Nepal: Integration of Biodiversity Aspects in Strategic Environmental Assessment of Nepal Water Plan and Environmental Impact Assessment of Operational Forest Management Plans in Nepal

Case study compiled for the drafting of CBD guidelines on Biodiversity in SEA.

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1. Introduction

This case study focuses on inclusion of biodiversity aspects in the Strategic Environmental Assessment (SEA) report of the Nepal Water Plan (NWP) finalised in July 2003, and separate plan-level Environmental Impact Assessment (EIA) reports of the Operational Forest Management Plan (OFMP) of Bara, Rautahat, and Dhanusha districts prepared in 1995, 1996 and 2000 respectively. The EIA report of OFMPs is taken into consideration as they are of plan level impact assessment.

Nepal has prepared OFMPs of 20 Terai districts, and has included EIA as a separate chapter with a view to inform the decision-makers and the implementers to integrate environmental aspects including biodiversity conservation during their implementation (of OFMPs). The EIA report of OFMPs has more or less similar contents, issues, impacts, mitigation measures and monitoring requirements. The NWP is of national character, and OFMPs are location specific, i.e., within the administrative jurisdiction of the District Forest Office. The districts are the administrative units of His Majesty's Government of Nepal (HMGN). Each District Forest Office administers forest conservation and management activities including biodiversity aspects in forests, protected areas and wetlands. At present, about 39.6% of Nepal's total area (of 147,181 km^2) is under forest cover and the forestry organisations administer it.

The plan level EIA has been conducted only for the forestry sector. The SEA of NWP is the first of its kind in the water resources sector.

1.1 Short description of the plan for which the SEA was carried out

The plan level EIA of OFMPS has been conducted for the Terai districts. The EIA reports are of strategic nature and provide guidance for the mitigation of forest-related environmental impacts including biodiversity.

The NWP has been prepared to implement the Water Resources Strategy (WRS) which was endorsed by HMGN in 2002. Based on WRS, the water sector issues were grouped into 10 areas (1) general; (2) social; (3) water supply and sanitation; (4) irrigation; (5) hydropower; (6) legal; (7) database; (8) international; (9) environmental; and (10) institutional issues.

The identified environmental issues were on (i) environmental database and mapping; (ii) integration of environmental considerations into planning of water resources development; (iii) effective implementation and enforcement of EIA and SEA norms and recommendations; (iv) biodiversity conservation, (v) surface- and ground water pollution; (vi) lowering of ground water table; (vii) lack of environmental awareness; (viii) landslides, erosion, sedimentation, Glacier Lake Outburst Flood (GLOF), flooding; and (ix) watershed conservation. One of the objectives of the WRS was to protect the environment and conserve biodiversity of natural habitats (please note that it does not mention agro-biodiversity). The guiding principles for the formulation of WRS (related to biodiversity and SEA) was, *inter alia*, to (i) conserve biodiversity, endemic, rare and endangered

species and habitats such as forests and wetlands in planning, developing and managing water resources; (ii) ensure adequate water quantity and quality for aquatic ecosystems, species and habitats; (iii) adopt ecosystem approach for watershed management; (iv) avoid, rather than finding means of reducing and/or mitigating, environmental impacts to watersheds and aquatic ecosystems; (v) include a fully-funded environmental protection or enhancement component to compensate for the project's environmental impacts; (vi) minimise destruction of productive ecosystems including forests and wetland; and (vii) manage the Siwalik range and Bhabar Zone (ecologically and geologically vulnerable forest ecosystem lying north to the Terai plain area to middle mountain) to improve forest cover, soil conservation and groundwater recharge (WECS, 2002).

The WRS has been prepared for 25 years (5 years as short-term, 15-years as medium-term, and 25 years as long-term). Out of ten outputs of WRS, one is related to achieving sustainable management of watersheds and aquatic ecosystems. The pre-condition for the implementation of WRS is also related to the approval of Nepal Water Plan. The 5-year strategic output is to strengthen institutions for watershed and ecosystem protection/management; the 15-year strategic output is to implement full scale watershed/aquatic ecosystems activities; and in 25 years, the watersheds and aquatic ecosystems will be managed sustainably.

The WRS has made commitment to fully comply with SEA and project-specific EIAs in all sectors (related to water resources) to specify effective environmental protection measures during design, construction and operational phases. Although the WRS identified biodiversity conservation issues, and adopted the guiding principle on biodiversity, it does not clearly specify biodiversity conservation in its outputs and activities. The focus of the WRS is particularly on aquatic ecosystems. However, watershed conservation would contribute to conserve biodiversity as well.

1.1.1 Nepal Water Plan

A 25-year (2002-2027) NWP has been prepared to implement the WRS. Several action programmes have been recommended to implement 10 components of the NWP. They are: (i) Water induced disaster (WID); (ii) **Management of watersheds and aquatic ecosystem**; (iii) Drinking water supply, sanitation and hygiene; (iv) Irrigation for agriculture; (v) Hydropower; (vi) Industries, tourism, fisheries and navigational use; (vii) Water related information system and river basin management; (viii) Legal frameworks; (ix) Regional cooperation; and (x) Institutional mechanism.

The second programme component is related to biodiversity conservation in the watersheds, and aquatic ecosystems, and the programme components and major actions related to biodiversity and SEA are given (Annex 1). Altogether 72 actions have been proposed under 9 programme components in the environmental action plan for the management of watersheds and aquatic ecosystems (WECS, 2004).

The SEA was initially designed to apply in NWP and was carried out jointly by the consulting firm (ITECO Nepal (P.) Ltd., SchEMS, and Time Consult (P.) Ltd). Its report was finalised in July 2003. But it was conducted for sub-sector policies related to irrigation, hydropower and water supply, WRS and draft sub-sector action plans to identify the sources of environmental issues at the strategic level, propose mitigation measures, address the cumulative effects, and streamlining the project level EIA.

1.1.2 Operational Forest Management Plans

Bara District OFMP: HMGN prepared the OFMP of the Bara district, located in the Central

Nepal. The World Conservation Union - IUCN carried out the EIA study in 1995 prior to the approval of the EIA Guideline for the Forestry Sector (1995) which requires EIA for forest management plans. The Forest Management and Utilisation Development Programme (FMUDP), implemented by the Ministry of Forests and Soil Conservation (MFSC) with the generous assistance of the FINNIDA officially requested the National Planning Commission (NPC) Secretariat to involve IUCN in carrying out EIA of this Plan. The Plan has components of (i) production forests, even-aged management in 24,298.5 hectares, and uneven-aged management in 1660.6 ha; (ii) potential community forests in 3,1974.3 ha; and (iii) protection forests in 3,273.8 ha, totalling to 32,430.3 ha of forests of the Bara district. The Plan also included (i) immature thinning in 583.5 ha; (ii) seedling felling in 114.9 ha; (iii) regeneration felling in 1060 ha; and (iv) selection felling in 71.7 ha of forests during the period of 5 years (1994/95 to 1998/99). A total of 150 issues were identified and they were boiled down to 19 issues during the EIA study. Of them, uncontrolled forest burning, poaching of wood (timber, fuelwood etc.), poaching of wildlife, clearing of forest land for agriculture and settlement, loss of habitat and biodiversity are related to biodiversity conservation (IUCN Nepal, 1995).

Rautahat District OFMP: The FMUDP prepared OFMP and conducted an EIA study in 1996 with particular focus on vegetation and biodiversity, and wildlife and biodiversity. The district, located in the Central Terai, delineated the forest areas into protection forests, potential community forests, and national production forests. The total forests area was 26,850 hectares. The protection forests will be left to conserve the existing representative biological resources and to maintain gene pool, primarily in the environmentally and socially sensitive areas. The OFMP has also considered the allocation of a protective buffer zone along the river sides.

Dhanusha District OFMP: Similar activities (as of Bara and Rautahat) were included in the OFMP. The EIA study was carried out to identify likely impacts of OFMP of Dhanushadham forest on the forest environment; propose mitigation measures to minimize the adverse impacts, if any; and recommend environmental monitoring framework. The plan was prepared for 2480 hectares.

1.2 Competent Authority for carrying out SEA and Plan level EIA

The FMUDP provided funding for EIA study for Bara and Rautahat districts. These EIA reports of Bara and Rautahat were not approved by the competent authority. In case of Dhanusha district OFMP, the MFSC, the focal ministry of the Convention on Biological Diversity (CBD) and also the policy-making body on forests and wild biodiversity, approved the OFMP report. The MFSC was also the lead ministry to institutionalise EIA system in Nepal before the establishment of the Ministry of Population and Environment (MOPE) in September 1995. It established the Environmental Impact Study Project (EISP) in 1982, and upgraded to Environment Division in 1990. In 1992, the MFSC was remained as the Ministry of Forests and Environment (MOFE) and again renamed as the MFSC during the formation of the Environment Protection Council (EPC) in 1993 under the chairmanship of the Right Honourable Prime Minister. Then EPC dealt with environmental matters as a coordinating advisory body, and MFSC worked in low profile to continue institutionalisation of impact assessment process. At present, the situation has changed and MFSC has its Environment Division with Environmental Assessment Section, and Biodiversity Section.

The Water and Energy Commission Secretariat (WECS), an advisory body on water resources sector, was involved in preparing WRS and NWP with World Bank funding. Accordingly, the

WECS prepared SEA of NWP at the national level through consulting services. In other words, all the plan level EIA and SEA reports were prepared by the consulting firms.

1.3 Legal Basis for SEA

The SEA of NWP was carried out based on WRS and the current Tenth Plan (2002-2007) which includes a policy for SEA (NPC, 2002). There is a window to carry out SEA of any plan and programme legally as the Environment Protection Act (1996) defines proposal *means a proposal prepared in regard to carrying out of such development work, physical activity that may bring about change in the existing environmental conditions or any plan, project or programme which changes the land uses* (MOPE, 1997). In this context, the SEA could be conducted through existing legal regime on the environment as well. However, there is no clear procedure for conducting and approving SEA report in the environmental law (legislation and regulation).

For OFMPs of Bara and Rautahat districts, the EIA studies were carried out before the enactment of the environmental legislation, and for Dhanusha district OFMP, the EIA study was carried out after the enforcement of the EPA, 1996 but it did not comply with the legal provisions. This has also been so as MOPE has a tendency "not to make decision within the legal time frame". The cost of delay decision is tremendous and it is extremely difficult to wait for MOPE's decision for priority projects. With the good intention of incorporating the biodiversity aspects, the Department of Forests of the MFSC has prepared similar OFMPs for all Terai districts (20 districts) and a chapter on EIA has been included in all reports. One of the reasons for carrying out plan level EIA studies was that MFSC was involved to institutionalise EIA process in Nepal.

As EIA study for OFMPs was not carried out legally, a person filed the case in the Supreme Court for necessary instruction to make the OFMP reports invalid, and instruct the competent organisation to conduct EIA legally. Finally, the Supreme Court ordered to dismiss the petition taking into consideration the request of the MFSC and of MOPE. The MFSC made strong argument that the OFMP focuses on environmental conservation including biodiversity, and MOPE requested to repeal the petition. Furthermore, MFSC has the institutional responsibility on the natural environment. Now, there is some controversy whether EIA should be carried out for all forest management plans (such as OFMP, Operational Plan, forest schemes, action plans etc.). However, the Schedule 2 of the Environment Protection Rules (EPR) (1997) clearly mentions the need for EIA for the formulation and implementation of forest management plans.

1.4 Kind of Documentation on SEA and Incorporation of Biodiversity

The legal provisions on EIA obliges the proponent to inform the public at least two times: (i) the proponent should publish a 15-day public notice before the submission of the Scoping Document for necessary approval by MOPE; and (ii) the proponent should conduct a public hearing at the project site after the preparation of the draft EIA report. Once the final EIA report is submitted for approval, MOPE should publish a public notice for 30 days to seek inputs from the stakeholders and the public.

As there is no guideline and elaborated legal procedure (as in IEE or EIA) on SEA, the public might not be involved in raising issues and concerns, and providing comments and suggestions on the SEA report. In case EIA of Bara's OFMP, about 50 persons were contacted during the study period. They include farmers, field and central level officials. In OFMPs of Rautahat and Dhanusha, local people and field level officials were contacted during information collection. In case of SEA of NWP, a scoping meeting was conducted on 10 March 2003; and the draft report was presented in a

workshop on 2 July 2003. Based on the workshop participants given in the SEA report, there is no participation from MFSC. It may be due to either not invited or not participated. In my knowledge, MFSC was not invited to participate in this workshop. However, MFSC was invited and it participated in the residential workshop on 13 to 15 June 2003, where the progress on the SEA report preparation was presented. In this workshop, MFSC representative made specific suggestions to sufficiently address issues related to biodiversity, watershed, protected areas and natural environment. The comments and suggestions were documented in the workshop proceeding. However, no official comment was sought from the CBD focal point (MFSC) on the SEA report. The final SEA report does not clearly address the issues on biodiversity raised by several participants during the workshop.

1.5 Social and Environmental Setting (of the country)
Nepal is a mountainous country, bordered between India (on east, west and south) and China (north). It is divided into 5 development regions (eastern, central, western, mid-western and far-western development regions) and 75 districts as administrative and development units. The country has also been divided into five physiographic zones: (i) High Himalaya; (ii) High Mountain (lesser Himalaya); (iii) Middle Mountain (Mahabharat range); (iv) Siwalik (hill range between Terai plain and middle mountain); and (v) Terai plain. The elevation ranges from 64m to 8,848m (the Mount Everest) above the mean sea level. The average annual rainfall is 1530 mm but it ranges from about 150 mm to 3000 mm. In some area, it reaches over 5000 mm. About 80% of the total precipitation occurs during June to September. The temperature also varies from less than 0^0C to about 40^0C.

Nepal is inhabited by more than 60 ethnic groups of Indo-Aryan and Tibeto-Mongoloid stock. Majority of the people practice Hinduism followed by Buddism. In 2003, the total population has reached to 24.2 million with the growth rate of 2.25%. The population density is about 164/km^2. The GDP is estimated at US$ 248. Only about 15% of the total population live in the so-called urban areas and over 80% still depend on subsistence agriculture. The average agriculture growth rate is estimated at 2.48% and non-agriculture growth rate at 10.44% between 1994/95 to 2000/2001. The life expectancy at birth is about 61 years with the average literacy rate of 54% (population over 6 years). Infant mortality rate has come down to 64 per 1000 births. About 38% of the total population are still below the poverty line.

A total of 17 environmental issues are prioritised. The most urgent environmental problems are: (i) forest depletion; (ii) degrading land; (iii) solid waste management; (iv) water pollution; and (v) air pollution. The moderately significant environmental issues include: (i) dwindling biodiversity; (ii) desertification; (iii) haphazard urbanisation; (iv) forest fire; (v) groundwater pollution; (vi) glacial lake outburst flood events; (vii) food security; and (viii) alternative energy. While the less urgent but still significant environmental issues are: (i) waning fisheries; (ii) decreasing biomass energy; (iii) transboundary movement of wastes; and (iv) noise pollution (MOPE/UNEP, 2001). Of them, environmental issues related to forests, land, biodiversity, desertification, forest fire, biomass energy etc. are of rural character. Furthermore, biodiversity in general and forest biodiversity in particular is one of the important areas requiring immediate attention.

2. Linkages between SEA and Biodiversity

2.1 Links to other policies, plans and programmes
There are several national policies on biodiversity conservation. Most of the policies approved by

the government after 2000 include biodiversity and impact assessment provisions. However, much focus is on EIA than SEA. They are:

a) The Tenth Plan (2002-2007) - a 5-year plan emphasises on biodiversity conservation and SEA but there is no linkage established between biodiversity and SEA.
b) Nepal Biodiversity Strategy (2002) urged to conduct EIA of project that are likely to have significant impacts on biodiversity with a view to avoid or minimise impacts.
c) Water Resources Strategy (2002) has urged for effective implementation of EIA and SEA norms and recommendations, and biodiversity conservation. The Strategy also adopted policy for the conservation of biodiversity, endemic, rare and endangered species and habitats such as forests and wetlands. One of the activities is to utilise SEA in water resources management to achieve its output (sustainable management of watersheds and aquatic ecosystems). However, there are no clear activities and outputs on biodiversity, and the general understanding is to conserve priority watershed and aquatic ecosystems.
d) National Wetland Policy (2003) includes policy statement to conduct EIA as per existing legal regime on the environment to avoid or minimise impacts on wetlands.
e) Sustainable Development Agenda for Nepal (2003) mentions to require EIA and analysis of alternatives for all project; and conserve and manage biodiversity in forests, rangelands, within and outside protected areas, wetlands and agriculture.
f) National Agriculture Policy (2004) promotes to establish gene bank and participatory biodiversity park, and promote *in situ* conservation but it does not recognise the role of SEA.

In forestry plans and programmes, biodiversity conservation aspects have been accommodated but there are no provisions for SEA. The Nepalese policies, plans and programmes have realised the need for the conservation of biodiversity, but there are no provisions for SEA except in the Tenth Plan and Water Resources Strategy. It means the importance of SEA is yet to be realised by the policy-makers.

2.2. Influence of Biodiversity Aspects on SEA

As mentioned above, there is an emerging understanding on the need for the conservation of biodiversity at different levels from national policy formulation to field implementation levels. The local authorities have also included biodiversity conservation aspects, but there is limited knowledge and understanding on impact assessment. Sometimes, EIA is also understood as the anti-development tool as many people consider it an additional burden, time-consuming, and a tool that unnecessary delays the project. Hence, understanding on SEA at different levels is extremely low, and the decision-makers, in many cases, at the central level hesitate to use the word "SEA".

Biodiversity conservation was addressed sufficiently in the plan level EIA of OFMPs and these EIA were carried out to conserve forest biodiversity. The SEA was proposed for Nepal Water Plan and its report has assessed impacts of WRS rather than the plan itself. However, this SEA was carried out at the appropriate level.

2.3 Tiered SEA

Except the Tenth Plan and WRS, there are no provisions on SEA in other policies, plans and programmes. The policy- and decision-makers have yet to underscore the importance and understand the benefits of SEA.

2.4 Integration of SEA into Existing Planning Procedures and Processes

Sectoral interest and requirement of the funding agencies prevails while carrying out SEA. In case of SEA of NWP, the WRS made specific provision, the budget was allocated and SEA report was prepared through consulting services. Hence, there is no clear procedure and process to integrate SEA in the planning cycle.

3. Biodiversity, the general meaning of biodiversity in the SEA

3.1 Definition of Biodiversity

The Environment Protection Act (1996) defines biodiversity as "ecosystem diversity, species diversity, and genetic diversity". It is in line with the CBD. Such definition is not available in other legislation in Nepal. Furthermore, none of the SEA and plan level EIA reports has defined biodiversity. In many reports including EIA reports, "wildlife is understood as the biodiversity" and its coverage is limited.

3.2 Distinguishing the Biodiversity in Ecosystems, Species and Genotypes

Biodiversity is much understood at the species level. The scientific communities and academia also focus on ecosystems and genetic levels. However, facilities for studying genetic diversity are limited in Nepal.

3.3. Level of Biodiversity addressed in the SEA

The plan level EIA of OFMPs has addressed biodiversity at species level and the SEA of NWP has mentioned ecosystems such as forests, protected areas, wetland, and agro-ecosystem. Most of the discussion in SEA has been made at species level such as number of plants including endemic and endangered species, mammals, birds, and reptiles. Hence, the SEA report does not provide clear information on the level of biodiversity (ecosystem, species and genetic levels) and information is sufficiently mixed.

3.4. Attention on Three Objectives of CBD

All the plan level EIA and SEA reports have focussed on conservation of biodiversity, and nothing has been mentioned on other two objectives of CBD. However, there are sectoral policies and legal provisions on promoting sustainable use and benefit sharing. For example, the National Parks and Wildlife Conservation Act 1973 (amendment 1993) has a clear provision to provide 30 to 50% of the total revenue generated in the protected areas for community development (for socio-economic development of the people living nearby the protected areas, particularly in the buffer zones). This benefit sharing approach is working very well, and it has contributed to conserve the national parks and wildlife reserves through peoples' participation.

3.5 Services

In Nepal, biodiversity has yet to be considered as a provider of ecosystem services. Nothing has been considered about the ecological goods and services obtained from forest ecosystems or other ecosystems. In April 2003, MFSC made a policy decision on to plant trees @ 1:25 taking into consideration the "no net loss" approach, i.e., if any project cuts down a tree, it should plant 25 trees, manage for 5 years and handover to community users or local forestry organisation for future management (Uprety, 2003). This decision was made to conserve biodiversity through impact assessment tool, and to least damage the forest resources and the biodiversity. The infrastructure projects, particularly the hydropower projects, raised their concerns on "heavy taxing" as forest area was used previously at "free of cost". This prompted to conduct a study on economic valuation of ecological goods and services provided by the forests. The MFSC-Environment Division is

planning to complete this study by mid-July 2005. It is expected that the study findings will contribute to create awareness on the need for conserving forest biodiversity. This is the first study of this kind in Nepal.

Still, Nepal has inadequate understanding on the ecosystem services and/or functions. There is a general understanding about the need for conserving endangered wildlife in the protected areas. The notion is that plant diversity could be maintained as a part of habitat management. In a nutshell, biodiversity conservation is ongoing without adequate understanding of its economic, social or ecological values.

3.6 Operationalisation

The SEA report of NWP has recommended to release 10% of total water flow to maintain downstream ecosystem. This is in line with the Hydropower Development Policy (2001) and Irrigation Policy (2003). It also urges to develop and implement water quality standards and primary treatment of sewage at source, and implement watershed management activities. Other mitigation measures are on compensatory plantation, and follow (adequate consideration) of national parks legislation and regulations. However, biodiversity conservation outside protected area is less considered. HMGN is also approaching the conservation of biodiversity in different categories of forests (government-managed, community-managed, leasehold, private and religious forests). The SEA study mentions possible impacts of biophysical interventions on biodiversity particularly due to construction activities, and construction labourers in forests and fish population.

4. Transparency and Stakeholder Involvement

The plan level EIA reports of OFMPs were prepared by the team including biologists (botanist, forester and wildlife specialist). Although the draft reports were not made public, the concerned agencies, particularly the forestry organisations at different level (central and district levels) know about the study report.

In case of SEA of NWP, the study team comprised of zoologist and botanist. Two workshops were organised during the study period. As mentioned above, the scoping exercise was organised in March 2003, and a second workshop was organised in July 2003 to discuss on draft SEA report. The July workshop was attended by the representatives of the Water and Energy Commission Secretariat, Department of Electricity Development, Ministry of Water Resources, Department of Water Induced Disaster Management Project, Department of Hydrology and Meteorology, Ministry of Population and Environment, and Department of Soil Conservation and Watershed Management (WECS, 2003). Except the last department, others were represented mostly by the engineers. It clearly indicates that the CBD focal point, the MFSC, was not represented in the workshop. And hence, biodiversity concerns were not reflected in the workshop.

In the June workshop (2003) about the NWP, the CBD focal point was invited. The comments made by the representative of the CBD focal point was "Environmental Action Plan should be prepared in such as way that the conservation of biodiversity and natural resources .. are ensured during and after the water plan implementation phase. The recommended actions are very general. Link recommended actions with set principles e.g. biodiversity conservation, ecosystem approaches" etc. However, these concerns were inadequately addressed in the final SEA report. Hence, the organisations and consultants involved in the preparation of SEA report have not fully considered the role of biodiversity stakeholders. The Ministry of Agriculture and Cooperatives (MOAC) also looks after agro-biodiversity. At the implementation level, the Department of National Parks and

Wildlife Conservation, Department of Forests, Department of Plant Resources, Department of Agriculture, Department of Livestock Services and Nepal Agriculture Research Council are directly related to biodiversity conservation aspects. There are several national NGO and international NGOs like IUCN and WWF. However, none of them were invited to participate in the workshops on SEA of NWP. In a nutshell, biodiversity stakeholders were not involved right from scoping to final SEA report of NWP. Furthermore, the WECS also did not ask for official comment on the draft SEA report from the CBD focal point and other biodiversity stakeholders.

The WECS should have advised the forestry organisation to participate in the major steps of SEA report preparation.

Table 1: **Summary of General Information**

SN	Particulars	Operational Forest Management Plans			SEA of NWP	Remark
		Bara	Rautahat	Dhanusha		
1	Introduction					
	Sector (Plan EIA conducted for OFMPs)	Forestry	Forestry	Forestry	Water resources	
	Location	Central Terai	Central Terai	Central Terai	National	Forests managed at district levels
1.2	Level of assessment	Local	Local	Local	National	
1.3	Legal basis for SEA	EIA mandatory for plan and programme levels (but not for policy) as per the definition of proposal in the Environment Protection Act (1996). SEA of Nepal Water Plan carried out though administrative instruction, and the spirit of Water Resources Strategy (2002).				
1.4	Documentation	Submission of final report and consultation during field data collection	Submission of final report and consultation during field data collection	Submission of final report and consultation during field data collection	Stakeholders' consultation made twice, information shared in June workshop about progress of SEA report preparation	Reporting only to client, more documentation in SEA of NWP as compared to EIAs of forestry plans
2	Links to other Policies	Biodiversity integrated	Biodiversity integrated	Biodiversity integrated	Biodiversity integrated	
2.1	Tiered SEA	No	No	No	Water resources	
2.2	SEA integration procedure	No	No	No	Yes	Focus of Tenth Plan and WRS on SEA
3	Biodiversity in SEA					
3.1	Meaning of BD in SEA	BD conservation recognised	BD conservation recognised	BD conservation recognised	BD conservation recognised	BD defined in EPA, 1996
3.2	Level of BD addressed in SEA	Species level	Species level	Species level	Ecosystem and species levels	
3.3	CBD objectives	Conservation	Conservation	Conservation	Conservation	Benefit sharing included in NPWC Act, 1973
3.4	Services	Not addressed	Not addressed	Not addressed	Not addressed	Study on economic valuation of ecological goods and services from forests planned
3.5	Operationalisation	Bio-physical interventions	Bio-physical interventions	Bio-physical interventions	Bio-physical interventions	Impacts of socio-economic activities

		included	included	included	included	on biodiversity addressed in SEA of NWP
3.6	Transparency and Stakeholders' involvement	Only forestry organisations and local people	Only forestry organisations and local people	Only forestry organisations and local people	Some stakeholders involved but inputs of CBD focal point not asked for	No participation of biodiversity stakeholders in SEA of NWP

Note: NPWC = National Parks and Wildlife Conservation

5. Biodiversity in the different stages of the SEA process

In case of plan level EIA of OFMPs, the study team included information at species level in the final report. The study was carried out based on the Terms of Reference (TOR).

In case of SEA of NWP, the WECS issued TOR to the consultant, and SEA report includes details on steps from environmental screening to auditing. The following paragraphs focus on information as contained in the SEA report of the NWP.

5.1 Screening

The list of proposals as included in the National EIA Guidelines and EIA Guidelines for Forestry Sector was used to screen the proposal to know about the level of impact assessment required for OFMPs. The EIAs of OFMPs were carried out to see the impacts on biodiversity and the environment.

The SEA was conducted in the spirit of WRS, 2002. The biodiversity criteria were not considered to know the need for SEA. To identify generic application of SEA procedure, the study team used the following screening criteria.

Is the planning process integrated? (i.e., full consideration of environmental consequences is given or implicit in the process): The answer was "SEA needed".

Are mechanisms for the assessment of social and economic impacts already in place? The answer was "as far as possible, SEA should include social and economic, if not, make sure mechanisms are installed and integration takes place".

Should SEA include related policy instruments, such as risk assessment and cost-benefit analysis? The answer was "make sure the application of SEA and related instruments is integrated".

Will the policy, plan or programme to be adopted directly determine type, form, size etc. of concrete projects? The answer was "SEA to discuss issues, broad options, and (environmental) implications: appraisal track".

Based on this, the SEA report concludes that SEA will be required to discuss the broad options for environmental soundness of the proposals.

5.2 Scoping

In case of OFMPs' EIA, scope of work was included in the TOR and scoping was not carried out. Also plan level EIAs were not carried out to comply with the legal provisions on environmental assessments. However, the study area was clearly defined, i.e., forest areas of the district.

In SEA of NWP, the scoping exercise has distilled issues into: (i) vegetation/forests; (ii) fauna - birds/mammals; (iii) aquatic ecology; (iv) fish species; (v) biodiversity and habitats; (vi) endangered, rare, threatened, protected and endemic species and their vulnerability; and (vii) national parks and wildlife reserves. In addition, other issues which directly or indirectly affect the downstream ecosystem include environmental flow and downstream effects of water diversion (water release), pollution/wastewater disposal, and livestock and cropping pattern. Biodiversity issues were looked at ecosystem level such as forests, habitats, aquatic ecosystem, national parks and wildlife reserves. It also focuses on species levels as well such as vegetation, fauna, and fish species. The study team identified these issues through stakeholders' meeting, and literature review. The study team comprised of zoologist and botanist.

As the water plan is of national level, the SEA report has not defined the study area. Biodiversity information is sufficiently generic. At the end of the scoping exercise, the strategic environmental issues on biological aspects were grouped into: (i) forests and vegetation; (ii) wild animals and habitats; (iii) aquatic ecology; and (iv) national parks and wildlife habitats. Other issues as mentioned under scoping, which may affect biodiversity, include water quality/pollution, water logging and inundation, and downstream water problems under physical issues. However, socio-economic issues that affect biodiversity were not clearly identified.

During the scoping exercise, alternatives were neither taken into consideration nor importance of biodiversity mentioned. Although the OFMPs did not undergo scoping exercise, both beneficial and adverse impacts of do-nothing and implementation of OFMPs were analysed in the final EIA report of OFMPs.

5.3 The assessment

In plan level EIA reports of OFMPs, biodiversity impacts at species level have been identified and predicted, and were included in the final report. The impacts focus on composition of biodiversity and potential loss of endangered species. Furthermore, forest biodiversity was sufficiently addressed in OFMPs report.

In EIA of Bara OFMP, the predicted adverse impacts related to biodiversity from the uncontrolled forest grazing are on destruction on forest regeneration, elimination of small animals, and easier to wildlife hunting. Implementation of OFMP would change the habitat due to regeneration of production forests and loss of biodiversity, change biodiversity composition, reduce or eliminate common or rare plants and habitat forms, and change vegetation composition. The EIA study has recommended for the implementation of OFMP by incorporating biodiversity and conservation principles into harvesting and silviculture activities. After the preparation of the EIA report, a biodiversity management plan was prepared for Bara district (Annex 2).

In EIA report of Rautahat, some of the adverse impacts identified and predicted by the EIA study include: (i) change in vegetation composition and loss of genetic variability; (ii) effect on moisture-loving preferred species due to evaporation of soil moisture (exposure of sunlight due to forest clearance); (iii) possible regeneration of light and temperature-loving plant species, and elimination of temperature-sensitive and shade-loving species; (iv) increased genetic erosion due to weeding and selection felling of unwanted species, and also genetic erosion of location specific plants such as *Dalbergia latifolia*, and *Ougeinia dalbergioides* due to habitat loss; (v) possible "isolation shock" to species flourishing in community and those who needs associates due to fragmentation of natural forests, and also selection felling; (vi) creation of new habitats which may be unsustainable from

ecological perspective (Uprety, 1996). In order to mitigate these impacts, the study has recommended to: (i) document plant diversity prior to regeneration felling, and also document species before weeding (after regeneration felling), (ii) establish required check points to monitor trafficking of forest products; and (iii) launch *ex situ* conservation programme for uncommon and rare species. The study has also proposed, *inter alia*, the following code of conduct, and conservation strategy for threatened plant species:

a) Adopt labour-intensive forest harvesting technology with due care on ground vegetation, climbers and branch cutting;
b) Carry out forest harvesting in dry season in order to enhance regeneration;
c) Ensure that only recommended commercial tree species are scientifically cut and other species are least damaged;
d) Ensure that endangered plant species are retained and conserved in their original habitat without any damage;
e) Conduct floral survey in each compartment before harvesting the timber species;
f) Strictly prohibit the collection of endangered species, and ensure their *in situ* conservation; and
g) Do not remove two species (*Dalbergia latifolia*, and *Ougeinia dalbergioides*) during the regeneration felling.

In case of wildlife, the study predicted adverse impacts on birds and microbes due to even-aged canopy forests, disappearance of woodpeckers as they are found in dead and dying trees, formation of habitat islands and change in habitats, increase in population of herbivores and corresponding increase in game species due to opening of canopy/creation of new habitats. In order to mitigate adverse impacts, the study has recommended to allow cogs and snags (possibly 25% of the stands), maintain corridors, manage open grasslands, promote only site-specific mechanical operations during regeneration felling activities, discourage rampant poaching and introduce anti-poaching operations to preserve wildlife species, set aside 1 km stretch of forests on both sides of rivers to serve as a contiguous linkage for migration of birds, and make water holes for wildlife species for the dry season (Shrestha, 1996).

In EIA report of Dhanusha OFMP, the adverse impacts include: (i) possible damage of plant species during the extraction of old and diseased trees and other forest products; (ii) change in habitat of wild animals and other species due to selective felling of old growth trees; (iii) possible encroachment for human settlement and agriculture expansion in regeneration felling areas; and (iv) possible wipe-put of open-area loving wildlife. In order to minimize them, the following mitigation measures were proposed:

a) Avoid the implementation of OFMP activities during the monsoon time to minimize soil compaction and ground disturbance as the soil is clay in the study area;
b) Regulate activities of forest workers' on vegetation and forests;
c) Prohibit wildlife hunting, trapping and poaching of wildlife, and illegal collection of forest products;
d) Avoid establishing camp site for work force in the forest area;
e) Manage the grasslands to improve wildlife habitat;
f) Promote *ex situ* biodiversity conservation in mixed forest along the both sides of the stream and river;
g) Ensure the protection of rare, endemic and threatened species, if any; and

h) Minimize unnecessary cutting of untargeted trees.

However, most of the impacts identified were at species level. It does not address the change in composition of biodiversity. About three weeks long field study were carried out to collect baseline information at species level. It means, number of species found in the forests was enumerated, possible impacts were identified and predicted, and corresponding mitigation measures were recommended. Most of the mitigation measures were proposed for avoiding and mitigating the impacts. None of the measures was of compensatory nature. The expert judgement and checklist methods were used to predict the impacts. It seems that the study team relied on local knowledge and experience while predicting the impacts. It also seems that comprehensive information was collected during the EIA of OFMPs. One of the reasons would be more emphasis of the forestry policies and legislations on the conservation of forest biodiversity.

The scenario is different in case of SEA report of NWP. Although impacts of water resources programmes were identified and included in the final report, they are generic in nature on biodiversity aspects (Table 2):

Table 2. **Impacts Consideration on Biological Resources**

SN	Biological Aspects	As written in sub-sector 3Ps	WR 3 Ps as implemented	As proposed by WRS and sub-sector Action Plan
1	Forest and vegetation	• Saves forest trees due to electricity generation and use	• Damage to biodiversity through habitat loss and inundation of forest area	• WRS does not provide specific measures for the protection and enhancement of forests and vegetation • Sub-sector action plans are silent about plantation and revegetation programmes
2	Wildlife and biodiversity	• Commitment of the Tenth Plan (2002-'07) on biodiversity conservation • Development of database and habitat conservation	• Biodiversity not given proper attention • Listing and description of plants and animals included in EIA report as ritual process	• Management of watershed and aquatic ecosystems realised with inadequate prescriptions • Some measures proposed in Environmental Action Plan without programmes and activities
3	Aquatic habitat	• No focus on conservation of biological resources • Weak linkage between irrigation and agricultural policies • Policy thrust on 10% of water flow to maintain downstream aquatic ecosystem	• Lakes are suffering from macrophytes • Loss of about 11 fish species in Phewa Lake due to eutrophication	• WRS has proposed activities to manage watersheds and aquatic ecology but lacks direction and concrete programmes on biodiversity
4	Protected areas (PAs)	• Need for conservation of PAs perceived in sectoral policies	• Approval required from Ministry of Forests and Soil Conservation for the implementation of projects within PAs	• National Parks and Wildlife Reserves are not touched upon by WRS

5	Carbon emission and trading	• Commitment on GHGs emission as a Party to UNFCCC	• No tangible activities formulated and implemented so far	• GHG issues not addressed
6	International convention on water use and biodiversity	• Only fragmentary inclusions about convention matters	• Biodiversity strategy and climate change action plans developed (no action plan on climate change has been prepared and only first initial national communication report has been submitted to UNFCCC secretariat in July 2004)	• WRS provides actions but sub-sector action plans are silent on convention implementation related to biodiversity conservation

Note: WR = Water Resources; and 3Ps = Policy, plan and programme
Source: WECS, 2003

Although the WRS focuses on watersheds, biodiversity and aquatic ecosystems, it neither provides specific measures for the protection and enhancement of forests and vegetation nor for plantation and revegetation programmes.

The SEA report recommends to adopting compensatory approach. It also emphasises on the need for restoring ecosystems, and creating new habitats. In most cases, compensatory plantation has been proposed at the rate of 10 times the number of trees cut down. It also mentions not to touch upon critical areas where endangered, rare, endemic and threatened species are flourishing.

In order to conserve wildlife, it urges to consult biodiversity action plan (BAP), make inventory on the types of habitats and critical areas of concerns in the entire river basin and maintain databases (Table 3).

Table 3. **Mitigation Measures Proposed on Biological Resources**

SN	Biological Issues	Impacts Predicted	Recommended Mitigation Measures	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 at proponent's cost and handover to community users)
2	Wildlife / biodiversity	Loss of wild animals, plants, rare and endangered species	Refer to Biodiversity Action Plan (BAP), 2000, and habit restoration	Nepal Biodiversity Strategy 2002 under implementation but BAP not prepared
3	Aquatic habitat	Loss of aquatic life, habitat and ecology	Include plans and programmes to ameliorate the impacts on aquatic life	Provision of realising 10% of water to maintain downstream ecology in Hydropower Development Policy, 2001 and Irrigation Policy, 2003
4	Effects on National Parks and Wildlife Reserve	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
Source: WECS, 2003

The SEA report acknowledges the possible loss of aquatic habitats due to water diversion thereby affecting aquatic flora and fauna including fish species, and riverine forests. For this, it recommends to release adequate amount of water to maintain downstream ecology, install fish ladder for migratory fishes, and provide provision to maintain the aquatic food chain and food webs in the downstream. Effectiveness of fish ladders in Nepalese river system is yet to know. An environmental auditing of 14 MW Modi Khola (stream) hydroelectricity project (HEP) concludes that design of fish ladder and its location requires special attention. Nepal has also no or scanty information on migratory behaviour of fish species. However, there are ample opportunities to reduce the loss of forests and tree species during the stringing of wire in the transmission line (TL) project by maintaining clear felling of forest areas in 5m strips in valleys and gullies, instead of 18m in the right-of-way of the TL (SRCL, 2002). While the 144 MW Kali Gandaki "A" HEP launched fish hatchery, open water stocking, and fish trapping and hauling programmes to promote the conservation of migratory fish species (ESSD, 2003). The fish species were released into the reservoir and downstream movement has been ensured through a "fish bypass system and collector channel" in the dam.

The water resources development (WRD) should respect the norms and standards of the protected areas. The SEA report mentions to grant the permission to implement the projects within the National Park taking into consideration the impacts. However, it recommends not to granting for the implementation of even the nationally significant project if the impacts are intolerable. This recommendation contradicts with the prevailing laws on biodiversity conservation within the protected areas. The National Park and Wildlife Conservation Act (1973) prohibits to stopping or diverting water of river and stream of the protected areas.

The EMP was prepared to provide guidance on the implementation of the mitigation measures, monitoring and auditing programmes, and also institutional arrangement for their effective implementation. The EMP in SEA report outlines strategic environmental issues on biological aspects and proposes mitigation measures for both strategic and project levels. The SEA report proposes to rewrite strategy or action plans, develop guidelines, standards and norms, and shift responsibility at the project level for implementation (Table 4).

Table 4. **Implementation of Mitigation Measures at Strategic Level**

SN	**Biological Issues**	**Gaps**	**Strategic Level**	
			Mitigation Measures	*Implementation*
1	Effects on forests and vegetation	Biodiversity component is clearly lacking, although some aspects of aquatic ecosystem have been addressed	Deal with protection, conservation and enhancement of forests and vegetation in all 3Ps.	Develop forest management, plantation and protection guidelines
2	Effects on wildlife / biodiversity	The sub-sector Action Plans should be linked with NBS, 2002	Provide biodiversity conservation prescription in WRS as a separate component.	Formulate BAP in relation to WRD
3	Effect on aquatic life and wetland ecosystem	Concrete plan and programme for the protection of aquatic ecosystem is lacking	Some strategic prescriptions are required to be integrated in 3Ps of WRD	Guidelines should be developed and implemented for aquatic ecology and watershed

				management
4	Issues on protected areas		NP & WR are protected by its own stringent laws, any WRD project in protected areas is the concerns of MFSC and MOWR	None

Note: WRS =Water Resources Strategy, 2002; NBS = Nepal Biodiversity Strategy, WRD = Water Resource Development; MFSC = Ministry of Forests and Soil Conservation; and MOWR = Ministry of Water Resources

Source: WECS, 2003

The strategic thrusts have been given in the Plan but lacks processes to ensure integration of biodiversity during its implementation. Furthermore, the EMP does not acknowledge the need for biodiversity monitoring and auditing thereby disjointing the baseline information, mitigation measures, and environmental monitoring requirements.

Impacts of NWP at different levels (species, ecosystem or genetic) of biodiversity were not categorised. Most of the impacts are related to species level. It neither documents the composition or structure of biodiversity nor the changes for the maintenance of biodiversity. The report has neither mentioned the location specific programme nor specific biodiversity impact although the study period was about six months.

The mitigation measures are not clearly linked with impacts and also with NWP. As mentioned above compensatory measures prevail. However, avoidance approaches are called upon if the impacts are intolerable. Baseline data were collected through review of secondary sources, stakeholders' consultation, and field study using rapid rural appraisals in three hydropower projects (Upper Bhotekhoshi, Khmit, and Kali Gandaki "A" HEPs). The methods used for impact assessment include the impact summary matrix and expert system. The report mentions that 'value judgement is the sole source of analysis in the study". Checklist was used during screening exercise, and interaction matrix method was used to know about the resources to be affected. Impact prediction was made using magnitude, extent and duration of impacts. The report relied on external literatures (experience of Europe and Canada), and local knowledge (experience of national expert) has been used, particularly through expert judgement on environmental matters in broad.

Biodiversity data exist in the country at the national level. In the purposeful study, such data could also be generated linking with the project. The national level biodiversity data are included in the Nepal Biodiversity Strategy (2002) (also available at CBD website). For the protected area system, the Department of National Parks and Wildlife Conservation (DNPWC), IUCN and WWF have also updated biodiversity related data, particularly at the species level in their working areas. Nepal has information on ecosystem level. However, information is scanty at genetic level. The SEA report has not fully considered the area available biodiversity data and information. It would have been appropriate if some major habitats have been identified and linked with water resources projects. That may give better picture to develop mitigation measures such as avoidance.

The site-specific biodiversity data are also collected under the projects and programmes. Before developing programmes and conducting impact assessments, the project developer or the proponent is obliged to collect site-specific data. So far, HMG has already approved the data collection format for biodiversity documentation and a project on "Documentation and Registration of Traditional Knowledge" is ongoing in 29 districts of Nepal. Similarly, biodiversity monitoring has also been initiated in some projects. HMG is approaching to document biodiversity in community forests to

internalise biodiversity conservation in forest areas. Furthermore, data and information on agro-biodiversity has been collected and germplasms are stored in the Nepal Agriculture Research Council (NARC).

Although the SEA report of NWP was finalised in July 2003, and Nepal Biodiversity Strategy (NBS) was published in September 2003, biodiversity data are inconsistent (Table 5).

Table 5: **Sample of Data Variation on Biodiversity**

SN	Group of Organisms	Number of Species		Remarks
		SEA Report, 2003	NBS, 2002	
1	Lichens	350	465	
2	Fungi	1500	1822	
3	Mammals	850	181	
4	Butterflies and moths	740 + 140	640	Total of butterflies and moths in NBS
5	Fish	180	182	
6	Medicinal plants	7000		About 700 species are known to have medicinal properties

Source: WECS, 2003 AND HMG/GEF/UNDP, 2002

Such variation makes difficult in streamlining biodiversity conservation. As users use SEA report and include such false information, it makes the CBD focal point and other users working in biodiversity conservation difficult to convince the non-biodiversity stakeholders. In a nutshell Nepal has some data and information on biodiversity both at national and protected areas level.

5.4 Decision making

The CBD focal point and others involved in biodiversity conservation have been continuously pursing to consider biodiversity aspects in decision-making process. One could take the example of EIA report of the West Seti HEP (750 MW). The MFSC insisted to allocate some income of HEP for biodiversity conservation during the approval of EIA report while MOPE, the approving agency for EIA report, realised it but did not consider the suggestion during approval process. Similar situation exist in other projects as well.

The MFSC made a policy decision in June 2003 to include detail information to integrate biodiversity aspects in infrastructure projects. The decision urges to address biodiversity aspects in EA reports, at least, in the following areas (Uprety, 2003):

a) Identification of biodiversity rich area where the project is planned for implementation;
b) Number and extent of distribution of legally protected, endemic, rare and threatened species;
c) Migratory species and area used by such species;
d) Species having social, cultural and scientific importance;
e) Species having medicinal properties, agricultural and economic value;
f) Wild relatives of domesticated species;
g) Possible loss of biomass;
h) Number and type of species found in the specified area; and
i) Area covered by natural/plantation forests including the composition of species.

The policy has also urged to consider biodiversity aspects during alternative analysis, collect site-

specific and quantified information with corresponding preventive, corrective and compensatory measures, and cost required for the implementation of mitigation measures. This policy decision of the CBD focal points has yet to be acknowledged during decision-making by other sectors.

There is also another policy decision to discourage forest clearance, acknowledge the need for conserving forests and/or increasing the area of man-made forests. The decision is related to plant 25 plants for each plant felled down (see # 3.5). The project developers are trying to integrate it in the impact assessment reports.

It is considered that there is a lack of understanding on biodiversity value. This has limited the usage of biodiversity concerns in the decision-making process. The CBD focal point is making efforts to consider biodiversity aspects in decision-making process, and it is considered that it not so easy to influence others. Hence, some exercise is needed to value biodiversity, disseminate information and influence decision-making process.

5.5 Monitoring

Recently, Nepal has initiated biodiversity monitoring. The monitoring indicators have been developed during the impact assessment process, and refined, if necessary, during the monitoring stage. Nepal has also encouraged to monitor biodiversity in different categories of forests. In case of Kali Gandaki HEP, environmental monitoring was conducted at regular basis. During the construction stage, 6093 trees (2610 HEP & 3483 T/L) of different species were felled down. Habitat loss was pronounced in the reservoir, downstream and powerhouse areas. It greatly affected the wildlife. It has declined the fish density and composition as well. A total of 291 of fishes (September-October 1993) were recorded at 6 sampling sites while the post-project data showed only 152 number of fish species (August 2003) at the same sampling sites (ESSD, 2003).

In case of Piluwa khola (3 MW), 166 trees were felled down instead of 146 trees predicted. The monitoring showed that fish movement, in reality, is serious during the dry months. Habitat loss is generally considered low in impact assessment reports, but the movement of Entellus Monkey was observed serious at headworks (of HEP). Furthermore, impact of habitat loss is high during the construction stage as compared to the operational stage. Downstream-upstream movement of fish is a permanent effect during the dry month.

Environmental monitoring was also carried out for Upper Bhokoshi HEP (36 MW capacity), and Khimti HEP (60 MW) and the reports have not been shared by the projects even with the competent authorities. The private sector has constructed and operated these two projects and it may be one of the reasons for not sharing the monitoring results.

The SEA Report of NWP has suggested to monitor forest and vegetation, and fisheries as baseline monitoring. The proposed indicators are forest management, and fish population, changes to spawning and migratory habits. Whereas number of trees/ha, health of trees, presence of ground cover have been included under impact monitoring. In case of fisheries, baseline monitoring indicators are also proposed for impact monitoring.

The summary on biodiversity in different stages of impact assessment is given in Table 6.

Table 6: **Summary of Biodiversity Considerations in Different Stages of SEA Process**

SN	Particulars	Operational Forest Management Plans			SEA of NWP	Remark
		Bara	Rautahat	Dhanusha		
1	Screening	Based on EIA guidelines	Based on EIA guidelines	Based on EIA guidelines	As included in WRS and NWP	National EIA guidelines and Forestry Sector EIA guidelines considered
2	Scoping	No	No	No	Stakeholders' consultation, and meetings amongst study team	Issues on biodiversity identified in SEA scoping of NWP
3	The Assessment					
3.1	Inclusions of biodiversity impacts	Detail impacts	Detail impacts	Detail impacts	Generic impacts, inadequate linkage with baseline data	
3.2	Quick or comprehensive assessment	Extensive field study	Extensive field study	Extensive field study	Quick assessment	Inadequate review of biodiversity data/information in SEA report
3.3	Mitigation measures	Site-specific, avoidance & corrective	Site-specific, avoidance & corrective	Site-specific, avoidance & corrective	Generic measures, avoidance (few), mitigation & compensatory	
3.4	Methodologies	Checklist, questionnaire, and field visit	Checklist, questionnaire, and field visit	Checklist, questionnaire, and field visit	Checklist, interaction matrix & expert judgement	
3.5	Availability of BD data	Site-specific data available	Site-specific data available	Site-specific data available	National level data	
4	Decision making	Incorporation	Incorporation	Incorporation	Inadequate consideration	
5	Monitoring	Specific monitoring indicators, methods and schedules included	Specific monitoring indicators, methods and schedules included	Specific monitoring indicators, methods and schedules included	Generic monitoring indicators, methods and schedules included	Inadequate linkage with mitigation measures and monitoring indicators in SEA of NWP

6. General observations on the case study

In Nepalese case, the competent government authority for biodiversity, the MFSC, and NGOs working in the field of biodiversity, local bodies, particularly the District Development Committee (who chair the District Biodiversity Coordination Committee based on the Nepal Biodiversity Strategy, 2002) should be involved or consulted right from the scoping exercise. Inclusion of biodiversity aspects in SEA was inadequate due to exclusion of biodiversity related institutions to a larger extent in the SEA process. In order to ensure the integration of biodiversity aspects in the SEA report, there is an urgent need to:

1) Develop and implement policy and/or working procedure to involve and consult the relevant biodiversity stakeholders including the CBD focal point;

2) Develop a mechanism to make the report public and seek for official comments and suggestions from the competent biodiversity related institutions before making decision on final SEA report;

   This will provide opportunities for comments and suggestions on the SEA report from biodiversity perspective. In Nepalese context, collection of official opinions/suggestions counts a lot in decision-making process. However, it was not made in SEA of NWP. If the report was made public before decision, it will also provide opportunities to seek the inputs of relevant organisations and refine the report.

3) Form a task force comprising of biodiversity experts and representative of the CBD focal point to provide comments and suggestions in different stages of SEA;

   These will open avenues to discuss on biodiversity issues and provide professional comments and suggestions. This may change the present decision-making practice of consulting few organisations or individuals, and the client..

4) Establish a mechanism for scientific back-ups to ensure the consideration of biodiversity aspects; and

   At present, biodiversity has been a "buzzword". People and decision-makers frequently use this term without adequately knowing its value and importance, and goods and services of biodiversity. Although, academia and scientific community understand it, their inputs in decision-making are either lacking or not considered. In Nepalese context, decision-makers are mostly from the administrative services and their academic qualification is on public policy, management, humanities and so on. Awareness could be raised by organising orientation programme to the policy- and decision-makers about process and practices of addressing biodiversity aspects in decision-making. Furthermore, a mechanism should be developed to provide scientific information to influence decision-making process through biodiversity perspective.

5) Include biodiversity specialists as a member of the SEA study team, and SEA review committee.

   In OFMPs, biodiversity issues at species level are accommodated, and there exist possibilities for continued inclusion as they are prepared and implemented by the forestry professionals. In SEA reports of other areas, still much needs to incorporate biodiversity issues and influence the decision-making process. In case of SEA of NWP, biodiversity issues are inadequately addressed in spite of major impacts from water resources projects and programmes. Inclusion of biodiversity specialist in the study team and also in the review committee would contribute a lot in streamlining biodiversity aspects in SEA process and its report.

As mentioned above, there is a tendency not to include institutions related to biodiversity including CBD focal point, not putting the SEA report in the public domain, and less or no consultation with biodiversity professionals/experts. Once, the institution carrying out SEA study understand the importance of biodiversity conservation, modalities could be developed, as mentioned above, to use biodiversity aspects in SEA process/reports and influence the decision- and policy-making process

as well.

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Annex 1

Programme Components for the Sustainable Management of Watersheds and Aquatic Ecosystems including activities only related to biodiversity

1. Improve environmental database

Activities

a) Prepare inventory of aquatic ecosystem
b) Collect biophysical and socio-economic data on priority watersheds and aquatic ecosystem
c) Compile indigenous knowledge and skills about watersheds and wetland resources

2. Map important, critical and priority watersheds and aquatic ecosystems

3. Develop water and wastewater quality standards and regulations

Activities

a) Develop water quality/guidelines for ecological maintenance in various types of water bodies
b) Prepare effluent standards/guidelines for ecosystem maintenance

4. Implement a water conservation education programme

Activities

a) Create awareness among people on conservation of aquatic ecosystem and aquatic biodiversity and its benefits to human being and surround ecology
b) Maintain at least 10 percent of dry flow in the downstream of all rivers at all times
c) Research on qualitative and quantitative ecological water requirements
d) Establish *ex situ* conservation and multiplication of endangered aquatic species that has economic and ecological value

5. Implement watershed and aquatic ecosystem protection, rehabilitation and management programmes

Activities

a) Prepare integrated management plan of important wetlands to revive the original condition

6. Utilise SEA in water resources sector

Activities

a) Carry out SEA for water resources strategy and develop environmental management plan (EMP)
b) Enforce SEA as mandatory prior to the initiation of water resources management and development plans, programmes and projects
c) Establish link between NWP and Nepal Biodiversity Strategy as well as NWP and National Parks and Protected Areas

7. Ensure compliance with environmental regulations

Activities

a) Reassess EIA procedure to find effective and efficient solution
b) Develop separate EIA regulation and build up stringent enforcement of EIA rules
c) Finalise separate EIA guidelines for irrigation, hydropower, drinking water and other uses of water sector

8. Promote community participation

Activities

a) Rehabilitate aquatic biodiversity with community participation
b) Prepare participatory watershed management plan with emphasis on wetland biodiversity conservation

9. Increase institutional capacity and coordination

Activities

a) Support enhancement of the capacity of DSCWM (Department of Soil Conservation and Watershed Management), DOF (Department of Forests) and DOA (Department of Agriculture) in applying integrated approach for the management of watersheds and aquatic ecosystmems
b) Support enhancement of capacity of conservation groups, CBOs (Community-based Organisations), NGOs and private in applying principles of integrated management of watersheds and aquatic ecosystems.

Source: WECS, 2004

Annex 2

Management of Biodiversity in FMUD Programme Area in Bara District

SN	Particulars	Recommendations
1	Natural succession: monitoring	Establish 6-10 monitoring sites for regular monitoring of natural forest succession following riverine disturbance and fires
2	Modification of forest compartment division	Modify (minor) forest compartment division to distinguish in detail the successional forest formations; and follow ecotone borders which divide the successional forest sites during compartment division
3	Wildlife management	Consider wildlife management component, and implement wildlife conservation activities strictly
4	Planned logging	Monitor regularly the felling and hauling to minimise their negative impacts on the forest ecosystem; discourage haphazard felling and cutting of unnecessary tree species; and carry out felling operations during dry season and well before the growing season of the main tree species
5	Allowing cogs and snags	Leave few mature trees in the regeneration areas; and do not remove cogs and snags as several bird species use them for nesting and feeding
6	Provision for open habitat	Leave existing open areas as such for wildlife population and to maintain habitat diversity
7	Sustainability in resource use	Regularise and simplify hunting for benefit of local people, gradually discourage poaching, and include anti-poaching operations to preserve existing wildlife species
8	Conservation awareness programme	Launch conservation awareness programme through local community and NGOs to reduce poaching
9	Income generation activities	Introduce various income generation activities to raise living standards of local people and also promote conservation awareness with the support of local community and NGOs

The plan has also given additional attention on:

1. Collection of compartmentwise data on species biodiversity sites and presence of endangered species;
2. Data on successional status of each compartment; and
3. Data on decaying wood left during the final felling.

Source: Salo, J. and Marjokorpi, A. 1996.

3 January 2005