many reports which might be related to inadequate interaction between the EA and pre-feasibility and feasibility study teams. In general understanding, data and information on physical environment is generated by the feasibility study team which will be valuable for EIA team to identify and predict impacts and select corresponding mitigation measures.

Irrelevant Data: In forestry sector projects, socio-economic and cultural information outside the forest area or in some cases district level information provides difficulties to quantify site-

specific impacts. Inadequate understanding on the type, nature and quality of data and information required led to the inclusion of unnecessary data and information in many reports. Because of this, including other aspects, impact identification and prediction in forestry sector IEE and EIA reports are sufficiently broad.

Unlinked information: Collection and analysis of baseline data and information is guided by scoping document and ToR for EIA study and ToR for IEE study. Some of the reports reviewed (in particular of non-forestry sector EIA reports) showed that baseline data are not linked with impacts, impact information are unlinked with proposed environmental measures, and measures are not linked with proposed monitoring parameters. For example, baseline information mentioned no rare and endangered species while proponent wrote in impact section some impacts on rare and endangered species.

Documentation: Importance of approved IEE and EIA reports will be realised during the implementation of project and environmental measures, monitoring and auditing. Documents are available but there is no system for appropriately keeping them for longer period.

2.4.1 Forestry Sector Plans and Projects

Nature of data and information required for impact identification, prediction and evaluation and selection of preventive, corrective and compensatory measures would depend upon the nature, type and location of the proposal.

Most of the forestry sector proposals are related to the collection of forest products such as leaf, bark, resin or fruit as raw materials for industries or selling of processed raw materials. Forestry sector IEE and EIA reports have collected baseline data on broader areas of physical and chemical, biological, and socio-economic and cultural domain of the environment. For example, leaf or resin collection might be from different forests in the district or from different districts. In principle, IEE and EIA are project-specific studies and should pin-point the nature of impact – direct or indirect – with its magnitude, extent and duration. Although this has been tried in both IEE and EIA reports, they are generic and non-site specific with corresponding non-site-specific environment protection measures. In a nutshell, almost all IEE and EIA reports are of strategic level, i.e., generic. It shows the need to focus on the nature of data and information required to evaluate the significance of the impacts. More focus should be given to generate data on biological aspects. For example, how much resin could be tapped from x number of pine tree having x girth and x height of approximately x age? More information is required on residential or migratory wild animals, core or primary or secondary or 'supporting' habitat. Extended effort in collecting baseline data and information from knowledgeable local people and forest users may provide realistic data which help to evaluate the significance of impacts using quantitative criteria.

The review of IEE and EIA reports of the forestry sector such as of 5-year forest management scheme of districts, collaborative forest management scheme and extraction of sand, stones, pebbles and gravel and collection of resin, leaf, bark and whole plant (Sabai grass) calls for rethinking the nature of data and information required with corresponding methods for

impacts evaluation. In some of the IEE report, the objectives of IEE don't include the need for the identification, prediction and evaluation of impacts, and jumps for proposing benefits augmentation measures and adverse impacts mitigation measures. Many IEE or EIA reports do not capture the elements of project-level assessment, meaning collection of data and information using appropriate methods, categorising impacts into identified, predicted and evaluated, and proposing measures that can avoid impacts, mitigate or compensate the impacts. The linkage between baseline, impacts, measures and monitoring parameters are yet to be established in most of the IEE and EIA reports reviewed. Taking into consideration the availability of trained human resources in forestry sector, there are multiple avenues and ample opportunities to improve data base and quality of report and implement measures as well.

2.4.2 Non-forestry Sector Projects Planned for Implementation in Forest Areas

The IEE and EIA studies were also carried out for hydroelectric generation and road projects prior to the endorsement of National EIA Guidelines (1993), EIA Guidelines for Forestry Sector (1995), Environment Protection Act (1996), Environment Protection Rules (1997) and decisions on environmental safeguards by the Government in forestry sector. This led to the varied quality of IEE and EIA reports of proposals that are proposed to implement in forest areas or pass through the forests which might be related to inadequate guidance on preparing the EA report by following the basic principles and practices. The IEE and EIA reports prepared till 2003 included generic and even non-site-specific impacts on forests and wildlife with mitigation measures and lump-sum budget 'as donation', particularly for plantation activities.

The MoFSC decisions on the need for quantitative data and information and compensatory plantation @ 1:25 and manage for 5 years in proponent's cost contributed to improve the quality of report on forests and forest products. The medium and big-sized non-forestry sector proposals have started quantifying possible loss of different types of tree species or plants of more than 10cm dbh, and subjective impacts on wildlife such as mammals and birds. There is still a tendency to qualify and include subjective impacts which might be related to low level of efforts in collecting site-specific data and information.

Capacity: As National EIA Guidelines and EIA Guidelines for Forestry Sector were prepared through country-driven 'consultative' process, and 'learning by doing' approach within limited sectors, this resulted to preparation of sectoral guidelines. In late 1990s and early 2000s, number of workshops, seminars and trainings were organised to build and/or enhance human capacity. From 2000 onwards, academic institutions, mainly of science streams, have included EIA in tertiary level of education. Besides, human resources and training sections of the government and semi-government institutions have organised training and workshops to their staff. Human resources development contributed to conduct IEE and EIA report and their field-level implementation.

The Ministry of Forests and Soil Conservation through its Planning and Human Resources Division and Regional Training Centres has offered training courses on IEE and EIA since the last decade. The Division has offered training to 197 forest officers on IEE and EIA by

organising 11 training programmes (personal communication, February 2013). Assuming 20 trainees in each programme for 7 years, 5 Regional Training Centres of MoFSC might have trained about 700 rangers or forestry officials on IEE process. In addition, several projects such as BISEF-ST and Livelihood Forestry Project offered trainings to their staff and officials of the District Forest Offices during the project period. The IEE and EIA courses in forestry organisations aim to develop forestry officials to conduct and/or review IEE and EIA reports.

In addition, forestry officials enrolled in M.Sc. in natural resources or environmental management during the last decade have also received 3 credit hours course on IEE and EIA processes. Similarly, students studying in Institute of Forestry have also been well versed in IEE and EIA in the recent years. It shows increased number of forestry officials well exposed in theory and practical aspects of IEE and EIA processes.

In many projects, there is unclear understanding on the EA provisions of the environmental law. For example, one of the hydroelectric projects under review received survey license in 2008, make public notice in 2010 and collected the recommendations letters from VDCs in 2009. In principle, public notice should be published once the draft IEE report is prepared to give the local people and stakeholders an opportunity to comment and provide suggestions on the draft report. The content of the public notice was similar to the notice published before the submission of the scoping document. Recommendation letters from the concerned VDCs or municipality(ies) are collected after the finalisation of the IEE report to ensure that public inputs are accommodated in the final report. This is not the case in most of the IEE or EIA projects. This limits the opportunity to local people and local bodies to provide their concrete suggestions on the report. This is considered related to the capacity (knowledge) of the member of the EIA team on the principles and practices and spirit of the existing laws.

Nepal has yet to establish accreditation system to prepare quality IEE and EIA reports. As of now, anybody can prepare it even by compromising its quality. Besides roads and hydro-electricity sector, human resources for review are scanty and much should be done for capacity building to prepare, review, and approve IEE and EIA reports and conduct monitoring. There is no dearth of knowledge-based officials in forestry sector but how to best mobilise available human resources is a challenge. Experience of MoFALD in engaging university students in preparing environmental monitoring reports is a new initiative and is well appreciated. It is expected to bring a change in generating data and information. It might also encourage other competent authorities to proceed for environmental monitoring. Hence it is also a part of initiate of the legally responsible institutions to develop and build human resources to get the benefits from EA tool.

Available human resources engaged in reviewing and approving the EA reports in non-forestry sector need additional effort to mainstreaming forestry components in their sectors. In water resources sector, IEE and EIA reports focus on generating and analysing forestry data and information as compared to other sectors. Review of EA reports provide a basis to consider for orientation and re-orientation to EA reports reviewers in non-forestry sector projects. This

might provide opportunities to select impact based forestry safeguard measures, and also further acknowledge the implementation of mitigation measures to improve forest condition.

The review shows that many of the sector reports are of similar nature and are not site-specific. This might require to organising regularly workshops or trainings in new development on EA, and sharing experiences so that IEE and EIA report of non-forestry sector contribute to sustainable development goals without destroying the forest resources. It would be appropriate to depute officials in EA review process in the government organisations after necessary orientation on the process and practice of EA and policies and legal provisions. Similar orientation programme could be done to EA report reviewers before engaging them in review process.

The Way Forward

Experiences on using EIA tool for the last thirty-two years through policies, national and sectoral EIA guidelines, legislations and manuals, including policy guidance on the need for quantitative data and information in IEE and EIA reports inform that Nepal has sufficiently internalised it as a creative and predictive tool to make the development proposals environment-friendly and sustainable. In addition, Nepal has issued species protection list and has national and international commitments on forests and biodiversity conservation. Proponents or developers or investors are increasingly complying with the legal provisions and policy decisions, particularly on the compensation of forests and its products. In the last decade, most of the academic institutions have offered courses on EIA at tertiary level. Many institutions including the forestry sector have institutionalised efforts to develop human resources through regular training and enhance capacities on using IEE or EIA tool.

In spite of these strengths, several weaknesses prevail to limit the benefits of this tool. One of the major weaknesses is the increased 'cut and paste syndrome' that limited the collection of site-specific data and information with corresponding impacts, safeguard measures and monitoring indicators. It equally limited the use of scientific methods in collecting data and in identifying and predicting the impacts and evaluating their significance. Less quality EIA reports, although legally approved, are also 'kept in shelves' or non-implemented and are equally difficult to implement.

Preparation of quality and implementable EA and associated reports is also related to the confusions on aspects to be covered in the scoping document, preparation of appropriate ToR, lack of monitoring information on 'what worked and what did not' to refine impacts and corresponding measures, lack of review guideline or criteria, inadequate engagement of proponents in preparing report (consultant-driven), inadequate commitment of the proponent on implementation of measures, and also inadequate field level data and information. The most important draw-back is the lack of monitoring and auditing in the spirit of the legal regime on the environment.

The then MoEST, in April and September 2008, requested the concerned ministries to send information on implementation status of the approved EIA report, and also monitoring and evaluation reports to facilitate carrying out environmental auditing in accordance with Rules 14 of the EPR, 1997 and contribute to improve the quality of the EIA reports by knowing the effectiveness of the environmental safeguards implemented. Non-response on this request limited further efforts to know the effectiveness of implemented measures and benefit from EIA process. However, the Western Regional Forestry Directorate produced and shared environmental monitoring report of the resin tapping within areas of its jurisdiction. Furthermore, there is a tendency not to share reports including monitoring results although all environmental documents should be, in principle, kept in public domain.

3.1 Forestry Sector Project

There are several ways to move ahead in identifying activity-based impacts, evaluating their significance and select environmental safeguards to meet the objectives of the proposal. In order to benefit from EA tool and ensure effective implementation of the safeguard measures. It is suggested to adopt the following approaches to ensure appropriate selection and implementation of the environmental safeguards:

Improving the quality of report: Identification and prediction of activity-based impacts and evaluation of their significance including the selection of appropriate and locally suitable environmental measures will improve the quality of EA reports. Taking into consideration the environmental safeguards as proposed in the forestry sector IEE and EIA reports and implementation status, a guideline could be developed to facilitate assessment of baseline data-based impacts with corresponding benefit augmentation and adverse impacts mitigation measures, and monitoring of compliance and effectiveness of measures and regular reporting provisions. It would provide a basis to know 'what worked and what did not' and replicate the appropriate and implementable measures in similar proposals to be implemented in similar ecological zones and forest types. This will equally contribute to enhance capacity of human resources in preparing, reviewing and approving IEE reports and providing inputs for improving quality of EIA reports.

Documentation: Documentation of IEE and EIA reports are inadequately managed. As they are needed during different stages of project implementation, and in particular implementation of mitigation measures, environmental monitoring and auditing, it is urgently required to establish a mechanism for updating documentation – in report form or digital library of IEE and EIA reports and put them in public domain.

Engaging the knowledge-based personnel: Enhanced involvement of knowledge-based human resources in preparing, reviewing, implementing safeguard measures and monitoring of IEE and EIA in the forestry institutions would greatly contribute to explore additional areas for capacity enhancement. For this, a group of knowledge-based people could be mobilised to review and evaluate IEE reports and provide inputs for decision-making process for necessary approval. The same or similar team may work on EIA and associated reports to send suggestions to MoSTE. This will greatly help in integrating forestry concerns in forestry and non-forestry sector projects. However, a mechanism should be developed to remunerate the reviewers. As practised in MoSTE, a decision could be made to ask the proponent to remunerate (meeting allowance) the review team members, and conduct a meeting outside (before or after) the office hours to solicit technical and written suggestions on the report.

Developing a system for regular interaction: A system should be developed to have regular interaction between the private sector proponents and the concerned government authority to discuss and resolve outstanding issues in implementing environmental safeguards as included in IEE, EIA and SEA documents. This will provide opportunities to know the level of compliance about implementation of safeguard measures, know cost-effective measures, understand difficulties and find ways to overcome them. The MoFSC may instruct its

departments, regional directorates, and District Forest Offices to organise such interactions and provide feed-back timely to the Ministry and relevant organisations.

Making the review and monitoring reports public: Competent review is one of the measures for improving the quality of the report and implementation of measures and making them practical and location-specific. For this, the reviewing and approving authority for IEE such as Department of Forests and Department of National Parks and Wildlife Conservation (proposals related to them) may use the team of experts to review the monitoring reports. Although the concerned body is responsible for environmental monitoring, most of the IEE and EIA reports of the forestry sector include in-built monitoring mechanism (monitoring by proponents). The proposed team of experts may be engaged in surveillance monitoring. The monitoring reports should be made public. It will make review process open and independent, and develop competency on review over the time period. This will equally contribute the proponents to make their report practical and factual. Similarly, a practice of making the monitoring report public would help to select the environmental safeguards and make the proponent more socially responsible over its act. It will equally enhance human capacity at appropriate level.

Enforcing the Legal Provisions: Once approved, IEE and EIA documents are legal. As a part of legal compliance, they should be implemented. Environmental monitoring and auditing should be carried out to know the level of compliance, effectiveness of measures, and actual change in environmental quality due to project activities. Taking into consideration the level of implementation of the environmental safeguards, MoFSC may wish to institutionalise and internalise environmental monitoring system to ensure effective implementation of environmental safeguards. Based on the experience from this administrative process, it could be included in the legal system.

3.2 Non-forestry Sector Projects Planned for Implementation in Forest Areas

As mentioned above, MoFSC could provide the forest area in accordance with the provision of Section 68 of the Forest Act, 1993. The proposal considered national priority by the non-forestry sector might not be in equal footing for forestry institution. Sectoral roles and responsibilities also do not permit it as the sectors have clearly defined mandates. Furthermore, Nepal has international commitments and sector institutions are made responsible to work accordingly. For example, Nepal is a Party to the CBD, Ramsar and CITES and MoFSC is implementing them on behalf of the Government of Nepal. Hence, its responsibility is to position its national and international commitment on ecosystem, species and genetic conservation based on national laws and international legally-binding instrument such as treaty. Ultimately, these are the national commitments. Taking it into consideration, forestry institution could facilitate the implementation of non-forestry sector proposal to meet national and international commitments as well. Some of the following approaches should get priority attention to develop, ensure and promote implementation of environmental safeguards in non-forestry sector proposals:

Integrating institutional responsibilities: Conservation and management of natural resources, in particular the forests, belongs to the responsibility of all institutions and individuals as forests provide multiple benefits to all living and non-living things. Any activity or proposal planned for implementation in forests should ensure forests and biodiversity conservation. One way of doing this might be to form a technical and independent review team (of institutions and experts) to assist non-forestry sector proponent(s) to develop criteria that ensure adequate integration of forestry requirements in non-forestry sector proposal, and implement the environmental safeguards. The proposed team may also be involved in surveillance monitoring as well and independently report to the concerned authorities. This might be initiated from large-scale infrastructure development projects and based on experiences, it could be replicated and expanded.

The quality of scoping document and terms of reference (ToR) largely determines the quality of EIA report. Issues are dealt during scoping exercise and impacts during EIA study but many of the scoping documents reviewed are dealing issues and impacts synonymously. In addition, ToR for IEE does not have space for scope of work. It might have been due to inconsistencies in formats of ToR and IEE report (Schedules 3 and 5), and EIA (Schedules 4 and 6) of the EPR, 1997. Small efforts in Scoping Document and ToR could make the IEE and EIA report practical and implementable. It can be improved by engaging the proposed team of experts.

Technical support for implementation: The competent forestry organisation may develop operational technical guidelines to support the implementation of environmental safeguards as contained in IEE, EIA or SEA reports. Such a support could be provided through its district forestry organisations and offices of the national parks and wildlife reserves with orientation, if necessary, or encourage to engaging independent and knowledge-based professionals on natural resource management. This will assist the non-forestry sector proponent to implement forestry requirements effectively and technically.

Establishing the Monitoring Team: If the non-forestry sector project affects the forest areas and forest products significantly, MoFSC may encourage the concerned body responsible for environmental monitoring (as per the EPR, 1997) to establish a monitoring team with representative from DoF or DNPWC or District Forest Office and/or Office of the national Park or Wildlife Reserve taking into consideration the nature, impact, scale and location of the project. Such a mechanism could be established before providing the forest area. The proponent or the concerned body should allocate necessary budget and provide logistics for monitoring. It is expected that this will contribute to internalise monitoring and evaluation system at least in projects which will be implemented in forests or pass through the forest areas. Such a monitoring would also enhance implementation of environmental safeguards. If any activity undergoes monitoring, it is likely that activity is implemented. Lessons learned could help to formulate policies and legislation to internalise monitoring as permanent mechanism.

Making the monitoring report public: While providing forest area for non-forestry sector proposals, one of the requirements would be the provision for regular submission of

monitoring report which includes detail data and information on implementation of environmental safeguards and their effectiveness to conserve and manage forests and biodiversity. The monitoring report as received should be made public to let the stakeholders know about the measures implemented and their effectiveness.

Providing updates on importance of forests conservation: The competent forestry institution may be interested to provide updates on guidance for specified time horizon for all non-forestry sector proponents, and support them to include environmental safeguards as 'in-built' measures, and approach for 'add-on solution' to 'case-by-case' proposals based on outstanding issues identified and corrective measures proposed. Regular update will provide an opportunity to proponents and development facilitators to understand and take measures to conserve and manage forests and other natural resources.

The proponent should be encouraged to establish a public relation office/unit at the project site to promote information sharing with the project affected people and communities and relevant stakeholders.

Tri-partite interaction: A regular consultation may be organised to share experiences and knowledge amongst the forestry sector and non-forestry sector organisations and the proponent. For example, MoFSC with its concerned department, Ministry of Energy and Department of Electricity Development, and the Proponent (may be NEA or private developer) may interact at frequent interval to share updates and find ways to resolve outstanding issues, if any. This will contribute to better understand issues and such interaction should be organised at technical and managerial levels. Solutions requiring legal action should follow the legal provisions.

Cost of delay decision: The conflict between the investor and the natural resource manager is an on-going issue in several countries. Several efforts were made to bridge this gap. In general, institutions having forest management responsibilities are weak in influencing decisions as ecological values are under or not estimated in countries like Nepal. This creates 'confusion' between institution having 'legal roles and responsibilities' and project developer. For this, it would be appropriate to facilitate early decisions. It does not mean that forest area should be given for the implementation of all proposals. It means early decision would help the investor or proponent not to invest on activities that do not provide early benefits and this will likely relax 'pressure' on forests.

Capitalising the Understanding: Recent trend on compensating the loss of forest area and/or forest products indicates the increased realization of the proponents about the importance of forest resources and/or increased regulatory provisions imposed to manage forests. This asset could be an entry point to develop a system to ensure implementation of proposed environmental safeguards in the IEE, EIA and/or SEA reports and regulatory provisions (prohibited activities in forests and protected areas) as included in the Forest Act, 1993 and the National Parks and Wildlife Conservation Act, 1973.

As mentioned above, some proponents have made efforts in implementing environmental safeguards as contained in the IEE and EIA reports. Cases of Fattepur Irrigation Sub-Project, Modi Khola HEP and its transmission line, Indrawati III HEP and Sindhuli-Bardibas Road Project provide information on the level of implementation and their effectiveness.

Based on above review, IEE and EIA requirements, efforts of the forestry organisations, what environmental safeguards are proposed and what is needed, and taking into consideration the principles and practices of IEE and EIA, primary effort should be made to ensure the implementation of safeguard measures, monitor the compliance and know the effectiveness of the measures. Unless implementation and monitoring is well established, it would be too early to develop additional mechanisms. For this, there is an increasing need for developing and using human resources more at the implementation level. This provides opportunities to know the 'activity-generated actual impacts' and effectiveness of proposed environmental safeguards. This will, in turn, contribute to improve the quality of IEE and EIA reports and make them implementable, and also develop a strong desire for implementation of measures that conserve forests and biodiversity.

Implementation of environmental safeguards could be promoted by transferring knowledge and skills from central to local level and vice-versa. Enhanced commitment of institutions, individuals and proponents, and consultants (for preparing quality report) are extremely necessary for making the best use of this EA tool to conserve forests and biodiversity, also in line with Article 14 of the Convention on Biological Diversity. In any case, forestry organization should be engaged in facilitating effective implementation of forestry related safeguard measures, continue surveillance monitoring and making all EA related documents public to increase proponent's commitment for the conservation of forests, biodiversity, land and other resources.

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Conclusions and Recommendations

4.1 Conclusions

Nepal has internalised and institutionalised environmental assessment (EA) tool to identify, predict and evaluate the impacts of the forestry and non-forestry sector proposals on forests and environment from the last 32 years through policies, laws, guidelines, guides and manuals. Experience shows high level of legal compliance in preparing and approving EA (IEE and EIA) reports and low level of implementation of environmental safeguards as contained in the IEE and EIA reports. Implementation of these measures is limited due to lack of established monitoring system as per the IEE and EIA reports or the provisions as included in the EPA, 1996 and EPR, 1997. There are additional legal provisions for addressing grievances, information sharing and reporting but they are yet to be implemented.

Most of the IEE and EIA reports are inconsistent in terms of baseline data and information, impacts identified or predicted and evaluated, environment protections measures (benefit augmentation and adverse impacts mitigation measures) proposed, and monitoring and auditing parameters proposed. Inadequate implementation of these measures also limited knowledge on what worked and what did not. In addition, most of the IEE and EIA reports are qualitative and face difficulty in implementation of measures. Some of the measures proposed are inappropriate as well which might be related to inadequate filed level study to collect appropriate data and information during the report preparation stage.

In forestry sector, human capacity exists to guide the preparation, review, implementation, and monitoring of IEE and EIA reports. The MoFSC is the lead agency to institutionalise IEE and EIA system in Nepal and could make a 'break-through' in implementing environmental safeguards effectively and efficiently. The forestry officials are equally competent enough to guide forestry and non-forestry sector proposals to make them forest and biodiversity-friendly. For this, additional effort is required. The forestry organisations and officials should move ahead to best utilise the EA tool for the conservation of forests and biodiversity based on its national and international commitments and also instruments it has prepared.

There are several ways to make the use of EA tool effective. The MoFSC could take initiatives to improve the quality of IEE and EIA reports, and engage the knowledge-based human resources in preparation, review and technical support for safeguards implementation and monitoring. The MoFSC may also develop a mechanism to develop a digital library for all IEE and EIA reports of forestry sector at the beginning, and expand it to non-forestry sector reports as well. It may organise regular interaction with the proponents to know the level of implementation of environmental safeguards, and make public the monitoring reports of the forestry sector proposals including further implementation for legal provisions.

In case of non-forestry sector proposals, it could find its space in integrating its institutional responsibilities and make other understand the roles and contribution and ecological services

provided by forests, be proactive to provide additional technical support for the implementation of forest-related safeguard measures, make the monitoring report public to enhance social responsibilities of the proponents, forming a monitoring team to ensure implementation of measures, and provide updates on the importance of forest conservation and administrative and regulatory measures on forests and biodiversity conservation. It may also be interested to organise tri-partite interactions/dialogues, and process for prompt decision to let the proponent know whether forest area can be provided or not and if provided in what form and conditions.

Implementation of environmental safeguards does not cost much. The Upper Tamakoshi HEP in its EIA report estimated total environmental management cost of approximately 1.5 percent of the total project cost. For Kabeli B1 HEP, total environmental cost (enhancement measures, mitigation measures and monitoring) is about 1.3 percent of the total project cost and the total environment cost to total project benefits is only 0.21 percent. Hence, there are ample opportunities to refine environmental safeguards through IEE and EIA process and implement for legal compliance.

4.2 Recommendations

Review results provide opportunities to maximise the use of EA in identifying and implementing environmental safeguards. The following recommendations would further contribute to mainstreaming safeguard measures to get maximum benefits in a sustained manner and also make the forest climate-resilient:

7. Environmental safeguards as included in the IEE, EIA and SEA documents are of generic nature and efforts should be made towards identifying site-specific impacts and corresponding appropriate measures. It will help to streamline variation in study objectives.
8. Environmental safeguards in the forestry sector IEE and EIA reports could be well integrated and implemented by: (i) improving the quality of report; (ii) engaging the knowledge-based human resources in preparing and reviewing reports before approval, and implementing and monitoring processes; (iii) developing a system of regular interaction between the proponent and forestry institution on technical and managerial matters; (iv) making the review and monitoring reports public; and (v) enforcing the legal provisions and procedures.
9. As forest areas are provided for non-forestry sector proposals, MoFSC should establish a system to integrate her core institutional responsibilities of forest management (least damaging the forest areas), provide technical support for the implementation of environmental safeguards, establishing monitoring team, make the monitoring reports public, and provide updates on importance of forests, and organise tri-partite interactions/dialogues regularly to share experience and knowledge in order to least damage forests and its areas and to comply with the national and international commitments being a Party to the conventions or a member of the relevant institutions. The delay decision might create confusion and conflicts and hence, it is necessary to further promote early decision and notification process.

10. Proper site selection can reduce project's adverse impacts on forests as seen in Modi Khola Transmission Line Project. Forest area should be considered as one of major criteria for alternative analysis to meet the requirement of Section 68 of the Forest Act, and to effectively implement the 2003 decision in integrating forest aspects in infrastructure and hydroelectric generation projects. The compensatory plantation should adequately consider the 'lost and indigenous species' to create a new habitat for wildlife, and/or it is necessary to promote objective-oriented plantation. Planted saplings must have appropriate level of rooting.
11. Environmental monitoring should be included as a part of project implementation along with necessary budget including staff from forestry sector or independent forest professionals. Compliance and impact monitoring reports should be, at least annually prepared and submitted to competent forestry organisation. Failure to comply with this should not get forest area for project implementation.
12. The regulatory agency should conduct surveillance monitoring and instruct the project timely for any lapses.
13. An awareness raising package should be included from forestry lens to project management, consultant, contractor, and construction workers. Local people should also be involved in such programmes for cross-fertilisation of ideas, needs and priorities for biodiversity conservation. It would be appropriate to depute officials in EA review process in the government organisations after necessary orientation on the process and practice of EA and policies and legal provisions. Orientation is also required to EA report reviewers before engaging them in review process.
14. It is equally important to use scientific methods for data collection and techniques to identify and predict impacts in forestry sector, establish clear linkage amongst the baseline, impacts, measures and monitoring and auditing parameters, encourage academia to provide case study-based updated education even by clarifying boundary for IEE and EIA data, launch awareness raising programmes, disseminate lessons learnt from good and failure projects and promote site visits. Many of them could be addressed through scoping document and the ToR.

It is expected that these recommendations would contribute to identify and select appropriate environmental safeguards and implement, monitor and refine them at frequent intervals. Effective implementation of safeguard measures will provide a basis to internalise them through policies and legislations.

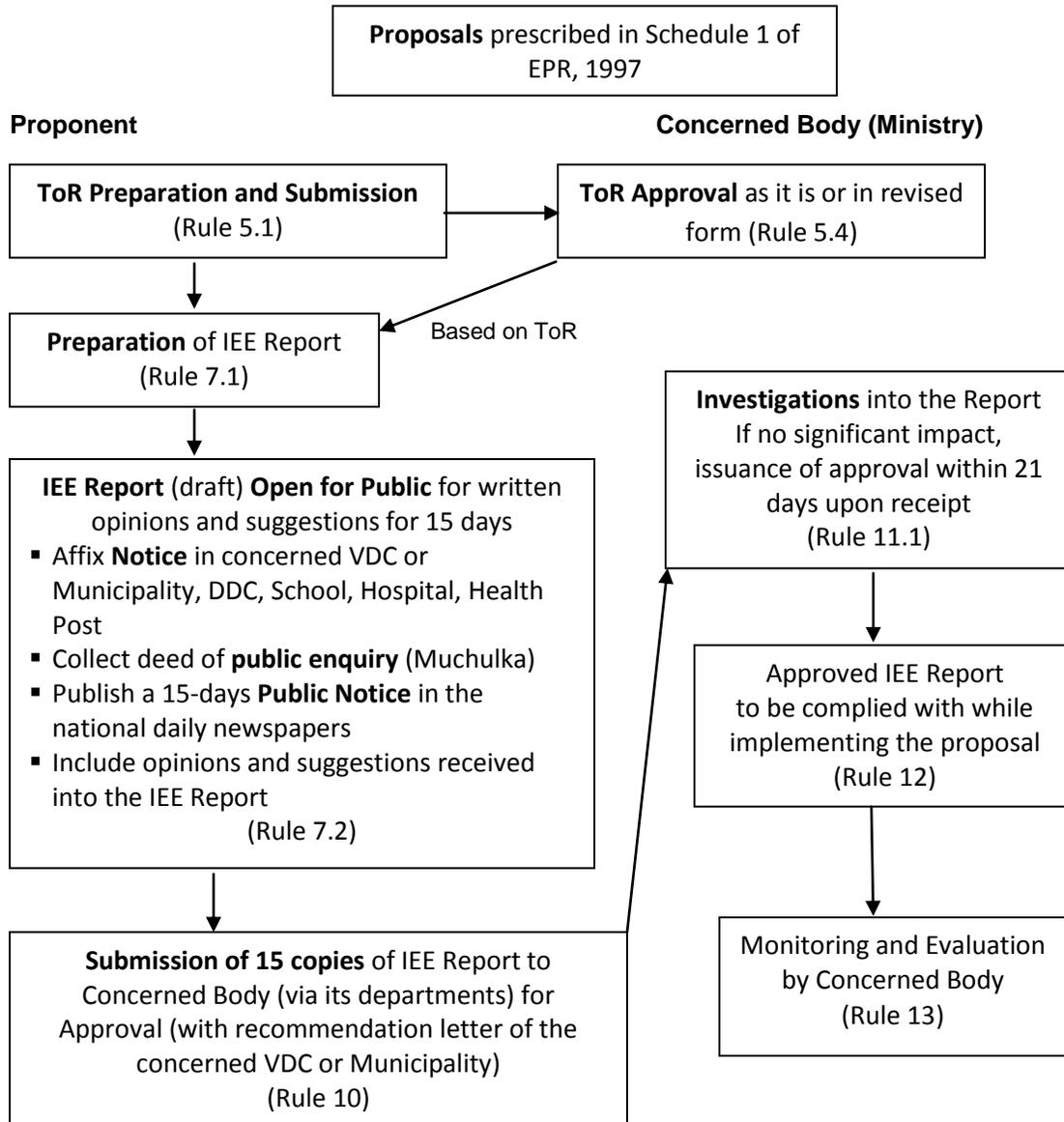
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Approval Process for IEE Report

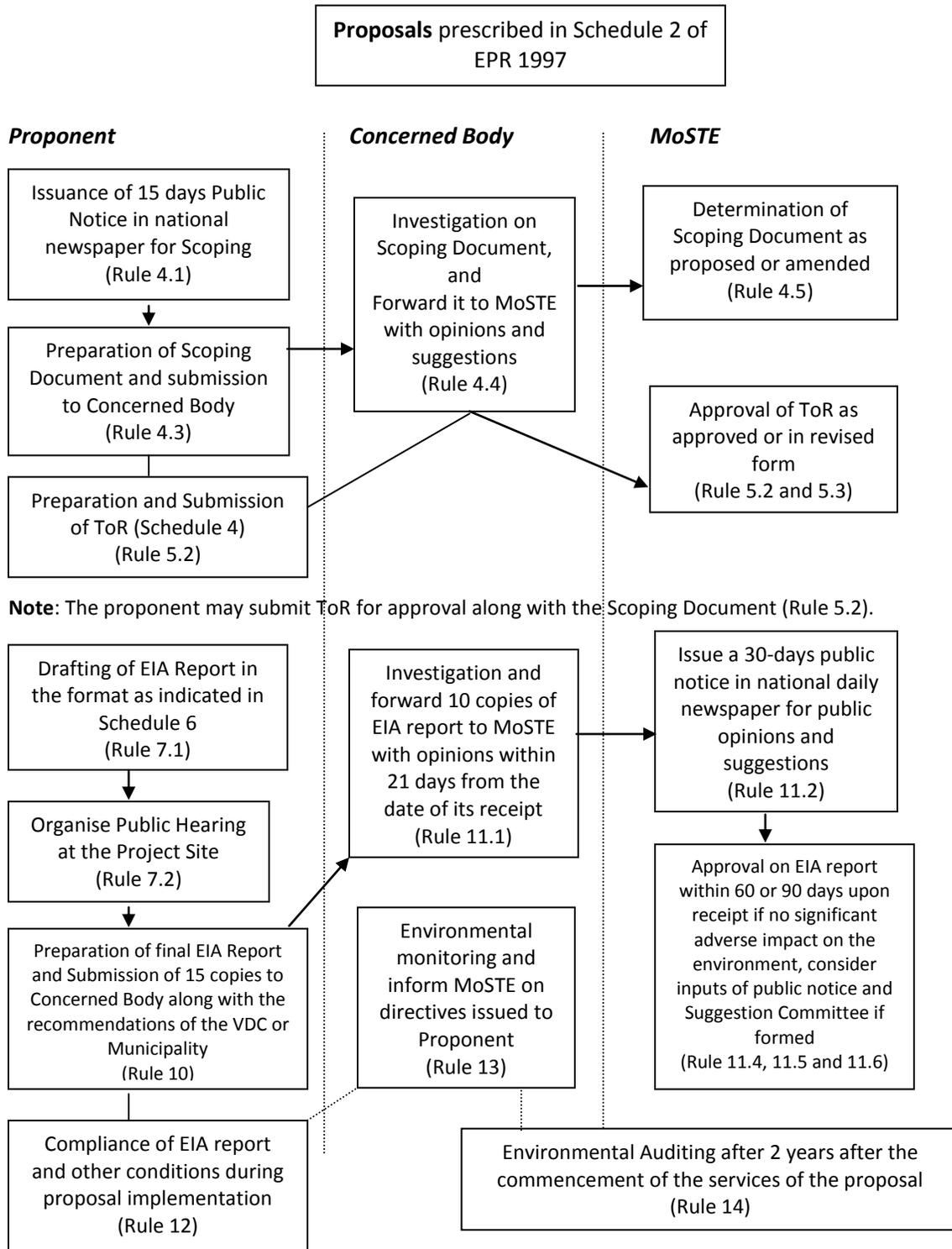
(Pursuant to Section 5 and 6 of EPA, 1996 and Rules 5, 7, 10 and 11-13 of EPR, 1997)



Approval Process for EIA Report

(Pursuant to Section 5 and 6 of EPA, 1996 and Rules 4-7, 10 and 10-14 of EPR, 1997)

Approval Process for Environmental Impact Assessment Report



Note: MoSTE – Ministry of Science, Technology and Environment, MoPE – Ministry of Population and Environment

Declaration on the Quality of the EIA and Associated Reports

Proponent

I declare the following:

1. I have provided correct and relevant information to the EIA Study Team;
2. I have allowed the EIA Study Team to conduct the Scoping/ EIA study professionally and independently;
3. I have read and understood the content of the Scoping/EIA Report;
4. I agree to implement all enhancement/mitigating measures proposed in this EIA report*; and
5. I understand that additional enhancement/ mitigating measures may also be imposed by the Ministry of Science, Technology and Environment should the original mitigating measures proposed in this EIA report are found not to be adequate to comply with the relevant legal requirements*

Team Leader

I declare the following:

- a. I have read and checked the content of this Scoping/EIA report;
- b. My study team members have conducted the study professionally using acceptable methodologies;
- c. The study findings are correct to the best of my knowledge; and have not been altered in any manner;
- d. The mitigating measures proposed are, to the best of my knowledge, reliable, practical and adequate to comply with the relevant legal requirements*; and
- e. Myself and my team shall be accountable for any misleading information in any part of this report

Team Member

I declare the following:

- a. I have conducted the study professionally using acceptable and standard methodologies;
- b. The study findings are correct to the best of my knowledge; and have not been altered in any manner;
- c. The mitigating measures proposed, to the best of my knowledge, are reliable, practical and adequate to comply with the relevant legal requirements*; and
- d. I shall be accountable for any misleading information in the part of this report related to my area(s) of study.

Note: * Only for EIA report

List of Approved EIA Reports

As of 23 January 2013

SN	Name	Sector	Production/Services
1.	Amit Pesticides	Agriculture	Pesticides
2.	Babai Irrigation Project (Siphon Construction)	Water resources	Irrigation
3.	Babai Irrigation Project	Water resources	Irrigation
4.	Badkapath Irrigation Project	Water resources	Irrigation
5.	Bagala Mukhi Rosin & Turpentine	Forest/Industry	Resin tapping
6.	Balanch-Attariya 132 KV	Water resources	Electricity transmission
7.	Bancharedanda Landfill site	Water management	Waste disposal
8.	Banepa-Sindhuli-Bardibas Road (Sector I)	Transport	Road construction
9.	Banepa-Sindhuli-Bardibas Road (Sector II)	Transport	Road construction
10.	Basantapur-Chainpur-Khadbari Road	Transport	Road construction
11.	Bhadrakali Resin & Turpentine	Forestry/Industry	Resin tapping
12.	Bhawani Chemical	Industry	Chemical production
13.	Bheri-Babai Diversion HEP	Water resources	Electricity generation
14.	Bhurigaun Telpani Road	Transport	Road construction
15.	Birat Mini Petroleum Refinery	Industry	Petrol refining
16.	Birendra Nagar Drinking Water	Water resources	Drinking water supply
17.	Butawal-Sunauli 132 KV	Water resources	Electricity transmission
18.	Central Park Apartment	Housing	Apartment
19.	Central Effluent Treatment Plant (Hetauda)	Waste management	Liquid waste treatment
20.	Chahare Khola HEP	Water resources	Electricity generation
21.	Chakrapath-Tokha-Jhorchhahare Road	Transport	Road construction
22.	Chamelia HEP	Water resources	Electricity generation
23.	Chitawan School of Medical Sciences	Health	Medical services
24.	City Scape Apartment	Housing	Apartment
25.	Civil Service Hospital	Health	Medical services
26.	Collection of Lokta	Forestry	Raw material collection
27.	Collection of Sabai Grass	Forestry	Raw material collection
28.	Construction & Operation of Export Promotion Zone	Industry	Export materials
29.	Dabur Nepal	Industry	Medicine production
30.	Dang Cement	Industry	Cement production
31.	Devdaha Medical & Research Centre	Health	Medical services
32.	Dhalkebar-Birtamod 132 KV	Water resources	Electricity transmission
33.	Disposal of Obsolete Pesticides	Agriculture	Pesticide disposal
34.	Down Town Apartment	Housing	Apartment
35.	Durga Rosin & Turpentine	Forestry	Resin tapping
36.	Eco Tourism	Tourism	Promotional
37.	Extraction of Boulders and Aggregate in Rupandehi	Forestry/local development	Raw material collection
38.	Farakppa Village Resort	Industry	Resort in NP
39.	Fattepur Irrigation Project	Water resources	Irrigation
40.	Galchhi-Trisuli-Syaphrubesi Road	Transport	Road construction
41.	Ganapati Rosin & Turpentine	Forestry	Resin tapping
42.	Gautam Budhha Airport	Transport	Airport development
43.	Ghunsa Khola HEP	Water resources	Electricity generation
44.	Gongar-Khimti 220 KV	Water resources	Electricity transmission
45.	Grande Tower Apartment	Housing	Apartment

SN	Name	Sector	Production/Services
46.	Hetauda-Bardhaghat 220 KV	Water resources	Electricity transmission
47.	Hile-Bhojpur Road	Transport	Road construction
48.	Himal Rosin & Turpentine	Forestry	Resin tapping
49.	Imperial Court Apartment	Housing	Apartment
50.	Indrapur VDC Forest Clearance	Forestry	Settlement
51.	Indrawati -3rd HEP	Water resources	Electricity generation
52.	Inkhu Khola Small HEP	Water resources	Electricity generation
53.	Jagatpur-Madi 33 KV	Water resources	Electricity transmission
54.	Jhapa Tea Estate	Agriculture	Tea production
55.	K-3 Substation (TL)	Water resources	Electricity transmission
56.	Kathmandu Fun Park	Infrastructure	Entertainment -
57.	Kathmandu-Naubise Alternative Road	Transport	Road construction
58.	Kavre Valley Drinking water Supply	Water resources	Drinking water supply
59.	Kawaswoti substation	Water resources	Electricity station
60.	Khanal Rosin & Turpentine	Forestry	Resin tapping
61.	Khimti-Dhalkebar 132 KV	Water resources	Electricity transmission
62.	Khudi HEP	Water resources	Electricity generation
63.	Kirne HEP	Water resources	Electricity generation
64.	Kishan Agrochemicals	Agriculture	Pesticides production
65.	Kist Medical Collage	Health	Medical services
66.	Kongde View Resort	Forestry/Industry	Resort at Sagarmatha NP
67.	Koshi Mini Refinery Petroleum	Industry	Petroleum refinery
68.	Kulekhani-3rd HEP	Water resources	Electricity generation
69.	Kusum-Purandhara 132 KV	Water resources	Electricity transmission
70.	Lalpur Gadda-chauki 132 KV	Water resources	Electricity transmission
71.	Laxmi Lime Products	Industry	Lime production
72.	Lekhnath Drinking Water	Water resources	Drinking water supply
73.	Likhu-4 HEP	Water resources	Electricity generation
74.	Lumbini Medical Collage & Research Centre	Health	Medical services
75.	Madan Smirti Academy	Health	Medical services
76.	Madi-1 HEP	Water resources	Electricity generation
77.	Madi Khola Small HEP	Water resources	Electricity generation
78.	Mahakali Irrigation Project	Water resources	Irrigation supply
79.	Mai HEP	Water resources	Electricity generation
80.	Mailung Khola 66 KV	Water resources	Electricity transmission
81.	Mardikhola Small HEP	Water resources	Electricity generation
82.	Medical Waste Management Kathmandu	Waste management	Waste handling
83.	Melamchi Drinking Water	Water resources	Drinking water supply
84.	Melamchi Water Treatment	Waste management	Water treatment
85.	Mewakhola HEP	Water resources	Electricity generation
86.	Middle Marsyangdi-Lower Marsyangdi 132 KV	Water resources	Electricity transmission
87.	Middle Marsyangdi HEP	Water resources	Electricity generation
88.	Civil Homes Apartment	Housing	Apartment
89.	Midim HEP	Water resources	Electricity generation
90.	Mid-Point Community Hospital	Health	Medical services
91.	Mistri Khola HEP	Water resources	Electricity generation
92.	Namarjun Madi HEP	Water resources	Electricity generation
93.	Narpani Chundhunga of Dynasty	Industry	Limestone extraction
94.	National Institute of Neurological & Applied Research	Health	Medical services
95.	Natural Flower	Forestry	Raw material collection
96.	Nepal Tobacco Co.	Industry	Tobacco (surti) production

SN	Name	Sector	Production/Services
97.	Nyadi HEP	Water resources	Electricity generation
98.	Operation of Jay Spinning Mills	Industry	Thread production
99.	Park View Apartment	Housing	Apartment
100.	Pashupati Agrochemicals	Agriculture	Pesticide production
101.	Pathalaiya-Parwanipur 132 KV	Water resources	Electricity transmission
102.	Rasuwa Gadhi HEP	Water resources	Electricity generation
103.	Road Maintenance and Rehabilitation	Transport	Road maintenance
104.	Saljhundi-Juthepauwa Road	Transport	Road construction
105.	Sanjen Hydropower	Water resources	Electricity generation
106.	Shurya Cement Limited	Industry	Cement production
107.	Sikta Irrigation Project	Water resources	Irrigation
108.	Silver City Apartment	Housing	Apartment
109.	Singati Khola Small HEP	Water resources	Electricity generation
110.	Solid Waste Management, Mechinagar	Waste management	Waste disposal
111.	Solid Waste Treatment (Okharpauwa)	Waste management	Disposal and treatment
112.	Solukhola Small HEP	Water resources	Electricity generation
113.	Sukhani Martyrs' Park	Forestry	Park development
114.	Suncity-1 Apartment	Housing	Apartment
115.	Suncity-2 Apartment	Housing	Apartment
116.	Sunrise Apartment	Housing	Apartment
117.	Sunrise Rosin & Turpentine	Forestry	Resin tapping
118.	Supplementary of Lower Solu HEP	Water resources	Electricity generation
119.	Surya Chemicals	Industry	Chemical production
120.	Swastic Rosin & Turpentine	Forestry	Resin tapping
121.	Syaphrubesi-Rasuwegadi Road	Transport	Road construction
122.	Tadikhola HEP	Water resources	Electricity generation
123.	Tallo Hongukhola HEP	Water resources	Electricity generation
124.	Tallo Modikhola HEP	Water resources	Electricity generation
125.	Tallo Solukhola Small HEP	Water resources	Electricity generation
126.	Tapa Chundhunga of Bishwakarma	Industry	Limestone extraction
127.	Thankot-Capagaun-Bhaktapur 132 KV	Water resources	Electricity transmission
128.	Thoche-Larke Road	Transport	Road construction
129.	Thulo Bharku-Syaphru Road	Transport	Road construction
130.	Tilganga Eye Centre	Health	Medical services
131.	Upper Madi HEP	Water resources	Electricity generation
132.	Upper Madi 'A' HEP (???)	Water resources	Electricity generation
133.	Upper Marsyangdi "A" HEP	Water resources	Electricity generation
134.	Upper Marsyangdi -2 HEP	Water resources	Electricity generation
135.	Upper Modi "A" HEP	Water resources	Electricity generation
136.	Upper Modi HEP	Water resources	Electricity generation
137.	Upper Sanjen HEP	Water resources	Electricity generation
138.	Upper Seti HEP	Water resources	Electricity generation
139.	Upper Tadi HEP	Water resources	Electricity generation
140.	Upper Tamakoshi HEP	Water resources	Electricity generation
141.	Upper Tamur HEP	Water resources	Electricity generation
142.	Upper Trisuli "3 A" HEP	Water resources	Electricity generation
143.	Vegacity Apartment	Housing	Apartment
144.	West Seti HEP	Water resources	Electricity generation

Source: Ministry of Science, Technology and Environment (personal communication). 24 January 2013

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List of Approved IEE Reports Related to Hydropower Generation

As of 23 January 2013

- | | |
|---------------------------------------|--|
| 1. Ankhu Khola HEP (42.9 MW) | 39. Mai Cascade HEP (4.5 – 7 MW) |
| 2. Ankhu Khola-1 HEP (7 MW) | 40. Mai Khola SHP (2.4 MW) |
| 3. Balephi HPP (50 MW) | 41. Mailum Khola HPP (5 MW) |
| 4. Baramchi Khola SHP (4.2 MW) | 42. Maiwa Khola HPP (13.5 MW) |
| 5. Bhairab Kund SHP (3 MW) | 43. Marsyangdi III HEP (30 – 42 MW) |
| 6. Bhim Khola HEP (9 MW) | 44. Maya Khola HPP (5.08 – 14.9 MW) |
| 7. Bijayapur-1 SHP (2-4 MW) | 45. Middle Chaku SHP (1.8 MW) |
| 8. Budhi Ganga SHP (6.2 MW) | 46. Midim Khola (Karapu) HPP (3 MW) |
| 9. Chake Khola SHP (2.83 MW) | 47. Naugarh Gad SHP (8.5 MW) |
| 10. Chaku Khola SHP (1.5 – 3.0 MW) | 48. Nyadi HPP (20 – 30 MW) |
| 11. Charnawati Khola HPP (3.52 MW) | 49. Orang Khola SHP (2.1 MW) |
| 12. Dapcha-Roshi Khola HPP (5 MW) | 50. Parajuli Khola Small HEP (4 MW) |
| 13. Daraundi-A SHP (6 MW) | 51. Phawa Khola HPP (5 MW) |
| 14. Dharam Khola HEP (4.8 MW) | 52. Pikhuwa Khola SHP (5 MW) |
| 15. Dordi Khola HEP (22-27 MW) | 53. Piluwa Khola HPP (3 MW) |
| 16. Dordi-1 HPP (10.3 MW) | 54. Radhi SHP (4.4 MW) |
| 17. Ghatte Khola HPP (5 MW) | 55. Rahughat HEP (27 MW) |
| 18. Handi Khola SHP (2 MW) | 56. Ridhi Khola SHP (2.4 MW) |
| 19. Hewa Khola HPP (4.5 MW) | 57. Roshi Mangaltar SHP (4.5 MW) |
| 20. Hewa Khola-A HPP (12 – 14.9 MW) | 58. Sabha Khola SHP (4 MW) |
| 21. Jhyari Khola SHP (2 MW) | 59. Sabha Khola-A HPP (8.3 MW) |
| 22. Jiri Khola SHP (2.2 MW) | 60. Salankhu Khola SHP (2.5 MW) |
| 23. Jumdi Khola SHP (1.75 MW) | 61. Sirpin Khola HEP (9.6 MW) |
| 24. Junbesi Khola HPP (5.2 MW) | 62. Siuri Khola SHP (5 MW) |
| 25. Kabeli-A HPP (34 – 36 MW) | 63. Siwa Khola SHP (15 MW) |
| 26. Kabeli-B1 HPP (25 MW) | 64. Tadi Khola HEP (4,2 MW) |
| 27. Khani Khani (Dolakha) HEP (30 MW) | 65. Thopal Khola SHP (1.65 MW) |
| 28. Khani Khola HEP (2 MW) | 66. Trishuli Third HPP (20 MW and 132 KV TL) |
| 29. Khani Khola-1 HPP (25 – 40 MW) | 67. Tungun Thosne HEP (4.3 MW) |
| 30. Khare Khola HPP (14.7 MW) | 68. Upper Chaku-A (22.2 MW) |
| 31. Khoranga HEP (2 – 4.8 MW) | 69. Upper Dordi-A HEP (22 MW) |
| 32. Lower Balephi HPP (20MW) | 70. Upper Hugdi Khola HPP (5 MW) |
| 33. Lower Chaku HEP (1.8 MW) | 71. Upper Ingwa Khola HEP (9.7 MW) |
| 34. Lower Indrawati HPP (8.26 MW) | 72. Upper Khimti HPP (5-9.98-12 MW) |
| 35. Lower Khare HEP (8.26 MW) | 73. Upper Mai Khola HEP (9.98 MW) |
| 36. Lower Modi-1 HEP (10 MW) | 74. Upper Mai-C HEP (6.1 MW) |
| 37. Lower Nyadi HPP (4.5 MW) | 75. Upper Mailum Khola HPP (14.3 MW) |
| 38. Lower Tadi Khola HEP (4.99 MW) | 76. Upper Mailum-A HEP (5 – 6.42 MW) |

Note: HEP – Hydro-electricity Project; HPP – Hydropower Project; and SHP – Small Hydropower Project
As per the Environment Protection Rules (1997), Proponent wishing to generate less than 5 MW of electricity should approve IEE report till 2007, and its fourth amendment provided opportunities to develop up to 50 MW HEP with IEE approval.

Source: Ministry of Energy (Personal Communication). 23 January 2013

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List of IEE Reports Approved by MoFALD

As of 23 January 2013

Yearly Approval of IEE Reports

Year	Sectors					Total
	Road	SG&S	Bridge	Landfill site	Others	
2062	34					34
2063	15					15
2064	9	2		2		13
2065	6			6		12
2066	15		31	4	1 (Refuse drive fuel)	51
2067	32	82	1			115
2068	27	44			1 (bus terminal)	72
2069	14	20	4			38
Total	152	148	36	12	2	350

Note: For BS 2069, approval data up to Marga month (December 2012) has been included.

Source: Ministry of Federal Affairs and Local Development (Personal communication). 23 January 2013

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List of IEE Reports Approved by MoPPW

As of 30 January 2013

SN	Fiscal Year	IEE Reports Approved	Sample List of Approved IEE Reports of Roads (FY 2067/68 and 2068/69)	
1	2061/62	4	Nepalgunj-Bhahauda, Banke	Thaktholi-Darchula, Darchula
2	2062/63	25	Bhurigaon-Guleria-Murtia, Bardiya	Rani-Biratnagar-Itahari-Dharan, Morang and Sunsari
3	2063/64	7	Mecha Highway (Charali-Chandraghari-Kechana), Jhapa	Baglung-Burtibang, Baglung
4	2064/65	41		
5	2065/66	28	Kanepokhari-Rangeli, Morang	Kalyanpur-Barsain-Subharanpatti, Saptari
6	2066/67	27	MRM (Jitpur-Taulihawa-Khanuwa), Kapilbastu	Laxmi Cement Udyog, Access Road, Lalitpur
7	2067/68	14		Dailekh (Narayan Municipality) – Lainchaur, Dailekh
8	2068/69	29		
	Total	175	Chhinchu(Pokhare)-Devsthal-Jajarkot, Surkhet, Salyan, Jajarkot	Belhya-Butwal, Rupandehi
			MRM (Maisthan)-Gaushalabazar-Samsi, Mahottari	Birgunj-Pathalैया, Parsa
				Nepalgunj-Kohalpur, Banke
				Jaleswor-Hardi, Mahottari
			Manma-Jumla, Dailekh, Kalikot, Jumla	

Source: Ministry of Physical Planning and Works (personal communication). 30 January 2013

List of IEE Reports of Management Plans approved by DNPWC

SN	Name of Protected Area	Plan Duration
1	Chitwan National Park	2006-2011
2	Sagarmatha National Park	2007-2012
3	Shey-Phoksundo National Park	2006-2011
4	Makalu-Barun National Park	2063/64-067/68
5	Rara National Park	2010-2014
6	Khaptad National Park	2010-2014
7	Langtang National Park	2011-2015
8	Bardiya National Park	2007-2011
9	Koshi Tappu Wildlife Reserve	2009-2013
10	Parsa Wildlife Reserve	2011-2016
11	Suklaphanta Wildlife Reserve	2007-2011
12	Apinappa Conservation Area	2066/67-2070/71
13	Kanchanjunga Conservation Area	2063-2068/69

Source: Department of National Parks and Wildlife Conservation (personal communication), 3 February 2013

Note: Power delegation for the approval of the IEE reports related to the works of the Department by the Ministry of Forests and Soil Conservation on 2063.12.18 (April 2006)

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Integration of Biodiversity Concerns in IEE Reports of Infrastructure and Hydroelectricity Generation Projects

(Unofficial translation)

In view of improving the quality of IEE reports by including important information on forests, natural environment, watershed and biodiversity, MoFSC made decision in June 2004 to include the following in the Terms of Reference so that IEE study could identify, predict and evaluate sufficiently the likely impacts of the proposal on forests and forest products including natural resources.

1. Proposals planned for implementation in the forest area should provide field level information related to forests, natural environment, watershed and biodiversity to the extent possible. It should mention in detail the methods, formulae and processes used to collect/generate data and information, and also elaborated methodologies for impacts identification, prediction and evaluation in the IEE report.
2. Identification, predication and evaluation of significant impacts, both beneficial and adverse impacts on biodiversity, should be carried out. The magnitude, extent and duration of impacts should also be mentioned along with the nature of impact – direct or indirect, beneficial or adverse, and permanent or temporary impacts. These impacts should be site-specific to the extent possible and separately mentioned for both construction and operation stages.
3. In case of biodiversity, following aspects should be given attention:
 - a. High biodiversity area;
 - b. Species protected by the law and conserved as a Party to the Conventions, endemic, rare, endangered species and their number including extent of distribution;
 - c. Area used by migratory species for some period/temporarily;
 - d. Species having social, cultural and scientific importance including of medicinal properties, agriculture and economic value;
 - e. Wild relatives of domesticated or cultivated species;
 - f. Biomass, volume and density of species likely to be destroyed by the proposal activities;
 - g. Total number of species found in specified area, and their importance value;
 - h. Forest area falling in the total project area; and
 - i. Natural and afforested forest area and species composition.
4. Give attention to watershed condition and biodiversity in alternative analysis;
5. The report should include clearly the environment protection measures (benefit augmentation measures and adverse impacts mitigation measures) for each impact identified, predicted and evaluated on forests, natural environment, watershed and biodiversity and categorise into preventive, corrective and compensatory measures, and implementation approaches (who implements, where and when) including estimated budget and proponent's commitment (on the budget).
6. Under monitoring, it is necessary to include information related to what to monitor, when, where, how and who to monitor including required budget and who bears the budget in the IEE report.

The MoFSC also encouraged the proponents to take into consideration the elements of biodiversity.

Environmental Impacts of Development Programmes as Outlined in MPFS, 1988

Impact areas	Sub-Areas										
	C/PF	N/LF	MAP	FBI	SCWM	NC	RIP	R/E	HR	M/E	OPC
1. Land use and natural resources											
a. Changing the land character	P/N	P/N	P/N	N	P/N	P/N	N	N	N	N	N
b. Foreclosing important uses	N	N	N	N	N	N	N	N	N	N	N
c. Diverting water	N	N	N	N	N	N	N	N	N	N	N
d. Jeopardizing man and his works	P/N	P/N	P/N	N	P/N	L	N	N	N	N	N
e. Altering natural defences	P/N	P/N	P/N	N	P/N	P/N	N	N	N	N	N
f. Endangering flora and fauna	P/N	P/N	P/N	N	P/N	P/N	P/N	P/N	N	N	N
g. Other factors	N	N	N	N	N	N	N	N	N	N	N
2. Water											
a. Water supply	P/N	P/N	P/N	N	P/N	P/N	N	N	N	N	N
b. Physical state	P/N	P/N	P/N	N	P/N	P/N	N	N	N	N	N
c. Chemical state	N	N	N	N	N	N	N	N	N	N	N
d. Biological state	P/N	P/N	P/N	N	P/N	P/N	N	N	N	N	N
e. Other factors	N	N	N	N	N	N	N	N	N	N	N
3. Atmospheric											
a. Air additives	N	N	N	N	N	N	N	N	N	N	N
b. Air pollution	P/N	P/N	P/N	N	P/N	P/N	N	N	N	N	N
c. Noise pollution	N	N	N	N	N	N	N	N	N	N	N
d. Other factors	N	N	N	N	N	N	N	N	N	N	N
4. Socio-Economic											
a. Population	N	N	P/N	N	N	N	N	N	N	N	N
b. Employment	P/N	P/N	P/N	P/N	P/N	P/N	P/N	P/N	P/N	N	N
c. Income	P/N	P/N	P/N	P/N	P/N	P/N	P/N	P/N	P/N	N	N
d. Health	N	N	N	N	N	N	N	N	N	N	N
e. Cultural traditions	N	N	N	N	N	N	N	N	N	N	N
f. Cultural patterns	N	N	N	N	N	N	N	N	N	N	N
g. Other factors	N	N	N	N	N	N	N	N	N	N	N
5. General											
a. Controversial impacts	N	N	N	N	N	N	N	N	N	N	N
b. Other factors	N	N	N	N	N	N	N	N	N	N	N

Note: C/PF = Community/Private Forestry; N/LF = National/Leasehold Forestry; MAP = Medicinal and Aromatic Plants; FBI = Forest-based Industries; SCWM = Soil conservation and Watershed Management; NC = Nature Conservation; RIP = Resources, Information and Planning; R/E = Research and Extension; HR = Human Resources; M/E = Monitoring and Evaluation; and OPC = Other Programme Components. P = Positive or favourable environmental impacts; N = No negative environmental impact; and L = Light negative impact.

Source: HMG/ADB/FINNIDA, 1988.

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Highlights of IEE Report of Five-Year Forest Management Scheme of Dailekh District

(Fiscal Year 2069/70 – 2073/74)

Objectives of IEE

- To propose benefits augmentation and adverse impacts mitigation measures on physical, natural, biological, chemical, socio-economic and religious and cultural environmental dimensions related to forest conservation, promotion, management, development, sustainable use, environment and livelihood as recommended in the 5-year forest management scheme;
- To determine monitoring methods to monitor all impacts; and
- To inform the decision-maker about potential impacts on the environment from proposal implementation, and support for appropriate decision.

Objectives of the Proposal: There are several objectives of forest management scheme and some of them are:

- To contribute to reducing poverty of the disadvantaged people through livelihood opportunities and improving the socio-economic condition by promoting local people's participation on the management and sustainable use of community, leasehold, religious and private forest;
- To ensure conservation of biodiversity, production and appropriate distribution of forest forests at local level through the management of government-managed forests as per its work plan;
- To adopt easy use system by promoting the development of private forest;
- To support local and national economy through the sustainable management and use of all types of forests;
- To support for environmental balance by preventing and controlling natural events such as river-bank cutting, soil erosion, floods and landslides by adopting plantation and bio-technologies;
- To implement international treaties and agreements while utilising the forest products;
- To implement different forest promotional activities including plantation, natural regeneration to improve condition of government managed forests and increase productivity;
- To take mitigation measures for forest fire, encroachment, and over grazing, and create awareness and involve local people in forest management; and
- To prepare and implement mitigation and adaptation related activities to reduce effects of climate change etc.

Proposed Activities

1. National forest development programme: mapping and survey of all forests of the district, natural regeneration management, productive scientific forest management, selection of mother tree and establishment and management of seed garden, control and management of forest fire, participatory control of encroachment and illegal export, identification of conservation forest and development of a management plan, biodiversity conservation, soil conservation programme, forest utilisation, awareness raising and skill development, including monitoring and supervision
2. Community forest development programme: formation of CFUG, preparation of CFUG working plan and transfer, CFUG plan review, monitoring and supervision of CFs, nursery development, saplings production and plantation, establishment and management of demonstration plot on sustainable forest management, capacity enhancement activities and observation trips, school forest activity, technical support for the collection and sustainable use of forest products, leasehold forestry programme with the CF etc.
3. NTFP development programme: identification, mapping and management of special areas of NTFPs, detail assessment of NTFPs and sample collection, profile preparation on nursery, farming, management, collection, storage and use of NTFPs, saplings production, plot establishment and management, support to NTFP-based enterprises and grant for NTFP farming, capacity enhancement, awareness and skill development, including publication of commercial NTFPs, collection and rational use of herbs and NTFPs
4. Leasehold forest development programme: Implement activities as per western high hill poverty reduction project under implementation by the Ministry of Federal Affairs and Local Development

5. Climate change related programme: implement mitigation and adaptation activities also taking into consideration the activities as per multi-stakeholder forestry programme to be launched
6. Miscellaneous: forest development and management activities proposed by Department of Forests, District Development Committee, District Forest Coordination Committee, other projects and programmes, and community and NGOs

Methods used to conduct IEE study should include use of official data and primary data collection, review of literature, map interpretation, data analysis, impact analysis, measures recommended for adverse impacts mitigation

Implementation of Plan-induced Beneficial Impacts

- Improvement on forest condition through forest cover growth;
- Increase in forest growing stock and quality due to productivity increase from scientific and sustainable forest management;
- Conservation of biodiversity and ecosystem; and also conservation of genetic resources by producing NTFP seeds including identification of additional species and conditions of NTFPs;
- Increment in wildlife number through the conservation of their natural habitats;
- Minimisation of soil loss through conservation of erosion-sensitive areas and watersheds;
- Reduction in forest fire and encroachment, and sustainable availability of raw materials to forest-based industries through increase in forest products;
- Improvement in socio-economic condition of the local people through employment opportunities and income-generating activities and supply of forest products to local people including contribution to local and national economy;
- Reduction in effects of climate change through increased absorption of greenhouse gases, and increment to adaptive capacity to climate change;
- Enhancement of local people's participation for the conservation, management and development of forests, and transfer of technologies and increase of knowledge and skills at local level;
- Increment of agriculture and livestock products, and awareness about the importance of forests; and
- Development of information system on forest products market, and increase in coordination and collaboration.

Measures to augment beneficial measures

- Provide training on forest products collection to target group in the field;
- Involve local people in forest conservation those involved in collection and transport;
- Collect only at prescribed quantity from prescribed location, time and method;
- Don't plant monoculture plantation in a large area; and
- Provide training and orientation to all involved in forest conservation, management and development.

Estimated budget for benefit enhancement measures is NRs. 460,000/

Adverse Impacts

- Possibility of soil erosion in some areas, soil compaction and effect on plant growth and forest fire due to human activities in the forest area;
- Likely landslides and river-bank cutting including damage to culverts and bridges due to extraction of stones, gravel and sand from rivers and streams;
- Possible effect of human beings during collection of wood and fuelwood; and effect on wildlife movement and their habitat;
- Possible damage to small plants and wild animals during collection and transport of forest products;
- Possible effect on aquatic life due to river/stream pollution, increase on wastes and pollution in forests, and expensive corrective measures;
- Possible disturbance in socio-cultural aspects including change in lifestyle due to increased income, and also conflict between locals and outsiders during activity implementation from outsiders;

- Possible loss of fruits, crops, domestic cattle and human beings from increased number of wild animals such as tiger and leopard attack.

Proposed mitigation measures

- Mobilise people at fixed number and implement bio-engineering works;
- Manage regeneration and leave mother trees, control cutting and destruction of trees, including monitoring of illegal export and damage;
- Burn or dump safely the wastes and by-products; and
- Use safe equipment for collection of forest products, and provide skill development training including respects to local culture, disciplines and ethics.

Estimated budget for adverse impacts mitigation – NRs. 35,75,000/

The IEE report has proposed for baseline, compliance and impact monitoring during scheme implementation with monitoring cost as per annual release. The report concludes that adverse impacts are minimal and beneficial impacts are high with possibility of mitigating the adverse impacts. Hence, IEE report recommends to implement the proposal.

Source: DFO, 2069. *Initial Environmental Examination Report of Five-Year Forest Management Scheme of Dailekh District*. District Forest Office, Dailekh

Highlights of IEE Report of Kapilbastu Collaborative Forest Management Scheme

Ten year plan: FY 2068/69 – 2077/78

Area: 5087.43 ha, and 4580.08 ha divided into 4 compartment from management perspectives; 195.6 ha categorised as encroached

Forest boundary: West to Gorusinghe, and East, West and South to Chandrauta

Users – 15,940 households

IEE report approved by Department of Forests on BS 2069.10.9

Objective of the Plan: sustainable and scientific management of forests, reduce ecological imbalance, ensure easy supply of forest products to group members, and contribute to poverty reduction and national economy

Major activities as included in the Collaborative Forest Management Scheme

Forest Management

1. Balance between number of trees and plants in forests: slowly establish sal dominant mixed forest to maintain balance amongst trees, poles, and plants of different age-group by converting matured and over-matured trees through intensive management system;
2. Emphasis on sustainable management: implement forest management activities such as cleaning, weeding, climber cutting, regeneration protection, fireline construction and maintenance and collect forest products taking into consideration the annual increment of forest products such as timber, firewood, and poles for the sustainable management of forest area
3. Supply of forest products: adopt a strategy to ensure fair distribution of forest products taking into consideration the demand of the local people
4. Emphasis on afforestation: implement plantation and agro-forestry activities in public and private land by providing quality saplings and technologies;
5. Management of NTFPs: promote *in-situ* conservation of NTFPs and cultivation in private land;
6. Revenue increase: adopt a strategy to support national economy through revenue received from forests

User groups

1. Actively participate in forest management through public awareness;
2. Institutional development and capacity enhancement;
3. Leadership development;
4. Gender equity, women empowerment and social inclusion;
5. Implement skill development programme, and establish depots at different places to sale forest products;
6. Implement forest-based income generating activities; and increase employment opportunities to poor, women and disadvantage groups of people; and
7. Develop alternative energy, and implement community development works.

Harvesting and Forest promotion activities

1. Regeneration felling – take out 20-35 trees/ha having over 40 cm diameter and implement at 455 ha in 10 years
2. Regeneration preparation felling – felling of other trees to maintain 130-150 poles or trees/ha
3. Thinning – felling of other trees by maintaining 400-500 trees/ha
4. Thinning and pruning – maintain 800-1200 poles or trees/ha by felling trees having 40cm diameter and branch cutting of other trees
5. Cleaning – to maintain 1600-2000 *lathras*/poles/trees per ha
6. Regeneration promotion – clean the leaves during seed falling time, soil preparation, seeding as necessary and caring
7. Coppicing – stump maintenance of fallen trees

8. Collection of dead and dying trees – keep at least one dead or dying trees per ha taking into account the biodiversity

Other activities include conservation of regeneration areas, fire line construction and maintenance, NTFPs production, extension and management, afforestation in public land, nursery development in private land, human resources development, publicity, social welfare and community development programmes, income generation, forest conservation, development of physical infrastructures, forest conservation from illegal export, encroachment, grazing, and fire

IEE objectives

1. Identify and predict significant beneficial and adverse environmental impacts;
2. Recommend measures to augment beneficial impacts and mitigate adverse impacts;
3. Suggest monitoring methods for good implementation of measures to minimise adverse impacts; and
4. Inform to decision makers about the implication of environmental impacts through the implementation of the proposal.

Beneficial Impacts

Physical and Chemical impacts: Cutting of over matured trees having over 40cm diameter helps to pass solar radiation, rainwater percolation and formation of organic soil due to decomposition of litters, and improvement in soil water holding capacity and maintaining pH; increase in soil fertility and physical and chemical properties; greenery development due to afforestation in barren land; increase in water sources, sustainability in agricultural land productivity; reduction of pressure of forest users in national forests due to self-sufficiency in forest products; increase in forest condition due to appropriate forest management; decrease land degradation from soil erosion and gully erosion including river bank cutting and reduction in river bank cutting.

Biological impacts: increase in natural regeneration, number, size and density of different species; significant improvement in biodiversity condition due to wetland conservation and forest management; taking out of 5D (dead, dying, diseased, deformed and decayed/ decaying) provides space, solar energy, water and minerals to grow remaining trees and use of 5D trees reduces forest fire; increase in natural regeneration; minimal impact on wildlife and trees/plants due to forest fire; improvement in wildlife habitat; increase water storage and meet water requirement of plants and animals; positive change in forest pest and diseases ecology

Social, economic and cultural impacts: increase in additional seasonal employment (261,130 man-days of local employment generation in project period); decrease in theft and illegal poaching etc due to employment opportunities; increase in income of workers and livelihood improvements due to investment in health, education and other areas; employment in forest area demarcation, wood, firewood and NTFPs collection and input to poverty reduction; increase in business (retail shops, tea and medicine shops) and local economic improvement

Other beneficial impacts are related to technology transfer, decrease in illegal collection of forest products, increase in government revenue (NRs. 1,32,77,675/ for first five years and 344,894,000 in 10 years); easy supply of forest products, increase in local users fund; and support to local development and livelihoods

Measures to augment Beneficial Impacts

1. Give priority to local people in collection, and transportation of forest products; management and workers supervision, forest conservation, management and development works
2. Prioritise to women, dalits and disadvantage people;
3. Give priority to local poor, women and disadvantage people of forest user groups for poverty reduction, and NTFP-based enterprises
4. Prior-training and employment in technical works while implementing working plan such as tree cutting, fire line construction, regeneration conservation, wire fencing, weeding, cleaning and other forest related works
5. Mobilise workers in forest conservation, management, development and proper utilisation

In order to augment beneficial impacts, select workers; provide training to user group members or workers, launch awareness raising programme; and involve in watching of forests and workers.

Adverse impacts

Implementation responsibility – range post and collaborative forest management group

SN	Activities	Environmental Impacts	Significance	Mitigation Measures
Physical Impacts				
1	Forest Management	Soil compact/hard and 'goreto'	10+10+20 Direct	Engage fixed number of labourers Use old walking route
		Gully formation in 'goreto' due to rain water	10+10+20 Indirect	Control measures if soil erosion
		Loss of trees, medicinal plants, and wildlife and destruction of habitat from forest fire	20+10+20 Direct	Control forest fire immediately Train workers and forest watchers on the control of forest fire Employ fire controller during forest fire season Construct and clear fire line Encourage local people to use small firewood and litters Prohibit entry of persons with matches, lighter and other such things
Chemical Impacts				
1	Forest management	CO ₂ emission from forest fire	20+20+5 Indirect	Encourage local people in using dry leaves, roots, stems etc as firewood and litters and other works Clean litters from forest track and fire line as far as possible
2	Firewood and wood collection	Effect on carbon storage	10+10+10 Indirect	Increase in carbon storage from block (barren land)/fringe area plantation, scientific management
Biological Impacts				
1	Wood and firewood collection, cutting and transport	Loss of trees	10+10+5 direct	Train all labourers on tree cutting and forest product collection Orientation to labourers before the start of the working plan Train and instruct to cutting trees that minimise impacts
2	Forest management	Possible impact on wildlife habitat	10+20+5 Direct	Don't harm wildlife by chasing, killing, disturbing habitat or by other means Prohibit to enter with weapons including 'guleli' Make regular monitoring effective
3	Collection of wood, firewood and other forest products	Possible impact on biodiversity	10+10+10 indirect	Ban hunting of legally protected wildlife and collection of protected plants Instruct the workers not to damage the small plants
Social, economic and cultural impacts				
1	Wood and firewood cutting, transport and storage	Possible accident during collection of forest products, tree cutting and transport	10+10+5 direct	Provide primary treatment box and support for major accident Establish primary treatment facility in office of collaborative forest management group Prior information to make aware the workers
2	Forest management	Social and cultural disturbances and	10+10+10 indirect	Educate and make aware Don't employ if engaged in social distortion activities

		distorted		
		Control on cattle grazing and difficulty in livestock rearing	10+20+5 direct	Plant improved fodder and ground species in barren and public land or fringe areas Encourage for rearing of improved varieties in cattle shed
3	Forest conservation	Adverse livelihood impacts to those engaged in collecting and selling wood and firewood to meet daily requirements	20+20+10 direct	Identify and employ them during implementation of working plan Implement diversified income-generating activities Increase employment opportunities by developing small enterprises

Major impact mitigation measures as proposed include: training on forest fire control, air pollution minimisation and controlled fire, forest management and forest products collection technology, and appointment of forest fire controller, fire line construction and cleaning, plantation, placing hoarding boards, selection of mother trees, conservation of plants and animals habitat, awareness raising on biodiversity, primary treatment and saving life of workers in case of accident, regular monitoring

Budget for benefits augmentation – NRs. 61,00,000/ and adverse impacts mitigation – NRs. 52,00,000/ and monitoring – NRs. 10,00,000/- for compliance/impact monitoring (?)

Recommendation: Implement working plan by minimising environmental impacts and through monitoring.

Source: DFO and KCFMG (2068). *Initial Environmental Examination Report of Kapilbastu Collaborative Forest Management Scheme*. District Forest Office and Kapilbastu Collaborative Forest Management Group, Kapilbastu.

Highlights of IEE Report of Sustainable Collection and Extraction of Sand, Stone and Gravels

Dudhaura and Balganga Streams, Bara District

Project highlights

Annual extraction (4 percent of the estimated stock in the streams): 105,600 m³

Dudhaura stream – 16,000 m³ (43.84 m³ per day for 365 days) which has 0.4m m³

Balganga stream – 89,600 m³ (245.48 m³ per day for 365 days) which has 2.24m m³

Plan for two years – 2069/70 and 2070/71 with possible government revenue of NRs. 7,524,290.31

Sustainable collection

1. Avoid river bank cutting places while collecting and extracting stones, gravel and sand from these streams, and don't extract them within 15m on both sides from stream banks;
2. Don't extract from areas having water in the river/streams or from water flowing places;
3. Don't extract in possible areas of river flow zone (river's dhar) or area that obstructs river flow;
4. Don't extract below river water level;
5. Give priority to extract stones, sand and gravel from rivers islands to regulate water flow from the central part of the river; and
6. Extract only from the mapped areas

Beneficial Impacts

1. Physical – land use related, use of stones, gravel and sands and decrease in river bank cutting thereby conserving land and settlement; and
2. Physical infrastructure such as dam, temple and settlements due to protection of river banks
3. Biological – conservation of river bank bushes and forests due to less river bank cutting, and conservation of bush-dependent birds
4. Social, economic and cultural – employment and income generation, increased income-generating activities and livelihood impacts, and poverty reduction including sustainable supply of raw materials to industries; increase in revenue; employment increase and support for poverty reduction; technology transfer; and increase in people's participation

Measures to augment Beneficial Impacts

1. Provide training in field engaged in collecting sand, gravel and stone;
2. Give priority to local people, particularly disadvantaged communities;
3. Make aware those engaged in collecting materials about protection needs of physical structures
4. Don't permit to extract materials than prescribed; and
5. Only collect from designated places, time and methods

Estimated budget for augmentation measures – NRs. 6,00,000/ for activities : (i) skill development of stakeholders and workers; (ii) bio-fencing (damming) at river banks (both sides); (iii) primary treatment and security; (iv) awareness raising about collection method and conservation

Adverse Impacts

Physical environment - transportation/vehicular movement induced impacts; damage to road, soil erosion, dust and noise pollution, and new roads may channel water towards settlement leading to flood

Biological – impact on parasites, insects and pests and other aquatic life, and impact microbial habitat and breeding

Health – possible accident to workers during collection of stone, gravel and sand and their extraction, transport, load/unload etc.

Impacts mitigation

Physical – (i) rotational collection - don't extract regularly from a single place and extract every two years; extract from 100m far from physical structures, and leave 15/15m on both sides of stream bank; (ii) prohibit use of explosives; and (iii) regulated entry points for vehicles to transport materials

Biological – (i) prohibit unregulated illegal export and use of explosives for fishing and killing of wildlife, and encourage local people in controlling such activities, if any; (ii) plantation – plant bamboo like species on both sides of the road used for materials transport

Social, economic and cultural – (i) health check-up – to those engaged in collection, transport (load/unload), contractor to arrange for monthly check-up and DFO to monitor annual on health check-up of driver and helper; (ii) security – provide helmet and primary health treatment facilities

Estimated budget for adverse impacts mitigation – Annual NRs. 6,40,000/ for activities such as: (i) soil conservation and gully control; (ii) road maintenance; (iii) awareness raising; (iv) sensitive areas conservation and roadside plantation; and (v) awareness raising on security and health

Estimate budget for environmental monitoring – NRs. 3,00,000/

Source: DFO, 2012. *Initial Environmental Examination Report of the Collection and Extraction of Sand, Stone and Gravel at Sustainable Basis* (Dudhaura and Balganga Streams). District Forest Office, Bara

Highlights of IEE Report of Chitwan National Park and Buffer Zone Management Plan (2012-2016)

Objectives of IEE

- Identify, predict and evaluate both beneficial and adverse impacts on the physical, biological, socio-economic and cultural aspects of the environment by the activities proposed in CNP/BZMP;
- Ensure that resources are used on sustainable basis;
- Identify alternative analysis considering various aspects of environment;
- Identify appropriate environment protection measures with continuous monitoring;
- Facilitate informed decision-making including setting the environmental terms and conditions for implementing the management activities with public participation and consultation; and
- Identify the residual uncertainties not possible to be resolved by the IEE study, if any.

Methodologies used to prepare IEE document include: (i) collection of secondary data; (ii) generation of primary data through field investigation, field survey, focus group discussion, interviews and social and resource mapping; and (iii) public consultation and information disclosures such as public notice, public consultation and recommendation letters, and consultation and interaction meeting.

Salient features of the CMP: established in 1973 with 932 km², declared as the World Heritage Site in 1984, meets IUCN category II, buffer zone declared in 1996 with an area of 750 km², represents the tropical and sub-tropical bioclimatic zone, provides habitats to great one-horned rhinoceros, Bengal tiger, Asian elephant, gangetic dolphin, gaur, sloth bear, wild dog and fishing cat as major mammals, swamp deer and wild water buffalo are extinction from the park

Objectives of CNP and BZMP is to protect wildlife species through appropriate protection strategy and manage their habitat by applying science-based measures to maintain the world heritage value of the park and to mainstream conservation for people's wellbeing. Main objectives are:

- To protect and conserve biodiversity with special focus on nationally protected and globally threatened wildlife species;
- To manage terrestrial and aquatic wildlife habitat to maintain ecological functions and processes;
- To regulate and promote sustainable eco-tourism maintaining wilderness and cultural heritage;
- To enhance public stewardship on biodiversity conservation by increasing awareness, minimising human-wildlife conflicts and improving livelihood of people; and
- To strengthen institutional capacity through research, capacity building, coordination and collaboration.

Management Strategies for Buffer Zone

- Zonation – conservation zone, sustainable use zone, and intensive use zone
- Community development – socio-economic development and participatory rest management
- Biodiversity conservation – additional habitat management to spillover population of wildlife
- Eco-tourism promotion – community-based eco-tourism for sustainable livelihood
- Functional coordination - eco-tourism for sustainable livelihood
- Capacity building – with stakeholders for improving professionalism in park-people cooperation and participatory management
- Conflict minimisation – minimise risk to people from human-wildlife conflict

Beneficial Impacts with Magnitude, Extent and Duration (MED)

SN	Activities	Impacts Predicted	Impacts (MED)	Score
1	Upgrading of posts	Protection system enhanced	Indirect, H, L, LT	100
		Easy monitoring of wildlife and human activities	Direct, M, SS,	40

			MT	
2	Institutionalisation of wildlife crime control bureau and CB anti-poaching operation	Reduced illegal activities	Direct, H, L, LT	100
		Conservation of wildlife	Direct, H, L, LT	100
3	Operation of restaurants and local market	Opportunity of trade and business	Direct, M, L, LT	40
		Improvement in livelihood	Indirect, M, L, LT	60
4	CNP scholarship for boy & girl	Improvement in education status	Direct, H, L, LT	100
		Reduction in gap between male and female literacy rate	Direct, M, L, LT	60
		Awareness	Indirect, M, L, LT	60
5	Workshop and training	Understand the need of conservation and means to achieve it	Indirect, M, L, LT	60
6	Establishment of research unit	Promotion of research	Indirect, M, L, LT	60
		Identification of core problems	Direct, M, L, LT	60
		Development of appropriate planning strategies	Indirect, M, L, LT	60
7	Tribal village as a tourist destination spot	Promotion of indigenous culture	Direct, M, R, MT	90
		Source of income	Direct, H, SS, MT	80
8	Establishment of museum-cum-cultural centre	Promotion of local culture	Direct, H, L, LT	100
		Employment opportunity	Direct, M, L, LT	60
		Increase visitors	Indirect, H, L, LT	100
9	Awareness programmes	Realisation of importance and benefits of park	Indirect, M, L, LT	60
		Understanding of responsibility by people towards conservation	Indirect, M, SS, LT	50
10	Upgrade or construct 50km weather road inside the park	Easy surveillance and patrolling	Direct, M, SS, LT	50
		Immediate rescue during accidents	Direct, H, SS, LT	90
11	Excavation of silt and cleaning/ uprooting of weeds in wetland	Improve condition of wetlands	Direct, M, SS, MT	40
		Promotion of aesthetic value	Indirect, M, SS, LT	50
12	Development of network of fire line	Management of grasslands	Indirect, M, SS, MT	40
		Prevents fire hazards	Direct, H, L, MT	90
13	Immunisation programme	Good health of wildlife	Direct, H, L, LT	100
14	Translocation of wildlife	Decrease population pressure	Indirect, M, SS, MT	50
		Increased biodiversity	Direct, M, SS, LT	60

Note: MED = magnitude, extent and duration, H-high, M-medium, L-low, R-Regional, L-local, SS-site-specific, LT-long-term, MT-medium-term, and ST-short-term,

Adverse impacts with Magnitude, Extent and Duration

SN	Activities	Impacts Predicted	Impacts	Score
1	Unmanaged population growth	Habitat deterioration	Indirect, H, L, LT	100
		Increased illegal activities	Indirect, M, L, LT	60
		Conflict	Indirect, M, SS, LT	50
2	Conversion of fertile land to tourist spots	Food insecurity	Indirect, M, L, LT	60
3	Prohibition of grazing in park	Conflict	Direct, M, SS, LT	50
		Decrease livestock	Indirect, L, SS, LT	40
4	Water pollution	Loss of aquatic species	Direct, M, L, MT	60
5	Construction of view tower, additional security posts	Air pollution	Direct, M, SS, MT	45
		Noise	Direct, M, SS, ST	35
		Problem of overburden	Direct, L, SS, ST	25

		Trampling effect on vegetation	Direct, M, SS, MT	40
		Exploitation of forest products	Indirect, L, SS, ST	25
		Trees cutting	Direct, M, L, MT	50
6	Increase in tourism activities	Solid waste	Direct, M, L, ST	45
		Population growth	Indirect, M, L, LT	60
		Change in land use	Indirect, M, L, LT	60

Under the adverse impacts, IEE report states that the management plan does not address issues related to wildlife victim, forest products required to growing population, strengthening the boundaries between the park and the buffer zone, in-migration to BZ area and food insufficiency as fertile land is changed to other land uses prohibition of livestock grazing in BZ as well. The management plan also does not address point and non-point source of water pollution, solid wastes etc.

Enhancement of beneficial measures

- a. Provision of fishery as well as river training programme to the local people in BZ;
- b. Making the people aware about electric fencing site and its importance;
- c. Regular monitoring provision for the effective functioning of electric fences;
- d. Identification of the prone area requiring electric fences;
- e. Promotion of local culture-based tourism;
- f. Provision of immediate compensation to the local people for their losses caused by the wild animals; and
- g. Promotion of different livelihood support programme with high public participation.

Mitigation measures

- a. Introduction of rational land use planning;
- b. Preparation and implementation of a proper compensation plan to protect people and reduce wildlife-human conflict; compensation should be provided immediately because the poor and marginalised people are mostly the victims of these attacks and if compensation and medical expenses are not provided in time, it may lead to the death of the victim.
- c. Mapping of wildlife habitat;
- d. Reducing the use of unnecessary chemicals in the fish pond;
- e. Prohibition to the construction of huge infrastructure within the National Park and Buffer Zone;
- f. Promoting the use of organic fertilisers instead of chemical fertilisers;
- g. Prohibiting the further encroachment of the forest area through regular patrolling;
- h. Removal of illegal settlements based on encroachment control policy through interaction with relevant stakeholder's and high public participation;
- i. Making the local people aware about the provisioning of forest ecosystem services;
- j. Maintenance of emission standard for air and noise that will be generated from brick factories, saw mill and other activities;
- k. Construction of wall around the factories as a barrier for pollution;
- l. Assigning the parameter to the waste water discharge into the river;
- m. Prohibition to use of huge machineries during extraction of sand and gravels from the river;
- n. Application of bio-engineering technique instead of only civil engineering to prevent flooding and erosion;
- o. Cultivation of those crops undesired by the target animals in the farm near the protected area;
- p. Relocation of factories or farms posing danger to the wild species in the protected areas; and
- q. Provision of training and orientation to the visitors for their safety and to avoid disturbance to the wildlife.

Cost for Mitigation Measures – total NRs. 19,00,000.00 for slope stability/river bank protection, assessment of air, soil and water quality for 4 years, plantation of trees, conservation and environmental education programme to the local people and compensation to the needy

Cost included in the management plan for measures such as wetland management, conservation awareness programme, wildlife health management, safeguarding of endangered species of flora and fauna, involvement of BZUGs/BZCFUGs, species conservation, habitat/corridor conservation, land for road/tower/post improvement, provision for grants for research, cultural promotion and code of conduct

Recommendations

- a. Revise the Management Plan regarding systematic implementation of the guideline for the construction of cottage and other industries in buffer zone;
- b. Operate saw mill outside 5km away from the forest area, and excessive excavation of sand should be banned in the buffer zone;
- c. Monitor sand stone gravel during Poush-Magh for the benefit to birds and reptiles;
- d. Make efforts to provide relief for the loss of property, and mitigate solid waste problem should be mitigated with people's participation;
- e. Plan should focus on strengthening of the existing boundaries and construction of new boundaries at required places to reduce human-wildlife conflict and habitat deterioration by encroachment.

Source: CNP, 2012. *Initial Environmental Examination of Chitwan National Park and Buffer Zone Management Plan*. Chitwan National Park, Kasara, September 2012

Training Course on IEE and EIA for Forestry Officials

One-Week Training Course on IEE for Forestry Officials

1. Introduction to and evolution of environmental assessment system
2. Key environmental concepts
3. Policy and legal requirements on IEE
4. Environmental Assessment: Principles and Processes
5. Contents of the TOR and IEE Report
6. IEE: Baseline collection, impact identification and evaluation methods, and mitigation measures
7. Environmental Protection Measures (Benefit augmentation measures and adverse impacts mitigation measures)
8. Environmental monitoring: indicators and methods – Forestry sector
9. Field work, report preparation, presentation and discussion of the IEE report

A 15 days Training Course on EIA for MoFSC Officers

Course Modules

Module I : Introductory Lectures – 1 day

- Definitions and Concept of Environment, Sustainable Development and Environmental Components.
- Environmental Issues of Nepal and Other developing countries
- Introduction to environment-related Policies, Plans and Strategies (Sixth to Tenth Plan); National EIA Guidelines, EIA guidelines for forestry sector and Manuals, Nepal Biodiversity Strategy (NBS) and Water Resources Strategy, etc.
- Environment-related sectoral Policies.
- Environment Related Laws (EPA,1996) and Regulations (EPR, 1997) and relevant environmental instruments like international conventions, treaties and agreements like Convention on Biodiversity (CBD); COP decisions on Article 14 of the Convention; Convention on EIA in the Trans-boundary Context, COP decisions of the Ramsar Convention, Agenda 21etc.
- EIA Criteria, Composition and Contents for Development Planning with Challenges and Opportunities (Strengths and Weaknesses) in Nepal

Module II : Environmental Assessment (EA) and Management – 3 days

- Guiding principles (UNEP, 1987-88) and concept of environmental assessment (EA) process; Types of Environmental Assessment – Initial Environmental Examination (IEE), Environmental Impact Assessment (EIA), Cumulative Impact Assessment (CIA) and Strategic Environmental Assessment (SEA).
- Categorization of the need of IEE or EIA for development projects in Nepal, with examples.
 - Category A - Environmentally friendly projects that rarely have significantly adverse environmental impacts.
 - Category B - Projects with significant but easily identifiable adverse environmental impacts for which mitigation measures may be prescribed readily through IEE.
 - Category C – Projects with significant adverse environmental impacts that require detail EIA. (*Refer National EIA Guidelines, 1992 and Sectoral Guidelines for Forestry and others*).
(Also, refer Categorization on the need of IEE/EIA – 6.1.1.2, and Schedule I,II and III of EIA Guidelines for the Forestry Sector, 1995)

- Full EA required
- Limited EA required
- No EA required
- Role of Environmental Assessment on - Sustainable Forest Management (SFM), Biodiversity Conservation, Solid Waste Management, Air and Noise Pollution Control and Water pollution from point-source and non-point source
- Principles and Process of Environmental Impact Assessment (EIA) and Project Cycle.
- Major policies, strategies and guidelines on EA system in Nepal including MFSC initiatives
- Major Legal Provisions on Nepalese Laws relating to environmental protection (including Constitution of the Kingdom of Nepal); Environmental Laws (EPA, 1996) and Rules (EPR, 1997).
- Present status of enforcement of environmental laws and rules in the forestry sector.
- Environmental standards (including ISO 14000 series and best practice and codes of conduct) and list of protected flora and fauna.
- Stages of study - Pre-feasibility, Feasibility, Construction, Implementation, Operation and Maintenance Stages; baseline data collection and processing.
- Use of Questionnaires, Checklists, Matrix and other Techniques including GIS and Remote Sensing
- Environmental Impact Assessment (EIA) process – Screening, Scoping, Identification, Prediction and Evaluation of Environmental Impacts; and key terminologies used in EA(Refer Flow Chart -1)
- Methodologies used in Environmental Impact Assessment (EIA) – Use of Ambient Levels/Standards and Value Judgment with different methods such as Checklists, Matrices, Map Overlays and GIS, Networks, Cost/Benefit Analysis and Modelling.
 - Impact Identification - Ad-hoc Method, Checklists, Interaction Matrix, Map Overlays, GIS, Network – Primary, Secondary, Tertiary, Expert System (based on value judgment), and Others
 - Impact Prediction - Mathematical Models, Statistical Models. GIS Models, Cost/Benefit Analysis, Expert Judgment, and Others
 - Impact Evaluation - Use of Impact Matrix with Magnitude, Extent and Duration, Delphi Method using Views of Stakeholders and Experts, Use of Numerical Values as proposed by National EIA Guidelines, 1993, Existing Policies, Strategies, Laws and Traditional Customs, Consideration of Standards and Others
- Guidelines for projects affecting indigenous people and ethnic minorities requiring settlement and /or compensation from protected areas.
- Case studies on development projects affecting forestry sector (including protected areas).

Module III : EIA Tools and Method – 5 days

Environmental Impact Assessment Process: Identification, Prediction and Evaluation of Environmental Impacts

- Concept of Screening - needs and importance; Screening criteria adopted by donor agencies (World Bank, Asian Development Bank and Others), and procedures adopted in Nepal – guided by Environment Protection Act and its Rules.
- Scoping and its significance in EIA process, selection of priority issues; review and decision-making and appropriate time of scoping.
- Introduction, objectives and methods of Initial Environmental Examination (IEE), preparation of terms of reference(TOR) and review and decision-making process
- Preparation of Scoping Document and TOR for EIA.
- Assessment procedure from environmental screening to auditing (Refer – flow chart) and EA in project cycle.
- Concept and principle of Cumulative Impact Assessment (CIA); Assessment tools and information needs for CIA.
- Concept and principle of Strategic Environmental Assessment (SEA) in planning process for Sustainable Development and its application over EIA.
- Public participation and consultation in EIA through involvement of stakeholders and process of public hearings:
 - Identification of stakeholders
 - Tools for effective public participation
 - Process of public participation or public hearing (PH)
 - Ways of communication and conflict management

- Legal provisions in public involvement and conflict management in Nepal, and problems encountered
- Advantages and disadvantages of PH
- Time required for PH and legal provisions
- Political and Cultural influences on implementing EIA
- Uncertainty and Risk on environmental assessment and management
- Precautionary measures in combating uncertainty and risk in environmental management.

Methodologies used in impact identification, prediction and evaluation

- Methods for baseline data collection and analysis – Physical and chemical, socio-economic and cultural environment.
- Methods for impact identification – Physical, biological and socioeconomic and cultural environment, including project affecting indigenous people and ethnic minorities requiring settlement and/or compensation from protected areas.
- Methods for impact prediction – Physical, biological and socioeconomic and cultural environment.
- Methods for impact evaluation – Physical, biological and socioeconomic and cultural environment.
- Group exercise on method for impact identification, prediction and evaluation (Example: Ad-Hoc, Check lists, Matrices, Map Overlays and GIS, Network, Cost/Benefit Analysis, Modeling, etc) in forestry sector.
- Impact Analysis - Quantification of impacts, and their augmentation and mitigation measures.
- Valuation of environmental resources and some selected economic instruments for environmental management such as: Cost benefit analysis (CBA), Hedonic pricing, Travel Costs, Contingent Valuation, Benefit Transfer Methods, etc.
- Consideration of alternative analysis and Preparation of EA Report
 - Alternatives - with and without project, and multiple alternatives within the project
 - Approaches of alternative analysis
 - Qualitative approach and quantitative approach
 - Ranking, rating or scaling approach
 - Weighting approach
 - Consideration of alternatives as per legal provision, etc.

Preparation of Environmental Management Plan (EMP)

- Introduction to Environmental Management Plan (EMP) and its contents
 - Content and implementation of Environmental Management Plan (EMP)
 - Identification of impacts and their types (physical, biological, social, economical and cultural)
 - Categorization of impacts – type, nature, magnitude, extent and duration, as specified in Environment Protection Rules, 1997 and Guidelines of EIA for Forestry Sector, 1995
 - Augmentation of positive impacts and mitigation of negative impacts, and responsibility of Institutions (Refer Annex VII, Table 1 and 2).
 - Conflict management and consensus building
 - Report format and key elements involved.
 - Legal provisions related to the implementation of EMP.
- IEE Manual for Forestry Sector and its application during decision making process
- Preparation of Environmental Management Plan (EMP) with costing, through group exercise.
- Major components of EMP reports (- examples from different development projects) related to Forestry Sector and discussion on improvement.

Environmental Monitoring and Auditing

- Environmental Monitoring and Evaluation:
 - Concept and types of Environmental Monitoring (Baseline Monitoring, Compliance Monitoring, Impact Monitoring and Others).
 - Monitoring process, parameters, criteria and indicators.
 - Location, schedules and responsibilities.
 - Group exercise on selection of process, parameters and indicators in monitoring.

- Group exercise on preparation and presentation of monitoring report (Citing Case Study of forestry sector, e.g. Resin Tapping).
- Environmental Auditing:
 - Concept and procedural methods of Environmental Auditing
 - Types of Environmental Auditing - Decision Point Auditing, Implementation Auditing, Performance Auditing, Project Impact Auditing, Predictive Techniques Auditing, EIA Procedure Auditing, and Waste Minimization Auditing, etc.
 - Selection of auditing parameters, approaches, responsibility and legal provisions.
 - Group exercise on preparation and presentation of auditing report, citing case study of forestry sector.

Review of EA reports and Decision Making

- Review of EA Reports and decision making and follow up:
 - Introduction and purpose of review (as specified by National EIA Guidelines, 1993)
 - General review and approval process as per the prevailing Environmental Protection Act (EPA, 1996) and Environmental Protection Regulation (EPR, 1997)
 - IEE Manual for Forestry Sector and its application during review process.
 - Responsibility and timing of review process (IEE, Scoping, TOR and EIA Reports) in Nepal and its relevance in other countries.
 - Criteria in review process - EIA Report Suggestion Committee, 1999, Forestry IEE Review Guidelines, 2004 and Grading and Weightage System
 - Decision-making process and time schedule (- include cost of delay in decision)
 - Follow-up during and after implementation of the development project

Module IV: Field Exercise and EA Report Preparation and presentation 5 days

- Group division and preparation of field work (preparation of checklists and questionnaires).
- Field work, report writing and group presentation.

Module V: Concluding Session and Certificate Distribution – 1 Day

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18 April 2013

The Chief
REDD-Forestry and Climate Change Cell
Ministry of Forests and Soil Conservation
Babarmahal

Ref.: Submission of the Final Report

Dear sir,

As per the contract agreement with the REDD-Forestry and Climate Change Cell, regarding the study on *review of past environmental safeguards adopted in forestry projects*, dated 24 January 2013, it is my pleasure to submit this Final Report, attached herewith, for your perusal.

The Draft Report submitted on 19 February 2013 has been revised taking into consideration the inputs received from participants of the consultation programme held on 6 March 2013 at the REDD Cell office, and oral inputs provided on 9 April 2013 to finalise and submit the final report. I would appreciate it very much if you could kindly approve the Final Report, at your convenience.

As I have not requested for any payment after the submission of the Inception Report and the Draft Report, I would like to request to provide remuneration as per the agreement for this study at your earliest convenience.

I would like to take this opportunity to thank you and all officials of the REDD Cell for entrusting me to carry out this important task.

Kind regards

(Batu Krishna Uprety)
Consultant
Kathmandu Metropolitan City-35
Koteshwor, Kathmandu
Tel.: 4600787 (Res)/9841-278643 (mobile)