Terms of References for key project committees, staff and main sub-contracts

1. FIELD ADVISORY COMMITTEES

181. The Field Advisory Committees will be established at the two field sites - Koshi Tappu and Ghodaghodi. They will serve as the local advisory body in order to provide policy guidance to the field programme activities, promote coordination among all relevant stakeholders and encourage use of site findings to influence local policy and practice. Their role will be instrumental to integrate the project's work into larger district level conservation and development initiatives, to influence work beyond Programme sites, to obtain additional support and partnerships and to avoid duplication of efforts.

182. The Programme intends to use existing inter-sectoral and mutlistakeholder committees where possible in order to promote more integrated development in the field areas, and will follow the guidelines and regulations of such existing inter-sectoral and mutlistakeholder committees. The FAC will meet at least semi-annually. The exact composition of the field level advisory committee will be decided after wide consultation with district stakeholders. In Ghodaghodi, the FAC is proposed to be chaired by the chair of the District Forest Coordination Committee and include members from Department of Forest, District Development Committee (DDC), Village Development Committee (VDC), Forest User Groups, Regional Directorate Office of the MFSC, WTLCP and TAL projects and Programme Manager. The DFO will serve as the Member Secretary. In Koshi Tappu, the FAC is proposed to be chaired by the Buffer Zone Management Council (BZMC) Chair and will include members from the, DDC, VDC, BZMC, Regional Directorate Office of the MFSC and Programme Manager. The KTWR Warden will serve as the Member Secretary.

183. Key responsibilities include:

(a) Promote inter-sectoral coordination and collaboration to support Programme activities at district and local levels (including co-ordination with donors in the relevant districts);

(b) Review Programme performance and major findings as appropriate;

(c) Mobilize co-fund and in-kind support from all sources, including local government, government line agencies, NGOs, community-based organizations, private sector etc;

(d) Coordinate with all relevant stakeholders at the district level and locally to avoid duplication of or conflicting actions at demonstration sites;

(e) Support replication or scaling up of successful actions from demonstration sites to other sites in the district;

(f) Facilitate cross-sectoral learning by sharing strategies, programmatic approaches, findings and recommendations;

(g) Facilitate the translation of Programme experience into national policy and practice.

2. FIELD MANAGEMENT COMMITTEE (FMC)

184. Field Management Committees (FMC) will be established at each field site and will consist of key field site implementing partners. The FMC is responsible for the implementation of the field site activities as per the Programme agreements and the guidance of the PMU. In Ghodaghodi it will be chaired by the DFO and members will initially include the Field Programme Manager and Forest User Groups (FUGs). In Koshi Tappu, it will be chaired by the Warden and members will initially include the Field Programme Manager and a representative from the Buffer Zone Management Council (BZMC).

Additional implementation partners will be added once local implementation is finalized. The National Programme Manager (NPM) and Chief Technical Advisor (CTA) will attend at least one meeting per year at each site. The FMC will meet quarterly.

185. Key responsibilities include:

(a) Promote coordination and collaboration to support site level activities;

(b) Approve field site's annual and quarterly plans and budget allocations;

(c) Review site performance and major findings and recommend adjustment to site strategies and plans to remain relevant to the national and local contexts (including national policies and priorities);

(d) Ensure timely access to co-fund (including technical support);

(e) Coordinate with all relevant district and local stakeholders to avoid duplication of or conflicting actions at demonstration sites and promote synergy;

(f) Facilitate cross-sectoral learning by sharing strategies, programmatic approaches, findings and recommendations;

(g) Support replication or scaling up of successful actions from demonstration sites to other sites in the district;

(h) Facilitate the translation of Programme experience into national policy and practice;

(i) Field Management Committee members are to serve as the focal point for their institution and take any issues to their institution for resolution.

3. NATIONAL PROGRAMME DIRECTOR

186. The National Programme Director will be appointed by the Ministry of Forests and Soil Conservation and has overall responsibility for the project.

187. Key responsibilities include:

(a) Guide Programme implementation to ensure that they are done in accordance with Programme Document and Programme Steering Committee guidance;
(b) Ensure coordination within various MFSC departments and other technical departments for smooth operation of the Programme at national level and at the demonstration sites as well as replication;
(c) Provide technical and policy advice as necessary;
(d) Act as the government representative of the program during review meetings, evaluations, and discussions;
(e) Support recruitment of candidates, national and international, for long term and short term assignments for the project;
(f) Assume direct responsibility for the government co-finance.

4. NATIONAL PROGRAMME MANAGER

188. The National Programme Manager is responsible for the implementation of the Programme under the overall guidance of the National Programme Director and will receive technical support from the Chief Technical Advisor. The NPM will be selected through UNDP procedures.

189. Key responsibilities include:

(a) Coordinate the planning, management and implementation of Programme activities as set out in the Programme document and as guided by the PSC;

(b) Work in close collaboration with Chief Technical Advisor to assure coherence between all Programme components and partners;

(c) Prepare a detailed work plan consistent with the envisaged outputs and objectives of the Programme Document that incorporates the workplan prepared by IUCN;

(d) Ensure sharing and flow of information in a transparent manner among all groups as appropriate;

(e) Manage the Programme budget and ensure that timely financial reports are prepared for UNDP;

(f) Liaise with other GEF projects in Nepal for the sharing of learning and experience;

(g) Establish and operate National Programme Management Unit, including the provision of space for the PMU that has easy access to all Programme partners and stakeholders;

(h) Participate in the recruitment of, and supervise Programme personnel and subcontractors/consultants, maintaining strong quality control and providing advisory support as required;

(i) Supervise the procurement and maintenance of Programme equipment and development of infrastructure. Ownership of such equipment will be retained by UNDP for the life of the project. The decision for transferring assets of the Programme at the time of Programme completion will be taken in mutual consultation between UNDP and MFSC;

(j) Provide technical inputs to the project;

(k) Maintain close coordination/linkages with concerned line agencies and I/NGOs, projects and keep them fully informed and supportive of the Programme activities through formal and informal interactions;

(l) Act as a regular liaison with the UNDP Country Office, government agencies, co-funders, and other Programme partners;

(m) Supervise timely preparation and submission of quarterly and annual progress reports, work plans, budgets, and financial plans as required, integrating the respective reports and plans from IUCN;

(n) Ensure the systematic transfer of responsibilities, authority and ownership of the Programme to the relevant institutions and community;

(o) Be responsible for information dissemination, resource mobilization and development of partnerships;

(p) Undertake monitoring of the project, facilitate internal and external evaluations and promote the sharing of lessons learning nationally and internationally;

(q) For the specific components of the Programme under direct GoN implementation responsibility:

i. Design, deliver and manage the resources, services and facilities required to achieve the results for these components, under the guidance and decisions of the Programme Steering Committee and in accordance with GEF, UNDP and GoN provisions;

ii. Develop an overall work plan and annual work plans and respective budgets for the specific components as per agreed-to formats for submission to UNDP;

iii. Recruit and manage required staff and consultants;

iv. Manage the finances of the Programme under GoN responsibility including disbursement and verification, according to approved work plans and budgets;

5. CHIEF TECHNICAL ADVISOR

190. The Chief Technical Advisor will provide overall technical guidance to the Programme and be directly responsible for the detailed planning and implementation of the specific Programme components under IUCN's direct implementating responsibility. The CTA will be selected by IUCN in close consultation with UNDP CO and MFSC.

191. Key responsibilities include:

(a) Support the NPM in the overall management of the Programme to assure coherence between all Programme components and partners;

(b) Ensure sharing and flow of information in a transparent manner among all groups as appropriate;

(c) Liaise with other wetland projects in Nepal and globally for the sharing of learning and experience;

(d) Participate in the recruitment of Programme personnel and subcontractors/consultants, maintaining strong quality control and providing advisory support as required;

(e) Provide technical advice on all elements of the project;

(f) Maintain close coordination/linkages with concerned line agencies, I/NGOs, projects and field site partners and keep them fully informed and supportive of the Programme activities through formal and informal interactions;

(g) Act as a regular liaison with IUCN;

(h) Contribute to resource mobilization and development of partnerships to further the Programme objectives;

(i) Undertake monitoring of the project, facilitate internal and external evaluations and promote the sharing of lessons learning nationally and internationally;

(j) Ensure learning to and from, and facilitate discussions on transboundary issues through links with the IUCN regional wetlands programme and other IUCN country offices.

(k) For the specific components of the Programme under direct IUCN implementation responsibility:

i. Design, deliver and manage the resources, services and facilities required to achieve the results for these components, under the guidance and decisions of the Programme Steering Committee and in accordance with GEF, UNDP and IUCN provisions;

ii. Develop an overall work plan and annual work plans and respective budgets for the specific components as per agreed-to formats for submission to NPM;

iii. Deliver the Programme components in accordance with GEF, UNDP, GON and IUCN provisions using IUCN's prevailing personnel, financial and other rules for all matters including human resources management, travel, logistics and financial management;

iv. Recruit and manage required staff and consultants and identify and sub-contract partners;

v. Provide the National Programme Manager with progress and financial reports as required, as well as input into other reports required by the MFSC or UNDP, as per the frequency and timing agreed to by the Programme Steering Committee;

vi. Manage the finances of the Programme components under IUCN's responsibility including disbursement and verification, according to approved work plans and budgets and using IUCN financial management and accounting systems;

vii. Establish and operate Field Programme Management Units in both Koshi Tappu Wildlife Reserve and Ghodaghodi Complex;

6. WETLAND BIODIVERSITY SPECIALIST

192. The Wetland Biodiversity Specialist is responsible for technically supporting all programme activities related to wetland biodiversity monitoring, planning, conservation and management. He/she will support activities both nationally and at the two field sites with approximately 50% of time in the field. He/she will be selected by IUCN in consultation with UNDP and MFSC and will report to the CTA.

193. Key responsibilities include:

(a) Provide technical support to all programme activities related to conservation of wetland biodiversity;
(b) Assume lead responsibility for IUCN's outputs/ activities related to wetland ecosystem conservation and management;
(c) Work with national and local counterparts(within and outside of government) to build capacity in wetland biodiversity issues, through training and coaching;
(d) Identify national and local partners and individuals to contribute to the programme and encourage networking for exchange and learning;
(e) Proactively identify means to enhance programme delivery to assure the achievement of results;
(f) Work with the monitoring and evaluation specialists to specify indicators for wetland biodiversity health; and
(g) Support the CTA and NPM as required in the overall implementation of the Programme to assure coherence between all Programme components and partners.

7. INDIGENOUS COMMUNITIES AND GENDER SPECIALIST

194. The Indigenous Communities and Gender Specialist is responsible for technically supporting all programme activities related to sustainable and equitable livelihoods. He/she will support activities both nationally and at the two field sites with approximately 50% of time in the field. He/she will be selected by IUCN in consultation with UNDP and MFSC and will report to the CTA.

195. Key responsibilities include:

(a) Provide technical support to all programme activities related to sustainable and equitable livelihoods;
(b) Assume lead responsibility for IUCN's outputs/ activities related to sustainable and equitable livelihoods;
(c) Develop and implement strategies for gender and social inclusion for the entire programme
(d) Work with national and local counterparts(within and outside of government) to build capacity in sustainable and equitable livelihoods issues, through training and coaching;

(e) Identify national and local partners and individuals to contribute to the programme and encourage networking for exchange and learning;
(f) Proactively identify means to enhance programme delivery to assure the achievement of results;
(g) Work with the monitoring and evaluation specialists to specify indicators for sustainable and equitable livelihoods: and
(h) Support the CTA and NPM as required in the overall implementation of the Programme to assure coherence between all Programme components and partners.

8. FIELD MANAGERS

196. The Programme Field Managers are each responsible for the planning, implementation and monitoring of the activities in their respective field sites. He/she will be selected by IUCN in consultation with UNDP and MFSC and will report to the CTA.

197. Key responsibilities include:
(a) Design, deliver and manage the resources, services and facilities required to achieve the results for the field site outputs, under the guidance of the CTA and NPM and in accordance with GEF, UNDP and IUCN provisions;
(b) Establish and operate Field Programme Management Units in either Koshi Tappu Area or Ghodaghodi Complex;
(c) Develop an overall work plan and annual and quarterly work plans and respective budgets for the field site outputs as per agreed-to formats;
(d) Provide overall technical advice to field site implementation and coordinate with programme staff to provide additional technical advice;
(e) Recruit and manage required staff and consultants and identify and sub-contract partners;
(f) Provide the CTA with progress and financial reports as required;
(g) Manage the finances of the Field Site Activities according to approved work plans and budgets and using IUCN financial management and accounting systems;
(h) Maintain close coordination/linkages with concerned line agencies, I/NGOs, programmes, projects and partners in the field site and keep them fully informed and supportive of the Programme activities through formal and informal interactions;
(i) Work with the monitoring and evaluation specialists to specify indicators for sustainable and equitable livelihoods;
(j) Proactively identify means to enhance programme delivery to assure the achievement of results;
(k) Contribute to resource mobilization and development of partnerships to further the Programme objectivesin the field site;
(l) Undertake monitoring of the project, facilitate internal and external evaluations and promote the sharing of lessons learning; and
(m) Support the CTA and NPM as required in the overall implementation of the Programme to assure coherence between all Programme components and partners.

Stakeholder Involvement Plan

Major project stakeholders and their participation / contribution are detailed in the Table below:

Institution	Role in the Project

Institution	Role in the Project
NATIONAL INSTITUTIONS	
Ministry of Forests and Soil Conservation (MFSC)	MFSC will be the project-executing agency. The Minister of MFSC will Chair the National Wetland Committee (NWC). The Secretary of this Ministry will chair the Project Steering Committee (PSC). The Ministry, as the focal ministry of CBD will also be responsible for institutionalizing most of the project's lessons learnt.
1. Foreign Aid Coordination Unit (FACD)	The FACD will ensure that other donor supported projects are consistent with, and complement this project's objectives. Head of this division will also be a member of the Project Steering Committee.
2. Planning and M&E Division	This Division will also support Project activities and will be represented in the PSC.
3. Environment Division	This Division will also support Project activities and will be represented in the PSC.
4. Department of National Parks and Wildlife Conservation (DNPWC) 5. Department of Forests (DoF) 6. Department of Soil Conservation and Watershed Management (DSCWM)	MFSC's technical departments, namely DNPWC, DoF, and DSCWM will provide technical expertise and oversight for management of the protected areas and national forest areas in the project area. The Department of National Parks and Wildlife Conservation will play important roles in updating list of protected species, transboundary biodiversity conservation issues, and replicating successful project experiences in other protected areas. It will be the focal institution to guide project activities at the Koshi Tappu Wildlife Reserve, and in building capacity of other protected area managers in wetland management. The Department of Forest will play an important role in promoting awareness and capacity building of community based natural resources groups - particularly community forestry groups on water and wetland issues integration in their action plans nationally. The Department of Forest will be the focal institution to guide project activities at the Ghodaghodi Lake Complex demonstration area.
Ministry of Water Resources	Participation in NWC and PSC. Resources and materials to the National Wetland Resources Centre and technical support. The Ministry's role in better river basin management will also be important for wetland and aquatic biodiversity conservation. Technical staff form the Ministry will be key resources for various Technical Advisory Committees under the National Wetland Committees, and the Ministry will play a role in partnering with the project to replicate to other sites in Nepal the approaches and tools developed. The Ministry will be involved in various project activities such as assessment of wetland sites in Nepal as well.
Ministry of Agriculture and Cooperatives ▪ Department of Agriculture (DoA) ▪ Nepal Agricultural Research Council (NARC)	Participation in NWC and PSC, resources and materials to the National Wetland Resources Centre and technical support. The Ministry's research and outreach on fisheries, agrobiodiversity, agroforestry, integrated pest management, fertilizer management are all expected to be used to promote better farming techniques. Technical staff form the Ministry will be key resources for various Technical

Institution	Role in the Project
	Advisory Committees under the National Wetland Committees, and the Ministry will play a role in partnering with the project to replicate to other sites in Nepal the approaches and tools developed.
	The Ministry will be involved in various project activities such as assessment of wetland sites in Nepal as well.
Ministry of Science, Technology and Environment	Participation in NWC and PSC, resources and materials to the National Wetland Resources Centre and technical support. Technical staff form the Ministry will be key resources for various Technical Advisory Committees under the National Wetland Committees. Key areas for contribution by the experts will include EIA and pollution control and harmonization of activities with other multi-lateral environmental agreements.
Ministry of Local Development	Participation in NWC and PSC, resources and materials to the National Wetland Resources Centre and technical support. Local development planning / indigenous people's empowerment. Technical staff form the Ministry will be key resources for various Technical Advisory Committees under the National Wetland Committees and will play a key role in integrating wetland issues into local development plans (DDC, VDC, Municipalities etc).
Ministry of Finance	Participation in NWC and PSC, resources and materials to the National Wetland Resources Centre and technical support. Technical staff form the Ministry will be key resources for various Technical Advisory Committees under the National Wetland Committees, particularly on issues of valuation, incentives and decentralized financial resource generation and management.
IUCN Nepal	IUCN Nepal will provide co-funding and technical back stopping to the project. It will serve as implementing partner for certain components of the project, notably the technical capacity building and demonstration sites. It will be represented in the Project Steering Committee. IUCN will also be instrumental in linking its global and regional lessons learnt into the proposed project.
UNDP	UNDP, as the Implementing Agency, will be responsible for monitoring and evaluation as well as a co-funder and PSC member to the project. It will also ensure links with other UNDP projects and initiatives.

KOSHI TAPPU AREA	
Koshi Tappu Wildlife Reserve Office (DNPWC)	The KTWR Office, with its BZ unit will be the main government partner for the project in Koshi Tappu area. The warden will represent DNPWC in the KTWR Field Implementation Committee. The DNPWC is also implementing a joint project with UNDP – the Participatory Conservation Programme, which this project will work very closely with.
Buffer Zone Committee	The Buffer Zone Committee will be important stakeholder in the project implementation, particularly in implementation of the Buffer Zone Plan and to ensure that all activities in the BZ are sustainable and wetlands friendly. A representative will sit on the KTWR Field Implementation Committee.
District Development Committees (DDCs) Udaypur, Saptari and Sunsari and	The following individuals, committees and projects will support project implementation as necessary: ▪ District Development Committee ▪ Local Development Officer ▪ District Water Resources Committees ▪ Sub Committee on Forest, Environment and Cottage Industries ▪ UNDP/ GON Local Governance Project (LGP), to mainstream wetland conservation issues into DDC plans ▪ 16 Village Development Committees (VDCs) that include the KTWR Buffer Zone
Community groups, CBOs and Local NGOs	As partners and beneficiaries
GHODAGHODI LAKE COMPLEX	
District Forest Office (DFO) Kailali	The DFO will be the main government partner for the project in GGC. The District Forest Officer will represent the DoF in the GGC Field Implementation Committee. The DFO is also the main counterpart for the proposed UNDP-GEF Nepal Biodiversity Landscape Project, and joint work on various issues is proposed to assure synergy and no duplication.
District Development Committees (DDCs) Kailali	The following individuals, committees and projects will support project implementation: ▪ District Development Committee ▪ Local Development Officer ▪ District Water Resources Committees ▪ Sub Committee on Forest, Environment and Cottage Industries ▪ UNDP/ GON Participatory District Development Planning Project (PDDP), to mainstream wetland conservation issues into DDC plans ▪ Three Village Development Committees (VDCs) comprising of Ghodaghodi lake complex
UNDP/GEF Nepal WTLC Project	The Conservation and Sustainable Use of Wetlands in Nepal project is adjacent to (though not overlapping with) WTLC. The projects will work closely to influence district and local development plans to be more biodiversity friendly. WTLC will also be used to replicate best approaches and methods for wetland conservation within its work areas.

Local NGOs (including Ghodaghodi Conservation Awareness Forum), CBOs -- Forest Users Groups Local communities	As partners and beneficiaries

ANNEXES

ANNEX 1: Threats to Wetland Biodiversity and Analysis of their Root Causes in Nepal

1. Review of threats

1.1 Destruction and degradation of wetland habitats

There are a number of threats to wetland biodiversity in Nepal. These can be categorized as habitat destruction and degradation; loss of ecosystem integrity; and depletion of species abundance and diversity.

Geographic inaccessibility, paucity of resources, and more recent armed insurgency, have hindered economic development in Nepal, particularly in the mountain areas and far western parts of the country. However, industrial development and agricultural intensification have made steady progress over the past ten years (per capita GDP increased over from US$3,411 in 1992 to US$4,173 in 2000 (both at 1985 prices)) and this, coupled with high population growth rates and large-scale in-country migration from the hills to the lowland Terai, have radically increased the pressure on the country's wetland systems and associated biodiversity.

Drainage and reclamation: The conversion of wetlands through drainage and reclamation for industrial and urban use is occurring throughout Nepal. Conversion for industry is mostly prevalent in the more highly developed central region where wetlands are still regarded as wasteland by much of the population and the price of this land is relatively inexpensive compared to farmland. Thus, wetland areas are often the favoured sites for industrial uses or housing.

Modification of land use: The human population of Nepal is estimated at nearly 23 million with densities ranging between 33 people per km^2 in the mountains and over 550 per km^2 in some parts of the Terai. The current estimates for population growth are over 2.5 percent per year; thus the total population of the country could exceed 30 million within the next decade. Since 81 percent of the population is engaged in agriculture, demand for the modification of wetlands to agricultural land, particularly rice fields, will continue to increase, placing additional pressure on the wetlands and their fisheries stocks. This is particularly the case in the lowland Terai region where substantial settlement of migrants from upland areas has pushed population growth rates up to over 4.5 percent in some areas. Many of these wetlands have no inlets but depend upon monsoon rains. The draining of these wetlands, often by high-powered pumps to provide irrigation or harvest fish, rapidly leads to them drying out when at best they undergo vegetation changes and at worst are encroached upon for grazing or reclaimed for agriculture. Excessive drainage also leads to increased incidence of subsidence, reduced water retention capacity, flooding, acid-sulphate soils and the creation of habitats where mosquitoes thrive. Of 163 wetland sites in the Terai inventoried by IUCN in 1998, 70 (43 percent) had suffered some degree of drainage. Much of this agricultural development produces a trade-off with the values of the wetlands for fish, wetland products and the more generalized benefits of wetlands, e.g. flood control and groundwater recharge. A range of policy incentives have been provided to stimulate production in the agricultural sector, including subsidies and support to credit, inputs, marketing, research and development. As a result there exist strong financial and price inducements to convert wetlands to other uses.

Inappropriate wetland management: This occurs typically when wetlands are managed according to single sectoral objectives. For example, water is often pumped from wetlands for dry-season crop irrigation or is subject to swidden agriculture or heavy grazing disturbing the structure of wetland vegetation. Even the management of wetlands for fishing does little to conserve biodiversity since fisher folk often take fish

and fingerlings until stocks are depleted. Where management is by commercial fishing lots, the owners often seek to maximize returns by harvesting all aquatic species including turtles and amphibians, often by pumping the wetland dry, thereby removing the breeding stock as well. This latter practice is prevalent at the demonstration sites—in the smaller lakes of Ghodaghodi, and the *ghols* and marshes at Koshi Tappu.

Fragmentation: The higher than average population growth rates in the Terai districts, stemming largely from high levels of immigration, has resulted in increasing pressure upon wetlands and forests that have become increasingly degraded and fragmented. In the western Terai, in the districts of Bardia, Kailali, and Kanchanpur, the forest area has decreased by 12 percent, 15 percent, and 24 percent respectively between 1978/79 and 1990/91 and it is projected that all the Terai forests would be cleared in 70 years assuming this annual rate of deforestation of 1.3 percent per year continues. This fragmentation has the effect of reducing previously extensive populations, especially of mammals and large reptiles, into genetically isolated sub-populations, many of which now risk falling below the threshold of population viability.

1.2 Loss of wetland ecosystem integrity

Alteration of the hydrological regime: The wetland systems of Nepal are dependent upon annual inundation by wet season water flows and their productivity is dependent upon the level and duration of inundation. Changes to flood height and duration can result in some seasonal wetlands not filling, or in previously permanent wetlands drying out thereby diminishing wetland productivity. There are a number of existing and proposed developments that may result in reduced peak flows and/or increases in dry season flow in rivers. The cumulative effects of such changes upon their biodiversity are unknown, but experience suggests are deleterious. These include:

- Hydro-power dams: The four major rivers of Nepal—the Mahakali, the Karnali, the Gandaki and the Sapta Koshi—and a number of smaller ones, all of which flow into the Ganges, are viewed widely as a great potential source of hydro-electric power. However, the construction of dams poses a major threat to wetland biodiversity by inundating important habitats; reducing downstream water flows, suspended load sediments, bed load transport, oxygenation, and nutrient dynamics; acting as barriers to migration; leading to associated development; displacing people into new ecologically-sensitive habitats; and by altering local microclimates. Nepal has identified 114 projects with a total projected capacity of 45,610MW. Problems of erosion, damage to turbines and siltation caused by heavy sediment loads are often overlooked. Although the controversial Arun III project has been cancelled and the World Bank's Operation Evaluation Department has recognized by its own analysis that the Kulekhani Hydroelectric Dam should not have been built, threats are again posed by Indo-Nepal co-operative proposals for new hydropower dams on the Mahakali (7,200MW), Karnali (10,800MW) and Sapta Koshi (3,600MW) rivers. The Chisapani Karnali Multi-purpose project costing billion of dollars will have the most profound impacts on the presently least modified or disturbed river system in Nepal thereby adversely affecting the highly productive fishery system downstream of the dam. The Karnali also supports the most viable population of the of the globally-threatened Gangetic Dolphin in Nepal– -a mammal particularly susceptible to the detrimental effects of dams and whose population has been divided into small, isolated sub-populations by prevented migration and reduced food availability. Similarly proposed large projects on the Koshi River have to be studied carefully to understand their impacts on the river's dolphin population since although EIA studies are undertaken, implementation of recommendations is limited to standard responses and very few studies pin-point specific solutions. Although no comprehensive study has yet been undertaken to assess the prevailing ecological impacts from disturbed water regimes, the effects of continuous habitat degradation arising from hydropower/irrigation/flood management dam development is reflected in the reduction of ungulate diversity. Nepal has 15 ungulate species that are either permanently or seasonally dependant on

river floodplains, and at present, only Royal Chitwan and Royal Bardia National Parks maintain varied populations of ungulate species. Koshi Tappu, although distinguished as the only area with a viable Asian Wild Buffalo population, has lost over half of its endemic ungulate species.

- Irrigation and Flood Management: Management of rivers in Nepal to control flooding (mainly in India) and to provide water for large-scale, dry-season irrigation (again mostly in India) has involved a number of low-gated dams or barrages being built, with several more planned. Key examples are the Koshi Barrage, those on the Karnali and Narayani rivers, the recently completed US$30 million Babai Dam, and the proposed Rapti Irrigation Project northeast of Royal Chitwan National Park. These barrages lead to major changes in seasonal water availability (e.g. the Rapti Project will remove 40 percent of the Rapti's dry season flow), temperature regimes, water energy, bed and suspended material transport, and oxygenation of the rivers themselves, as well as in associated vegetation and faunal communities. They effectively isolate wildlife populations leaving them particularly vulnerable to the impacts of human development, catastrophic environmental events, demographic changes, and reduced genetic transfer and associated in-breeding depression. The ecology of fishes inhabiting floodplain shows them to be extremely sensitive to modifications in flood regime. Despite fish passes being included in many, these barrages still interfere with fish migrations between feeding areas and spawning habitats with well-oxygenated waters and swift currents often long distances upstream, thereby leading to the disappearance or serious decline in the productivity of migratory species. The Babai Dam, completed in October 2001, was constructed for irrigation to improve the productivity of the farming land in the surrounding lower lying Terai. It will remove 75 percent of the Babai's dry season flows, thereby threatening Nepal's most sustainable population of Gharials in Royal Bardia National Park. Fish numbers have decreased in the Babai River over the last ten years and all evidence suggests that this is due to a combination of dam construction and an increase in the local human population. The dam is a physical barrier to the movement of fish, particularly the globally-threatened Mahaseer (*Tor tor*), and the fish pass is poorly-positioned so that it is missed by fish swimming up river. As a result, the breeding behaviour of a number of fish species (small- and large-scale spawning migrations) has been affected adversely and the overall number of fish in the river has been reduced.

Construction of dams for irrigation in the Ganges system has divided dolphin populations into small isolated subpopulations, preventing migrations and reducing food availability. In Bangladesh, the dolphin population above the Kaptai irrigation dam on the Karnaphuli River disappeared over a period of six or seven years after completion of the dam, and that of the Padma River system is said to be "fast declining" due to the construction of the Farakka Barrage. A land-locked population in the Kulsi River, a southern tributary of the Brahmaputra, declined from 24 animals in 1992 to 12 in 1995. The diversion of water for irrigation causes great fluctuations in water flows, reducing suitable habitats for the dolphins. Similar effects are expected with dolphin populations in the major rivers of Nepal, including the Koshi, Narayani and Karnali rivers in Nepal.

The Koshi Barrage, built to retain water and protect the vast river plains of Bihar, India, from flooding, has proved markedly attractive to water birds, but has had significantly adverse effects on riparian vegetation and animal communities, particularly populations of mammals. The long-term and continuing loss of remaining riverine forest, as well as the so far unpredictable habitat changes, will most likely make this area unsuitable for many species. Even, the relict population of Asian Wild Buffalo is severely affected and spends a substantial amount of time on agriculture lands outside the Koshi Tappu Wildlife Reserve. Large carnivores such as tiger and leopard seem to have disappeared a considerable number of years ago. The trends in vegetation cover predict that the continuing high levels of water in the Reserve will finally lead to the destruction of forest cover leaving only early successional stages that can cope with the frequent high floods.

Recently the District Irrigation Office, Kailali has completed the pre-feasibility study for using Ghodaghodi Lake to provide irrigation facilities for up to 45 hectares of land. A detailed study is planned.

While the DIO is concerned mainly with the use of overflow/over-drained water from the lake basin, a full EIA is necessary to conserve and manage the lake basin for irrigation while maintaining aquatic biodiversity. This task of conserving the lakes, analysing the environmental factors, and designing necessary mitigation measures comes under an environmentalist mandate and hence is not within the remit of DIO (Chief, DIO, Kailali pers. comm.).

- Groundwater: Growing human populations and increasingly polluted surface water make groundwater the main source for domestic and other water requirements, particularly for irrigation. The Government's agriculture development plan is promoting groundwater extraction for irrigation in many parts of the Terai. However, the lack of institutional control over usage to ensure adequate recharge, coupled with the lack of monitoring, has resulted in haphazard drilling of deep tube wells by big hotels, large-scale industrial and commercial establishments, and drilling of small-diameter shallow tube wells by households, which has produced considerable stress on finite groundwater potentials. Kathmandu's deep aquifer has dropped from 9m below the surface to 68m below within the past few years and it has been estimated that the total sustainable withdrawal of groundwater from the Valley's aquifer is approximately 26.3 MLD while current withdrawals total about 58.6 MLD. Such reduction in groundwater levels inevitably affects surface wetlands.

As is the case for agricultural production, a range of fiscal and market instruments have been used in support of these water-based developments, often at the cost of wetlands. Another critical factor is that development planning, investment appraisal and product pricing structures have paid little attention to the fact that natural ecosystems form an economic part of water infrastructure. In the water and energy sectors, there has been a move over recent years towards full-cost recovery in pricing and investment. Yet both the allocation of investment funds and the calculation of market prices still focus only on the direct costs of establishing and maintaining physical infrastructure. They do not see the costs of ecosystem management as a necessary target for investment or as a component of price calculations. Yet, because wetlands are both economic users of water and economic components of the water supply chain, there is an appreciable cost to not factoring them into investment and pricing decisions, to channel sufficient funds into their management as part of water infrastructure, or to invest in measures to avoid or mitigate downstream ecosystem impacts.

Pollution: The increasing industrialisation and intensification of agriculture in Nepal is increasing the pollution load in its rivers, which in the absence of government measures will continue to increase. Discharge of untreated industrial effluent, domestic waste-water, and mineral rich agricultural run-off into the water bodies is common in Nepal and this has enhanced pollution, eutrophication and excessive growth of weeds, particularly alien species such as water hyacinth, thereby resulting in decreased species diversity and loss of function, e.g. potable water supply. The IUCN inventory of Terai wetlands reveals that of the 163 wetlands surveyed, 51 (31 percent) were affected by pollution. The sources of pollution include:

- Industrial waste: Industrial effluents are a source of increasing pollution in Nepal. Discharges from the Gorkha Brewery and the Bhrikuti Paper and Pulp factory are the major source of pollution in the Narayani River. Wastewater from carpet factories is also one of the major sources of pollution of the Bagmati River in Kathmandu. Due to comparatively higher numbers of industries in the Terai, many rivers and streams there are polluted by industrial waste.

- Pesticides and herbicides: The use of herbicides and pesticides is increasing throughout Nepal and India—an estimated 2,600 tons of pesticides are dumped annually into the Ganges River

system. The emphasis on high-value crops and commercial agriculture laid out in Nepal's Agriculture Perspective Plan (APP) 1995 has greatly accelerated the use of agro-chemicals.

Although the use of DDT for agricultural purposes is banned in Nepal, many other chemicals, e.g. Dieldrin, Aldrin, and Endrin, classified as severely hazardous (Rotterdam Convention) are still commonly used throughout the country, and control measures remain inadequate. Alternatives such as Caldan and Nukil are not widely available. Often, due to a lack of understanding and a wish to increase crop production, excessive doses are applied. The problem is exacerbated by ineffective implementation of policies and regulations for the safe disposal of pesticides. With increased emphasis on crop production and corresponding increase in the use of pesticides by farmers, several types of pesticide are imported in large quantities, a significant portion of which expire before they can be used. These are either used after expiry or disposed off carelessly. The open border with India is also a problem since chemicals are available freely, and can be brought across the border for use easily. These toxins run off into water bodies to be absorbed by aquatic organisms. Bioaccumulation of these in many higher-level animals leads to high concentrations of toxic products causing death and sub-lethal effects such as reduced reproductive capability and making them unsafe for human consumption. Pesticides (Phoret, Thiodan, Methyl parathion, Cypermethrin) are used for poisoning birds both to prevent crop predation and those used for food, and in fishing bait. Their use has also been reported in illegal poaching for the wildlife trade.

Government pesticide regulations and implementation of existing legislation are inadequate; and import, marketing, use and disposal of chemical pesticides are all being handled haphazardly. The quantity and quality of imports are poorly known, and various persistent and toxic chemicals are also formulated, marketed, and distributed within the country. Users are often ignorant of the hazards of chemical pesticides and of the symptoms of poisoning so most cases go unreported in rural Nepal. Cases of fatal pesticide poisoning are reported sporadically and one study revealed that about 300 people were admitted to 10 hospitals with pesticide poisoning over a twelve-month period in 1992. The Department of Agriculture has initiated an Integrated Pest Management system combining mechanical, biological, and chemical methods of pest control with a view to minimizing the harmful effects of toxic pesticides on man and the environment, and although the APP calls for greater emphasis on IPM and full coverage of the country within five years, this has not been achieved.

- Fertilizers: The use of inorganic fertilizers is increasing throughout Nepal resulting in high nutrient run-off that causes eutrophication, oxygen depletion, accelerates seral succession towards dry land, and possibly facilitates disease spread. It is estimated that about 1.15 million tonnes of chemical fertilizers are dumped annually into the Ganges River system. IUCN's inventory of Terai wetlands indicates that of the 163 wetlands surveyed, 100 (61 percent) were severely affected by agricultural run-off. Epizootic Ulcerative Syndrome (EUS), a disease caused by the fungus *Aphanomyces invadans* in the internal tissue of fish (which has caused significant losses of wild and cultured freshwater and estuarine fishes throughout the Indo-Pacific region), has been prevalent in Nepal since 1983. The source of contamination and the causative agent of EUS in Nepal are not known, but deterioration of water quality in water bodies provides favourable environmental conditions for the growth of *A. invadans* in fish. Over 40 species of fish, mostly freshwater species, are reportedly susceptible to EUS with Catfish (*Wallago attu, and Mystus spp.*), Snakeheads (*Channa* spp.), and Barbs (*Puntius* spp.), being the most susceptible. While local fish species (Rohu, *Labeo rohita*, Naini *Cirrhinus mrigala* and Bhyakur *Catla catla*) are also affected, exotic Chinese Major Carps (*Ctenopharyngodon idealla, Hipophthalmicthyis molitrix, Aristichthyis noblis*), Tilapias (*Oreochromis mossambicus*) and Milkfish (*Chanos chanos*) are seen to be resistant. EUS has been reported in the Koshi Tappu area since 1983 where it has caused high mortality of native fish resources, and from Ghodaghodi Lake since 1998. Itching problems in humans have also been reported for the same lakes.

In Koshi Tappu, many of the wetlands have changed from mesotrophic to eutrophic due to the accumulation of nutrients from natural and human activities. Seepage areas on the eastern side of the embankment adjacent to the agricultural fields are severely affected by agricultural run-off. These areas are now hypereutrophic, being almost completely covered by water hyacinth and other macrophytes, and few migratory birds now visit these areas. The Ghodaghodi Lake Complex is severely affected by natural eutrophication, although agricultural run-off is affecting Nakhrodi Lake. Extensive proliferation of macrophytes causes a shift in the balance of bird species, favouring egrets, storks and jacanas at the expense of those migratory waterfowl that require some open water for feeding. Ultimately these plants die and contribute to the organic material on the lake bottom raising it and accelerating seral succession towards dry land. In Nakhrodi Lake, succession is rapid due to shallow, eutrophic, macrophyte-rich waters and the lake is changing into marshland where *Ipomoea fistulosa* and *Salix* spp. are prominent.

- Domestic sewage: Total outputs of sewage are increasing and rivers and wetlands around many large towns are used extensively for dumping solid waste, and untreated domestic and industrial effluents. The Bagmati River system in Kathmandu Valley receives some 40 million litres of untreated wastewater per day, 95 percent from domestic sources. The misuse of the River has greatly disturbed the balance in its ecology and caused the number of fish species to decline from 54 to seven species within a decade. Disposal of untreated domestic sewerage, leaked septic tanks, extremely polluted rivers, and disposal of untreated effluents are polluting the shallow groundwater aquifers (dug wells and shallow hand pumps) in the Valley. Bacterial and chemical contamination includes high faecal coliforms, nitrate or ammonia, iron and manganese. During the monsoon, an average faecal coliform count of 4,404 col/100ml was reported for water from dug wells. In Pokhara, water pollution and solid waste disposal problems have been greatly exacerbated by the establishment of tourist facilities along the shores of Phewa and Begnas Lakes, and their water quality has deteriorated due to faecal contamination from the direct discharge of sewerage via drains including the overflow from septic tanks in hotels and restaurants. Washing of clothes by hotels, restaurants and households results in the discharge of over 100kg of soap and detergents daily into Phewa Lake.
- Sedimentation: Asia's rivers are by far the greatest contributors of sediment, possibly supplying up to 80 percent of the world total. The combined Ganges-Brahmaputra Basin ranks first, with an estimated annual sediment yield of 2.4 billion tons (15t /ha/yr), of which the Ganges alone contributes three-quarters (11.3t /ha /yr), vastly higher than such tropical rivers as the Mekong (2.1t ha /yr) and the Orinoco (0.9- 2.1 t / ha /yr). The total Ganges system is estimated to carry approximately 430 million tons of sediment per year for a unit area denudation rate of slightly over 400 tons/km^2/year. Of the total volume of sediment passing through the Ganges system annually, it has been estimated that 170 million tons (40 percent), is contributed by the Koshi River—at a unit area denudation rate of 2,270 tons/km^2/year, 3.5 times that of the Upper Indus Basin. The sediment load carried by the Koshi River is extremely variable. The average annual silt load of the river during 1948-78 was 95 million cubic metres. Point source sediment contributions, caused by mass wasting, are the major source of sediment for most Himalayan rivers. Highest sediment concentrations are associated with high flood discharges. IUCN's inventory of Terai wetlands indicates that of the 163 wetlands surveyed, 112 (69 percent) were threatened by sedimentation/siltation.

  The Koshi River has a steep gradient of about 1.5m/km in the gorge upstream of Chatara and this reduces sharply to 0.873m/km between Chatara and the Barrage as the river suddenly leaves the hills and enters the flatlands of the Terai. The sudden reduction in sediment transportation capacity deposits heavy sediments in this zone resulting in braiding of the river, and forcing it to change its course- -it has been notoriously unstable for over 250 years with a progressive westward shift. Although clearly a natural phenomenon, sedimentation at Koshi Tappu has increased significantly as a result of disruption of the river dynamics by the Koshi Barrage and its embankments. This

movement has been curtailed by the Barrage and the incidence of siltation is higher in the area upstream of the barrage where a rise in the riverbed of >1m has seriously threatened the Reserve's wetland habitats.

Prior to construction (1963-74), the river was degrading at a maximum rate of 165.6mm/yr (1955-62) but since then, the river has aggraded at a rate of 107.0 mm/yr. The Koshi Barrage is now little more than an expensive flooding basin, where permanently rising flood beds undermine its original function of flood containment. The shifting of the river within the confines of the embankments has caused major damage to wetland habitats, increasing braiding, eroding most of the Sal and riverine forest and some ox-bow lakes, and turning large areas of grassland into river but leaving a vast area of barren sandy land behind from where it used to flow. These areas may slowly re-vegetate. Sedimentation of ox-bow lakes and marshes through deposition of silt during monsoon floods is also a problem.

At Ghodaghodi too siltation is a problem, here caused by deforestation within the Churia watershed (Betini forest) and human encroachment along the Lake's shoreline and upstream areas.

1.3 Depletion of species abundance and diversity

Over-harvesting of plant and animal products: Nepalese communities remain overly dependent on their surrounding natural resource base for their livelihood. This has led to the steady depletion of resources to fulfil basic needs, in particular food, firewood, fodder, and construction materials. The main unsustainable uses of resources are:

- Firewood and timber: Forests are under pressure from increasing human populations and their demand for firewood, timber, leaf litter, and other forest products. The survival of wetlands is closely associated with forests. For example, the high forest coverage (approx.65 percent) in Kailali District supports a large number of ox-bow lakes and marshes/swamps. Over 75 percent of the energy resources and over 40 percent of fodder needs are met through forests. In Kanchanpur District, it is estimated that only 50 percent of wood demand and 5 percent of firewood can be met by local forests at present, thus leading to unsustainable resource extraction practices, including collection and sale of firewood as a source of income. Felling of Sal and riverine forests for trade and domestic uses in the Terai, collection of biomass such as leaf litter, fodder, and collection of medicinal and aromatic plants have led to the depletion of forest cover and availability of resources. The forest area in the Terai decreased at an annual rate of 1.3 percent between 1978-91 (cf. 2.3 percent in the hills between 1978-94). Degradation and fragmentation of forests is particularly severe in Government-managed forests where trade in illegally-felled timber is motivated by extensive tracts of commercially-valuable Sal forest in the lowland Terai and facilitated by the open border with India. It is estimated that four or five Sal trees can fetch the price of a small car (about US$6,400)! At Koshi Tappu, 90 percent of households within the vicinity of the Reserve collect firewood (of which 26.3 percent comes from forest and 16.4 percent from driftwood collected within the Reserve) and 16 percent of households collect fodder from within the Reserve.
- Fishing: The size of fish catches is unregulated, even where they could be. Although the Koshi Barrage has the provision to ban fishing within a two-mile radius the two DDCs actually lease the area to contractors such that there are about 2,000 fisher folk around the Koshi Barrage catching between 1.5 and 6kg per person per day.
- Grazing: Traditional socio-cultural and agricultural practices in the Terai favour high cattle populations. As a Hindu country, killing and export of cattle in Nepal is illegal. This has

exacerbated grazing pressure on grasslands and forests through a proliferation of unproductive animals (cows too old to produce milk and oxen too old to plough fields or pull carts).

In three districts of the western Terai in 1996/97, the estimated population of domestic animals (cattle, buffaloes, goats, and sheep) was about 1.2 million compared to a human population in 2001 of just over 1.3 million, a livestock to human ratio of close to 1:1. However, grasslands outside of protected areas in the Terai are now limited and, as a result there is heavy grazing pressure within the protected areas as well as in Government forests. Intensive year-round grazing in forests disrupts the regeneration of trees and impoverishes the ground flora. The threat is highest in forests lying close to settlements, e.g. over 12,600 cattle are recorded grazing the shoreline forests at Ghodaghodi, where the composition of wetland vegetation is gradually changing into terrestrial communities as a result of over-grazing. In high elevation pastures in the Himalayas, grazing is generally a seasonal threat, but in the Terai it is a year-round threat to many of the highly productive Protected Areas. Koshi Tappu is a good example, where approximately 70 percent of the land area is now grassland but these too are degraded from heavy gazing by domestic livestock. Stocking densities in the area are high—at an average holding of 5 animals per household or a density of more than 400 animals/km2. Since there is no clear Park boundary, no fences, no regular patrolling, and free grazing, between 15,000-20,000 livestock graze the area daily, and 3,000 are stocked inside the boundaries permanently. Animals are even herded across the border from India. The resulting over-grazing and cutting degrades the *Phragmites karka- Saccharum spontaneum* grasslands that are replaced by the *Imperata cylindrica*-type not favoured by Asiatic Wild Buffalo. This reduction in, and changed composition of, palatable species results in scarcity of food for ungulates in turn forcing them to raid agricultural crops in the surrounding villages. Over-grazing also leads to disturbance in bird habitat through the destruction of the nests of ground-dwelling species (e.g. Bengal Florican and Swamp Partridge) and destruction of the habitat of tall grass specialists (e.g. Striated Grassbird and Hodgson's Bushchat). Over-grazing and movement of livestock along shoreline contribute to soil erosion and high input of nitrogenous nutrients to wetlands resulting in elevated eutrophication of water and excessive growth of certain aquatic vegetation, which again leads to loss of suitable habitat for birds and other aquatic life. Over-grazing also reduces the condition of the livestock themselves through poor nutrition, inadequate food supply and high population pressure, making them more prone to disease, e.g. liver fluke transmitted mainly through marshland snails. Such diseases may be transmitted to wild ungulates thereby leading to local extinctions of species, e.g. Asian Wild Buffalo were present in Royal Chitwan National Park in the early 1960s but became extinct there, probably due to diseases carried by domestic cattle and buffaloes. It is estimated that 62 percent of the domestic livestock inside Koshi Tappu are in poor condition and concerns over disease transmission to Nepal's last remaining herd of Asiatic Wild Buffalo are high.

- Poaching: Poaching is widespread in Nepal, often for subsistence purposes to supplement either meagre diets or inadequate alternative livelihood opportunities. Ineffective law enforcement and insufficient conservation awareness are contributory factors. At Koshi Tappu, 763 wild animals were reported killed between 1994 and 1999 comprising 683 wild boars, 65 hog deer and 15 spotted deer, of which 81 (76 wild boars, 3 hog deer and 2 spotted deer) were poached in 1999 alone. Wild Buffalo, turtles and birds are also killed but no records are kept. Since most poachers and their victims remain undetected by the Reserve authorities, annual mortality due to poaching is believed to be several times higher than what the records suggest, and is one of the main causes for the depletion of the several wildlife species in the Reserve. Poachers use traps, snares, spears, guns, explosives, and poisons (mainly pesticides) to kill targeted species. In addition to subsistence use, various live animals and parts of dead animals are sold as food, medicine, pets, and for a variety of decorative purposes. Gangetic Dolphins in the Karnali River are exploited for their meat and oil. Oil, which is used in lamps, as an attractant for catching fish, and for medicinal purposes, is expensive (about US$8 per 250ml bottle, at 1989 prices). Hunting pressure may have contributed to

reducing the number of dolphins in the Koshi River to the point where the population currently has little chance of long-term survival.

Small populations of dolphins isolated behind barrages will quickly become extinct even with limited hunting pressure. Hunting of Gharial and Marsh Crocodiles for skins, meat, and body parts thought to have medicinal value, and the collection of their eggs for food, has contributed to population declines. Current poaching levels are unknown but as with dolphins, even low-level exploitation can have devastating effects on small, fragmented populations. Otters are still hunted for their pelts, meat, and uterus thought to have medicinal value, but the effects of hunting on their populations are unknown. Freshwater turtles are exploited for their meat and those body parts thought to have medicinal value. No information is available on levels of exploitation or which species are most affected in Nepal, but all the turtle species recorded in the Karnali and Narayani Rivers are used on a subsistence basis in the neighbouring states of Uttar Pradesh and Bihar in India. The large-scale commercial exploitation of turtles in India focuses primarily on flap- and softshell turtles.

Destructive harvesting practices: A number of resource harvesting practices are destructive to biodiversity, through their destruction of non-target species. Practices include:

- Fish bombing: There is worrying and increasing trend in the use of explosives to collect all the fish from a specific area. The use of fish-bombs using dynamite taken from road construction projects began in the 1980s. The practice has significant adverse impacts on fish populations and on the survival of key indicator species (dolphins, gharial and crocodiles, otters, fishing cats).
- Electro-fishing: This practice of using an electric charge to kill all aquatic organisms within a selected range is widespread in Nepal, and particularly in the Terai. Car batteries with electrodes provide the charge. This is particularly destructive when used on dry season refuges for important breeding species.
- Poisoning: Another worrying and increasing trend since the 1980s is the use of poisons e.g. pesticides (particularly Thiodine and Phoret), household bleach and other chemicals derived from local plants, to catch fish, either indiscriminately or introduced into bait. It reduces the fish population by mass killing, affects the food chain of the ecosystem, and causes pollution of water bodies. Use of poisons is widespread at Koshi Tappu and at Ghodaghodi.
- Small-mesh nets: Use of small-mesh sizes is widespread in Nepal and these are used on a variety of net types—gill nets, cast nets, dragnets, and a variety of local types; e.g. in the Ghodaghodi area, traditional fishing implements include nets down to 6mm mesh size. These nets are indiscriminate in their catches resulting in the removal of both adult breeding stock and young fingerlings from the populations, thereby reducing the possibilities of future breeding and recruitment from the areas. Although fishermen try to avoid entanglements because of potential damage to their nets, by-catches of other species including dolphins do occur.
- Draining: Draining of entire small wetlands to harvest all fish and aquatic products is widely practiced, an unsustainable method since it causes the loss of feeding and breeding sites of other species and causes habitats to undergo ecological succession towards dry land.
- Gravel and driftwood collection: The removal of driftwood and associated debris from riverbeds and banks for firewood, and unregulated mining of gravel and rock for road-building, decreases river productivity, alters the hydraulics and substrate composition, and eliminates essential habitat for several fish species during all or part of their life cycle, thereby endangering fish populations and the aquatic wildlife that depends on them.

Change in indigenous species composition: is being caused in Nepal through the spread of existing alien invasive species, and by the introduction of new ones.

Spread of existing alien invasive species: Several alien invasive species are problematic in Nepal. Water hyacinth (*Eichhornia crassipes*), present in the country for many years, is widespread and is assumed to have altered aquatic ecosystems to some extent. Invasive species such as *Ipomoea carnea* subspecies *fistulosa*, and *Mikania micrantha* are also becoming more abundant in areas near wetlands, thereby affecting habitats of water birds and other wetland dependent fauna as well.

Introduction of new alien species: Exotic fish farming is being promoted as a profitable method of income generation in natural lakes and ponds, as well as in private ponds in Nepal. Several exotic fish species have been introduced in Nepal, some of which can be invasive (such as *Oreochromis mosambicus* or Nile Tilapia). Their spread in Nepal's wetlands is as yet not assessed. A recent assessment of natural lakes in Kailali district (where Ghodaghodi Lake Complex is situated), showed that of the 101 natural lakes found in the district at least 80 were being used for exotic fish farming, mostly carps. This is being encouraged not only by the Department of Agriculture, but also by Village Development Committees and District Development Committees in most parts of the Terai, and also in other parts of the mid-hills, to generate much needed cash for development. A reduction of 42 percent in the yield of native fish species (*Mystus* and *Puntius* spp.) was observed in Begnas Lake in Pokhara after introduction of exotic Bighead Carp (*Aristichthys nobilis*), Silver Carp (*Hypopthalmicthys molitrix*) and Grass Carp (*Ctenopharyngodon idealus*). This practice is doubly harmful for local flora and fauna. In smaller lakes in the Terai, exotic fish farming involves draining wetlands to remove local flora and fauna and restocking these with exotic fish. Surviving native fish populations are reduced by exotics preying on their fry, or by out- competing them for food and breeding sites resulting in the extinction of species, and water birds and others are discouraged from feeding at these sites.

2. Root Causes

Three root causes have been identified as underlying the threats described above (see Figure 1). These are described further below, along with the factors that contribute to them, and a brief overview of how the Project intends to address each.

2.1 Poor integration of wetland biodiversity values into sectoral, legal and policy frameworks and poorly co-ordinated implementation of plans between sectors

One of the major underlying causes of inappropriate land-use and poor water management in Nepal is the lack of an integrated approach to planning at national and district levels. There is a lack of a coherent, co-ordinated institutional framework for wetland management. Several Government agencies organised along single sectoral lines having overlapping jurisdiction over wetlands—mainly the Ministry of Water Resources, Ministry of Agriculture, Ministry of Forests and Soil Conservation, and District and Village Development Committees supported by the Ministry of Local Development. The laws, policies and programmes of these agencies are not coordinated either during formulation or implementation, and their priorities and programmes do not provide adequate attention to wetland biodiversity. There is little awareness of wetland values and functions and hence these tend to be ignored in development plans leading directly to their subsequent loss and the loss of the biodiversity they sustain.

Until very recently, wetlands did not even receive any attention in conservation planning, e.g. the National Conservation Strategy (1989) did not include any provisions for wetland ecosystem conservation or sustainable use. Similarly, the Department of National Parks and Wildlife Conservation Act (1973), which laid the legal framework for the Protected Area system, and the Buffer Zone Management Rules

(1996) and the Buffer Zone Management Guidelines (1999), paid inadequate attention to wetlands conservation and sustainable use. Even the first Ramsar Site in Nepal, Koshi Tappu Wildlife Reserve, was created originally for the protection of the last remaining population of Asiatic Wild Buffalo and not for the protection of wetland biodiversity. As a direct result, most of the important wetland areas were not included under protection and fall outside the Reserve boundaries. Only the recently approved Nepal Biodiversity Strategy (2002) has recognised the need for wetland conservation, while the National Wetland Policy (2003) has recently emerged as the central plank of the Government's approach to wetland biodiversity conservation for the foreseeable future, but this needs to be implemented.

Though many wetlands exist on Government land and under the legal jurisdiction of the Department of Forests, the focus on forestry issues means that wetland conservation does not receive adequate attention. In other cases, single sector foci prevail, e.g. the Ministry of Agriculture has been promoting farming of exotic fish species in lakes without due attention to indigenous fish species or other local biodiversity, and a similar lack of concern for biodiversity is apparent in the activities of the Department of Irrigation. The Water Resources Act (1992) does not list conservation of wetlands and aquatic biodiversity among its many priorities.

Policy harmonization and programme coordination of different line Ministries is the primary remit of the National Planning Commission. However, such co-ordination is weak and national level plans and policies remain single sector in focus and this permeates down to district development planning and implementation. Although District Development Committees have a sub-committee on the forest, environment and cottage industry, and also water resources committees for periodic integrated multi-sectoral district development planning, this has also proved ineffective in integrating biodiversity conservation into sectoral plans and in providing a coordinated approach to wetland conservation. DDC plans have also failed to recognize the importance of sustainability of wetland resource use for local indigenous communities since these communities lack the power to influence these policies. This has in turn contributed to a general lack of awareness on wetland values, capacity, and incentives. Though there is a burgeoning number of civil society institutions, including conservation-oriented organizations and special wetland interest groups, that could potentially influence district level planning and implementation to make them more sensitive to wetland issues, they too have inadequate capacity and fora to influence the planning and implementation process.

There is an additional coordinated planning opportunity for wetland management under the Water Resources Rules (1993), which has the provisions for a District Water Resources Committee, headed by the Chief District Officer, with representatives from District Agriculture Development Office, District Forest Office, District Drinking Water Office, District Irrigation Office, any relevant Government Hydroelectricity Project, other Office relating to uses of water resources and the DDC. The Local Development Officer is the committee's Member Secretary. However, the focus of such committees is on maximising water use for irrigation, and domestic and industrial use, and to a smaller extent arbitrating in cases of dispute. However, this committee is not responsible for equitable use of water and conservation.

20. When developments are planned, economic trade-offs balanced, or project profitability assessed there is perceived to be little economic benefit to wetland conservation, and few economic costs to their degradation and loss. Macroeconomic and sectoral policies continue to favour wetland-degrading sectors, and to employ fiscal and market instruments that encourage the activities, land and resource uses that lead to wetland modification and conversion. Because markets and prices remain distorted against wetland conservation there are few financial or economic disincentives for wetlands-degrading sectors to modify their activities. Investment in wetland management continues to be seen as an uneconomic use of land, funds and other resources.

The UNDP-GEF intervention aims to establish a multi-sectoral planning process that will be operational at national and local levels. It will achieve this by supporting the creation and operation of a National Wetlands Committee comprising senior government officials from all relevant sectors to ensure integration and co-ordination of wetland issues into the legal, policy, and planning frameworks. A national network of specialists on wetland issues will act as a scientific and technical body to advise the Committee. National wetland and biodiversity action plans, already under development, will be strengthened through technical support, and elements of them will be implemented through the Project.

2.2 Inadequate technical, economic and institutional capacity, information base, and awareness for wetland biodiversity conservation planning and management decisions

Within Nepal's biodiversity and natural resource protection and management sectors, human and institutional resources are extremely low and this is particularly so for wetland conservation. There are very few professionals in Nepal with technical skills on wetland conservation, and none of the universities offer courses on wetland conservation and management (although some teach topics relevant to small aspects of wetland conservation). Expertise does exist nationally on flora, fauna, water and watershed resources management, but the mechanisms for these professionals to share their ideas, skills and learning are absent. The general lack of resource allocation for wetland conservation has meant that there have been no wetland conservation projects and programmes in the country resulting in no "learning-by-doing", and hence no cadre of people with practical wetland management skills. Additionally, the strong information base, recognized as a prerequisite for sound policymaking and natural resource management planning, is also absent. Although some basic data collection has been undertaken in Nepal on aspects of wetland biodiversity and limnology by various government departments, universities and NGOs supported by funds from UNDP, the World Bank, and Asian Development Bank, IUCN, WWF, King Mahendra Trust For Nature Conservation, and foreign universities, there is still a lack of basic information on most wetland biodiversity issues, with data holdings often fragmentary, of varying quality, outdated, unavailable or underused. This is particularly true for wetlands in the mid-hills and mountains. At all levels there is currently little information on, or understanding of, wetland functions and values, the principles of wise use of natural resources, and a lack of awareness of the global importance of the country's biodiversity. This has led directly to poor policies, planning, and development decisions and impaired natural resource management resulting in a depletion of natural resources through over-harvesting and destructive harvesting practices

The under-valuation of wetland goods and services has acted as a pervasive force in hastening their degradation and loss. As well as influencing development and economic sectors, this has meant that conservation efforts have often been based on unsound economic and financial principles. They have largely failed either to set in place the incentive systems that are essential for their economic viability and acceptability, or to secure the funding base that is required for their long-term sustainability.

The UNDP-GEF intervention will develop a comprehensive capacity building programme to train trainers and support national training programmes that will significantly enhance the capacity of the natural resource protection and management sectors. Training programmes will be developed after a strong capacity needs analysis involving all relevant national and local sectors within the country. The Project will create a broader and more policy-relevant information base to support policymakers, planners, and managers and facilitate their understanding of wetland values and functions, wetland management, and sustainable use thereby encouraging their integration into development practice. This will be achieved through extensive inventory work and assessment of Nepal's wetlands to identify and prioritise sites for key biodiversity and develop comprehensive biodiversity overlays to ensure their future protection and integration into national development plans. The overlays will be complemented by a series of information tools such as legislative updates for species protection lists and national Red Data Books.

2.3 High local community dependence on wetland resources but low involvement in their management and low recognition of wetland values

The unsustainable use of wetland natural resources is prevalent throughout Nepal. Poverty is widespread and rates of population growth are high. Since most communities have weak, un-diversified, and insecure local livelihoods based on the direct exploitation of natural resources, people have little or no option in their patterns of exploitation.

Wetlands have many stakeholders at the community level with diverse interests, and overlapping government jurisdiction and a lack of policies and programmes to support community empowerment for their management means that government and communal wetlands are often used as "open access" areas. Benefits of wetland resources accrue mostly to relatively wealthy local households—usually by livestock grazing, water abstraction for irrigation, and from DDC and VDC contracts for farming exotic fish. Poorer wetland-dependent, indigenous communities and households are not given the opportunity or the responsibility for wetland management nor opportunities for alternative livelihoods. Consequently, even though these poorer households recognise the implications of their unsustainable use, over-harvesting of plant and animal products remains commonplace simply because there are no alternatives.

Due to a poor appreciation and understanding of wetland values, few market mechanisms exist either to capture these benefits as tangible cash values or to price them according to their true scarcity and value – either for the environmental agencies who are responsible for formal conservation activities or for local communities who live around and use wetlands.

One of the world's most successful examples of natural resources management has been the community forestry programme in Nepal. This has demonstrated that successful local natural resources management is possible provided that supportive policies, capacity building actions, and long-term tenure securities exist, complemented by proper stakeholder identification and negotiated resource management planning at the local level. The UNDP-GEF intervention will build on this successful example by promoting a similar approach to wetland conservation and management in the country, by demonstrating alternative systems of community development based on sustainable utilisation of wetland biodiversity and natural resource conservation. This will be demonstrated at two project sites with complementary integration into national and local policy and planning frameworks. The focus will be on bringing communities directly into the management planning process, identifying practical and sustainable alternatives for harvesting and collecting wetland resources and forest products, helping to influence local development policies, developing incentives for community-based ecotourism activities, and promoting the sustainable utilisation of resources. The two sites will demonstrate this collaborative approach both within and without the Protected Area system. Building on economic valuation assessments at the two demonstration sites, the Project will identify sustainable financing mechanisms for conservation activities to rectify the current state of conservation financing and act as a model for wider application.

The ultimate causes behind these root causes are mostly socio-political and will not be addressed by the UNDP-GEF intervention. These include poor infrastructure, transport and communications; the current effects of armed insurgency; and institutionalised corruption and mismanagement at many levels.

Annex 2: Demonstration Sites – Their Selection, Biodiversity Values, Description, And Threats

Introduction

This annex:

- outlines the process for the selection of demonstration sites;
- describes each site;
- highlights globally significant biodiversity of each site;
- outlines the threats to the biodiversity of each site; and,
- identifies the root causes of the threats at each site and proposes remedial action.

The demonstration sites

Process of selection of the demonstration sites

The site selection process for the two national demonstration sites is outlined below:

a) The PDF-B Document *Conservation and Sustainable Use of Wetlands in Nepal* suggests work at demonstration sites to "*allow testing and refinement of solutions, as well as promoting replicability to other wetland sites in Nepal*" and short-lists four sites in the Terai as potential demonstration sites. These have been identified to "*represent various ecosystems such as river floodplain, ox-bow lakes, marshes, swamps and reservoirs*". Mid-hill and mountain wetlands were not short-listed because of very limited information on biodiversity values, threats and socio-economic importance. In addition, their remoteness would reduce their potential demonstration value, and the current insurgency, which is more prevalent in the upland areas, poses a threat to the sustainability of project activities.

b) As stated in the PDF-B document, the *"final selection of sites, based on recommendations presented by the PDF-B team"* was undertaken at the First Project Steering Committee Meeting. These sites were selected after evaluating information against selection criteria developed for the IUCN GEF Mekong River Basin Wetland Biodiversity Conservation and Sustainable Use Programme and adapted for use here. This was conducted in conjunction with a national review of the information base, policies and plans, and the progress towards management planning for internationally important wetland sites. This review confirmed that the four candidate sites described in the PDF-B Document were the most relevant of the 10 identified from the Action Plan, but it also revealed significant overlap between the sites in terms of global biodiversity values present, threats faced, and likely demonstration activities available. As a result, a different approach was adopted, and the main objective of the demonstration sites was clarified, namely to demonstrate a range of sustainable management techniques suitable for replication in different situations throughout the Terai of Nepal, while making a significant contribution towards conserving global biodiversity. Two main situations were identified:

- management of protected wetlands and their buffer zones; and
- management of wetlands outside of Protected Areas where a regional planning or catchment planning approach would be suitable.

Two sites (Beeshazar Lake and Lumbini wetlands) were rejected on the basis of limited global biodiversity values dependent upon the sites themselves; significant overlap with the two recommended sites in terms of ecosystem and biodiversity, threats, and Protected Area status; and because Lumbini is primarily an artificial wetland.

c) Both selected sites were visited at least once during the project preparation period to verify biodiversity values. Discussions were held with local authorities, and where possible with local people, to determine current activities and threats to biodiversity at each site.

Sites selected for demonstration activities

As a result, the two sites selected for the project are:

- Koshi Tappu Wildlife Reserve and its proposed buffer zone (collectively referred to as "Koshi Tappu Area")
- Ghodaghodi Lake Complex.

The Koshi Tappu Wildlife Reserve and its proposed buffer zone have been selected to demonstrate the management of a riverine ecosystem within and around a Protected Area. The site also has the potential of being used to demonstrate trans-boundary wetland management since the Koshi Barrage area has been leased to India for a period of 199 years. The site was selected on the basis of its high global biodiversity values, including the presence of endangered and endemic flora and fauna such as Gangetic Dolphin, Asiatic Wild Water Buffalo, Gharial, and the Bengal and Lesser Floricans; the absence of an adopted management plan for the entire ecosystem and the resources needed for its implementation; the existence of several threats to the wetland from both natural and anthropogenic activities; and, the opportunity to demonstrate the role of community participation in wetland management.

The Ghodaghodi Lake Complex has been selected as being ideal for the purposes of demonstrating the management of an unprotected wetland ecosystem using a sub-catchment planning approach. This area is a key link between the Churia Hills and the Terai plains, and also acts as a corridor connecting the Royal Bardia National Park with the Royal Sukhlaphanta Wildlife Reserve. Furthermore, this site falls within the Terai Arc region identified by the WWF Project bearing that name, linking Royal Chitwan National Park with Corbett Tiger Reserve (India). The area has high global biodiversity values including the presence of the nationally Critically Endangered plant Bijay Sal or Indian Kino Tree *(Pterocarpus marsupium)* and globally-threatened fauna including Gharial, Marsh Crocodile and Red-crowned Roofed Turtle; is under threat from both natural and anthropogenic activities; and affords an excellent opportunity to demonstrate the importance of community participation in wetland management in a non-Protected Area setting.

Figure 1 shows the approximate locations of each within the region. Figures 2 and 3, which appear later in the text, show the locations in greater detail. Table 1 provides an evaluation of each of the selected sites against the site selection criteria. The two sites were recognised as priority areas for biodiversity conservation by the 1995 HMNG/Government of the Netherlands Biodiversity Profiles Project. Koshi Tappu was declared a Ramsar site in December 1987; Ghodaghodi was nominated as a Ramsar Site by HMNG in January 2002 and is awaiting formal listing by the Ramsar Bureau.

The Koshi Tappu Wildlife Reserve (86°55'15"-87°05'02"E, 26°33'57"-26°43'40"N) occupies 17500 ha of the Sapta Koshi River floodplain in the most north--easterly part of the Gangetic plain, close to Nepal's southern border with Bihar State in India. Its proposed buffer zone encompasses an additional 17300 ha. At some points the Nepal-India border is less than 100m from the proposed Buffer Zone area. The Reserve, roughly rectangular in shape, is 16.3km north south and 9.3 km east west and lies within Sunsari, Saptari, and Udaypur Districts of the eastern Terai of Nepal. The Reserve's headquarters is in Kushaha village, Sunsari District, 2.6 km northwest of the East-West Highway (the only highway in Nepal connecting the breadth of the country) and approximately 57km west of Biratnagar by road, the country's second largest city.

The Sapta Koshi River floodplain is the largest of all river basins in Nepal comprising 60,400km^2 (of which 32,537 km^2 lies in China). The Sapta Koshi River carries the highest sediment load of all rivers in Nepal and reputedly contributes 40 percent of the sediment load of the Ganges River. The southern boundary of the Reserve runs parallel to the Koshi Barrage, 6.5km to the south. The 4,995ha of *dubar* (submerged land), between the Barrage and the southern boundary of the Reserve, has been leased to the Indian Government for 199 years. The northern boundary of the Reserve is demarcated along the floodplain of the eastern embankment near Prakashpur, to the village of Tapeshori north of the Trijuga River.

Table 1: Evaluation of the demonstration sites against site selection criteria

Criteria for site selection	Koshi Tappu Area	Ghodaghodi Lake Complex
Supporting rare or threatened (vulnerable or endangered) wetland species	✔	✔
Maintaining the genetic and ecological diversity because of the uniqueness of its flora and fauna	✔	✔
Providing the habitat for plants or animals at a critical stage of the biological cycle	✔	✔
Supporting one or more endemic plants or animals or communities	✔	
Supporting a significant proportion of indigenous fish Subspecies, Species or Families or including areas on which fish stocks depend	✔	
Area large enough to be significant, but small enough to be managed as a unit. In this respect, individual small lakes or marshes are not recommended, but boundaries of the demonstration sites should preferably lie within Provincial or equivalent administrative authority	✔	✔
Provide a high likelihood of success for management in a manner which will provide adequate protection of the biodiversity values	✔	✔
Have important trans-boundary implications if not managed properly	✔	✔
May be under threat from significant development proposals, but can be managed in a way that these threats can be minimized or ameliorated	✔	✔
Provide examples of wetland functions and ecological services	✔	✔
Are near communities who are to some degree dependent on its values and benefits, and who can be involved in future management of the wetland	✔	✔
Have the potential to demonstrate Wise Use principles, as described in the Ramsar Convention	✔	✔
Can act as a model for best practice and facilitate a learning role for other initiatives	✔	✔
Are significant for religious, cultural, historic or socio-economic reasons	✔	✔

Biodiversity values of the demonstration sites

The key biodiversity values of the demonstration sites are summarized in Table 2.

Table 2: The key global biodiversity values at the two demonstration sites

Koshi Tappu Area, Eastern Nepal	Ghodaghodi Lake Complex, Kailali District, Far Western Nepal

Site description	Stretch of the Sapta Koshi River and its floodplain in the Terai lowlands in Eastern Nepal, adjacent to the Indian border. This area has been long-settled, and has a relatively high density of people, including many ethnic minorities directly dependent on the River and other wetlands in the area for their livelihoods.	A complex of lakes, marshes and seasonal ponds in the lowland plains stretching up to the foothills of the Siwaliks. The area has long been settled by the Tharu communities but has of late seen a rapid influx of hill migrants. The area remains relatively less disturbed than most other wetland areas in lowland Nepal.
Biodiversity highlights	High density of migratory and resident bird populations—467 species listed, with congregations of over 50,000 migratory waterfowl during the winter months. Largest known heronry in Nepal. Last surviving population of the Asiatic Wild Buffalo in Nepal. Gangetic Dolphins are resident in the Sapta Koshi river. Two endemic fish species—*Barilius jalkapoorei, Pseudeutropius murius.* 45 percent of total vertebrate species of the country.	Supports 1 percent of the population of Cotton Pygmy-goose and has substantial populations of migratory waterfowl in the winter months. 34 mammal species recorded.
Habitats	Wetland types: Riverine: a) Perennial rivers; b) River floodplain; Lacustrine (ox bow lakes and ponds); Palustrine (marshes and swamps); Man-made: a) Water-storage area (Koshi barrage); b) Canals: c) Rice fields. Others Grassland (67.3 percent): 5 main types, namely Saccharum type, Saccharum-Phragmites mixed type, Imperata type, Saccharum-Typha mixed marsh type, and Cymbopogan-Saccharum type. River, sand, boulders (25.9 percent). Forest land (4.2 percent): 4 main types namely, Khair (*Acacia catechu*) forest, Sissoo (*Dalbergia sissoo*) forest, Mixed deciduous riverine forest, and Savannah forest (*Bombax ceiba* dominated). Savannah (2.6 percent).	Wetland types: Riverine: a) Perennial rivers; b) River flood plain; Lacustrine (ox bow lakes and ponds); and Palustrine (marshes and swamps). Others Forest land: 3 main types, namely Sal (*Shorea robusta*) forest, Asna or Saj (*Terminalia alata*) forest, Mixed deciduous riverine forest.

Plants	658 plant species recorded of which 284 are wetland macrophytes. Globally Vulnerable: *Dalbergia latifolia (IUCN, 2002)* Nationally-threatened species: Endangered: *Oroxylum indicum, Crateva unilocularis, Operculina turpethum*; Vulnerable: *Asparagus racemosus, Alstonia scholaris, Butea monosperma, Curculigo orchioides, Piper longum, Tinospora sinensis*; Three species protected under the Forest Act 1993: *Acacia catechu, Bombax ceiba, Shorea robusta.* 107 plant species with medicinal values; 64 edible (by humans) wild plant species; and, 12 plant species with domestic utility.	473 plant species recorded of which 195are wetland macrophytes. Globally Vulnerable: *Dalbergia latifolia* (IUCN, 2002) Nationally threatened species: Critically Endangered: *Pterocarpus marsupium;* Endangered: *Operculina turpethum, Oroxylum indicum*; Vulnerable: *Asparagus racemosus, Butea monosperma, Curculigo orchioides, Piper longum*; Data Deficient:, *Mangifera indica* Four species protected under the Forest Act 1993: *Acacia catechu, Bombax ceiba, Pterocarpus marsupium* and *Shorea robusta.* Source of wild genetic material for cultivated varieties: Wild Mango (*Mangifera indica*), Wild Rice (*Oryza rufipogon*), and Wild Perilla (*Perilla frutescens*). 105 plant species with medicinal values; 46 edible (by humans) wild plant species; and 8 plant species with domestic utility.
Mammals	32 species reported. Globally endangered and threatened species (IUCN, 2002) include: Endangered: Gangetic River Dolphin *(Platanista gangetica)*, Asiatic Wild Buffalo *(Bubalus bubalis)*, Asian Elephant *(Elephas maximus)*; Vulnerable: Gaur *(Bos frontalis)*, Common Otter (*Lutra lutra*), Smooth-coated Otter (*Lutra perpiscillata*), Fishing Cat (*Prionailurus viverrinus*)Least Risk : Rhesus Macaque *(Macaca mulatta)*, Hanuman Langur (*Semnopithecus entellus*) Data Deficient: Bengal Fox (*Vulpes bengalensis*), Other significant mammals include Leopard *(Panthera pardus)*, Jungle Cat (*Felis chaus*), Jackal (*Canis aureus*), Spotted Deer (*Axis axis*), Hog Deer (*Axis porcinus*), Barking Deer (*Munitacus muntjak*), Porcupine (*Hytrix indica*), Civets (*Viverra zibetha; Viverricula indica*) and Mongoose (*Herpestes edwardii; H. javanicus*)	34 species reported. Globally endangered and threatened species (IUCN, 2002) include: Endangered: Tiger (*Panthera tigris*), Hispid Hare (*Caprolagus hispidus*) Vulnerable: Smooth-coated Otter *(Lutra perpiscillata)*, Common Otter *(Lutra lutra)*, Dhole (*Cuon alpinus*), Swamp deer (*Cervus duvaucelli*), Clouded Leopard (*Neofelis nebulosa*), Sloth Bear(*Melaurus ursinus*) Least Risk : Rhesus macaque *(Macaca mulatta)*, Hanuman Langur (*Semnopithecus entellus*) Data Deficient: Bengal Fox (*Vulpes bengalensis*), Other significant species include Leopard *(Panthera pardus)*, Jackal *(Canis aureus)*, Wild Boar *(Sus scrofa)*, Jungle Cat *(Felis chaus)*, Fishing Cat *(Prionailurus viverrinus)*, Mongoose *(Herpestes edwardii)*; Spotted Deer *(Axis axis)*, Hog Deer *(Axis porcinus)*, Barking Deer *(Munitacus muntjak)*

Birds: Status, and Globally threatened and endangered species at the site	467 species of birds recorded including 114 species of water birds, representing almost all the water bird species known to occur in Nepal. Globally-threatened species (IUCN2002): Critically Endangered: White-rumped Vulture *(Gyps bengalensis)*, Slender-billed Vulture *(G. tenuirostris)*, ; Endangered: Greater Adjutant Stork *(Leptoptilos dubius)*, Bengal Florican *(Houbaropsis bengalensis)*, , Lesser Florican*(Sypheotides indica)* ; Vulnerable: Spot-billed Pelican *(Pelecanus philippensis)*, Lesser Adjutant Stork *(Leptotilos javanicus)*, Baikal Teal *(Anas formosa)*, Baer's Pochard *(Aythya baeri)*, Pallas's Fish Eagle *(Haliaeetus leucoryphus)*, Greater Spotted Eagle *(Aquila clanga)*, Lesser Kestrel *(Falco naumanni)*, Swamp Francolin *(Francolinus gularis)*,Wood Snipe*(Gallinago nemoricola)*, Black-Bellied Tern *(Sterna acuticauda)*, Indian Skimmer *(Rynchops albicollis)*, Bristled Grassbird *(Chaetornis striatus)*, *Grey crowned prinia (Prinia cinereocapilla)* Least Risk : Black-Bellied Tern *(Sterna acuticauda)*, Ferruginous Duck *(Aythya nyroca)*,Painted Stork *(Mycteria leucocephala)*, Black-necked Stork *(Ephippiorphynchus asiatcus)*,Oriental White Ibis *(Threskiornis melanocephalus),White tailed Eagle (Hailaeetus albicilla)* , Grey-headed fish-eagle *(Ichthyophaga ichthyaetus)*, Lesser fish –eagle *(Ichthyophaga humilis)*, Indian Black Vulture*(Sarcogyps calvus)*, Black vulture (*Aegypius monachus)*, Pallid Harrier (*Circus macrourus)*, Black- bellied tern (*Sterna acuticauda)*. Two restricted range species recorded: Kashmir Flycatcher *(Ficedula subrubra)* and Yellow-vented warbler *(Hylloscopus cantator)*.	140 species of birds recorded. Globally-threatened species (IUCN, 2002): Critically Endangered: White-rumped Vulture *(Gyps bengalensis)*, Slender-billed Vulture *(G. tenuirostris)*; Endangered: Lesser Adjutant Stork *(Leptotilos javanicus)* Least Risk : Ferruginous Duck *(Aythya nyroca)*, Grey -headed fish eagle *(Ichthyophaga ichthyaetus)* Other significant bird species: Cotton Pygmy-goose *(Nettapus coromandelianus)*, Grey-headed Fishing Eagle *(Icthyophaga ichthyaetus)*.
Reptiles **Globally threatened and endangered recorded at site**	45 species recorded. Globally-threatened species (IUC, 2002): Critically endangered : Red-crowned Roofed Turtle *(Kachuga kachuga)* Endangered: Gharial *(Gavialis gangeticus)*, Elongated Tortoise *(Indotestudo elongata)*, Vulnerable: Marsh Crocodile *(Crocodylus palustris)*, Three-keeled Land Tortoise *(Melanochelys tricarinata)*, Crowned river turtle (*Hardella thurjii*) , Three other species are listed in CITES Appendix I: Ganges Soft-shell Turtle *(Aspedereles gangeticus)*, Peacock Soft-shell Turtle *(Aspideretes hurum)*, Bengal Monitor Lizard *(Varanus begalensis)*, and Indian Python *(Python molurus)*.	10 species recorded. Globally-threatened species (IUCN, 2002):Critically endangered : Red-crowned Roofed Turtle *(Kachuga kachuga)* Endangered: Three-striped Roof Turtle *(Kachuga dhongka)*; Vulnerable: Marsh Crocodile *(Crocodylus palustris)* Least Risk : Asiatic Rock Python (*Python molurus)* Three other species are listed in CITES Appendix I: Indian Roofed Turtle *(Kachuga tecta)*, Golden Monitor Lizard *(Varanus Flavescens)*, Indian Python *(Python molurus)*.

Fish:	117 species recorded.	27 fish species recorded.
Status and Nationally threatened and endangered recorded at site	Globally-threatened: Unknown. National Red Data Book for Nepal (1995) lists Endangered: *Tor tor*; Vulnerable: *Rita rita, Acrossochelius hexagonolepis, Chanagunius chagunio, Tor putitora, Barilius bola, Danio rerio, Tetradon cutcutia, Schizothorax plagiostomus, Schizothorax progastrus, Psilorhynchus pseudechecheneis, Anguilla bengalensis*, and another 13 species as susceptible. Only site in Nepal where the fish *Colisa sota* has been recorded	Globally-threatened unknown. National Red Data Book for Nepal (1995) lists Endangered: *Tor tor*; Vulnerable: *Tor putitora, Acrossochelius hexagonolepis*.
Amphibians	11 species recorded (2 toads and 9 frogs).	Unknown - no surveys undertaken.
Invertebrates	No surveys undertaken except for butterflies - 77 species identified.	No surveys undertaken except for butterflies – 32 species identified.

Koshi Tappu Wildlife Area

Description of the site

The Wildlife Reserve was gazetted in 1976 as the only remaining site in Nepal for the globally-threatened Asiatic Wild Buffalo (*Bubalus bubalis*) and in 1988 became Nepal's first Ramsar site on the basis of its high numbers of resident and migratory waterfowl.

The area comprises a complex mosaic of lotic (running water) and lentic (standing water) ecosystems with a variety of physical, hydro-biological and vegetative characteristics. Of the 20 global freshwater wetland types found in Nepal, 17 are said to be present in Koshi Tappu (see Table 4 at end of Annex). Construction of the Koshi Barrage between 1958 and 1964 created a huge reservoir with seepage marshes and reed beds on the periphery, which became a significant over-wintering and staging area for large numbers of migratory waterfowl. The structure and function of these are affected significantly by sedimentation, river dynamics and seasonal monsoon flow, and the maintenance of the Barrage is not conducive to continued conservation of all these wetlands since the natural processes of continuing shifts in the river course and high sedimentation rates now occur within the artificial constraints of the embankments

Environmental context

The main habitats within the Koshi Tappu area include:

- Permanent, seasonal, and irregular rivers and floodplains: The total water surface area of the rivers and streams is approximately 1,426.5ha during the dry season but this increases significantly in the monsoon season. The Koshi and Trijuga are the main rivers. In the north-eastern part of the Reserve (Prakashpur to Madhuban) the Koshi River has shifted recently to the west by about 1-3km converting the former riverbed to barren land, while elsewhere its shift to the east has threatened existing ox-bow lakes but left old channels with seasonal and irregular waters on the western side (e.g. Moriya Khola/Dhar). Other small seasonal streams such as Gangajali, Pouda, Sundari and Mohali flow on the western side of the Reserve.

  The rivers are the only habitat for the globally-threatened Gangetic Dolphin, Gharial, and Indian Narrow-headed Softshell Turtle, and many of the nationally-threatened fishes including Sahar (*Tor*

tor), Mahseer (*T. putitora)*, Jalkapur (*Balirius radiolates*), Bucche asala (*Schizothorax plagiostomus)*, Asala *(S. richardsonii)*, Chuche asala (*S. progastus)*, and Rajabam (*Anguilla bengalensis* and the main habitat of the globally-threatened Smooth-coated and Eurasian Otters, Black-bellied Tern, Indian Skimmer, and Baikal Teal.

- Floodplain: The Reserve is located on the floodplain of the Koshi River. Much of the floodplain, about 2,300ha, is barren land comprising sandbars and islands formed by the natural deposition during flooding. These are almost devoid of any vegetation, with the exception of some older sandbars that have been colonised by *Tamarix dioica* and *Saccharum spontaneum* through the normal succession towards grassland. The habitat provides safe breeding sites for the globally-threatened Black-bellied Tern and Indian Skimmer as well as Indian River Tern, Little Tern, Little Pratincole, Eurasian Stone-curlew, and Sand Lark. The floodplain is highly affected and modified each year by monsoon flooding which has created inundated grasslands, swampy forest, and seasonal marshes.

- Freshwater oxbow lakes: Four freshwater oxbow lakes are present within the Reserve along the eastern embankment, and two more—the Kamalpur and Bhagalpur Lakes -are prominent in the western part. All of these lakes are maintained by monsoon flood, rainwater, and seepage water but they are severely threatened by high rates of siltation, vegetational succession, and infestation by water hyacinth (*Eichornia crassipes*) and Ipomoea (*Ipomoea aquatica*). The ox-bows, swamps and marshes play host to some of the river and floodplain animals mentioned above and are also the favoured habitat of the globally-threatened Marsh Crocodile, Red-crowned Roofed Turtle, White-bellied Heron, Greater Adjutant Stork, Baer's Pochard, Ferruginous Duck and some nationally-threatened fishes including Katle (*Acrossochelius hexagonolepis),* Patharchatti (*Chagunius chagunio)*, and Zebra (*Danio rerio)*.

- Seasonally flooded grassland: Wet or seasonally flooded grassland covers an area of about 1,652ha (70 percent) within the Reserve and includes Saccharum-Phragmites dominated type, Saccharum-Tamarix association, and Typha-Vetiveria dominated swampland. These grasslands are the most important habitat of the remaining Asiatic Wild Buffalo and other globally-threatened species such as the Bengal Florican, Swamp Partridge, Hodgson's Bushchat and Bristled Grassbird, as well as other significant mammals such as Hog Deer, Spotted Deer, and Wild Boar.

- Floodplain forest: The riparian forest is inundated seasonally during the monsoon floods and develops characteristics of freshwater swamp forest during this time. There are three main types of such forest found in floodplain area, namely Khair (dominated by *Acacia catechu)*, Sissoo (dominated by *Dalbergia sissoo)*, and mixed deciduous riverine forest. A fourth type, the wet grasslands with savannah trees (*Bombax ceiba*), is also included. These forests are the main habitat of the globally-threatened Gaur *(Bos frontalis)* and Elongated Tortoise, and provide nesting sites for numerous species of waterbirds.

- Reservoir: The huge reservoir created by the Koshi Barrage and used for irrigation in India forms an extremely important habitat for migratory waterbirds, notably ducks and waders. It is by far Nepal's most important wetland for waterfowl and at least 22 species of waterbird have been recorded in the country only from here. Numbers vary, but over 20,000 waterbirds have been counted during winter including most of the globally-threatened species listed above for rivers and lakes.

- Seasonally flooded rice fields: Seasonally flooded rice fields are a wetland type in the classification of global freshwater wetlands (Dugan 1990). Over 11,280ha of rice fields are found in the Project area including in Sunsari and Saptari districts. These rice fields are inundated during the monsoon and converted into wetland sites of importance for birds and amphibians.

Socio-economic Context

Koshi Tappu is located in the eastern development region of Nepal and the Project area involves 16 Village Development Committees (VDC) of Sunsari (6 VDCs), Saptari (7 VDCs) and Udaypur (1 VDC) Districts. The total population of the two major Project districts (Sunsari and Saptari) is estimated to be 1,195,915, settled in 221,436 households (2001 Census). The two districts support 22.3 percent of the total population of the eastern region and 5.2 percent of the country's population. Population density of the area is estimated at 460 persons/km^2, which is extremely high compared to the national average (157 persons/km^2), regional average (188 persons/km^2) and Terai average (330 persons/km^2). The population growth rate of Sunsari and Saptari, during the 1991-2001 census period, is estimated to be 3.04 percent and 2.2 percent per annum respectively, compared to the national average of 2.24 percent and the Terai average of 3.0 percent per annum. The high population in Sunsari indicates the presence of more hill migrants than in Saptari. Average family size of the two districts is 5.4, in line with the national average (5.44), although in Saptari district alone it is relatively greater (5.64).

Agriculture is the main occupation for about 66.6 percent of the population of the Project districts; of the rest, 26.8 percent depend on wage-earning (largely agriculture), 2.6 percent on commerce/trade, 1.3 percent in services and 2.7 percent on other occupations. More than 50 percent of the farmers own less than 1ha of land, but the Project area produces a food surplus. The total livestock population of the district is estimated to be 1.052 million animals with the average holding being 5.44 animals/household. Almost 30 percent of the population of the Project districts belong to wetland-dependent ethnic groups in the following order of population size—Tharu, Muslim, Mushhar, Mallaha, Dusad, Kewat and Rajbansi. The dominant non-wetland-dependant ethnic groups of the project districts include Yadhav/Ahir, Dhanuk, and people of hill-origin.

Sunsari District ranks 61st (1 = least developed, 75 = most developed) and is classified as "Best" from the perspective of its overall composite index of development, while Saptari is ranked 30th and is classified as "Intermediate". The Human Development Index (HDI) of Sunsari and Saptari is 0.382 and 0.374 respectively, both above the national average index of 0.325. Similarly, the Gender-sensitive Development Index (GDI) is 0.338 for Sunsari and 0.325 for Saptari, again above the national average of 0.267.

The Project site itself, which includes 16 VDCs, supports 105,706 people from 18,093 families with an average family size of 5.84 persons/household (2001 Census). The population density in the VDCs falling within the Project area varies between 313 and 998 persons/km2. Population growth in these VDCs ranges from 2.15–4.73 percent per annum. Wetland-dependant groups such as Tharu, Mallah, Rajbanshi, Dusadh/Paswan, Musahar, Kewat, Bantar, Santhal/Satar, and Jhagar/Dhagar constitute 31% of project site population. Farmers of Terai origin, comprising of Yadhav, Rajput, and Misra, constitute the largest population (31.9%). The hill-origin groups such as the Brahmin, Chhetri, Newar, Gurung, Magar, Rai and occupational peoples comprise 27 percent of the population. Emigration from the Project area is estimated to be only about 1 percent per annum, the result of some large landholders migrating to urban centres. Immigration is high, particularly along the northern boundary of Koshi Tappu called *Srilanka Tappu*. People from the hilly area of Udayapur district as well as from Bihar State of India are the main immigrants settling mainly within Prakashpur, Haripur, Lauki, Badagamba, Bairawa and Sripur VDCs. Information on annual immigration is not available. People of Terai origin are dominant especially in West Kushaha, Haripur, and the southern part of Laukahi, Bairawa, East Pipra, Badgamba and Jagatpur.

Land ownership is small –about 39 percent of households are either landless or own less than 0.05ha of land, 31 percent of households own 0.05 to 1 ha, 20 percent own 1 to 3 ha, and only 10 percent own more than 3 ha. Irrigated lowland (*khet*) is the dominant land type (over 80 percent) owned privately by people.

The other types owned are upland (*bari/bhitta*) followed by ponds, reed beds and rushes for thatching (*kharbari*), barren land, and orchard.

Almost 87.3 percent of the economically active population in the Project area is involved in agricultural activities, of which, 51.2 percent are involved fully in farm activities including animal husbandry, while 36.1 percent are involved partially in agriculture and allied activities. Other occupations include trade (4.8 percent), services (6.8 percent), and other work (1.1 percent). Minority groups such as fishermen (Mallah, Godi) undertake agricultural labour to supplement income from their traditional occupation. In order to cope with food deficiencies, most households rely on one or more alternative income generation activities. Agricultural production is sufficient to subsist upon for up to 3 months for 36 percent of households, who then undertake wage labouring, seasonal migration to seek jobs, fishing, etc. to earn a living for the rest of the year. Agricultural production is adequate for 3-6 months for another 31 percent of households and for the remaining months they are dependent on off-farm activities. Only 22 percent of households produce enough for the whole year, while 11 percent of households produce a surplus that they sell in the local markets

Of the households that produce too little food for annual subsistence, about 58 percent are involved in wage earning (often on others' agricultural land), 19 percent in sharecropping, 5 percent in fishing, and 3 percent in NTFP collection and sale. About 2 percent migrate seasonally to seek employment and another 2 percent work temporarily as full-time labourers in others' houses. Similarly, others (11 percent) are involved in the sale of firewood, timber trading, and other businesses (KTWRMP 2002). The people of wetland-dependant communities, in particular, are struggling for basic survival. Women face more problems due to income constraints; household responsibilities; no reproductive rights (women have 4-16 children!); inadequate supplies of grass, fuel-wood and fodder; and overall gender discrimination; and are desperate for needs-based assistance to improve their lives and the well being of their children.

Rice is the main crop grown during the monsoon (summer). However, in some places, early rice is also grown. Wheat, oilseeds, and pulses are grown in winter, and maize is grown in summer. Crop yields vary by location and cultivation practice. VDCs in the east, from Kushaha to Haripur, remain wet throughout the year and hence rice yields are better but those of wheat and other crops are low. The average annual income derived from present agricultural practices on one hectare of rice field is US$385. However, production and income varies by place and cultivation practices. Cultivation of fruits and vegetables are mainly for domestic consumption, the fruits commonly grown are mango, litchi, jackfruit and banana. However, land occupied by fruit trees is very small—just 0.59 percent of the total private land. Vegetable cultivation potential is yet to be tapped in the area, except in Laukahi, where people have started to grow vegetables for market. Most other farmers in the proposed buffer zone grow winter and summer vegetables mainly for their own consumption. There is good potential and scope for commercial vegetable production.

Livestock is an integral part of agriculture or crop cultivation and counts as an important asset for farm households. Some rear livestock to supplement their crop production activities, while some others rear them as their main subsistence activity. Cattle and buffaloes are valued highly for their secondary products, e.g. for ploughing and manure, whereas goats, sheep and pigs are kept mainly for meat and cash income. Most livestock reared within the Project site are local breeds. Free grazing is the most common feeding practice and stall-feeding is limited to some milch cows and buffaloes. It is estimated that only 2 percent of households have adopted stall-feeding for milch animals, but in some areas such as Prakashpur bazaar, stall-feeding is gradually increasing.

Fish farming is one of the most important economic activities in the Terai. However, it is not popular among the communities around Koshi Tappu due to the relative abundance of fish in the Koshi River and

associated wetlands. Fishing remains limited to and practiced mainly by traditional fishermen. Despite the ban on fishing inside the Reserve, it is still widespread along the Trijuga River, Kamal Daha and in some stretches of the Koshi River. Outside the Reserve, fishing is most common in the area to the south near the Barrage as well in the seepage streams and marshes along the eastern boundary of the Reserve. Fish farming was initiated as a cage fishery pilot project in Koshi Tappu during 1994-1997 with support from the Wetland Conservation Fund of Ramsar Convention, and since 1995 the buffer zone development programme under the Parks and People Programme (PPP) has further encouraged it. As a result, a few private and community fishponds have been developed recently, especially in the eastern seepage area. Fish farming is also integrated with duck and poultry farming. However, the shifting of Koshi River to the western edge of the site about two years ago has dried out most of the community ponds developed by the Parks and People Programme.

Koshi Tappu Wildlife Reserve has not yet become a major tourist destination but there has been an increase in visitors from 754 in 1995 to 2,536 in 1999. However, since then, tourist numbers have reduced to about 2,000, reflecting the general decline in tourist arrivals due to the political insurgency. Although there is good potential for tourism activities in Koshi Tappu, so far the substantial proportion of tourism benefits have gone directly into the Reserve revenue or to the four hotels located in the proposed buffer zone. Few residents in the proposed buffer zone are involved in tourism related activities and only about 20 households have benefited from employment in hotels and from village and cultural tourism such as performing the traditional Jhangad dance. Negative impacts from tourism are not yet visible in the area, probably because of the relatively small number of visitors.

Main threats to the wetland biodiversity in the Koshi Tappu Ramsar Site

A brief description of the threats to the biodiversity of the Koshi Tappu Ramsar site is presented below and an analysis of the root causes and proposed remediation measures is presented in Table 3.

- Conflict between management of site as Protected Area and as Ramsar Site: The Wildlife Reserve was created and defined primarily for conservation of the Asiatic Wild Buffalo and not as a Ramsar Site. As a result most important wetland sites lie outside of the boundaries of the current Wildlife Reserve. The new management plan does not contain adequate measures for conservation of waterbird habitat.
- The Koshi River has a history of being extremely dynamic and changes its course and flow patterns often. As a result of the change in course over the recent years, many wetland sites lying outside the Protected Area are drying up due an alteration in the water regime of the area. Some of these wetland sites are crucial areas for wintering migratory birds. The shifting of the River has also led to the loss of habitat, especially climax vegetation. The River has one of the highest rates of sedimentation in Nepal and the creation of the barrage has increased the rates of sedimentation in the regions north of the Barrage. The construction of the Sapta Koshi Multi-Purpose Project, a hydropower dam on the Koshi River upstream of the Reserve, is a potential threat.
- Small remnant, isolated population of Asiatic Wild Buffalo in danger of extinction. The population of Asiatic Wild Buffalo at Koshi Tappu is the last in Nepal and is isolated from populations in India due to the degradation and loss of forest corridors between sub-populations.
- Feral cattle and cattle grazing pressures are a threat to the Asiatic Wild Buffalo population as crossbreeding can cause dilution of the genepool. Feral populations are not only a source of competition for wild ungulates for food and habitat resources but also act as a medium for spread of disease to wild populations.

Over 3,000 cattle reside in the Reserve and roughly another 10,000 from the surrounding villages graze the grasslands on a daily basis. Some herders have erected permanent cattle sheds along the

southern and northern boundaries of the Reserve to house their animals at night. The intensive grazing has affected the composition and productivity of grasslands adversely, including disturbing of wildlife habitats. Over-grazing causes replacement of the Phragmites-Saccharum community by *Imperata cylindrica* (an unpalatable dry land species). This problem is worsened due to the open border with India where there is a good market for hybrid buffalo calves and also because the culling and export of cows is illegal in Nepal as it is a Hindu kingdom.

- Encroachment has been a considerable threat to the site and has been taking place due to many reasons including the unclear demarcation of the boundary on the western side of the Reserve and the lack of a buffer zone. While some settlements were relocated when the Reserve was established, compensation dues are still pending in some cases. Encroachments on the high land north of the Wildlife Reserve are of particular concern as this deprives animals of shelter on high ground during the seasonal flooding.
- Trans-boundary Issues, including the jurisdiction, management and use of biological resources in the Barrage and adjacent areas leased by India, are responsible for the neglect and poor status of wetlands and wetland species in the area. Problems include the drainage of water for irrigation at times when it is most required for migratory waterfowl, and the opening of floodgates without consideration for the impact on aquatic species.
- Over-fishing is a common phenomenon around the Reserve and in the Barrage area. There is no restriction on catch size and the age of the fish caught, leading to a decrease in fish populations in the region. Over-fishing has resulted in the dwindling of food supplies for otters, gharial, dolphin and other fauna in the region. Fishing is the main source of income for many landless wetland-dependent communities, particularly Mallah/Gongi, Bantar, Jhangad, Mushar, etc. The fish habitats and population in the proposed buffer zone including the Barrage are highly degraded and over exploited and as a result more pressure is exerted on wetlands of the Reserve. These communities illegally fish in the Trijuga, Mariyadhar and Koshi rivers including lakes/ponds and marshes in the Reserve. A variety of traps, nets and poisons are used by fishermen to fish throughout the year.
- Poaching and killing of wildlife: Poaching is high in the Reserve with a recorded 763 cases detected by Reserve officials between 1994 and 1999. Poisoning of birds and fish is common and victims include turtles and gharials. Mist-netting of birds is common in the area and birds are often trapped on sandbars from breeding colonies and their eggs are collected. The villagers mainly use the animals for food. Other animals that are poached include otters (for their pelts and fat), Gharial, Wild Boar, Hog Deer, Spotted Deer and turtles.
- Threats to Gangetic Dolphins, a highly endangered species, include the creation of large dams on all the four main tributaries of the Ganges originating in Nepal. Very few records exist of the existence of dolphins upstream of the Koshi Barrage since its creation. Dolphins are poached and caught in nylon fishing nets. There is demand for their oil, which is used as fish-bait and in medicine.
- Invasive species: Significant areas of the wetlands are covered by Water Hyacinth *(Eichhornia crassipes)* and Ipomea (*Ipomoea carnea* ssp. fistulosa). Much of the vegetation inside and along the Reserve is infested with *Mikania micrantha, Lantana camara, Chromolaena odorata,* and *Parthenium hysterophorus*.
- Human-wildlife conflict is common in the area and the absence of any compensation schemes or insurance for crops destroyed by wild animals is cause for great hostility. Crop damage is often caused by animals like the wild buffalo, elephants, deer, wild boar and porcupine.
- Disturbance and habitat loss due to the collection of biological resources including grass, wood, timber and non-timber forest produce has a great impact on the breeding of fauna within the Reserve. Collection of these resources is often associated with the destruction of prime grassland habitat and forest fires.
- Uncontrolled drainage of small wetland areas for irrigation and fishing leads to the loss and destruction of habitat in and around the Ramsar Site.

Ghodaghodi Lake Complex

Description of the Site

The area remains outside of the Protected Area system. A part of the whole complex has been nominated by GON to the Ramsar Bureau for listing as a site of International Importance under the Wetlands Convention. The basis for the nomination was that the area includes examples of a specific type of wetlands that are rare and vulnerable in the western Terai bio-geographical region; supports an appreciable assemblage of rare, vulnerable, or endangered species; and, regularly supports 1 percent of the Asian population of the Asian Pygmy-goose (Nettapus coromandelianus). The Ramsar nominated area, in the context of the whole Complex is shown in Annex 3 (Maps).

Environmental Context

The Ghodaghodi Lake Complex (80°56'43"E, 28°41'03"N) site comprises 14 natural, permanent or seasonal lakes ranging from 2 to 138ha (total area 259 ha) and at an altitude of 205masl. The Complex, irregular and elongated in shape, some 5.5km north south by 1.5km east west, lies within Kailali District in Nepal's far western Terai. The site is remote--although it lies close to the East-West Highway, it is some 60km by road from the district headquarters of Dhangadi to the southwest. It was connected with the rest of the country by road only in 1993, when the bridge over the Karnali River was completed. Since then it has undergone much socio-economic change

Ghodaghodi Lake, spread across 138ha, is the largest natural lake in the Nepal Terai. The lake system is connected with extensive forests along the Siwalik (Churia) Hills to the north and falls between two of the Terai's Protected Areas--the Royal Bardia National park and the Royal Suklaphanta Wildlife Reserve—and functions as an important corridor for the movement of wildlife. The Complex is characterised by various types of wetlands. Marshy areas on the fringes of the lakes are subject to periodic inundation. Only Ghodaghodi Lake and Narerodi Lake are perennial; the others are seasonal, and turn marshy for varying periods during the dry season.

The Ghodaghodi Lake Complex is an intricate ecological system with a variety of physical, hydrological and vegetative characteristics. It comprises a series of inter-related, but not surface-connected, lakes surrounded by deciduous forest largely of Sal (*Shorea robusta*), Asna or Saj (*Terminalia alata*) and mixed riverine forests in which Jamun (*Syzygium cumini*) and Pani Bet or rattan *(Calamus tenuis)* are dominant. The wetlands are a complex of open water, areas of floating vegetation, swamps, marshes, and wet grasslands. Rivers and streams are present throughout the area. The hydrology of the system depends on the Betini Churia watershed. Seasonal freshwater marshes are entirely associated with inundation by the monsoon rains. These marshes convert gradually into grassland due to lack of permanent water.

Lake waters are generally eutrophic with N:P ratios and overall levels of nitrogen comparable with most Terai lakes. However, Narerodi Lake (the second largest in the Complex) has a high concentration of phosphorus, probably due to agricultural inputs from adjoining fields, while Ghodaghodi Lake itself is phosphorus deficient. The abundance of aquatic macrophytes serves as food and breeding sites for numerous fish and waterbirds. The lake ecosystem and its adjoining river system provide important habitats for the globally-threatened Marsh Crocodile (*Crocodilus palustris*) and Smooth-coated Otter (*Lutra perspicillata*) as well as various turtles.

The main habitats within the Ghodaghodi complex include:

- Permanent and seasonal lakes: Groundwater, springs, and seasonal monsoon rains maintain the permanent freshwater lakes. Ghodaghodi Lake, Narerodi Lake, Bainshawa, and Ojhuwa are permanent while the remainder are seasonal and for varying periods. There are areas of open water,

but aquatic plants abound. Submerged species are dominated by Hydrilla (*Hydrilla verticillata*), Starworts (*Chara* spp.) Hornwort (*Ceratophyllum demersum*) and pondweeds (*Potamogeton* spp.). There are large areas covered by free-floating species such as *Azolla imbricata*, duckweeds (*Lemna minor* and *Wolffia globosa*), and by anchored leaf-floating species dominated by water lilies (*Nymphaea nouchali, Nymphoides hydrophyllum* and *N. indicum*), Water Primrose (*Ludwigia adscendens*), pondweeds (particularly *Potamogeton natans*), and Lotus (*Nelumbo nucifera*). These lakes are important for the globally-threatened Marsh Crocodile (*Crocodilus palustris*) and Smooth-coated Otter (*Lutra perspicillata*), and support almost 1 percent of the world population of Cotton Pygmy-goose (*Nettapus coromandelianus*), as well as numerous rare waterbirds including Ferruginous Duck (*Aythya nyroca*), Grey-headed Fishing Eagle (*Ichthyophaga ichthyaetus*), Oriental Darter (*Anhinga melanogaster*), and Comb Duck (*Sarkidiornis melanotus*),

- Permanent and seasonal freshwater marshes: Permanent marshes are found around the fringes of the four permanent lakes and along the edges of the rivers (Tengwa, Kauwa, Kandra, Donda, and Suktikanda), while elsewhere are seasonal marshes fed by the monsoon rains. These marshes are dominated by emergent species—those around the lakes are dominated by *Limnophila indica, Monochoria vaginalis, Cyperus esculentus, Polygonium hydropiper* and *P. glabrum*; elsewhere by *Paspalidium flavidium*, Reed (*Phragmites karka*), Reed-mace (*Typha angustifolia*), sedges (*Cyperus difformis, C. diffuses, C. iria*), Buttercup (*Ranunculus sceleratus*), *Schoenoplectus articulatus* and S. *juncoides*, and *Acorus calamus* to name but a few. Over 70 species of emergent species have been identified here. The swamps and marshes are important for many waterbirds including the Lesser Adjutant Stork (*Leptptilos javanicus*), Red-naped Black Ibis (*Pseudibis papillosa*), Black Stork (*Ciconia nigra*), and Woolly-necked Stork (*Ciconia episcopus*).

- Permanent and seasonal rivers and streams: There are four perennial rivers originating from the Siwalik foothills and Mahabharat Hills –the Donda and Sukti Kada flow along the eastern side of the Ghodaghodi Lake complex basin, the Kandra and Tengna along its western side. These rivers are characterized by flat terrain, wide floodplains, and sandy substrates, some marshy grasslands, mixed riverine forests and some Sal forest. They are swollen during the monsoon and some turn partially dry for some parts of the year. These rivers are important habitats for nationally-threatened fish species such as *Tor tor, T. putitora*, and *Acrossochelius hexagonolepis*, as well as a variety of rare waterbirds.

- Grassland: Adjacent wet grassland forms a rich habitat comprising sedges (*Cyperus distans, C. esculentus, C. imbricatus*), Reed (*Phragmites karka*), and grasses *Alpinia nigra, Chrysopogon aciculatus, Cynodon dactylon, Imperata cylindrica*, and herbs such as *Desmodium triflorum, Dichanthium annulatum, Digitaria sp., Centella asiatica*. Livestock grazing is heaviest in the southern and eastern parts of Ghodaghodi Lake and the eastern part of Narcrodi Lake because of their proximity to villages and the abundance of *I. cylindrica;* in the less disturbed areas, *C. dactylon* and *C. asiatica* are dominant.

- Permanent freshwater swamp forest: is dominated by the Willow (*Salix tetrasperma*) and Jamun (*Syzygium cumini* and *S. jambos*) these occur in particular around Narcrodi Lake and other lakeshores. Lowered water levels in the lake have initiated ecological succession and changed lake habitat into swampy lands with *Ipomoea fistulosa* and caused some of the smaller lakes, e.g. Gaichkatuwa and Chiriya, to become swamp forest.

  This habitat forms one of the most important breeding sites for the globally near-threatened Grey headed Fishing Eagle (*Ichthyophaga ichthyaetus*) and the nationally-threatened Comb Duck (*Sarkidiornis melanotus*).

- Terrestrial Forest: Sal Forest, in which Sal (*Shorea robusta*) and Asna or Saj (*Terminalia alata*) are dominant, is present around the north and west of the Ghodaghodi and Narcrodi Lakes. Other major tree species include Amala (*Phyllanthus emblica*), Kyamun (*Cleistocalyx operculata*), Bel (*Aegle*

marmelos), Kusum (*Schleichera oleisa*), and Karma (*Adina cordifolia*). The forest is thick with lianas and undergrowth, and the secondary layer is formed by a variety of trees including Bhalayo (*Semecarpus anacardium*), Bhogate (*Maesa macrophylla*). and Sindure (*Mallotus philippensis*). The forests on the northern shores are drier and more open with a rich growth of Dhanyero (*Woodfordia fruticosa*). Asna or Saj Forest is dominant along the lakes' eastern shores with Sindure being the second dominant species and other main species as in Sal forest. The forest is again thick with lianas and dense undergrowth. Trees of *Eugenia kurzii* are common along the lakeshores and in depressions while the secondary layer is composed of a number of trees including Bayer (*Ziziphus mauritiana*), Bhogate, Dhanyero, Piyar (*Buchanania latifolia*) and Kalikath (*Aporusa octandra*). Jamun (*Syzygium cumini*) is found along the lakeshores in both forest types. Riverine Forest is relatively open, dominated by Khair (*Acacia catechu*) and Simal (*Bambax ceiba*) with a secondary layer of Bhogate, Kalikath, and Murraya (*Murraya koenigii*). Sissoo (*Dalbergia sissoo*). a common and important component of Terai riverine forests, is rare here. The rare spiny shrubs of *Gardenia turgida* and *G. campanulata*, which have highly restricted distributions within Nepal, are present here.

- Seasonally flooded rice fields: Seasonally flooded rice fields are a wetland type in the classification of global freshwater wetlands (Dugan 1990). Rice is cultivated in an estimated 3,560ha in the Project area. These rice fields are inundated during the monsoon and converted into wetland sites of importance for waterbirds and amphibians.
- Irrigation canals: There are seven irrigation projects within the Project area with a total area of over 1,300ha. The numerous irrigation canals form an artificial habitat of flowing water suitable for waterbirds (e.g. egrets, herons, storks) and amphibians.

Socio-economic Context

The Ghodaghodi Lake Complex is located in the far western development region of Nepal and the Project area includes two Village Development Committees (VDC) fully and a part of a third VDC located in one District – Kailali. The total population of the **Project district** is estimated to be 616,697, settled in 94,430 households (2001 Census). The district supports 28.1 percent of the total population of the far western region and 2.7 percent of the national population. Population density of the area is 191 persons/km^2, which is slightly higher than the national (157 persons/km^2) and regional average (112 persons/km^2), but lower than the average for the Terai as a whole (330 persons/km^2). The population growth rate of Kailali district during the 1991-2001 census is estimated at 4.8 percent per annum, over twice that of the national average of 2.24 percent and much higher than the Terai average of 3.0 percent. Average family size is 6.53, also above the national (5.44) and regional averages (5.96).

Agriculture is the main occupation for about 80 percent of the economically active population; of the rest, 15 percent are engaged in production labour, 1.2 percent professional/technical workers, 1 percent in services and 2.8 in other occupations. Almost 55 percent of farmers own less than 1ha of land but the Project area produces a food surplus. The total livestock population of the district is estimated at 751,209 with the average holding being 7.96 animals/ household. More than 60 percent of the area is covered by forest and roughly 56 forest related industries are active in the district, including one large company - the Resin and Turpentine Industry. These industries provide employment for about 2,830 persons.

About 50 percent of the population of the Project district belong to wetland-dependent ethnic groups, Tharu being the dominant group (49.52 percent). Other major groups include those of hill origin such as Brahmin, Chhetri, Magar and other occupational castes.

Kailali District ranks 32nd (1 = least developed, 75 = most developed) and is classified as "Intermediate" from the perspective of its overall composite index of development. The HDI and GDI of the district are 0.299 and 0.244 respectively, both below the national averages of 0.325 and 0.267 respectively. Low agricultural development, low institutional capacity, gender discrimination, an unmanaged educational system, inadequate health facilities, lack of basic infrastructure, encroachment and, ultimately, increasing poverty, are recognized as the major constraints for the development of Kailali district.

The **Project site** itself, which includes five VDCs (Kota Tulsipur, Khailad, Bauniya, Joshipur and Darakh) and supports 74,500 people from 1100 families, with an average family size of 7.2 persons/household (2001 Census). The population growth rate in the VDCs in the Project area is even higher than the district growth rate and ranges from 6.74–8.07 percent per annum. The majority of the population within the Project site belong to the Tharu community who are recognized as a Terai indigenous community and wetland-dependent ethnic group. The people of hill-origin, mostly Chhetri, Brahmin, Magar and other occupational castes, form the second largest ethnic group (47.0 percent). Other Terai-origin groups make up the remaining 1.7 percent of the population. Emigration from the Project area is estimated to be minimal, while immigration into the area is very high. People from the northern hilly districts of Dadeldhura, Baitadi and Doti make up the bulk of immigrants. Information on annual immigration is unavailable, but the District Forest Office (DFO 2002) records that 20,000ha of forest land within Kailali District has been encroached upon by migrants since 1978. Similarly, in the catchment area of Ghodaghodi Lake, more than 400ha of forest have been converted into agricultural land since 1978, due to the increasing number of migrants from the hills (IUCN 1998). The latest DFO study (DFO 2002) notes that about 90 households have settled within the Ghodaghodi area and encroached about 131ha of land.

Land ownership is small—an estimated 64 percent of households own less than 1ha of land. Rice is the main crop grown in the monsoon (summer), but in some places early rice is also grown. Wheat, oilseeds and pulses are grown in winter and maize is grown in summer. Crop yields vary by location and cultivation practices

Livestock is an integral part of agriculture or crop cultivation and counts as an important asset for farm households. Some households rear livestock to supplement their crop production activities, while some others rear them as their main subsistence activity. . Cattle and buffaloes are valued highly for their secondary products and services (e.g. ploughing and manure), whereas goats, sheep and pigs are kept mainly for meat and cash income. Most of the livestock reared in the Project site are local breeds. Free grazing is the most common feeding practice and stall-feeding is limited to some milch cows and buffaloes

Despite rich biodiversity, Ghodaghodi Lake has not yet become a major tourist destination. However many Indian and Nepali pilgrims visit the area and celebrate various Hindu rituals such as marriage, wearing of the holy thread, Puja (worship), etc. in the temples along the shore of lakes.

Almost 88 percent of the economically active population in the Project area is involved in agricultural, forestry and fishing activities. Due to low agricultural production and the lack of alternatives, many people seek work in India as seasonal labourers, while some work in the district municipal headquarters and urban centres. However, the indigenous Tharu are mostly involved in fishing and agriculture. Those households that cannot produce enough food for annual subsistence are involved in wage earning (mostly agricultural or forestry), sharecropping, fishing, and collection and sale of NTFPs. The people of wetland-dependent communities are struggling for basic survival. Women in the Project area are mainly involved in domestic work and agricultural activities, but are also engaged in collecting fuel wood, fodder and other forest resources. Tharu women, who are shy and avoid outsiders, are involved in collecting snails, fish and other wetland resources. The illiteracy rate of women is high.

Main threats to the wetland biodiversity in the Ghodaghodi Lake Complex

A brief description of the threats to the biodiversity of the Ghodaghodi Lake Complex is presented below and an analysis of the root causes and proposed remediation measures is presented in Table 3.

- High Degree of human disturbance: highway traffic, construction of unplanned new temples, picnicking and increasing human activities around Ghodaghodi areas have disturbed the habitats of birds and other wildlife.

- High Grazing Pressure: Over 12,000 cattle from the villages adjoining the Ghodaghodi Lake Complex graze daily in all seasons either in the forests or on the fringes of the lakes. Grazing pressure is higher in the eastern part of Narcrodi Lake and the north and southeastern parts of Ghodaghodi Lake. The heavy grazing has led to the loss of native vegetation and the proliferation of the unpalatable *Imperata cylindrica*. Rearing of improved varieties of livestock and stall-feeding practices are very limited. Over grazing and browsing of palatable species has damaged the regeneration capacity of vegetation.

- Poaching, hunting and illegal forest produce extraction: Hunting is a common pastime of a certain section of the community in the region. Wildfowl, wild boar and deer species are commonly hunted. Wildfowl and bird trapping and egg collection has also been reported in the area. Illegal tree felling and smuggling of Sal (*Shorea robusta*) and Khair (*Acacia catechu*) timber is prevalent.

- Encroachment: Human encroachment along the lakes' shores and adjoining forests has been increased by continue inflow of migrants from the hill districts (Dadeldhura, Baitadi and Doti) since 1978. The open access conditions of the government managed forests and wetlands make it easier for encroachers to convert these lands into agricultural lands. Due to increasing number of migrants over 400 hectares of forestland along Ghodaghodi Lake Complex has been converted into cropland. The encroachment problem is severe in the southeastern part of Narcrodi Lake, the eastern part of Sunpokhari and Budhi Narcrodi, and the southeastern and northwestern part of Ghodaghodi Lake.

- Eutrophication: Natural eutrophication through the death and decay of biological products is higher in Ghodaghodi. However, increasing human activities such as bathing, washing, disposals from religio-cultural practices, and buffalo wallowing and grazing around the area, have accelerated the process of eutrophication. The accumulation of humus and organic matter in the lakes has promoted the excessive growth of several species of emergent and aquatic plants. The aquatic herbaceous vegetation of the northern part of Narcrodi Lake is gradually being replaced by woody *Salix* species. The excessive growth of aquatic macrophytes such as *Ceratophyllum demersum, Nelumbo nucifera, Naja minor, Hydrilla verticillata* on the water surface of Ghodaghodi Lake has made it difficult to observe the bottom of the lake.

  A number of marshy floating islands dominated with Reed *(Phragmites karka)*, sedge (*Cyperus* spp., *Schoenoplectus* sp.) and fern *(Thelypteris interrupta)* are observed to be profusely growing in the Ghodaghodi Lake. Besides, many marshes and shallow lakes are being converted into grasslands due to a rapid succession rate.

- Siltation: Rapid deforestation, over-grazing, and other human disturbances have increased soil erosion and siltation in the rivers, canals and lake system and have gradually led to the subsidence of lake's bottom.

- Dependency on forest and wetland resources: There is a high dependence on forest and wetland resources since roughly 88 percent of the population is engaged in agriculture and fishing. Fish, snails, lotus leaves and rhizome, leaves of trees, wild fruits, green vegetables, grass, the local community extracts fodder, firewood and timber for use.

- Reduced inflows into the lakes: Due to degradation and silting up of the existing but inadequate canal system there is a decrease in water flows into the lakes leading to stagnation and succession. The northern Betin Siwaliks Watershed, where a number of water springs ooze out from the ground, is the major source of water for the Lake Complex. But due to rapid deforestation and encroachment in the area the water sources are gradually drying up.

- Lack of waste disposal schemes and pollution: The rites and rituals performed at the shrines in the area, the frequent visits of religious pilgrims and the observance of seasonal festivals contribute to polluting the lake area. Pollution by waste generated during the observance of religio-cultural practices in Ghodaghodi Lake is highest during *Margha Panchmi*, a special occasion for worshipping the Ghodaghodi deity during which the indigenous Tharu community celebrates by sacrificing pigs, goats, chickens, and pigeons. In addition, washing, bathing and buffalo wallowing also pollutes the lake waters.

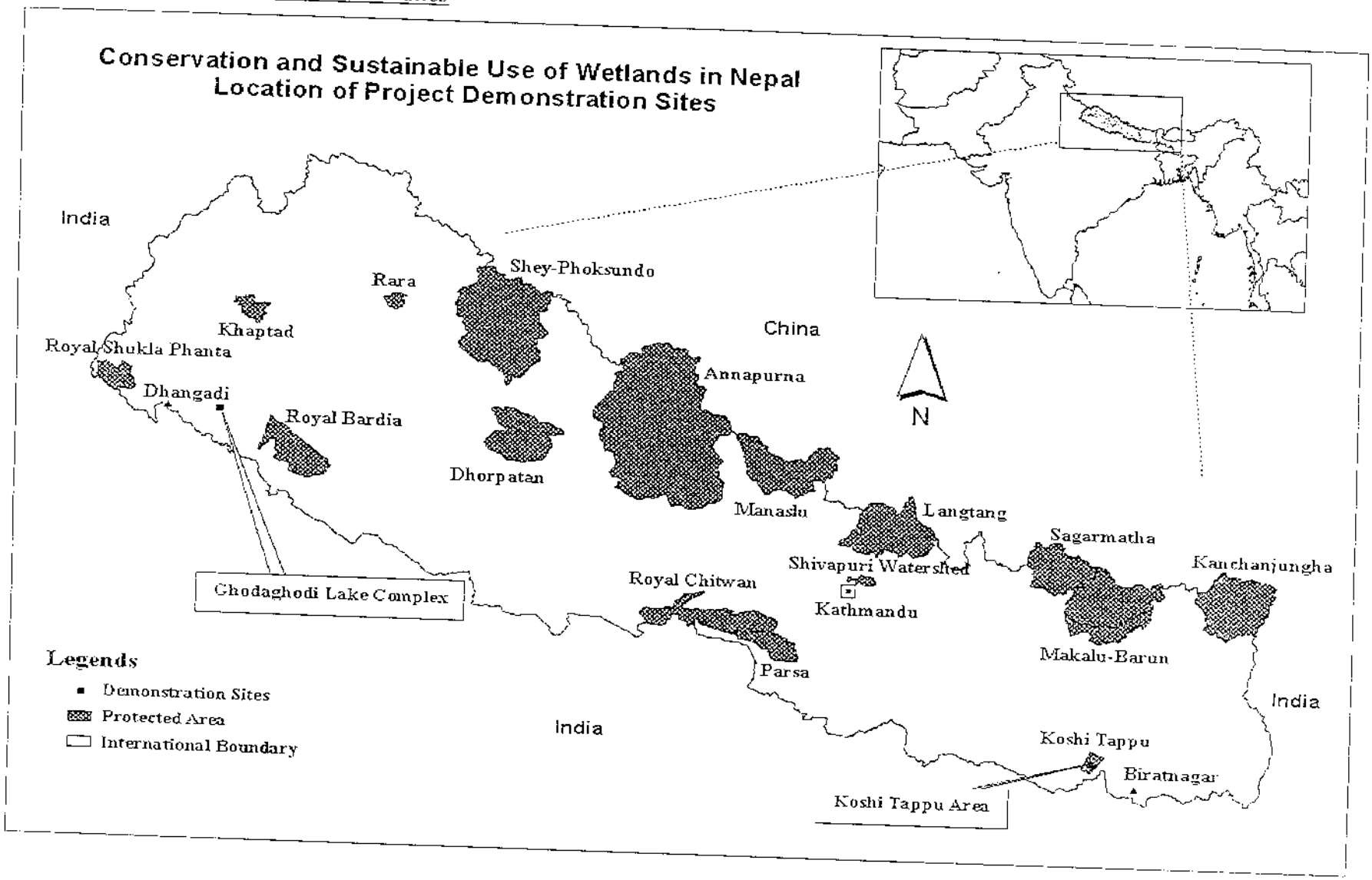
- Invasive species: *Ipomoea carnea* ssp. fistulosa is the major invasive alien species in the area. The species is rapidly colonizing marshes/swamps, canals and ditches. Water Hyacinth *(Eichhornia crassipes)* has been introduced in small lakes and marshes.

- Exotic fish farming: Over 100 lakes and ponds in Kailali district are used extensively for farming exotic carp species (Common Carp, Grass Carp, Silver Carp). This is also true of all the smaller lakes in the Complex with only the larger Ghodaghodi and Narerodi being exempt from these practices.

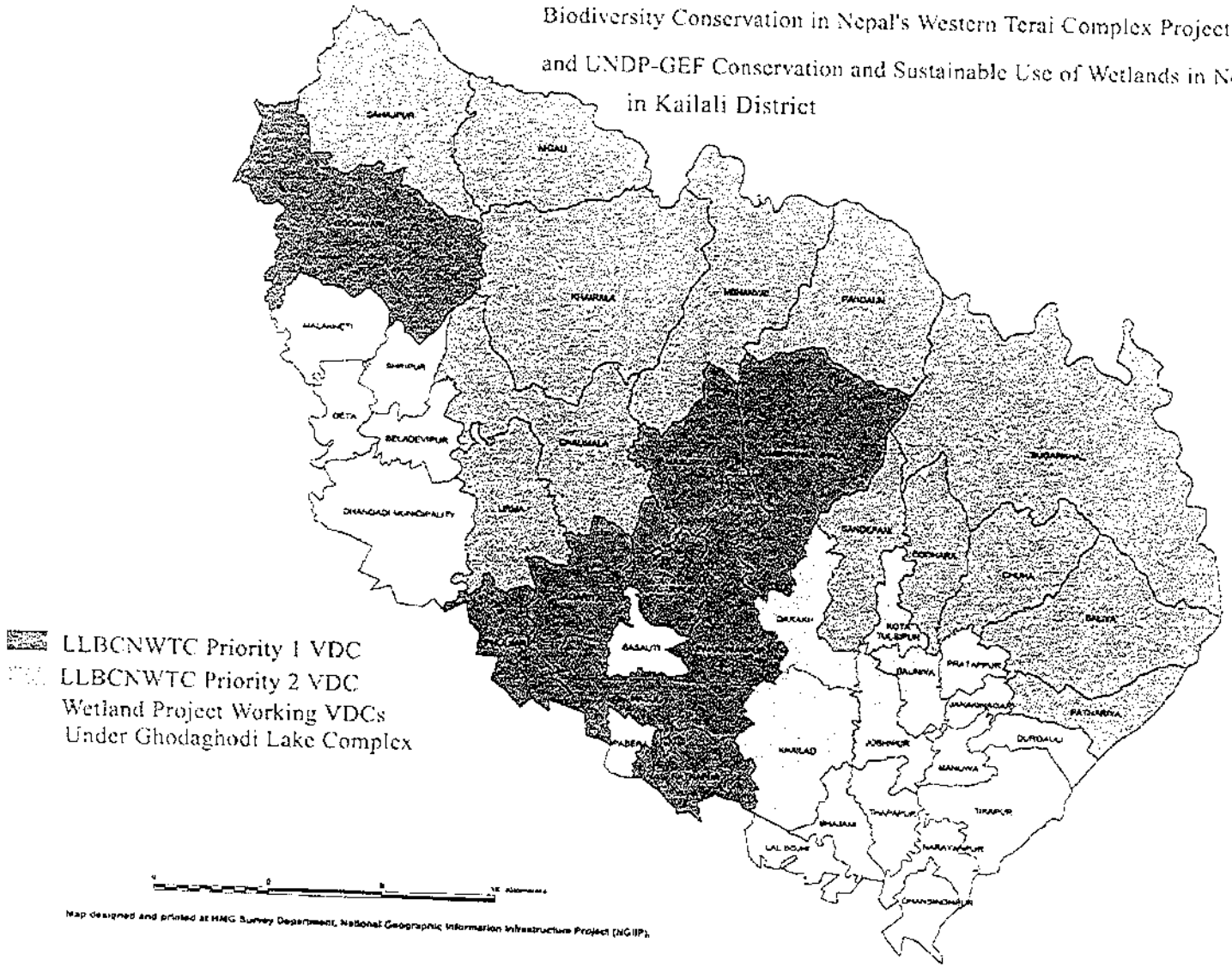
- Drainage of water for irrigation and dredging: The main interest of landowners downstream of the Lake Complex is to secure water for irrigation. About 500ha of rice fields are currently irrigated by water from the Ghodaghodi Lake.

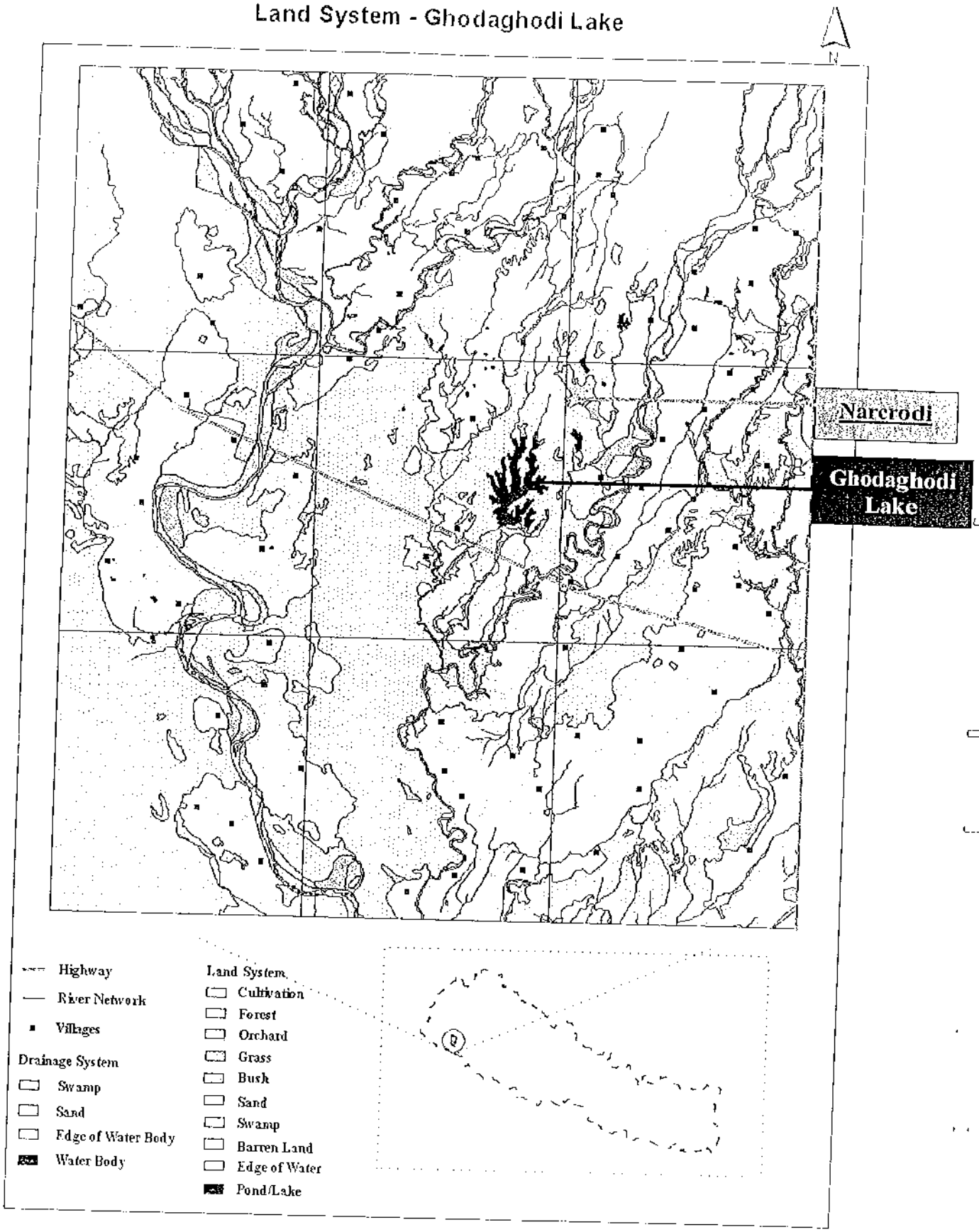
Annex 3: Maps

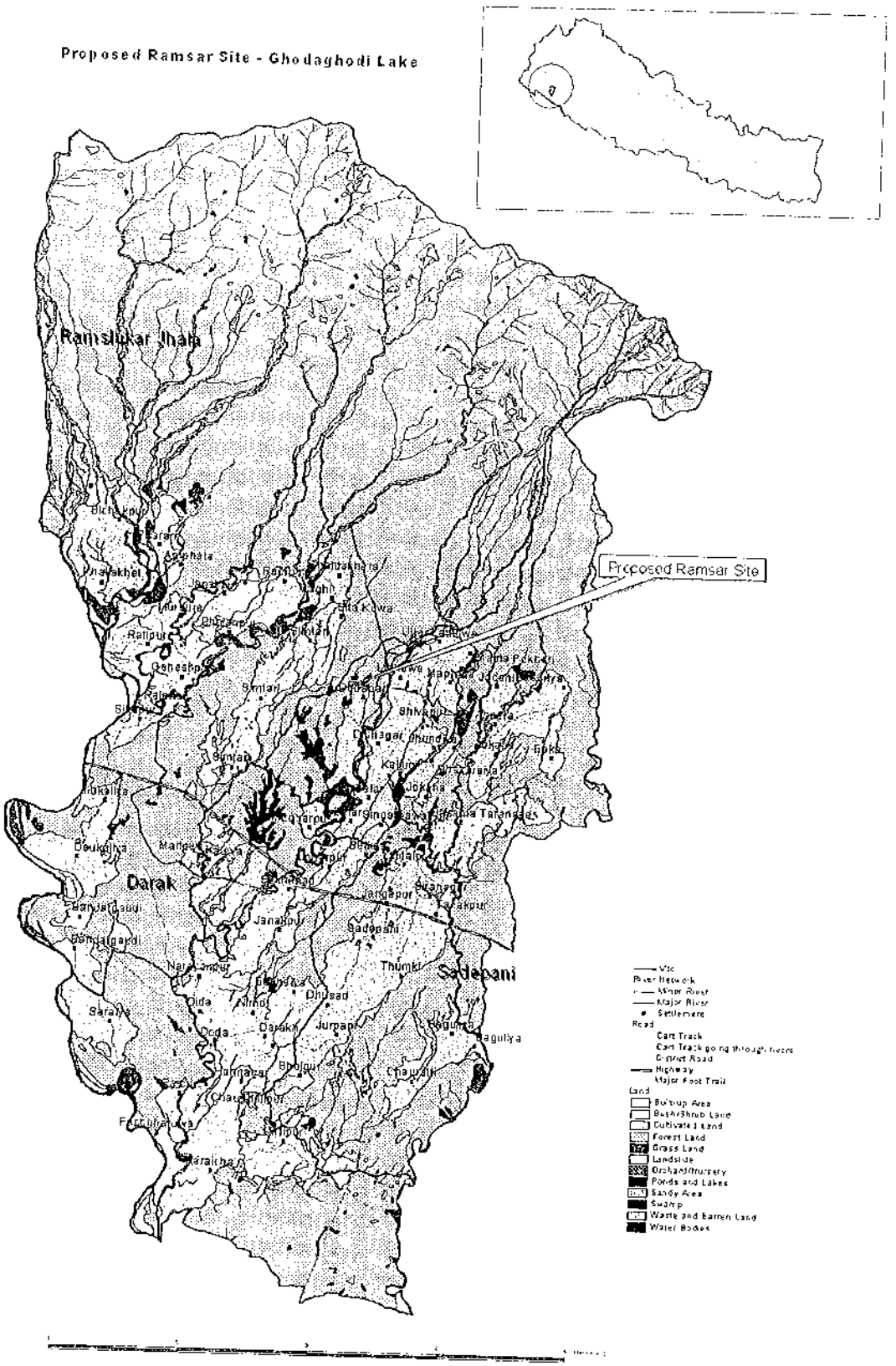
Location and Maps of Demonstration Sites

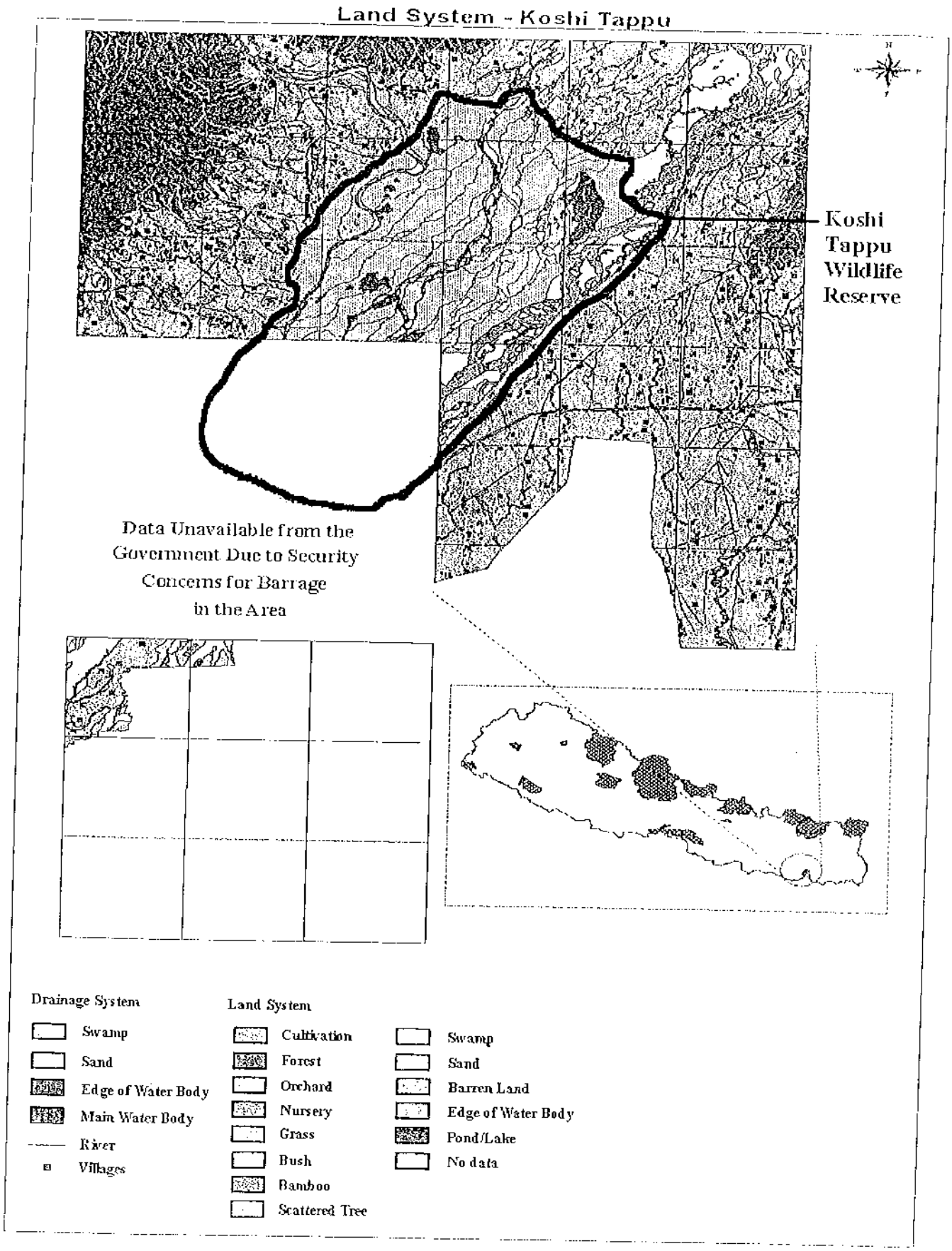


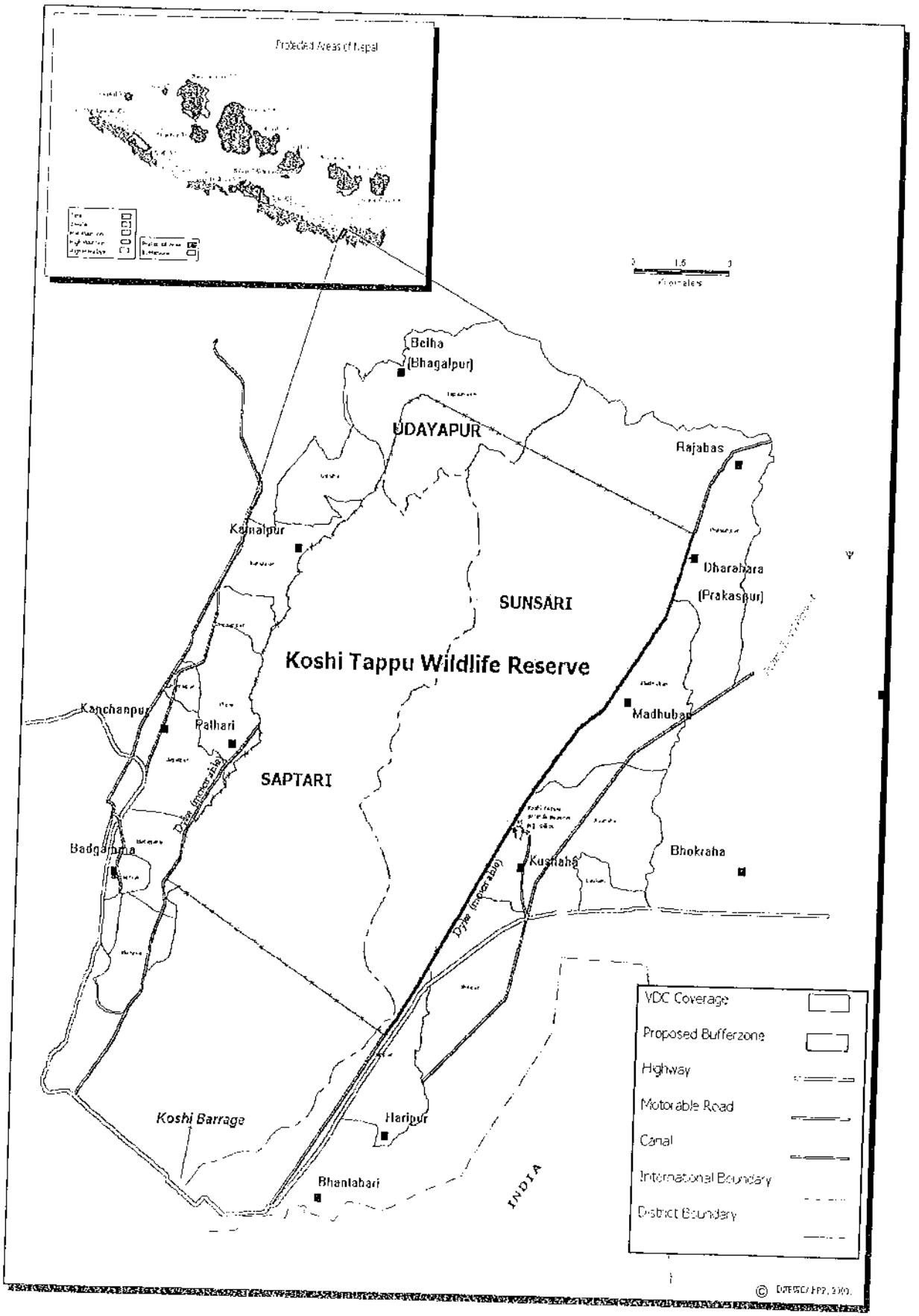
Village Development Committees (VDC) Under UNDP-GEF Landscape Level Biodiversity Conservation in Nepal's Western Terai Complex Project (LLBC NWTC) and UNDP-GEF Conservation and Sustainable Use of Wetlands in Nepal Project (DSUWN) in Kailali District




Land System - Ghodaghodi Lake
N
Narcrodi
Ghodaghodi Lake
Highway
River Network
Villages
Drainage System
Swamp
Sand
Edge of Water Body
Water Body
Land System
Cultivation
Forest
Orchard
Grass
Bush
Sand
Swamp
Barren Land
Edge of Water
Pond/Lake


Proposed Ramsar Site - Ghodaghodi Lake
Ramsikar Jhala
Proposed Ramsar Site
Darak
Sadepani
Thumki
Dhusad
Jurpani
Jamaicha
Bhaluwa
Chauraha
Jaraicha
Jangpur
Janakpur
Dhanagadi
Dida
Daraki
Jagulia
Vdc
River Network
Minor River
Major River
Settlement
Road
Cart Track
Cart Track going through rivers
District Road
Highway
Major Foot Trail
Land
Built-up Area
Bush/Shrub Land
Cultivated Land
Forest Land
Grass Land
Landslide
Orchard/nursery
Ponds and Lakes
Sandy Area
Swamp
Waste and Barren Land
Water Bodies


Land System - Koshi Tappu
Koshi Tappu Wildlife Reserve
Data Unavailable from the Government Due to Security Concerns for Barrage in the Area
Drainage System
Swamp
Sand
Edge of Water Body
Main Water Body
River
Villages
Land System
Cultivation
Forest
Orchard
Nursery
Grass
Bush
Bamboo
Scattered Tree
Swamp
Sand
Barren Land
Edge of Water Body
Pond/Lake
No data


Protected Areas of Nepal
Beiha
(Bhagalpur)
UDAYAPUR
Rajabas
Kanaipur
Dharahara
(Prakashpur)
SUNSARI
Koshi Tappu Wildlife Reserve
Kanchanpur
Pathari
Madhuban
SAPTARI
Badgama
Kusaha
Bhokraha
Koshi Barrage
Haripur
Bhantabari
INDIA
VDC Coverage
Proposed Bufferzone
Highway
Motorable Road
Canal
International Boundary
District Boundary

Annex 4: Nepal's National Legal, Policy and Institutional Framework Relevant To Wetland Conservation

1. This annex presents the key policy and legal bases for wetland resources conservation and sustainable use in Nepal. Nepal has an institutional and policy base, and policy and legal framework that support biodiversity conservation. A more comprehensive list of Acts can be found in Table 1.

2. A number of other legal acts have a direct bearing on wetland biodiversity conservation but many of their directives conflict and gaps persist. Numerous Government departments and agencies are involved in wetland conservation with overlapping responsibilities for planning, coordinating, implementing, and monitoring environmental policies and legislation. Furthermore, their mandates for different aspects of environmental management continue to change as ministries are created or abolished, and the limits of institutional responsibility are not always clear.

   The most important legal, policy and institutional framework are discussed below:

3. The commitment to environmental conservation is enshrined in the Constitution of the Kingdom of Nepal - 2047 BS (1991) under Chapter 4, which states that, "The Kingdom of Nepal will give priority to raising public awareness on environmental issues, to mitigating the adverse effects development works have on the environment, and to the conservation of rare fauna and flora." The Constitution also makes provision for the formation of a committee on Natural Resources and Environmental Conservation by the House of Representatives (Chapter 8).

International Conventions

4. Section 9 of the Treaty Act (1990) ensures that domestic laws do not contravene the provisions of international treaties or conventions that have been ratified, acceded, accepted or approved by the Parliament of Nepal.

5. Nepal ratified of the Convention on Biological Diversity (CBD) in 1994. The Environment Division of the Ministry of Forests and Soil Conservation (MFSC) is the focal unit to facilitate implementation of the country's obligations as a Contracting Party to the CBD, under the guidance of the National Biodiversity Steering Committee. It acts as a national focal point for guiding CBD implementation and monitoring.

6. Nepal became signatory to the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar) in 1988. The Department of National Parks and Wildlife Conservation (DNPWC) of the MFSC is the focal institution for this convention. The Koshi Tappu Wildlife Reserve (proposed demonstration site of this project) in the first Ramsar site of Nepal and three other wetland sites—Ghodaghodi Lake area (proposed demonstration site of this project), Bish Hazari Lake, and Jagdishpur Reservoir have been recently nominated. These recent nominations all fall outside protected areas, and the legal basis for their conservation and management arrangements have not been clarified. Although the DNPWC is the focal point for Ramsar and is responsible for Koshi Tappu Wildlife Reserve, at the newer Ramsar sites of Jagdishpur Reservoir and Ghodaghodi Lake, the Department of Irrigation and the Department of Forests respectively are responsible.

7. Nepal became a contracting party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973 (CITES). The goal of the treaty is to control, reduce or eliminate international trade in those species whose numbers or conditions suggest further removal of individuals from their natural habitat would be detrimental to the survival of the species, including wetland species. Although the National Parks and Wildlife Conservation Act, 1973 and National Parks and Wildlife Conservation Rules, 1974 are the principal legal devices for

implementing the CITES in Nepal. The Forest Act of 1993 also bears a similar responsibility. District Forest Officers have to resort to the Forest Act to implement CITES beyond the protected areas.

National Policies and Strategies

8. A National Conservation Strategy (NCS) (1988) emphasises the basic requirements of the people, as well as the need to safeguard natural and aesthetic values, and maintain the country's cultural heritage. It also resolved that a separate body, the National Council for the Conservation of Natural and Cultural Resources, was to replace the National Commission for the Conservation of Natural Resources to be responsible for implementing the NCS and formulating guidelines concerning resource conservation matters. This Council has since been formed and represents the most important step to date in establishing an institutional framework for cooperative environmental management and protection in the country.

9. The Nepal Biodiversity Strategy (NBS), 2002 lays down Nepal's strategy for biodiversity conservation and has clearly identified the need for conservation and sustainable-use of wetlands and specifically the need for the following key actions:
   - Formulation of comprehensive national wetland policy and wetland legislation,
   - Review of institutional arrangements to ensure clarity in tenure, wise-use, and conservation,
   - Research on wetland resources to provide scientific data and information,
   - Identification of critical wetland habitats and their protection, and directory and database on wetlands
   - Promotion of collaborative management of wetland resources,
   - Implementation of demonstration projects to apply and promote wise use of wetlands and their resources, and
   - Promotion of awareness and capacity programmes on the importance, use, function and management of wetlands and their resources.

10. In order to meet its obligations under Article 3 of the Ramsar Convention to develop a national wetland policy, and under Recommendation 6.3 of the Conference of the Parties 1996, to mange wetlands in participation with local people and communities, the National Wetland Policy (2003) has been recently formulated.

11. The policy addresses the need for a coordinated approach to wetland management and includes the following objectives:
   - to conserve, manage and promote wise use of national wetlands particularly through the collaboration of communities;
   - to recognize the importance of the knowledge, innovations, and practices of indigenous people and local communities in relation to wetlands, and to promote the wider use of such for conservation and sustainable-use of wetlands;
   - to manage wetlands in an ecologically sustainable way;
   - to achieve community participation in the management and decision-making process of wetlands;
   - to raise public awareness, especially of women, about the conservation values and benefits, and wise-use of wetlands; and
   - to ensure a sound scientific and technological basis for conservation, management, and wise-use.

12. Concomitant with the above initiatives, another strategy has been outlined by the Government—the Water Resources Strategy (2002) aimed at setting guidelines for the sustainable use of water while providing for hazard mitigation, environmental protection, economic growth and

constructive methods of resolving water use conflicts. Section 6.3 focuses on the management of watersheds and aquatic ecosystems and is a landmark for Nepal in that it is the first legal or policy document related to water resources that acknowledges environmental conservation and ecosystem maintenance as a priority during water resource planning. The strategy emphasizes the need to strengthen institutional capacity for this purpose and includes the following activities:

- Enhance institutional capacity and coordination
- Improve environmental database system
- Map important, critical, and priority watersheds and aquatic ecosystems
- Implement watershed and aquatic ecosystem protection, rehabilitation and management programmes
- Develop and implement Strategic Environmental Assessment in water resources management
- Implement a water conservation education programme
- Develop water and wastewater quality standards and regulations
- Promote community participation

13. The Agricultural Perspective Plan (1995) provides the priorities for agricultural development in the country and also highlights the need for sound environmental management for agricultural productivity. It also includes aquaculture as a key area of work. The Ministry of Agriculture and Cooperatives is the focal Ministry.

Conservation and sustainable use of Wetlands and important wetland species

14. The foundation for the legal framework for biodiversity conservation was laid in the early 1970s when GON created an Office for the Management of National Parks and Wildlife in 1972, which subsequently became the Department of National Parks and Wildlife Conservation (DNPWC) under the Ministry of Forests and Soil Conservation (MFSC) in 1980. The National Parks and Wildlife Conservation Act (1973) laid the outline for the conservation of wildlife in the country and lists protected species in an annex. This list has only been amended four times since (1974, 1982, 1989 and 1991), with inadequate inclusion of globally threatened species. The DNPWC presently works with a network of eight National Parks, four Wildlife Reserves, three Conservation Areas, one Hunting Reserve which, including five buffer zones around national parks, cover a total of 26, 696km2 or 18.14 percent of the country's total land area and 67.89 percent of ecosystems of the country. The Ministry of Forests and Soil Conservation (MFSC) approved the Buffer Zone Management Guidelines in 1999. The Guidelines have been implemented in the five Buffer Zones already declared by GONepal. Detailed guidelines have been provided for the implementation of provisions related to the Buffer Zones of the National Parks and Wildlife Conservation Act as well as the Buffer Zone Management Regulation at the field level. Moreover, it facilitates the work of government staff and User Committees in Buffer Zone Programmes. In addition, regulation for government-managed conservation areas has been passed to enhance community participation in conservation and local development.

15. Though there is no statutory definition of wetland in Nepal, the Aquatic Fauna Conservation Act (1961)'s subsequent amendment includes the term "wetland" under its definition of water as:[3]

"Water includes lakes, marshes, streams, rivers, rivulets, tanks, canals, channels, ponds, reservoirs, artificial reservoirs, wetlands, cages used for fish farming and fish farming water in paddy fields and their sources."

16. The Act defines "aquatic life" as "any living creature in the water," thus is unclear about inclusion of amphibians and waterfowl under its scope. Act prohibits the use of electric current, explosives or poison or to harvest aquatic fauna. However, section 5(a) has permitted the use poison under special circumstances. The Act also prescribes that as far as possible dam construction should

[3] The Original Act had defined "Water" as "lakes, ponds, streams, rivers, rivulets, banks, canals, channels, reservoirs, and their sources."

include fish ladders to facilitate their movement or alternatives to ensure their existence upstream of the dams. However, neither it has defined wetlands nor it has incorporated any mechanism on management of wetlands and institutionalisation of wise use system. The Ministry of Agriculture and Cooperatives if the main agency for this Act but the Chief District Officer (Under Home Ministry) is designated as the implementing authority of this Act.

17. The implementation of the Master Plan for the Forestry Sector (MPFS) (1988) is done under the Forest Act (1993). Under the Act, forest resources in the country, including the possible management of wetlands contained within can be managed as national, community, leasehold, private or religious forests. More than 845,193ha of forests have been handed over to about 10,966 Forest Users' Groups (FUGs) under community forestry, mainly in the hills. The Department of Forest (DoF) under MFSC is the main agency for forest management in Nepal. The Community Forestry Division under the DoF is the main agency for the promotion of community forestry programme in Nepal.

18. The Soil and Watershed Conservation Act (1982) and the Soil and Watershed Conservation Rules, (1986) empowers the Ministry of Forests and Soil Conservation to declare any area as a protected watershed area. Under the Act, any construction of dams, drainage, ditches and canals, harvesting of privately owned trees, excavation of sand, boulders and soil, discharge of solid waste, and establishment of industry or residence within any protected watershed areas requires permission. Though this Act has no specific provision on wetlands, it has a possible value for protecting important wetland sites. The Department of Soil Conservation and Watershed Management (DSCWM)

19. The Water Resources Act (1992) stipulates that the ownership of water resources within Nepal to be vested in the Kingdom of Nepal. Any kind of use of water resources requires license from District Water Resources Committee, or the Ministry of Water Resources, except for domestic, local irrigation and small scale water based industries such as water mills. The Act does not list biodiversity or environmental uses of water resources. It has prioritised the use of water (from highest priority to the lowest) as: drinking water and domestic uses, irrigation, agricultural uses such as animal husbandry and fisheries, hydroelectricity, cottage industry, industrial enterprises and mining uses, Navigation, Recreational uses, and other uses. The Ministry of Water Resources exercises jurisdiction and authority over the water resources of Nepal under this Act. Under this Act, GoN is authorized to prescribe the necessary water quality standards and to prescribe pollution tolerance limits, which has not yet been done. Water pollution has been prohibited by this Act, but lack of standards in determining the limit has made this provision ineffective.

20. The Electricity Act (1992) forbids any activities with adverse impacts environment, such as activities that cause soil erosion, flooding, landslides, and air pollution, while generating, transmitting or distributing electricity thus is very important for ensuring environmental friendly hydropower projects.

21. Under the Environment Protection Act (1997), any area of Nepal can be gazetted as "Environment Protection Area" to protect areas containing special natural heritage, rare wildlife, biological diversity, plant, or places of historical and cultural importance. However, no such protected areas are designed under this Act so far and the Act provides no clear provisions on the system of operation and management of such protected areas. The Environment Protection Rules (1997) requires an environmental impact assessment (EIA) study of any river engineering projects for electricity generation of more than 5 mega watts, construct multipurpose reservoirs, and inter-basin water transfer and use of water. The Ministry of Population and Environment of the focal ministry for this Act.

22. The Land Act (1964) has set a ceiling on private land ownership, and guarantees the right of tenant farmers. Private wetlands (such as paddy fields) would fall under the provisions of this Act. This Act has also envisioned a national Land Use Council under the Chairmanship of the Vice

Chairman of the National Planning Commission to determine national land use policy. The Ministry of Land Reforms and Management is the focal Ministry for this Act.

23. The Local Self-Governance Act (LSGA) (1999) has authorised the locally elected district development committees (DDC), village development committees (VDCs), Municipalities and Metropolitan authorities to carry out developmental activities, conservation of cultural heritage and natural resources, and the environment. The authority and jurisdiction given to the local governments units under this Act (e.g. on water resources) conflicts with other Acts (such as Water Resources Act, Aquatic Fauna Conservation Act, Soil and Watershed Conservation Act, Forests Act). The Ministry of Local Development is the focal ministry for this Act.

Some issues and proposed Project Focus

24. The overall Project strategic focus will be on strengthening the implementation of existing enabling environment (laws, policies and regulations), since in general the frame exists, but it is not being implemented. In order to strengthen regulatory frameworks for wetland conservation, the project will take two approaches: it will undertake to reform or clarify some key wetland influencing frameworks and will improve understanding to influence other policy reforms. The three key issues the project will work directly on will include the implementation of the National Wetland Policy (2003), strengthening the scope and implementation of the Aquatic Life Conservation Act, and strengthening the National Parks and Wildlife Act and Buffer zone guidelines.

25. Government agencies working on wetlands still work largely independently of each other, e.g. the concurrent preparation of the Water Resources Strategy (2002) and the National Wetland Policy (2003) with neither acknowledging the other, indicates little collaborative planning and programme implementation. The field-based counterparts of central agencies also work largely independently of each other and of local authorities. As a result, conservation and sustainable use objectives are not understood and incorporated into local plans fully as ideally they should be. The establishment of a permanent, self-governing, multi-agency organization, with representatives from government agencies, district and village authorities, academia, NGOs, industry, and other interested parties, that co-ordinates and promotes the conservation and recovery of wetlands in Nepal, could serve as a platform upon which inter-sectoral co-ordination and planning for wetland biodiversity conservation is strengthened.

26. Though certain protection is afforded to aquatic fauna through the Aquatic Life Conservation Act (1961), this does not cover migratory water birds. Penalties for the poaching or destruction of aquatic fauna are minimal and have ceased to be a deterrent. The protection afforded to fauna under the National Parks and Wildlife Conservation Act (1973) is inadequate. Of the total 12,651 known faunal species in Nepal only 39 species receive complete protection under its Appendix I and this list does not even cover all globally Critically Endangered and Endangered species. The Bill on the Fifth Amendment to the National Parks and Wildlife Conservation Act 1973 has been prepared and forwarded for the approval of the Cabinet. Among other things, the new amendment includes provision for farming of common wildlife species, invigoration of research studies, detailed specification of the provisions of Buffer Zone, and specifications relating to the exchange of wildlife species with other countries. A number of Bills related to conservation of biodiversity such as Access to Genetic Resources and Benefit Sharing, Implementation of the CITES, and Plant Resources Conservation Bill have been finalised and forwarded for the approval of the Cabinet. A CITES unit has been established within the DNPWC to carry out various activities related to the effective implementation of CITES. The proposed UNDP-GEF intervention will support activities so that the Aquatic Life Conservation Act and the National Parks and Wildlife Conservation Act give adequate protection to globally and nationally threatened species. It will help clarify the responsibility for implementing the Aquatic Life Conservation Act (currently the Chief District Officer is to ensure this Act is enforced at the local level, and is ineffective). Special focus of the project will be to clarify the legal status of new Ramsar Sites outside

protected areas (such as the Ghodaghodi Complex) to ensure that adequate protection is given to these sites from inappropriate development interventions. The Project will also help refine Buffer Zone guidelines so that wetland buffer zones follow appropriate hydrological boundaries so that it promotes associated watershed management practices.

27. Efforts on the legislative and policy fronts to decentralize decision-making over land and natural resource management has formed part of a broader systemic shift towards decentralisation of authority to district levels under the Local Self Governance Act of 1999, but this is currently in conflict of other government Acts such as the Forest Act and even Water Resources Act. This UNDP-GEF Project will help clarify roles and responsibilities of the District and Village Development Committees at the four project districts for wetland management, where the two Project demonstration sites are located. Lessons from this experience are expected to influence national policy harmonisation between LSGA and other Acts (especially because of the Government commitment to reform other legislation in line with LSGA). Though the Nepal Biodiversity Strategy (2002), the Forest Policy (2000) and the 10th Five Year Plan emphasise landscape-scale conservation efforts, no specific regulatory regime exists for biological corridors or habitat networks. The Project will work very closely with the UNDP-GEF Project "Nepal Biodiversity Landscape Project" to ensure that regulatory regimes on landscape-level conservation also give focus on wetlands such as rivers that cut across both productive and protected areas, and are integral for the maintenance of both aquatic flora and fauna and are particularly important for migratory species

28. Despite the existence of the Pesticide Act (1991) and Pesticide Regulations (1993), the use and resulting spread of pesticides particularly in the aquatic environment is neither regulated nor monitored. Many persistent organic pesticides used regularly in Nepal include those listed in Annex A of the Stockholm Convention and also in the UNEP list of internationally recognised chemicals whose production and use should be banned in the world[4] . The problem is exacerbated by the fact that the Act does not cover the disposal of date-expired pesticides. There is also a lack of effective legislation on utilisation of groundwater resources in the country. Reforms in the Pesticide Act and Regulations, though highly desirable, will be outside the scope of this project. The Project will, however, help improve understanding on the impacts of inappropriate pesticide usage on public health and wetland ecosystems. A draft Ground Water Legislation is being prepared which will govern use of groundwater for drinking water, irrigation, industrial, commercial, and other uses and will empower the private sector and local communities to manage irrigation and drinking water supplies. Water rights and wetland rights have not yet been dealt with adequately in existing legislation, and without adequate guidelines traditional rights could come into conflict with both development and conservation objectives. Revisions and additions to existing legislation are required to deal with this issue also ensuring that traditional water and wetland management systems are acknowledged and maintained. Such revision will be facilitated through Technical Advisory Committees of the National Wetland Committee and advice will also be sought from international lawyers on this issue.

29. The land review, squatter resettlement, and land compensation mechanisms in use are ineffective in curbing the spread of illegal settlements at wetland sites. Some of these settlements have been able to secure regularisation partly due to support from local elites who capitalise on illegal settlements as part of their vote bank in exchange for favours to entrench them. This has contributed to perverse incentives for further encroachment. Where formal reviews of illegal settlements have taken place, the criteria for land compensation have not targeted effectively nor secured the needs of the genuine landless and this has contributed to the emergence of professional land squatters and professions who profit from organised encroachment. A major part of the Project work at the demonstration site, particularly in Ghodaghodi Lake Complex, will

[4] Including DDT, BHC, Aldrin, Dieldrin, Endrin, Chlordane, Aldicarb, Endosulfan, Lindane, and Heptachlor.

be to clarify the land rights and to undertake activities that discourage encroachment through improved delineation of communal and private properties, community rules enforcement, and incentives. Details of this will be worked out during project implementation in consultations with local communities, leaders, District and Village Development Committees.

30. Environmental impact assessment of new development initiatives is carried out in accordance with existing rules and procedures, but without complete transparency on the findings of the reports and the involvement of all stakeholder groups, the effectiveness of the exercise remains questionable. Implementation of recommendations and long-term monitoring of most projects' impacts leave much to be desired. Recognition of the impact of watershed development on wetland ecosystems is essential to ensure the minimisation of environmental degradation. An ecosystem approach to wetland management that includes consideration of direct and indirect biophysical and social effects, and compliance with participatory, comprehensive and rigorous environmental assessment and management should be integrated into all levels of the development process from policy setting and strategy formulation through project planning, design, implementation, and operation. The Project will establish close working relationship with MOPE-NORAD project "Regulation and Monitoring of Capacity Building for EIA of Hydropower Projects in Nepal" on EIA capacity building issues. The Project will take an active interest in any proposed interventions that may impact on the proposed demonstration sites. At the beginning of Year 1 of project implementation, national commitments and local commitments will be obtained from relevant government agencies to prevent any actions that would negatively impact the demonstration sites. National level commitment on this will be one of the first agenda of the First Project Steering Committee Meeting, which has all wetland impacting line Ministries are represented.

31. Water-related treaties have been signed with India but have never been fully executed to their original intent. Expectations are still raised but rarely fulfilled, leaving both sides dissatisfied. There is also uncertainty as to how to proceed with additional river basin treaties, how to handle rivers that originate form the Siwalik (Churia) Hills, or whether to formulate a joint (or regional) umbrella treaty covering all trans-boundary rivers. Trans-boundary co-operation for water, biodiversity, and wetland conservation also needs to be strengthened, especially between India and Nepal, and will help towards resolving the conflicts that have arisen between resource use and conservation goals in several irrigation and large, multi-purpose projects. The Project will support a series of dialogues with India, specifically in relation to Koshi Tappu Area management, and this is expected to influence other transboundary water and wetland management issues as well.

32. Review and evaluation of the Acts are urgently required to adequately address obligations arising from the Articles of the Convention on Biological Diversity (CBD) and other international agreements and conventions to which Nepal is party. The intellectual and cultural property rights of indigenous peoples need to be secured through legislation. Since this is the focus of an on-going project of IUCN Nepal, the proposed UNDP-GEF intervention will work very closely with IUCN Nepal.

Table 1: Legislation impacting Wetland Biodiversity and Ecosystem Conservation in Nepal

1	Private Forest Nationalisation Act	1957	To nationalise all the natural forests in the country
2	Aquatic Life Conservation Act	1961	Forbids the introduction of poisonous, noxious, or explosive materials into a water source or destroying any dam, bridge or water system with intent to catch or kill aquatic life.
3	The Land Act	1965	Makes a provision related to land consolidation and development along with control of land degradation.
5	Forest Areas Land Act	1971	Land ownership and use of forests
6	Plant Protection Act	1972	To monitor the selling, import and export, and transplantation of various kind of plants and their products from one district to another, to regulate use of pesticides, plant quarantine station, prevention and treatment of plant disease
7	National Parks and Wildlife Conservation Act	1973	To protect animals, defines wildlife as any wild animals including mammals, birds, fish and reptiles, and to look the welfare of wetland dependent and other wildlife
8	Pasture Lands Nationalisation Act	1974	Guidelines for management of pasture lands
9	The Tourism Act	1975	Makes it mandatory for mountaineers to keep the environment clean and abide by the specified conditions
10	Soil and Watershed Conservation Act	1982	To preserve convenience and financial interest of common public by controlling natural disasters such as flooding and landslides
11	King Mahendra Trust for Nature Conservation Act	1982	To formulate conservation, maintenance and management of wildlife and other natural resources
12	Solid waste (management and resource mobilisation) Act	1986	Ensure solid waste management through the collection, transportation, recycling, disposal and the classification of hazardous waste
13	The Town Development Act	1987	Conserves wildlife and vegetation including natural environment within the reserved areas
14	Management and Resource Mobilisation Act	1987	Manages solid waste and controls air, water and soil pollution from solid waste
15	National Conservation Strategy	1987	Preserves biological diversity and maintains essential ecological and life support systems
16	The Nepal Water Supply Corporation Act	1989	Takes necessary steps to control water pollution and provides legal provision to penalize those who are found contaminating drinking water
17	Seed Act	1989	Register, certify, ownership and release of seeds
18	Constitution [Article 26(3)]	1990	"The State shall pursue a policy of mobilizing the natural resources and heritage of the country in a manner which might be useful and beneficial to the interest of the nation."

19	Constitution [Article 26(4)]	1990	"The State shall give priority to the protection of the environment and the prevention of its further damage that may cause significant adverse effect in the environment."
20	The Municipality Act	1991	Makes provision of legal measures for environment protection in town areas
21	The Village Development Committee Act	1991	Makes provision of legal measures for environment protection in villages
22	The District Development Committee Act	1991	Makes provision of legal measures for environment protection at district level
23	The Pesticide Act	1991	Registration of pesticides before they can be imported, exported and produced. Container and labels specification and licensing for any person, institution or agency for selling, formulating or professionally spraying pesticides.
24	The Vehicle and Transport Management Act	1992	Defines and prescribe necessary standards for vehicles
25	The Electricity Act	1992	Makes provision of license to carry out electricity generation with no substantial adverse effect on environment.
26	The Industrial Enterprises Act	1992	Regulates industries by providing permission to those that may not cause significantly adverse effects on the environment.
27	Irrigation Policy	1992	Maintaining necessary environmental balance while developing irrigation systems in Nepal
28	Water Resources Act	1992	To minimize environmental damage to wetlands, especially to lakes and rivers through the requirement of environment impact assessment, requires one to submit a detailed economic, technical and environmental report before survey or use of water resources and to prepare environment study and subsequent report before a licence is granted.
29	Nepal Environmental Policy Action Plan (NEPAP)	1993	Management of rangeland ecosystems, importance of NTFP, and management of community land for NTFP production
30	Forest Act	1993	Ensure the development, conservation and proper utilization of forest and forest products.
31	Forest Regulation	1995	Collection, sale, licensing and distribution of Forest Products, and guidelines for Community Forests
32	Pesticides Regulation Act	1993	To regulate pesticide entry into the country by permitting the import of registered chemicals only.
33	Environmental Protection Act	1996	To make necessary arrangements to open the EIA report for the general public to render opinions and suggestions
34	Buffer Zone Management Rules	1996	To conserve buffer zone along with forest, wildlife, natural environment and natural resources, biodiversity and development work for all.
35	Environmental Conservation Rules	1997	Institutionalisation of EIA system, pollution control, management of environmental conservation area and management of environment fund

36	The Kathmandu Valley Development Authority Act	1998	Guidelines for environment of Kathmandu Valley
37	Drinking Water Supply and Sanitation Policy	1998	Defines water quality and pollution standards and waste water disposal
38	Master Plan for Forestry Sector	1988	Specifies provisional strategies for the phased handing over of all accessible hill forest to user communities.
39	Animal Health and Livestock Services Act	1998	Import regulation through quarantine check-posts and standard formulation for biochemical
40	Buffer Zone Management Guidelines	1999	Sustainable utilization and conservation of natural resources in the buffer zone and to give sustainable protection to National Parks and Reserves
41	Hydropower Development Policy	2001	To supply electricity as per demands of the people through the development of the high potentiality of the water resources, motivate the national as well as foreign sector to invest for the development of hydropower.
42	Water Resources Strategy	2002	Tempering the interests of the public and environment with economic development to ensure long-term sustainability of water resource use in Nepal.
43	9th Five Year Plan	1997-2002	Prioritise the adoption and implementation of necessary legal and procedural measures, and promote inter-sectoral cooperation for environmental protection
44	10th Five Year Plan	2002-2007	Conserve biodiversity, conserve land against degradation, expand ecotourism, better land use planning
45	Nepal Biodiversity Strategy	2002	To protect and promote the wise use of biological diversity and resources, the maintenance of ecological processes and system and the equitable sharing of ensuing benefits on a sustainable basis.
46	Wetland Policy	2003	Collaborative community management and sustainable use of wetland resources ensuring conservation of wetland biodiversity
48	Ground Water Act	Under preparation	NA

Figure 1: Central Organizational Chart of Government of Nepal

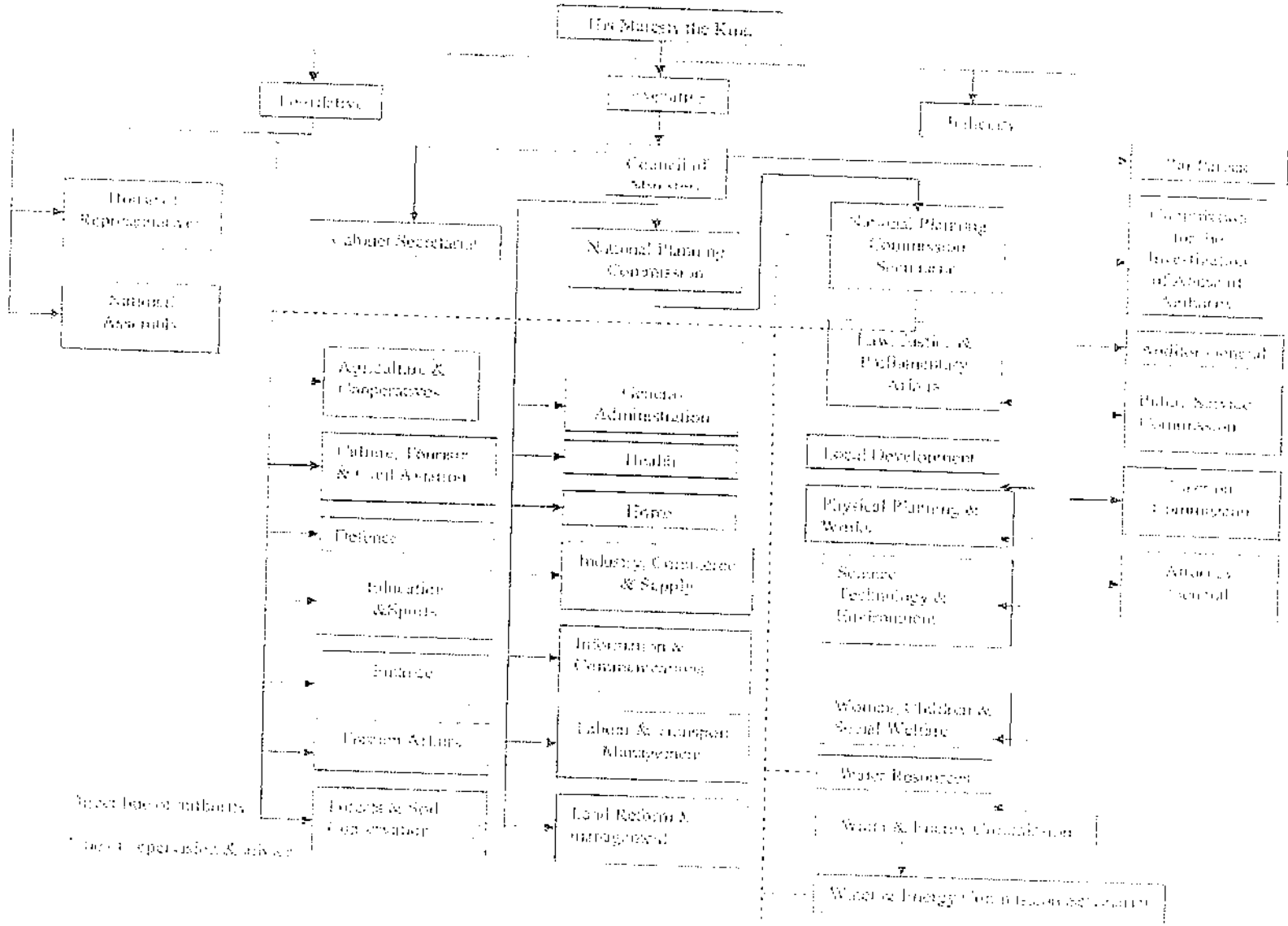
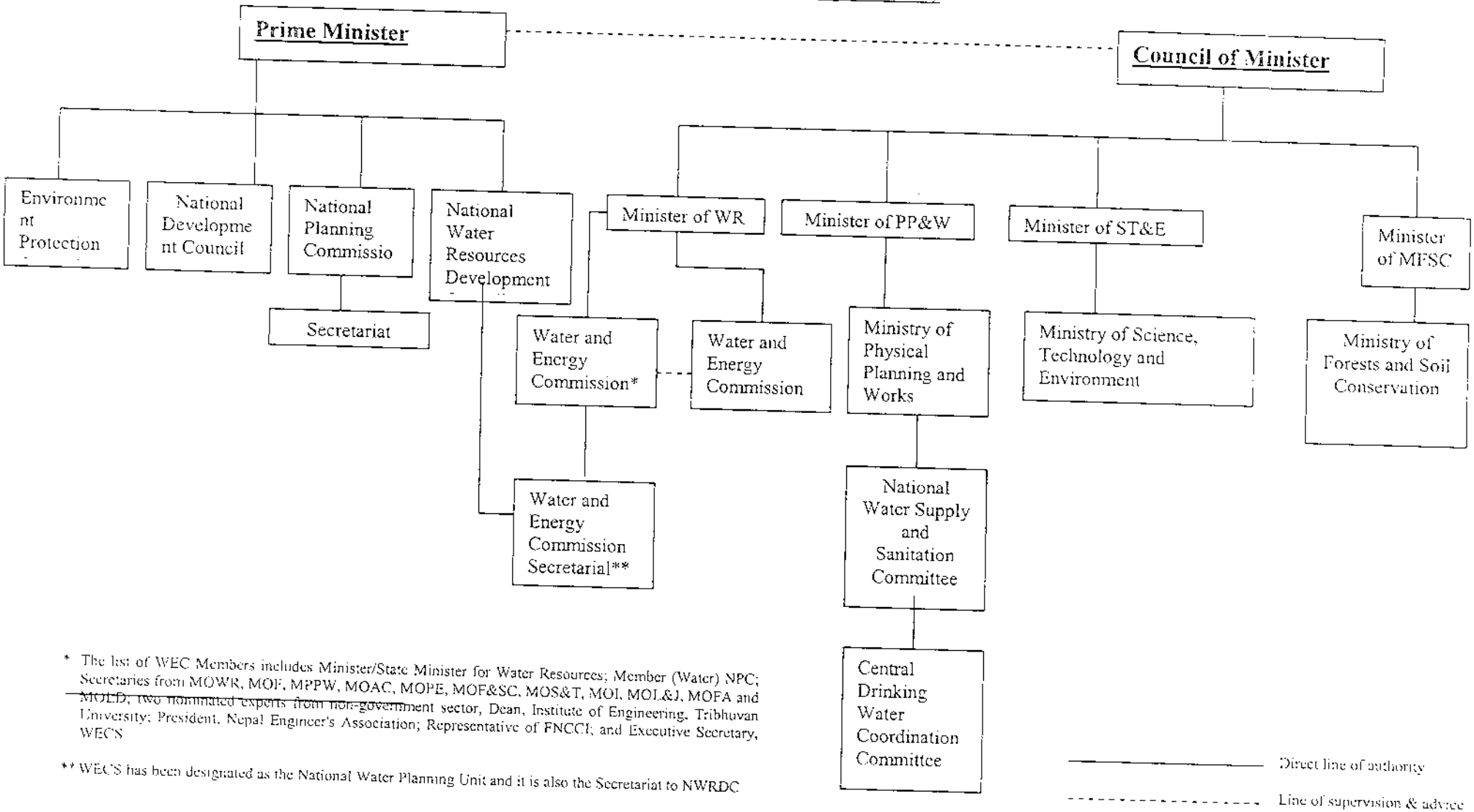


Figure 2: Coordination/Policy Level Institutions for the Water Sector (Existing Situation)



* The list of WEC Members includes Minister/State Minister for Water Resources; Member (Water) NPC; Secretaries from MOWR, MOF, MPPW, MOAC, MOPE, MOF&SC, MOS&T, MOI, MOL&J, MOFA and MOLD; two nominated experts from non-government sector, Dean, Institute of Engineering, Tribhuvan University; President, Nepal Engineer's Association; Representative of FNCCI; and Executive Secretary, WECS

** WECS has been designated as the National Water Planning Unit and it is also the Secretariat to NWRDC

Source: Water Resources Strategy, HMG of Nepal, 2002

Annex 5: Project Risks and Proposed Mitigation Measures (updated)

The main project risks are highlighted in the Table below along with proposed adaptive management strategies to mitigate these risks.

Risk	Rating	Response
Widespread insecurity due to internal armed conflict has limited field-based activities at many sites nationally. Government offices and projects have been targets of physical attacks. Under the prevailing conditions of social unrest, the Project may be locally exposed to and influenced by the armed conflict.	Medium	The Project aims at improving socio-economic development and promoting sustainable and equitable livelihoods at the community level. It also focuses on strengthening the role of local people in decision-making and the management of natural resources, i.e. improving environmental governance. As such, the Project will contribute towards reducing some of the root causes of the present conflict. Many projects have been able to continue operating in spite of the insurgency; including IUCN's projects and three ongoing medium-sized GEF Projects in Nepal (one in the lowland Terai). The learning from IUCN, UNDP and other projects suggests that initiatives with significant community support are less affected by the insurgency. Through its participatory and transparent nature, and its responsiveness to local needs, the Project aims to build strong community support. In the two particular field sites of the project UNDP and other partners are implementing several projects without any threat. In the area of Ghodaghodi Lake Complex, which falls in Kailali district, WWF is successfully implementing Terai Arc Landscape Programme which is collaborating with Western Terai Landscape Complex Programme supported by UNDP/GEF. IUCN has been working in Ghodaghodi Lake Complex since 1996 and has a good rapport and credibility with the local communities. UNDP has recently set sup a Programme Office in Kailali district which will ascertain security of the project staff and assets and ensure effective delivery of all UNDP supported projects. In Koshi Tappu Complex, UNDP's supported buffer zone programme has been implemented in collaboration with the buffer zone communities of Koshi Tappu Wildlife Reserve for the last 10 years. IUCN has its field office in the area (45 KM away from Koshi Tappu Complex) which will closely monitor the project activities and impact of conflict. IUCN has been successfully implementing other projects even in mountain areas of Nepal where the relative impact of conflict is higher. Both UNDP and IUCN have good rapport with the local communities including the conflicting parties and have got high level of acceptance from them for programme implementation. Maoists targets are mostly the government structures and programmes which are directly implemented in the field through the government. Since neutral parties have greater access to conflict-affected field sites, IUCN Nepal will directly implement the demonstration activities in overall government's guidance. The implementation approach for the project includes working through local partners (especially NGOs and CBOs) in affected areas, under the support of IUCN. This is a strategy that has been effectively used by IUCN and other organizations in areas currently affected by the insurgency. The 5-year timeframe of the overall Project provides flexibility for delays should they occur. The Project also focuses demonstration on sites in the

		Terai since these areas are less affected than the mid-hills and mountains. The adaptive management approach also enables project interventions to be modified in response to the local situation. The project will adopt conflict sensitive approaches while implementing activities based on continues analysis of security situations. National programming and much of the capacity building could continue even if field movement is restricted for some time. A security assessment and response system will be established, which includes both preventive measures (training for staff on how to avoid conflict) as well as actions to be taken according to the severity of the situation to assure staff and partner safety. Special communication systems will be purchased should communication lines be disrupted. The Project will maintain close communication links with other government, donor and non-governmental projects to ensure a coordinated approach.
Government contributions (finances, counterpart staff) especially for the demonstration sites are not forthcoming in a timely manner. The capacity building strategy of the Project relies heavily on on-the-job training and coaching through joint work so staff availability is essential.	Medium	The Project assumes a 6-8 month start-up period to bring all staff on board. In Koshi Tappu, the government has shown its commitment to the recommended staffing levels in its recently developed Management Plan. In Ghodaghodi, the Project will work with existing line agency staff. The Technical advisors will maintain close discussions with the Government to ensure that staff and finances are secured as required. Most of the government's contributions are through its existing staff and facilities, or budgets allocated for the sites. The project will build staff capacity to make them more effective in wetland conservation and sustainable use. The development and initial piloting of a sustainable financing strategy by the project that builds on successful international experience in wetland conservation financing is designed to address the perpetual shortcomings in government funds to finance conservation and identify funds for after the project's completion.
Sectoral Ministries such as Ministry of Water Resources and Ministry of Agriculture and Cooperatives will not adopt guidelines and policy recommendations to integrate wetland-sensitivity into their national planning and actions.	High	The project recognizes that the best way to influence cross sectoral policy is to demonstrate both the need to integrate wetland sensitive activities and by drawing on lessons from Nepal and elsewhere to show the costs of not taking wetland issues into consideration for human and ecosystem well being. The project has built in several opportunities for joint leaning and capacity building for senior decision-makers, particularly to understand the full economic benefits of wetlands. Furthermore it will develop and pilot market-based instruments to demonstrate to these decision-makers ways to integrate these economic values as well as finance the conservation of wetlands.
Political instability (including changes in government administration) causes major changes in policy priorities.	High	Despite previous changes in political leadership, GoN Nepal has remained committed to biodiversity conservation, including wetland conservation and sustainable use. These issues figure in the Nepal Biodiversity Strategy and in preliminary documents of the Tenth Development Plan. By demonstrating the value of wetlands to sustainable development in the country, the project will advocate for the continued priority of wetlands in development policy.
Large-scale river	Low	Although large river engineering schemes are being discussed for various

engineering schemes significantly alter river hydrology in the Project sites.		sites in Nepal, there is an increased government commitment to make them as environment friendly as possible. A national discussion on the World Commission on Dams recommendations is likely to clarify some issues for their construction and management. The Project will engage in multisectoral policy discussions on river engineering as well as address this issue through transboundary dialogues. It will also create guidelines for wetland-friendly construction and operation of river engineering works. Commitments from relevant government authorities to prevent negative impacts on the demonstration sites are included as project milestones. While significantly strengthening the EIA process in Nepal is beyond the scope of the project, the project will produce guidelines on how to make EIAs more wetland-sensitive and will collaborate with existing and planned projects to support EIA. The project will also work with civil society (local and national networks) to improve their understanding of wetland issues and strengthen their ability to engage in dialogue with the government should the EIA process not be adequately followed.
Sedimentation in the Koshi River (primarily a natural phenomenon) results in significant changes in the river course in the Koshi Tappu Area.	Low	While controlling significant changes in the River course is beyond the scope of the Project, the importance of this river to Nepal (and the number of people who would be impacted if the river shifted substantially) and particularly to India (for flood management) imply that the government would act to rectify the situation. Other government line agencies (including Water and Energy Commission) are monitoring the situation.
Lack of secure land tenure for many households in the demonstration sites will impede efforts to change local practices regarding sustainable management and use of wetlands.	Low	Although it is unlikely that the project will be able to change land ownership in its timeframe, emphasis is placed on promoting secure access rights to wetland resources for local communities, and in particular wetland-dependent communities on local land resources (including wetlands). The community forestry experience in Nepal has demonstrated the effectiveness of collaborative and community-based resource management approaches once access is secured even without land ownership. The establishment of the buffer zone and its council in KTWR is another positive indication for an environment that is conducive to resolving access and benefit issues.
Inability to identify sufficient means for continuing project activities beyond the life of the project.	Medium	This will primarily be addressed through the sustainable financing strategies to be prepared by the Project for both the national and the demonstration sites. The economic value of wetlands will be demonstrated along with the costs associated with continued degrading practices, and will serve as an incentive for national investment in wetlands. Policy makers from the relevant finance and planning departments and Ministries are specifically targeted for awareness raising based on the economic valuation. The Financing Strategies will identify a diversity of sources of funds, and not focus only on securing additional central funds for MFSC. By demonstrating to developmental line agencies (such as Ministries of Finance, Local Development, Agriculture and Water Resources) the value of wetland conservation and sustainable use from development, poverty reduction and ecosystem service perspectives, the financing strategy will aim to identify allocations from multiple sources. At the sites, the community action plans will focus on low cost

		interventions for wetland conservation as well as identifying sustainable income generating options. Furthermore, the capacity building approach means that one-off costs associated with training trainers and technical staff and with investing in toolkits and guidelines will not extend beyond the project's life. Milestones have been included throughout the project to secure the commitment of national and local government agencies to adequately staff and finance both the demonstration site and national wetland actions.
Lack of support for the entities established by the project (NWC, TACs, Networks) beyond the life of the project.	Low	The networks created in the project have been designed on a low cost input to avoid their dependence on project funds. The NWC will be the responsibility of the Ministry of Forests and Soil Conservation, and they will form TACs as required. Such thematic task teams are a common current practice in Nepal and are specifically outlined in the National Biodiversity Strategy and Action Plan. The specialist and indigenous communities networks are expected to operate on a demand-driven basis; for example, practitioners will seek each other's expertise as needed and as their resources permit. These networks are also anticipated to provide services to government and other organizations for wetland conservation as part of increasing decentralization and recognition of the role of civil society through the Local Self Governance Act. Additionally, capacity will be built in these groups for proposal writing to provide them with the skills to access other sources of funds to assist them to implement their wetland-related action plans.
Government lacks the staff, capacity and resources or will to adequately implement the project. Staff turnover within government could also weaken institutional memory and the sustainability of the project.	Medium	The Government's national endorsement of the project signifies its commitment to realize this project. It remains a priority initiative in key policy documents such as the National Biodiversity Strategy and Action Plan. Recognizing that project implementation of a large size requires specialized project management capacity and knowledge; strong technical support has been built into the project from IUCN Nepal. The selection of appropriate and qualified technical personnel and best available technical advice will be essential as a part of the project implementation framework. Since neutral parties have greater access to conflict-affected field sites, IUCN Nepal will directly implement the demonstration activities, under the government's overall guidance. To address staff turnover, the project has also built in significant resources for institutional capacity building within government and other institutions. This will involve in training of trainers and the provision of materials to be able to train new staff. Emphasis will also be placed on the importance of handover mechanisms to maintain institutional memory.

Annex 6: Response to GEF Council Review

A. Comments from Germany

	Summary of Comment	Response	Reference to the document where changes are made
1	A clear baseline has to be provided for all indicators using percent reductions or increases.	Available baseline information has been added to the revised LFA and Results Framework table. Where no information exists, baseline studies will be undertaken during project inception.	Section II Part II LFA Page 56-68
2	Financial sustainability of the project is contradicting. How the National Financial Strategy will be able to secure funds from government's budget which is extremely low and under heavy competition from other sectors of the economy	One of our working assumptions is that the lack of adequate government allocation of budgets for wetland conservation and use is in part due to lack of understanding of the full costs of improper wetland management (including costs to development/ livelihoods through reduced ecosystem services). The development of financial strategies nationally as well as at the two sites is the main project intervention to try to identify new sources of financing in the future. It is expected that there will be a greater allocation of government budgets to wetland issues once the costs have been analyzed and articulated in economic terms to development planners and policy makers. It is indicated under financial sustainability strategy and specific activities have been proposed in the log-frame (Activity 2.1.4 for central level and Activities 3A.2.4 and 3B.2.4 for field level)	Para 85 under financial strategy Section II Part II LFA Page 65-68
3	Assumptions and outcomes seem to overlap each other. The project planning matrix needs to be re-considered	LFA/ Results Framework and related Pro-Doc text have been revised to separate outcomes as compared to assumptions that are beyond the direct control of the project proponents.	Section II Part II LFA Page 57-68 Page 24-29
4	An updated risk assessment with reasonable measures elaborated to counter the risks of project failure need to be included	The risk analysis and mitigation strategy submitted in the original brief has been revised and strengthened. A risk monitoring and mitigation strategy and emergency plan will be developed upon project inception that builds on the considerable experience of UNDP, IUCN and other development partners active in Nepal.	Annex 5 Page 139-142: Revised Risk Analysis & Mitigation Strategy

B. Comments from Switzerland

1	Strategies for financial sustainability of the project are not very clear. How the project will ensure allocation of more funds from the government for wetland conservation, when the government budget for conservation is extremely low and under heavy competition from other sector of economy	This has been covered under comments 2 above. The financial strategies are not expected to be solely dependant on central government resources from the Ministry of Forests and Soil Conservation. They will explore contributions from all levels, including other national government departments to pay for the environmental services provided by wetlands, as well as from community contributions and from revenue generated though sustainable use of wetland resources.	Project financial strategy Para: 84-87, Page 33-34
2	Considering the socio-economic conditions of the target populations, application of financial and economic instruments will be challenging and may involve risks of failures.	Creating incentives for sustainable and equitable use and conservation of wetlands is a major challenge for the project. This will continue to be reviewed and addressed during project implementation. Some budget revisions have been made to allocate additional resources to the testing of these instruments.	N/A
3	Use of flagship species has limited scientific value as an indicator for monitoring purposes and caution is needed while applying as monitoring indicators	Use of flagship species is not a single indicator proposed but rather it will be used in combination with other indicators. Attention will be placed on globally threatened species and on developing other appropriate indicators during the inception phase.	Section II Part II LFA Page 57-61

C. Comments from Canada

1	Linkage to Tenth Plan and focus on poverty reduction and social inclusion is weak. Livelihood support should be a separate outcome with significant resources allocated for this	Linkage to country's 10th Plan and focus on poverty reduction as well as social inclusion has been made under Section I Part II Strategy National project actions (Outcome 1&2) have been designed to integrate issues of livelihood security and equitable development. Core project staff includes a gender, social inclusion and indigenous people specialist who will lead the development and implementation of national and site level gender and social inclusion strategies as well as related capacity building and policy recommendations. Outcome 3 includes specific actions, expected results and budgets to support sustainable livelihoods. Additional budget has been allocated for these actions and efforts will be made throughout the project to seek additional funds for further work.	Para 78 Table 1 Page 30 Para 49; Page 22 Part III Implementation Arrangement, Para 100, Page 36-38 and Section IV Part II TOR Page 82 Outcome 3 :Page 27
2	Heavy and complex central structure with addition of new institutions and mechanisms seems not to be non-sustainable set up and does not necessarily guarantee for policy reforms	Revisions to the project management structure have been made as part of detailing the project implementation responsibilities. The project will be managed through a steering committee and advisory committees that are part of existing or proposed government bodies. Day to day project management will occur through a national project management unit housed with the Ministry of Forests and Soil Conservation. At the two field sites the project will be guided through existing multisectoral committees that include key local development bodies in order to effect policy influence, promote synergy and use of results and avoid duplication. The national committee proposed to address wetland issues from a multisectoral perspective is based on the government's proposal under its biodiversity strategy. In the field sites, existing multisectoral development committees will be used. Although ongoing costs of such committees are currently thought to be minimal, this will be assessed during the life of the project and integrated into financing strategies if needed.	Part III Implementation Arrangement Page 35-39 and Section IV Part II TOR Page 76-82
3	Several assumptions and	The risk analysis and mitigation strategy has been revised and strengthened.	Annex 5, Revised Risk Analysis &

	risks identified by the project has no mitigation strategy suggested and are in conflict with government agency working as implementing partner at present conflict situation.	As a consequence, the implementation strategy has also been modified to increase the role of non-governmental partners to directly implement portions of the project, notably at the field sites, (while government maintains overall control and responsibility). This approach has been shown to enable safe and effective project implementation in other projects (including GEF/ UNDP and IUCN) at the field level while at the same time acknowledges the role of the central government in making policy changes.	Mitigation Strategy Page 139-142 Part III Implementation Arrangement Page 35-39

D. Comments from U.S.A.

1	Need to clarify whether security situation is a project risk or not; and, if so, how this will be mitigated.	The risk analysis and mitigation strategy has been revised and greatly strengthened as a result of Council concerns and our own concerns about the security situation and its implications for the project. Full details are given in Annex 5 of the project document, where the seriousness of each risk has been individually evaluated and mitigation strategies proposed. A major outcome of the risk analysis has been the modification of implementation arrangements to increase the role of non-governmental partners who will now directly implement a greater portion of the project, notably at the field sites, (while government maintains overall control and responsibility). This approach has been shown to enable safe and effective project implementation at the field level in other projects (including other GEF/ UNDP projects and IUCN projects) while at the same time acknowledging the role of the central government in making policy changes. Security-related issues and risks to the project will continue to be seriously reviewed and addressed during project implementation as part of regular monitoring and evaluation and as well as through inputs from specialists who can bring global experience of project implementation in conflict situations. A risk monitoring and mitigation strategy and emergency plan will be developed upon project inception that builds on the considerable experience of UNDP, IUCN and other development partners active in Nepal.	Annex 5. Revised Risk Analysis & Mitigation Strategy Page 139-142

Annex 7: Other Agreements (please see separate file)

1) Endorsement Letter & Letter of Commitments
2) Memorandum of Understanding between FSC and IUCN
3) Project Co-operation Agreement between IUCN and UNDP

Annex 8: LPAC Minutes

Minutes of the
Local Project Appraisal Committee Meeting
for
Conservation and Sustainable Use of Wetlands in Nepal

Date: ***03 January 2006***
Venue: ***UN Conference Hall, UN House, Pulchowk, Kathmandu,***
Chairperson: Mr. Ghulam M. Isaczai, DRR (P), UNDP

Opening:

Mr. Ghulam Isaczai, DRR (P), UNDP chaired the PAC meeting on "Conservation and Sustainable Use of Wetland Resources in Nepal" held on 03 January 2005 at UNDP. He welcomed all the members to the meeting and highlighted on the important contributions made by various partners in the project formulation and the Ministry of Forestry and Soil Conservation (MFSC) in particular for providing leadership in the process from the beginning. He apprised the participants of the purpose of the PAC review and mentioned that the suggestions received would feed into the finalization of the project document. He then asked Mr. Vijaya Singh to make a brief presentation about the project.

Mr. Vijaya Singh, UNDP made a brief power point presentation of the project concept; major areas of interventions; implementation modality and partnership; and project budget. After the presentation, **Mr. Isaczai** opened the floor for discussion.

Discussion:

Mr. Ananda Ram Regmi, MoF requested clarifications on the cash contributions by IUCN to the project and details on the committed co-financing contribution which has now been spent in the project work/area, given the delay in project start-up process. He wanted to know that why some of the indicators have been chosen to be measured after 10 years of project implementation; while the project actual duration is only for 5 years

Mr. Laxman Gautam, FAO asked the reason for having the two positions - National Programme Manager and Chief Technical Advisor. He also suggested that coordination mechanism between two government ministries – the Ministry of Agriculture and Co-operatives (MoAC), which is the focal ministry regarding Aquatic Plant Protection Act and the Ministry of Forest and Soil Conservation

(MFSC), which is the executing agent for this project - be established. He also suggested having concrete plans for gradual mainstreaming of donor supported activities into existing structures by ensuring co-ordination among different agencies such as MoAC and MFSC and involving District Development Committee (DDC) and Village Development Committee (VDC) in programme implementation by providing block grants as necessary.

Mr. K. C. Paudel, MFSC appreciated that the project has made provisions for documenting indigenous knowledge related to wetland resources which Ministry of MFSC has been supporting for long time. He asked further clarifications/suggestions on the following indicators and assumptions listed in the pro-doc.

Indicators:

- Outcome 1 Bullet 01: *Wetland policy framework is revised based on project recommendation and field experience*. The revision of the wetland policy, which has recently been promulgated, needs to be based on implementation experience. The learning from the implementation should be reflected in the policy revision
- Outcome 2: Bullet 01: *Environment Division of the MFSC will have adequate staff and budget for aquatic ecosystem management*. Does it mean that the government's capacity for aquatic ecosystem management is lacking and needs enhancement? He suggested that rather than only specifying the "Environment Division" it should mention MFSC, which is responsible for managing biodiversity in the country.
- Outcome 1 Bullet 04: *Inconsistencies between LSGA and sectoral policies and laws identified (year 3) and resolutions accepted (year 5)*. How can we ensure about the inconsistencies in the beginning of the project?

Assumptions:

- Bullet 04: *GoN remains open to the participation of civil society in wetland management*. Why this assumption is needed given the fact that that GoN has always been open to the civil society organizations.

He wanted to know how National Wetland Committee (proposed in the document) will be linked to National Biodiversity Co-ordination Committee (NBCC) and suggested to make provisions for discussing wetland issues under one of the thematic committees of NBCC instead of having a separate wetland committee. He also opined that the expectation from this project to contribute to trans-boundary co-operation will be too ambitious.

Mr. Biju K Shrestha, NPC suggested that the project should contribute to developing the technical capacity of the local bodies (DDC and VDC) in the spirit of full devolution of district programmes. He further suggested using the

indicators for gender and social inclusion and ensuring mechanisms to gather disaggregated information to fit into the frame of the PRSP.

Mr. Pradip Koirala, NPC mentioned that with regard to the various outcomes and the budgeting under each outcome, more budgets for Outcome 3 should be allocated if possible. He further wanted clarifications on the role of local government bodies like DDC and VDC in the project and suggested to include representative from the Ministry of Environment, Science and Technology in the project steering committee.

Mr. Parvin Aryal, MoWR emphasized on the need to define threshold values for sustainable use of wetland resources and wanted to know how the project will address this. He suggested including exit strategy to ensure continuity of the activities even after the phase out of the project in five years time. He further wanted to know how the project will ensure trans-boundary co-operation outlined under outcome 3.

Mr. G.J. Thapa, KMTNC mentioned that besides Koshi Tapu and Ghoda Ghodi Lake complexes, there are several other important wetland sites including the Bishazari Lakes in Chitwan, which were preliminary identified as candidate sites during PDF –B phase but not included later on into the project. He raised the concern that how these sites will be conserved in the near future.

Ms. Neera Shrestha Pradhan, WWF wanted to know that where the proposed Wetland Information Centre will be established. She further raised the concern that why more resources has been allocated to capacity building and policy components and only less resources to field level activities.

Mr. Huub Peters, SNV Nepal, made following suggestions (through email)

- Linkage to MDGs and PRSP has to be strongly built; and provisions for implementing complementary programmes like IGA, agro-biodiversity and renewable energy, next to wetland management, need to be made.
- Mapping of partners' programme complementary to wetland management need to be done to ensure effective partnership and co-ordination among the partners. It is important that the project activities boost the government regular programme rather than replacing them.
- Need to strengthen the local management committees with clear mandates in wetland management. At the same time, the role of DFCC, DDC and civil societies in the project has to be clarified.
- Effective awareness programmes, going beyond the traditional methods, will be needed (radio, pamphlets, eco clubs, TV, leaflets, etc.) to provide environmental education to the school children and the parents.

Responses:

Ms Lisa Singh, UNDP:

- IUCN, in 2004, implemented a one-year project supported by the World Bank's Development Market Place in Koshi Tappu area, one of the two sites identified by the project, in collaboration with the Department of National Parks and Wildlife Conservation (DNPWC). Given the delay in project approval process and the need to start inception work, it was agreed in the beginning that the contributions made by the Development Market Place Project to Koshi-Tappu Wetland site will be counted as the part of IUCN contributions to this project. However, because of delay in GEF project inception, the former Project completed before the actual start of the GEF project. IUCN contributions to the GEF project were counted as a part of total project co- financing in the ration of 1:1.
- Furthermore policy strengthening and community field activities have an integrated framework since field experiences are expected to feed into policy refinement while policy aspects can be tested through field work. In this regard, from UNDP-GEF perspective all three components are of importance in ensuring project sustainability to include institutional capacity building which included community institutions.

Mr. Vijaya Singh, UNDP

- The remaining contributions from IUCN (both in kind and cash) to the project have been specified in the document.
- The Wetland Information Centre will be established at the centre and government will provide space for that.
- The National Programme Manager will be responsible for managing the UNDP/GEF funds while the Chief Technical Advisor will be responsible for managing the rest of the project activities on behalf of IUCN.
- Having MoAC represented in the project steering committee it is expected that there will be strong linkage between the MFSC and MoAC both at the field and centre level.
- Since the current policies related to wetlands are quite broad and have gaps in addressing the issues like building dams or draining of wetlands; these policies have to be reviewed and revised over time. Recommendations for policy review have been made based on detailed policy analysis done during the project development phase.
- The reason for substantial amount of budget being allocated for capacity building, policy and institutional strengthening components is - this project tries to address all the coherent issues related to wetland management based on threat analysis done during the project development phase. The project tries to demonstrate successful models of wetland management in the pilot sites by creating positive incentives for the local people to protect

the wetlands; strengthening sectoral policies to favour wetland conservation; and enhancing institutional capacity at local and centre level to co-ordinate and jointly implement wetland management activities.

- The project does not envision direct investments at the local level for community development or poverty alleviation as such; instead, it will support soft activities such as awareness creation and capacity building for wise use of wetland resources to support the livelihood and institutionalising market based approaches for sustainable wetland management. The budget allocation to different three components is, therefore, based on intricate linkage of one component to another.
- Emphasis has been given and provisions are made for translating policies into actions by ensuring co-ordination and programme ownership at all levels and using existing institutional structures as far as possible. Since the programme in the district will use the established DFCC structure there DDC and VDC will have lead role in planning and co-ordination. The role of DDC and VDC has been identified as the implementing partner for providing support and co-ordination as well as taking lead role in project implementation as necessary;
- Financial and institutional sustainability aspects as well as the replication strategies which together constitute the exit strategy for the project have been clearly articulated.
- Since one can not measure the impacts on short period, long term indicators extending upto 10 years from the year of start of the project have been chosen. It is expected that after five years of implementation the nation will develop sufficient capacity for managing wetlands on sustainable basis. By then conservation issues will be mainstreamed into sectoral policies; and wetland management plans will be implemented locally in a co-ordinated way.
- GoN needs to mobilise more resources (either external or internal) to conserve other important wetlands in the future. The learning from the two project sites will provide important feedback for managing other sites in the country. A provision has been made in the project to replicate successful wetland management practices in other sites as well.

Dr. Damodar Parajuli, MoFSC:

- Due to funding constraints it was not possible to include other priority wetland sites in this project.
- The government has been doing conservation work in the proposed two sites through partners' support and also utilizing its own resources for long time; and will continue to do so even after the termination of this project. So, there will be no gap in implementation.
- The government has given due attention to management of other priority wetlands in the country in line with NBS and NBSIP by mobilizing resources

from other agencies. JICA has already showed interests in this area to work together with the government.

Mr. Narayan Paudel, DNPWC

- The government is committed to manage priority wetlands in the country and has started consistently mobilizing partners' resources for that. As a result, King Mahendra's Trust for Nature Conservation (KMTNC) and World Wildlife Fund (WWF) have opened separate units on fresh water management. As per the provisions of Ramsar Conventions it is the government's mandate to conserve and make wise use of wetland resources in Nepal.
- Nepal's conservation efforts are rooted further down to the level of local community organizations rather than limiting at the level of DDC and VDC. The local user groups are empowered enough to take direct benefits from the conservation programmes; and the same modality will apply in the case of wetland management.
- The efforts for trans-boundary co-operation between India and Nepal to conserve the wildlife species have already initiated under Terai Arc Landscape programme. Even, recently, for declaring the buffer zone of Koshi Tappu Wildlife Reserve, dialogue between the two countries was proven meaningful.

Conclusion:

Dr Damodar P Parajuli, MFSC thanked UNDP for organising the LPAC review meeting for this project. He also thanked to participants from different institutions for joining hands with the MFSC in this project and appreciated their valuable comments on the project document. He mentioned that the MFSC, as an Executing Agent for this project, wants to see the project implemented as soon as possible so that the government could work on bridging the remaining gap in the area of wetland management with the help of other partners. He requested to incorporate the comments made during the meeting as far as feasible and practicable. He further mentioned that MFSC would like the document to be clearer on roles and responsibilities of the partners – who will do what - so that there will be no confusion left at the later stage during implementation. The document should have flexibility to work under the changed context.

Mr. Ghulam Isaczai, UNDP thanked all the participants for their valuable contributions in the meeting and asked to send further comments, if any, via email to be sent by the end of this week. He summarized the discussion as below for improvement of the project document:

- To clarify the linkage between policy, capacity development, and institutional strengthening components with field level implementation work

- To elaborate the linkage between PRSP, poverty reduction and biodiversity conservation;
- To ensure the role of local stakeholders in the programme implementation;
- To create awareness about the importance of wetlands in other areas outside the current project sites
- To clarify on the issues related to sustainability and exit strategy
- To include the partnership arrangement plan and detailed risk analysis in the pro-doc

Finally, Mr. Isaczai concluded the meeting by summarising that the PAC had approved the project for approval.

Annex 1:

Project Appraisal Committee Meeting
Conservation and Sustainable Use of Wetlands in Nepal
03 January 2006

UN Conference Room, UN House, Pulchowk

AGENDA

14:30 – 14:35	Welcome Remarks: Mr. Ghulam M. Isaczai, Deputy Resident Representative (P), UNDP
14:35 – 15:15	Presentation of the Project Concept
15:15 – 16:15	Discussion
16:15 – 16:30	Closing Remarks: Mr. Ghulam M. Isaczai, Deputy Resident Representative (P), UNDP Dr. Damodar Parajuli, Chief, Foreign Aid Coordination Division, Ministry of Forests and Soil Conservation

List of Participants:

1. Dr. Damodar Parajuli, Joint Secretary and Chief, Foreign Aid Co-ordination Division, Ministry of Forests and Soil Conservation, Singha Durbar
2. Dr. Krishna Chandra Paudel, Joint Secretary and Chief, Environment Division, Ministry of Forests and Soil Conservation, Singha Durbar
3. Mr. Narayan Prasad Paudel, Director General, Department of National Parks and Wildlife Conservation, Babar Mahal
4. Mr. AnandaRam Regmi, Under Secretary, FACD, Ministry of Finance, Singha Durbar
5. Mr. Pradip Koirala, Programme Director, National Planning Commission, Singha Durbar
6. Mr. Biju Kumar Shrestha, Programme Director, National Planning Commission, Singha Durbar
7. Mr. Dilip Kumar Chapagain, Under Secretary, Ministry of Local Development, Pulchowk
8. Mr. Pravin Aryal, Senior Divisional Engineer, Ministry of Water Resources, Babar Mahal
9. Mr. Dinesh Acharya, Agriculture Officer, Ministry of Agriculture and Cooperatives, Singha Durbar
10. Mr. Sagendra Tiwari, Acting Country Representative, IUCN, Nepal Programme, Pulchowk
11. Mr. Huub Peters, NRM Practice Leader, SNV Nepal Programme, Pulchowk
12. Ms. Julia Robinson, IUCN, Nepal Programme
13. Ms. Neera Shrestha Pradhan, World Wildlife Fund, Nepal Program, Baluatar
14. Mr. Ganga Jung Thapa, Executive Officer, King Mahendra's Trust for Nature Conservation, Jawalakhel
15. Mr. Ghulam M. Isaczai, Deputy Resident Representative (Programme), UNDP
16. Ms. Lalita Thapa, Assistant Resident Representative, UNDP
17. Ms. Lisa Singh, Assistant Resident Representative, UNDP
18. Mr. Sharad Neupane, Assistant Resident Representative, UNDP
19. Mr. Vijaya Singh, Biodiversity Analyst, UNDP
20. Ms. Jaana Vosmisto, Programme Officer, UNDP

Annex 9: NPC Briefing Meeting Notes

Meeting notes of the
Project Briefing Meeting for

Conservation and Sustainable Use of Wetlands in Nepal
Date: 09 February 2007
Venue: Meeting Hall, National Planning Commission (NPC), Singhadarbar, Kathmandu
Chairperson: Honorable Dr. Pushpa Raj Rajkarnikar, Acting Vice Chair, NPC.

On the request of NPC, a project briefing meeting on *Conservation and Sustainable Use of Wetlands in Nepal* was held on 09 February 2007 in the context of final endorsement of the project *by the Government of Nepal*. The purpose of the meeting was to provide a fresh update on the project and brief on in what ways the project is still relevant in the changed context of the country and how it is going to provide tangible benefits to the local community. The meeting provided opportunities for better understanding and clarification of project activities, implementation modalities and outcomes. Several queries and concerns were clarified in this meeting and it was agreed that the project was relevant and should go for implementation without any delay. The Honorable Vice-Chair concluded the meeting with following instructions:

The project will ensure that:-

1. Right from the inception of the project, adequate attention must be given to ensure capable, effective and sustainable institution (local, district and national) particularly at local level for addressing wetland issues in a sustainable manner.

2. Focus on field level activities that directly contribute to livelihoods of the local communities should have higher priority and possibility of revising the project inputs if required;

3. The concerns of the local people and their traditional knowledge are well considered

MFSC, UNDP and IUCN will pay due attention to ensure institutional sustainability and capacity development of local community right from the project inception. Issues of budget reallocation will be dealt with during project budget revision after one year of project implementation. Other relevant issues which might emerge during the implementation of the project will be addressed by learning by doing process.

List of Participants

1. Honorable Dr.Pushpa Raj Rajkarnikar, Acting Vice Chair, NPC
2. Honorable Dr. Bhim Neupane, Member, NPC
3. Honorable Dr. Chaitanya Subba, Member, NPC
4. Honorable Dr. Posh Raj Pandey, Member, NPC
5. Honorable Dr. Indira Shrestha, Member, NPC
6. Ms. Geeta Shrestha, Joint Secretary, NPC
7. Mr. Hari Dutta Pandey, Joint Secretary, NPC
8. Mr. Biju Kumar Shrestha, Program Director, NPC
9. Mr. Mohan Dhungel, Deputy Director General, Department of Forest (DoF)
10. Mr. Hari Narayan Belbase, Section Officer, NPC
11. Ms. Neeta Pokharel, Section Officer, NPC
12. Dr. Jagadish Chandra Baral, Planning Officer, MoFSC
13. Mr.Ram Chandra Kandel, Assistant Planning Officer, MoFSC
14. Mr. Sher Singh Thaguna, Assistant Planning Officer, DNPWC
15. Mr. Vijay Singh, ARR, UNDP
16. Mr. Narayan Belbase, Acting Country Representative, IUCN Nepal
17. Mr. Bhawani Prasad Kharel, Senior Program Officer, IUCN Nepal