

Chapter 9

Environmental Governance

Introduction

Governance is traditionally understood to mean control, rules, or administration by a state over society by the former exercising its power to direct, manage, and regulate citizens' activities in the best interest of the country. The United Nations Development Programme (UNDP) defines governance as the “exercise of economic, political and administrative authority to manage a country's affairs at all levels” (UNDP 1997). The quality of governance depends on the capacity and vision of the Government to design, formulate, implement, and monitor policies and to perform its duties.

Good governance is participatory, people-oriented, and involves government bodies, private sector agencies, social groups, communities, and the civil society at large in the process.

It is transparent and accountable and honors rights of the people to participate in the decision making that affects their life. Critical aspects of governance denote different aspects of good governance. It is effective in making the best use of resources and it is equitable. It promotes the rule of law (UNDP 1997).

Good governance controls the misuse of natural resources and promotes their sustainable management and use. Good governance encourages local leadership and decentralization of power to the grassroots level and builds local capabilities. Good governance promotes sustainable economic development that is linked with the sustainability of the natural environment, and promoting conservation and sustainable use of natural resources to meet present needs without compromising the needs of future generations. Good governance includes implementation and evaluation of a country's commitments to different international environmental conventions, treaties, and protocols it has signed. It includes mobilization of requisite resources from different sources.

Environmental Governance in Nepal

Environmental governance in Nepal includes key elements of environmental policy and strategy planning; development and implementation of plans and programs at national and local levels; development and enforcement of environmental laws and regulations, norms, and standards; and establishment and operation of environmental institutions that supervise, execute, and monitor all aspects of the process. The judiciary imparts environmental justice to the citizens and safeguards those rights.

Environmental Policies, Plans, and Programs in Nepal

Planned development in Nepal has been ongoing since introduction of the First Five Year Plan in 1956. Since then, ten periodic national development plans have been implemented—one for three years (1962–1965) and the others for five years each. The most recent one, the Tenth Plan, covers the period from 2002 to 2007.¹

The National Planning Commission (NPC), which is the agency responsible for formulating plans and policies on national and sectoral development, guides all socioeconomic development planning in Nepal. The 10th Five-Year Plan (2002–2007), clearly states that poverty reduction is and remains the cornerstone development objective of Nepal. Whenever possible, the NPC has attempted to integrate environmental issues with sustainable development and poverty reduction. Nepal has always recognized the value of protecting its natural resources. From the beginning of the 8th plan period (1992–1997), environmental issues have been consistently included in Nepal's socioeconomic development plans.

¹ Planning is carried out according to the Nepali year, which starts and ends around mid April. Thus, for example, the plan for 2002 to 2007 is for five years from mid April 2002 to mid April 2007.

Table 9.1 describes the major highlights of Nepal's socioeconomic development plans from the environmental perspective.

The first three plans focused on natural resources conservation. From the 4th Plan onward, environmental concerns were incorporated in sectoral policies. However, from the 5th Plan—the period following the 1972 Stockholm Conference, in which Nepal had participated—actions on preventing environmental degradation were initiated. During the 6th and 7th Plans, more concrete

steps were taken towards safeguarding the environment through enforcement of environmental policies, encouraging participation of the private sector, civil society, and women's groups. From the 8th Plan period (1992–97) and especially following the Earth Summit on Environment and Sustainable Development held in Rio, environmental considerations were firmly incorporated in the development process. The concept of sustainable development, advocating economic growth with sustainable resource utilization, was integrated in Nepal's

Table 9.1: Environmental Components of National Socioeconomic Development Plans (1956 –2007)

First Five-Year Plan (1956–1961)

Natural resources utilization, agriculture production. Forest Nationalization Act 1957 enacted.

Second Periodic Plan (1962–1965)

Survey of natural resources, preparation of management plan for forestry of selected districts, forestation, forest demarcation, and promotion of forest-based industries.

Third Five-Year Plan (1965–1970)

Resettlement of Hill population in Terai, land management and cadastral survey, sedimentation and water flow measurements in Terai, master plan for drinking water and sewerage in Kathmandu Valley, and emphasis on water quality.

Fourth Five-Year Plan (1970–1975)

National and sectoral policies related to environment, programs of delineation of agricultural land, reclamation of forest land for resettlement, soil and land use surveys, watershed conservation in some parts of the country.

Fifth Five-Year Plan (1975–1980)

Emphasis on ecological balance, conservation of national forests and wildlife, reduction of urban pollution, promotion of ecotourism, encouragement to women's participation in environmental activities.

Sixth Five-Year Plan (1980–1985)

Emphasis on population control, watershed management, initiation of environmental impact assessment (EIA) of development projects, regulations on urban environment, environmental aspects included in land use policy.

Seventh Five-Year Plan (1985–1990)

Introduction of environment friendly policies and integrated environmental management, emphasis on participation of private sector, non-government organizations (NGOs), women, civil society for environmental management. National Conservation Strategy Master Plan for Forestry Sector endorsed.

Eighth Five-Year Plan (1992–1997)

Environment management policies integrated with sustainable economic development and poverty reduction, national environment policies and action plan reinforced to incorporate environmental issues with development planning. Establishment of Ministry of Population and Environment (MOPE). Preparation of EIA guidelines, improvement of legislative measures, promotion of environmental education, development of National Environmental Policies and Action Plan, inclusion of environmental aspects into hydropower, irrigation and industrial development policies, preparation and implementation of the Agricultural Perspective Plan initiated, Environmental Protection Act enacted.

Ninth Five-Year Plan (1997–2002)

Environmental Protection Regulations enacted, sustainable resource management principles endorsed, rural and urban environment problems differentiated, community-based forestry programs initiated, institutional strengthening of line ministries, legal provisions for national resource conservation and management, scope of biological diversity expanded, pollution control program introduced, involvement of civil society in municipal waste management, programs for environmental conservation, participatory environmental education, training and research programs on environment, development of environmental management information system. Programs of forest management and supply of forest products, introduction of market-based instruments for forestry management, water pollution control aspects addressed. Environmental standards on air, water pollution, and industrial effluents enforced.

Tenth Five-Year Plan (2002–2007)

Long-term goals of environmental management with better governance, pollution control, sustainable use of natural resources, emphasis on links between environment and economic development, public participation encouraged, internalization of environmental concerns into development plans and programs, implementation of national environmental standards, implementation of provisions of international environmental conventions, policies for capacity development of local institutions in environmental management, promotion of women's participation in environmental management at all levels, research on environment friendly technologies, legal and fiscal mechanisms for controlling industrial pollution introduced, adoption of appropriate strategies and working policies, natural disaster management policy introduced.

Source: Different plan documents.

development planning process. This period is characterized by concrete environmental actions undertaken by the country. These include such things as development of clear environmental policies, implementation of national environmental legislation, development of environmental action plans, and introduction of mandatory environmental assessment in infrastructure projects.

The key environment-related policies and strategies introduced to date include: National Conservation Strategy 1988; Industrial Policies 1992; Nepal Environmental Policy and Action Plan 1993; Tourism Policy 1995; Solid Waste Management Policy 1996; National Water Supply Sector Policy 1998; Revised Forest Sector Policy 2000; Hydropower Development Policy 2001; Nepal Biodiversity Conservation Strategy 2002; Leasehold Forestry Policy 2002; Water Resources Strategy, Nepal, 2002; National Wetland Policy 2003; Irrigation Policy 2003; and Sustainable Development Agenda for Nepal, 2003.

The Conservation Strategy endorsed by the Government in 1988 includes a number of programs to internalize the environmental impact assessment (EIA) system in Nepal. The strategy underscores the need to ascertain the potential consequences of development activities on the environment and to minimize detrimental effects. The strategy requires that project proponents identify the potential socioeconomic and environmental impacts of the project, and recommend ways in which these would be mitigated.

The Industrial Policy 1992 has emphasized measures to minimize adverse impacts on the environment during the establishment, expansion, and diversification of industries. The policy opens avenues to formulate guidelines and standards to check and minimize adverse effects of pollution associated with industrial growth. Industries that are likely to affect the environment have been categorized and a license is required to establish industries that affect public health and the environment (MOI 1992).

The Nepal Environmental Policy and Action Plan 1993, which was endorsed by the Environment Protection Council, was the first program to comprehensively articulate the environmental policies of Nepal—it listed seven:

- (i) To manage natural and physical resources efficiently and sustainably;
- (ii) To balance development efforts and environmental conservation for sustainable fulfillment of people's basic needs;
- (iii) To safeguard national heritage;
- (iv) To mitigate the adverse environmental impacts of development projects and human actions;

- (v) To integrate the environment and development through appropriate institutions, adequate legislation and economic incentives, and sufficient public resources;
- (vi) To foster environmental education and awareness at all levels; and
- (vii) To facilitate participatory involvement of private sector, NGOs, international non-government organizations (INGOs), and civil society with government efforts in environmental protection.

The Tourism Policy 1995 emphasizes implementing environmental protection programs in an effective and integrated manner to promote sustainable tourism development. The need for developing tourism environmental guidelines and a local code of conduct concerning the environment is also discussed (MOCTCA 1996).

The National Solid Waste Management Policy 1996 underscores the importance of carrying out an EIA prior to selecting the final waste disposal site to reduce environmental pollution (MOLD 1996).

The Hydropower Development Policy 2001 envisages implementation of environmental management plans to minimize adverse effects of project development. The policy clearly requires that 10% of the annual minimum discharge or whatever level is recommended by the EIA study be maintained downstream in rivers (MOWR 2001).

The Nepal Biodiversity Strategy 2002 emphasizes conducting EIAs in accordance with the provisions of the Environment Protection Act 1996 and Environment Protection Regulations 1997 to assess impacts of development activities on biodiversity. The strategy has focused on ensuring effective implementation of existing laws on EIA (MOFSC 2002).

The Water Resources Strategy 2002 underscores the need for effective implementation of EIA and strategic environment assessment (SEA) norms and recommendations. The strategy has dissected environmental problems in the water resources sector and has emphasized implementing different environmental activities for management of watersheds and aquatic ecosystems. The strategy also calls upon the Ministry of Environment, Science, and Technology (MOEST) to take a lead role in developing environmental review and assessment tools and to advise the Government regarding required changes to the policies and implementation procedures of SEA and EIA (WECS 2002).

The Sustainable Development Agenda for Nepal 2003 prepared by the Government National Planning Commission defines sustainable development for Nepal and opportunities and broad goals covering

the period to up 2017. The document begins by describing the pathways forward, detailed objectives, and states necessary government policies. The agenda draws upon and is in conformity with the long-term goals envisaged in the Ninth Plan 1997–2002, the Tenth Plan 2002–2007, the Millennium Development Goals and the Poverty Reduction Strategy Paper, and commitments made by the country in various international forums (NPC 2003).

The Irrigation Policy 1993 (revision 1997) makes specific provisions and urges designing and implementing irrigation projects and programs based on the recommendations of EIA studies. Such reports should be prepared taking into account the National EIA guidelines 1993. The new Irrigation Policy 2003 has a working policy to identify and select irrigation projects that take into account environmental factors. The working policy emphasizes implementing projects by minimizing adverse environmental impacts, conducting initial environmental examinations (IEE) and EIA, and organizing public hearings, ensuring biodiversity conservation by mandating releasing of minimum essential water flows downstream, and utilizing water for irrigation by avoiding or reducing adverse environmental impacts (MOWR 1993).

The first major thrust to environmental conservation and management in Nepal was undertaken as part of the Eighth Five-Year Plan (1992–1997). The different policies and strategies initiated during the Eighth Plan were continued during the Ninth and Tenth plan periods. The Ninth Plan specified various key policy directives:

- (i) Priority to environmental programs that involve women and the poor;
- (ii) Special programs for environment conservation in remote areas;
- (iii) Involvement of NGOs in environmental education;
- (iv) Training and research on pollution control, solid waste management, and others;
- (v) Development of environmental management information systems; and
- (vi) Implementation of environmental standards.
- (vii) It also emphasized developing alternative energy sources like solar, micro-hydro, and biogas plants as energy substitutes to replace forest products as fuel.

The ongoing Tenth Plan has accorded high priority to integrating environmental concerns into program implementation and has included a broad spectrum of working policies. The Tenth Plan has adopted the following working policies:

- (i) To prevent degradation of natural resources, biological diversity, and cultural heritage;

- (ii) To increase local participation in environment conservation, according to the Local Self Governance Act 1999;
- (iii) Municipalities are to prepare and implement land utilization and waste management plans. Mandatory construction of sewage treatment plants while implementing city and settlement development plans. Take special initiatives in environment conservation, such as declaring plastic-free zones, provide aid to local authority through environment conservation trust;
- (iv) Contribution of women's groups to environmental conservation will be encouraged;
- (v) Different communities will be encouraged to improve their surrounding environment on the basis of self-awareness and motivation;
- (vi) Improvements, conservation, and management of nationwide natural, cultural, and religious spots will involve local authorities. The role of nongovernment organizations, community organizations, and the private sector will be encouraged;
- (vii) To mitigate environmental degradation in the lower regions by development activities in the upper regions (hydropower, irrigation) and to introduce rehabilitation programs;
- (viii) Municipalities will be the designated institutions for vehicular emission testing and issuance of certificates;
- (ix) Introducing monitoring and appraisal systems in the implementation stage of projects that have undergone environment impact assessment;
- (x) A central mechanism will be established to coordinate different programs for implementation of international conventions relating to environment (e.g., climate change, desertification, Basel Convention on Hazardous Substances);
- (xi) Air, water, and sound pollution standards will be determined and programs implemented giving emphasis to an effective monitoring system;
- (xii) To manage and control industrial pollution, appropriate financial policies and legislative systems will be prepared and implemented;
- (xiii) Environmental education will be integrated in formal and informal education, and necessary improvement in syllabuses will be made;
- (xiv) To make environmental education effective, necessary acts and regulations will be formulated and reviewed;
- (xv) Scientists, technicians, and researchers will be encouraged to promote new technologies in the area of environmental conservation;

- (xvi) Priority will be given to implementing the Sustainable Development Agenda for Nepal 2003;
- (xvii) Conservation-related traditional behavior, technology, and others will be documented and preserved. Likewise, an environmental information and database will be established and improved;
- (xviii) To establish an environment conservation center under the ministry concerned emphasizing the utilization of human environmental resources;
- (xix) Prepare conservation-related directives and methodology for the World Trade Organization and make exports eco-friendly.
- (xx) Emphasize an integrated development plan on the basis of the interrelationship between highlands and lowlands;
- (xxi) To control the environmental impacts from glacial lake outburst floods, necessary studies and research will be conducted, including monitoring of different variables related to climate change;
- (xxii) Different strategies will be formulated for the environmental management of the industrial, forestry, and agricultural sectors and river systems;
- (xxiii) Different action plans will be formulated and implemented regarding management of different groups of urban wastes under a solid waste management program;
- (xxiv) Necessary programs will be implemented in coordination with related agencies for the conservation and sustainable utilization of the Bagmati, Bishnumati, and Manohara rivers inside Kathmandu Valley; and
- (xxv) Utilization of renewable energy sources will be encouraged.

The major working plans and programs approved by the government and incorporated in different development plan documents (see Table 9.1), that support the delivery of environmental objectives include the National Forestry Plan 1976; Forestry Sector Master Plan 1989; Master Plan for Livestock 1991; National Environmental Policy and Action Plan 1993; National Biodiversity Action Plan 1995; Agriculture Perspective Plan 1995; National Plan of Action on Habitat 1996; National Action Program on Land Degradation and Desertification 2004; and National Water Plan 2005.

In addition to the above, community forestry programs initiated in 1993 (MOFSC 1993a) have been expanded to almost all parts of the country. As of March 2000, about 0.65 million ha of national forests have been handed over to more than 9,000

community forestry user groups. About 1 million local people directly benefit from this process.

Based on the experience of community forestry, the Government has also started soil conservation and watershed management activities with people's participation. A participatory watershed management system is in place in a number of districts for the conservation and rehabilitation of degraded watersheds. Community groups are now actively involved in terracing and conservation plantation on degraded hill slopes, and in water source protection.

User groups have also been mobilized to manage the buffer zones of the Terai national parks and reserves since the mid-1990s. This approach has been expanded to all the protected areas in the country (9 National Parks, 3 Wildlife Reserves, 3 Conservation Areas, and a Hunting Reserve) in a phased manner. Local user groups have been instrumental in managing Nepal's conservation areas and utilizing natural resources for community development in a sustainable manner (MOFSC 1996).

The Government introduced a vehicular pollution control program in 1996. Vehicle mass emission standards were introduced in 1999 and in 2000. The Government has also established monitoring stations to ensure regular monitoring and evaluation of pollution levels in Kathmandu Valley.

The Tenth Plan has also incorporated strategies, policies, and working programs for the management of natural and human-induced disasters in the country. The objective is to ensure security of human lives and property by managing natural and human-induced disasters systematically and effectively and by making the development and construction related programs sustainable, reliable, and gainful. While formulating plans and policies on disaster management, emphasis will be given to the use and development of technologies that lessen harm to the environment. The relief and rescue activities provided by the state will be made transparent. Programs will enhance awareness regarding disaster management. The Seismological Measurement Center and the Natural Disaster Management Center will be strengthened (NPC 2002).

The Tenth Five Year Plan has envisaged several plans for disaster management. These include an integrated information system to coordinate the efforts of national and international organizations working in disaster management; a central database system at the center and district database systems in the districts; storing disaster relief materials in storage centers in all five regions; preparation of geological maps of the country; identifying areas that can be affected by natural disasters; collecting information and updating the catalogue of

earthquakes; and awareness raising programs about possible damage from water-induced disasters. In addition to preparing hazard maps, application of geo-engineering and the use of geo-environmental maps will be undertaken to regulate physical infrastructure development and disaster management and carry out relief programs for people affected by disasters.

Effectiveness of Environmental Policies, Plans and Programs

Although the Government has accorded a high priority to resolving environmental problems and has formulated comprehensive sets of policies, plans, and programs, their effectiveness has been below expectations. These policies have failed due to inadequate focus on cross-cutting issues, continuous intervention by political parties, the inability of national advisory bodies to function properly, the inability of policy institutions to implement policy, and most important, lack of adequate resources. Key national agencies like the NPC and sectoral ministries have not been proactive in implementing approved policies and programs, and the Government has failed to attract the participation of the private sector. In this regard it is worth mentioning that under grant assistance from the Asian Development Bank (ADB), a study was conducted by MOPE in cooperation with the Bank on institutional strengthening of the Ministry of Population and Environment (MOPE) which was completed in 1999. However the recommendations of the study report were never implemented (ADB and MOPE 1999).

Monitoring of project implementation has been poor. Moreover, the key environmental body until recently was MOPE, which was never funded to the extent needed to fulfill its mandate. Similarly, sectoral agencies were unable to fully implement regulations due to lack of funds and inadequate infrastructure capacity. Those agencies whose main mandates were not environmental had only enough capacity to fulfill their own priorities, so environmental requirements were relegated to second place and, more often than not, left unattended.

The political instability that has plagued Nepal for the last 14 years has also played a role. Agencies have found it difficult to address environmental problems comprehensively because of frequent changes in senior staff and political interference in program implementation (NPC 1997).

Regulatory Framework

Legislation

The Constitution of the Kingdom of Nepal, 1990 (Part 4 Article 26: State Policies) stipulates the following principles:

- (i) The state shall pursue a policy of mobilizing the natural resources and heritage of the country in a manner useful and beneficial to the interest of the nation; and
- (ii) The state shall give priority to the protection of the environment and also to the prevention of its further damage due to physical development activities by increasing the awareness of the general public about environmental cleanliness, and the state shall also make arrangements for the special protection of rare wildlife, forest, and vegetation.

The Environment Protection Act 1996 and the Environment Protection Regulations 1997 are the two main legal documents providing for environmental information and public participation in the EIA process. The Act and Regulations provide a legal basis for protecting the environment and controlling pollution. They propose measures for pollution control through permitting environmental inspection, establishment of environmental laboratories for monitoring pollution and conservation, creation of an environmental protection fund, and an environment protection council, providing incentives to business, and awarding compensation for adverse environmental impacts.

The Local Self Governance Act 1999 provides more autonomy to village development committees (VDCs), district development committees (DDCs), and municipalities by empowering local authorities to manage natural resources, and guides them to integrate environmental resources and environmental planning. Highlights pertaining to environmental governance include the following:

- (i) The Act requires wards to help in protection of environment through plantation and stipulates the rights and duties of the VDC;
- (ii) It empowers VDCs to levy taxes on utilization of natural resources;
- (iii) It provides powers to formulate and implement plans for conservation of forest, vegetation, biological diversity, and soil; and
- (iv) It provides power to formulate bylaws in the area of management of all natural resources.

Standards

Most of the existing environmental standards and norms were developed and put into effect during the

1990s. EIA guidelines were developed by the NPC in 1993 and legitimized by MOPE in compliance with the provisions of the Environment Protection Act 1996. These standards serve as national norms for mitigation of environmental damage caused in the construction of development projects. In addition, norms prescribed by different line agencies help implement infrastructure projects in an environmentally conscious manner. The Foods Department under the Ministry of Agriculture and Cooperatives has developed specific quality standards under the prevailing Food Act 1967 that include guidelines for 87 edible products (MOAC 1967). Similarly, the Department of Electricity Development under the Ministry of Water Resources has developed safety standards for the construction of hydropower projects; the installation and operation of electro-mechanical equipment, transmission, and distribution systems; the operation of hydropower dams; and others. These standards also have mandatory provisions for the protection of the surrounding environment, including the protection of aquatic and animal life. In cases where standards are still being developed (such as national standards for drinking water), World Health Organization (WHO) or other standards are being applied in the interim. Details of some environmental standards developed by different public sector agencies of Nepal are provided in Appendix 9.1.

International Commitments

To date, Nepal is a signatory or party to 21 environment-related conventions and is obligated to fulfill its commitments to them at national and global levels. The seriousness of Nepal's commitments to these conventions has been demonstrated over the past 10–15 years by the enforcement of relevant policies and strategies, by the establishment of an institutional and regulatory framework, and by the implementation of different environmental programs. In particular, the Ninth and Tenth Five-Year Plans have reflected strong commitments to prioritize and implement provisions of the international treaties/conventions on the environment.

Nepal is actively involved in the following conventions: United Nations Framework Convention on Climate Change; Vienna Convention on the Protection of the Ozone Layer; Convention on Biological Diversity; UN Convention to Combat Desertification; Convention on International Trade in Endangered Species of Wild Flora and Fauna; Ramsar Convention on Wetlands; International Tropical Timber Agreement; and Convention on Persistent Organic Pollutants.

Many activities are being carried out to implement programs related to these conventions. This is taking place at the national level by different government agencies like MOEST, the Ministry of Forest and Soil Conservation (MOFSC), and NPC, and other stakeholders in cooperation with various NGOs, INGOs, and experts on relevant subjects under financial and technical assistance from multilateral and bilateral organizations (MOPE 2002). One such example is the joint study by MOPE and the Department of Hydrology and Meteorology with support from United Nations Environment Programme (UNEP) on enabling activities for the preparation of the initial communication related to United Nations Framework Convention on Climate Change (MOPE 2002). The Environment Sector Program Support (ESPS) project conducted by MOPE from 2001 to 2005 with Danish International Development Agency (DANIDA) support, which included institutionalization of environmental management aspects, industrial water treatment activity, and improvement of energy efficiency of industries for cleaner production, is another example. Similarly a study was conducted by MOPE on institutional strengthening of the EIA process for hydropower development in Nepal with the Norwegian Agency for Cooperation and Development (NORAD) support during 2002–2004.

The results of such studies are contributing to the updating of relevant data and information and are helping to improve plans and programs for environmental management at the national level. They are also serving as useful inputs for information sharing with the international community.

Unfortunately, procedural delays are common in the ratification of some important international environmental treaties and conventions, and their obligations are not being fulfilled on time. For example, although Nepal is a party to around 21 environment-related international conventions and treaties, it has only been able to ratify a few of them so far. The major reason is the failure of the agencies concerned to understand the technical aspects of the subject. Other reasons include a lack of initiative and capacity on the part of MOPE, which until 2005 was the key agency responsible for environmental administration. Ideally, the policymaking agencies concerned and key environmental bodies of the Government should review the status of these commitments and coordinate their actions to comply with their obligations.

A list of the major international environmental conventions in which Nepal has participated, together with their related obligations and status of implementation, is provided in Appendix 9.2.

Sub-regional Linkages

Other developing countries in the region have also been encountering serious environmental problems. Many countries are experiencing the same challenges of developing legislative and institutional frameworks appropriate to their conditions. It might be beneficial for Nepal to establish linkages with the relevant environmental institutions of these countries. Such exchanges of information and experiences on the successes or difficulties of planning and implementing environmental programs would further enhance capacity building in this area.

South Asian Association for Regional Cooperation (SAARC) has been a very useful forum for this. The South Asia Cooperation for Environment Program (SACEP) and UNEP have also taken many initiatives to promote regional cooperation in South Asian environmental management. For example, UNEP has been supporting South Asian countries in conducting different activities related to understanding climate change and devising measures to combat their impacts. Similarly, SACEP has been conducting studies and preparing handbooks on national environmental legislation and institutions for these countries under the UNEP/SACEP/NORAD publication series on environmental law and policies (UNEP et al. 2001).

In recent times, the need for well-established linkages between energy, the environment, and the economy has been recognized strongly in South Asia. In this context Nepal can also benefit from regionalizing its environmental activities.

Enforcement of Environmental Laws and Standards

Nepal's environmental laws can be broadly divided into two categories. The first includes laws directly designed as legal provisions for the protection of the environment and conservation of natural resources; for example, the Environment Protection Act 1996 and its Regulations 1997, National Parks and Wild Life Conservation Act 1973, Soil and Watershed Conservation Act 1982 and Regulations 1985, and EIA Guidelines 1993. The second category includes those directly or indirectly influencing the environmental protection process but aimed at promoting and managing sector-specific development programs such as the Forest Protection Act 1967, Industrial Enterprises Act 1992, Pesticides Act 1991, Solid Waste

Management and Resource Mobilization Act 1987, and Vehicle and Transport Management Act 1992 and its Regulations 1997. All acts have to be approved by Parliament on recommendation of the Government, while the Government, on recommendations of the respective ministries, approves regulations defining detailed procedures for implementation of the respective acts.

Legal provisions in the first category including the Environment Protection Act and Regulations, and EIA Guidelines are directly enforced by MOEST which also monitors their application. The legal provisions of laws in the second category are enforced and their application monitored by the respective ministries. For example, rules and regulations related to the use of pesticides are enforced and monitored by Ministry of Agriculture and Cooperatives; regulatory instruments related to forestry, biodiversity, and similar are enforced and monitored by MOFSC; and legal provisions under the Local Self Governance Act 1999 are enforced and monitored by local government bodies like DDCs and VDCs. Similarly, some key environmental standards developed by MOEST are enforced by MOEST itself, whereas sector-specific environmental standards are developed and enforced by the respective ministries. Regulations and standards on control of urban wastes are developed by MOEST and enforced by the municipalities. However, MOEST has also been empowered to cross check and monitor implementation of sector-specific laws and compliance of standards.

Lack of inter-agency coordination, inadequate skilled personnel, poor and weak mechanisms of control and supervision, inefficiency of public administration, lengthy decision making processes, lack of coordination between the Government and NGOs, instability of the Government, lack of appropriate technology, illiteracy, and lack of mass awareness are some of the major reasons for weak enforcement of environmental legislation. The difficulties associated with effective enforcement of legislative instruments stem from the fact that MOEST and other sectoral agencies are fragmented in their approach to monitoring. Monitoring is weak and uncoordinated, strict measures for enforcement are lacking, and non-compliance is rampant. Prior to formation of MOEST² in 2005, MOPE was the key government body on environment in Nepal. However, MOPE was not successful in enforcing environmental laws and regulations in the country. Moreover MOPE remained weak in monitoring and evaluating the environmental performance of other environment related agencies. These agencies also

² MOEST was formed in 2005 by annexing the Environment Division of the former Ministry of Population and Environment (MOPE) and joining it to the then existing Ministry of Science and Technology (MOST), which was then restructured into MOEST.

have roles to play in some aspects of monitoring. However, here the problem is even worse, since environmental monitoring is not their main mandate. Besides they also face scarcity of funds. These agencies are more occupied with achieving their own agendas than ensuring that environmental requirements are complied with. For them environmental matters are usually of secondary importance if any at all (MOPE and ESPS 2003). For example, the Ministry of Industry, Commerce and Supplies has been more concerned with meeting their targeted product outputs than with complying with the environmental standards prescribed by MOEST (and before that MOPE) for industries. Collecting all the legal instruments scattered through multiple sectoral bodies into a single common legislation might rectify some aspects of this situation.

The Environment Protection Act and Regulations, and SEA and EIA procedures are themselves in need of updating and modification to keep them relevant to changing demands. At the same time, major existing provisions of IEE and EIA prescribed in the Environment Protection Act and Regulations are unclear and not comprehensive and require revision. Due to lack of funds, implementation of EIA provisions has not been effective. In the meantime national coordinating bodies like NPC and the Environment Protection Council are not paying the necessary attention to strict enforcement of legal provisions of EIA by different agencies. From the Tenth Plan, the NPC has introduced the concept of SEA, which could be very useful for environmental screening and proper planning of sectoral programs; however, the process still needs to be properly institutionalized and adequately documented. As a result of inefficiencies throughout the system, the implementation of environmental guidelines is often delayed.

Major Stakeholders

The environmental institutions in Nepal include different public and private sector stakeholders that can be categorized broadly as follows.

Judicial bodies. The Supreme Court, Appellate and District courts.

Advisory bodies. National Development Council, NPC, National Water Resources Development Council, Environment Protection Council, National Commission on Sustainable Development, Water and Energy Commission, National Biodiversity Coordination Committee, and others.

Policymaking bodies. Parliamentary Committee on Environment Conservation; line ministries including Ministry of Environment, Science and

Technology; Ministry of Forest and Soil Conservation; Ministry of Physical Planning and Works, Ministry of Water Resources; Ministry of Industry, Commerce and Supplies; Ministry of Local Development, Ministry of Defence, Ministry of Home Affairs; Ministry of Agriculture and Cooperatives; and Ministry of Labour and Transport Management. Policymaking bodies also include the Department of Hydrology and Meteorology, Nepal Bureau of Standards and Metrology under the Ministry of Industry, Commerce and Supplies, and the Central Food Research Laboratory under the Ministry of Agriculture and Cooperatives.

Corporate and local bodies. Nepal Electricity Authority; Nepal Agricultural Research Council, Royal Nepal Academy of Science and Technology, Solid Waste Management and Resources Mobilization Center, Nepal Water Supply Corporation, DDCs, VDCs and metropolitan and municipality administrations.

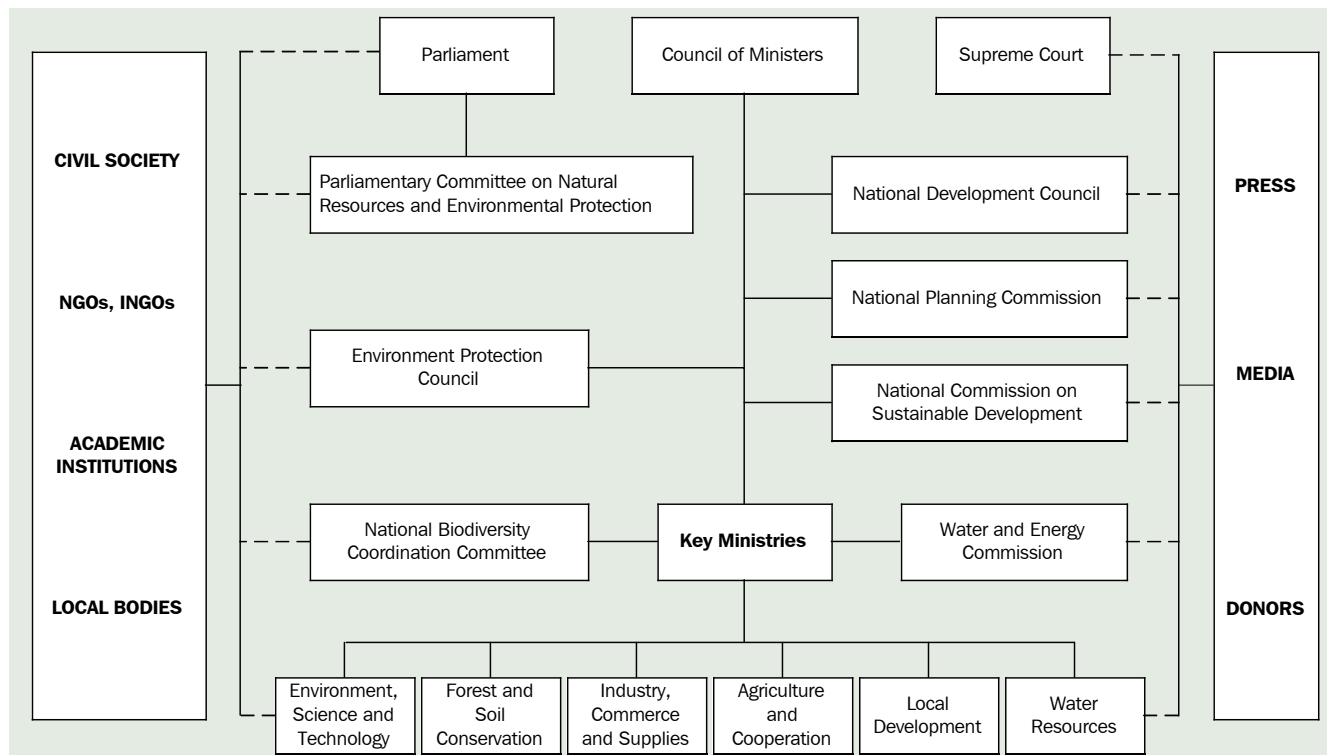
Private sector organizations and NGOs. Federation of the Nepalese Chambers of Commerce and Industries, statutory NGOs such as King Mahendra Trust for Nature Conservation, and other NGOs (see Appendix 9.3) registered under the Association Registration Act and affiliated with the Social Welfare Council; Federation of Community Forestry Users, Nepal; and Federation of Water Users Associations, including various community-based organizations and professional societies.

Academic institutions. Kathmandu University, Tribhuvan University, College of Information Technology, and School of Environment Management Systems based in Kathmandu are contributing towards the preparation and training of environmental professionals.

The media. The media in Nepal has been very active in bringing issues and problems of environmental concern to the public's attention and this has contributed to better and continued surveillance. Media focus has also prompted relevant government and private agencies to undertake projects aimed at environmental improvement. Frequently published articles in dailies like Kantipur, The Kathmandu Post, The Himalayan Times, and Nepal Samachar Patra, and other popular weekly publications like the Nepali Times, Himal, and Spotlight, as well as media programs conducted by agencies like the Nepal Forum for Environmental Journalists and Society of Environmental Journalists Nepal serve as examples.

Civil society. With heightened and improved awareness, civil society has in general demonstrated its serious concern for the environmental situation of the country and has been proactive in supplementing the Government's efforts to bring about improvements.

Figure 9.1: The Key Environmental Institutions in Nepal



INGO = international nongovernment organization, NGO = nongovernment organization
 Source: Compiled from various sources

In spite of this large number of stakeholder institutions and good intentions on the part of all concerned, performance on environmental matters remains poor. The most serious impediment to progress on environmental issues remains the lack of inter-stakeholder coordination. This lack of coordination has led the different agencies to work in isolation and has impeded addressing environmental management in a holistic manner. Stakeholders need to be networked and streamlined to maximize benefit from their joint efforts. The hierarchical linkages of key environmental institutions are shown in Figure 9.1.

Role of Key Environmental Stakeholders

Parliamentary Committee on Natural Resources and Environmental Protection

The Parliamentary Committee on Natural Resources and Environmental Protection provides guidance to and oversees government actions in initiating natural resources conservation and environmental protection. As a legislative body, the Committee also has authority to give directives to, and seek information and clarification from, the executive branches of the Government on natural resources

and the environment. The committee is headed by an independent chairperson elected from among the members of Parliament.

National Development Council

The National Development Council is the highest policy-level body of the country and is chaired by the prime minister. The council is mandated to provide guidance over major policy issues and periodic plans, including all aspects of natural resources conservation and environmental protection. It is composed of all cabinet ministers, all members of the NPC, chairpersons of the various parliamentary committees and selected chairpersons of the DDCs, and the leader of the main opposition party in the house, as well as other prominent parliamentarians, representatives of key private sector organizations, and intellectuals. The NPC serves as the secretariat of the Council.

Environment Protection Council

The Environment Protection Council is a high-level national body focusing on management and protection of the environment; it is chaired by the prime minister. It was established in 1992 and comprises ministers of relevant ministries, senior civil officials, representatives of NGOs and the private sector, and individual environmental professionals. MOEST is the secretariat of the Council.

The Council provides guidance on the formulation of environmental policies, their legal framework, procedures, and policy implementation. It provides guidance on the management of natural and physical resources and coordinates environmental activities among the relevant national agencies, taking into account the EIA of project developments, dissemination of information on the environment, and promoting environmental awareness and education.

Judiciary

The judiciary is the guardian of the constitutional and legal system of a country. It is responsible for the protection of constitutional and legal rights. Most of the legal norms related to sustainable development concern people's basic rights like the right to development, right to information on the exploitation of natural resources, right to a healthy environment, right to participate in decision making, right to a fair and equitable share of the fruits of development, and so on. When the judiciary plays an effective role to protect these rights, it leads towards achieving sustainable development (HMG 1990).

Nepal has a pyramid judicial structure, with a single Supreme Court at the apex, 11 Appellate Courts, and 75 District Courts. Under the Constitution, the King at the recommendation of the Judicial Council appoints Supreme Court judges, a body composed of senior judicial officers. Supreme Court judges can only be removed on the stated grounds pursuant to a determination by a two-thirds majority of a sitting House of Representatives. The Judicial Council may remove lower court judges from office following a recommendation to that effect. The Act also provides for independence of the judiciary.

The Judiciary has promoted the development and enforcement of legal norms in the field of sustainable development by exercising its powers under Part 11 of the Constitution and by the provisions of other Acts and Regulations adopted by the Government from time to time (HMG 1990). Article 88 (2) of the Constitution has conferred such powers to the judiciary, which are extremely important for the enforcement of legal norms related with sustainable development.

National Planning Commission (NPC)

Chaired by the prime minister, the NPC is an autonomous government body charged with formulating all national and sectoral policies, and development of periodic plans, as well as short-term and long-term plans and programs. The Government appoints the members of the NPC, including the vice-chairman. It has an environment division headed by one of its members responsible for policy planning,

programming, budgeting, monitoring, and review of all environment-related activities in the country.

Ministry of Environment, Science and Technology (MOEST)

MOEST was established as a new Ministry mandated to carry out environmental activities early in 2005 following dissolution of the Ministry of Population and Environment (MOPE). After the establishment of MOEST, the environment division of MOPE was moved to this Ministry.

MOPE had been created in September 1995 to act as the focal point for the interrelated areas of population and environment. Its main responsibilities included (i) formulation and implementation of policies, plans, and programs; (ii) preparation of acts, regulations, and guidelines; (iii) undertaking surveys and research studies; (iv) dissemination of information; (v) monitoring and evaluating programs; and (vi) human resources development for the environment sector.

MOPE's scope of work included two broad categories of activities: primary and supportive. Primary functions included activities executed on the initiative of the ministry in cooperation with other agencies. Cooperation and assistance extended to other ministries and agencies in executing their own programs and activities are the supportive functions.

With the environment division now moved to MOEST, MOEST has taken over all the environmental functions of MOPE.

Ministry of Forest and Soil Conservation (MOFSC)

The MOFSC is responsible for formulating and implementing plans, policies, laws, and programs for the conservation of forest resources and their management; as well as for administering and monitoring their implementation. The ministry also prepares guidelines and manuals for forestry development, conservation and protection of biodiversity and wildlife, soil conservation, watershed management, and protected areas.

MOFSC operates through five central departments and a research center.

- (i) The Department of Forest administers the forests and rangelands throughout the country, which account for about 47% of the total area of Nepal;
- (ii) The Department of Plant Resources is responsible for botanical research on forest species and their promotion;
- (iii) The Forest Products Department Board promotes the economic and sustainable utilization of wood, medicinal and aromatic

- plants, and other non-timber forest products by developing suitable technologies and processes for utilizing such products;
- (iv) The Forest Survey and Research Center acts as an autonomous body in conducting forestry related research and surveys;
 - (v) The Department of National Parks and Wildlife Conservation is responsible for the management of the national parks and protected areas as well as biodiversity conservation; and
 - (vi) The Department of Soil Conservation and Watershed Management bears responsibility for carrying out soil conservation activities and watershed management.

The ministry has offices in all 75 districts, and regional offices to conduct different activities related to development and management of the forestry sector.

Ministry of Industry, Commerce and Supplies

The Ministry of Industry, Commerce and Supplies is responsible for promoting industry in the country without compromising environmental management. The ministry controls industrial pollution in both new and existing industries. It is also responsible for preparing and enforcing legislation and regulation on industrial pollution, water discharges from industries, and developing industry-specific discharge standards for air and waterborne environmental contamination. A separate unit on Environment and Technology Transfer also exists within the ministry.

Operating under it are the Department of Industry, the Department of Cottage and Small Scale Industries, and the Cottage and Small Industry Promotion Board. The Department of Industry and the Department of Cottage and Small Scale Industries have environment units for enforcing discharge standards, applying IEE and EIA to industries, issuing permits for industrial establishments, and monitoring emissions and effluent discharges.

The Nepal Bureau of Standards and Metrology, under the ministry, is responsible for setting standards for air, water, and other environment-related components. It also enforces the above standards and fixes effluent and emission standards for industries and motor vehicles.

Ministry of Local Development

The Ministry of Local Development is responsible for formulating policies, plans, and programs on rural and town developments and monitoring their

implementation, taking into consideration their environmental implications. The ministry also implements the environmental provisions made in the Local Self Governance Act 1999 through its local organs and local bodies like DDCs and VDCs in collaboration with local communities and user groups.

Ministry of Agriculture and Cooperatives

Besides its main jurisdiction of agriculture and livestock development, the Ministry of Agriculture and Cooperatives is responsible for formulating policies, standards, and legal instruments related to environmentally sensitive products and control of agricultural pollution. It operates through its regional and district offices in all five development regions and 75 districts. The key entities under the ministry are the Nepal Agricultural Research Center, the Department of Agriculture, the Department of Livestock Services, Nepal Tea and Coffee Development Board, the Dairy Development Board, and the National Seed Development Board. The Central Food Research Laboratory under the ministry implements the Food Act 1966, the Animal Feed Act 1976, and corresponding regulations.

Ministry of Water Resources

The Ministry of Water Resources is responsible for all activities related to the development of water resources, electricity, irrigation, alternative energy development, and management of water-induced disasters. The ministry has an independent policy-planning wing—the Water and Energy Commission Secretariat—responsible for planning of water resources based on strategic environmental evaluation and assessment of environmental impacts of the water development projects. The Commission Secretariat developed a comprehensive Water Resources Strategy for Nepal in 2002 and a National Water Plan for implementing its provisions in 2004 (WECS 2004) giving high priority to environmental concerns and their management as an indivisible part of all these plans and programs. The ministry also has an environment division responsible for identification and management of environmental implications of water resources development.

Nepal Electricity Authority

The Nepal Electricity Authority is a semi-government public utility responsible for the generation, transmission, and distribution of electric power throughout the country. It operates through six directorates and 12 departments and has field offices in almost all 75 districts of Nepal, engaging around

10,000 employees at different levels. The Nepal Electricity Authority is the key agency for construction and maintenance of power projects (mainly hydro-based). It contains a well-established environmental directorate with around 25 officers and support staff. EIA of all hydro projects has been made mandatory in the project development process. Environmental management plans of all projects are executed under the supervision of this directorate.

Ministry of Physical Planning and Works

The Ministry of Physical Planning and Works has two major wings—one for construction of roads and highways, another for extension of water supply and sanitation projects. The Water Supply and Sanitation Department develops rural water supply schemes and hands them over to community water users, while the Nepal Water Supply and Sewerage Corporation, established in 1998, is responsible for water supply and sewerage schemes in urban areas, mostly municipalities. The ministry itself and all departments under its supervision have environment divisions headed by senior officials, some of them environmentalists. The Melamchi Water Supply Scheme is being developed for diversion of 170 million liters of water per day from the Melamchi river (Sindhupalchowk district) to Kathmandu Valley. A special division is responsible for supervising and implementing all environmental programs envisaged in the project.

Similarly, the roads department of the ministry is responsible for constructing and managing roads and highways, giving due priority to environmental aspects. It takes into consideration the EIA and implementation of environmental management plans at planning, executing, and maintenance stages. These are being managed by the geo-environmental division of the department.

Municipalities

Kathmandu Metropolitan City has a population of about 1.8 million people (CBS 2002). Major environmental problems in Kathmandu Valley include solid waste disposal, air and water pollution, unmanaged slums, and shortage of potable water. Degraded sanitary conditions are causing health and other problems. The city created an environment division in 1997 which carries out environmental management and conservation programs within the metropolitan area. The key functions of the environment division are solid waste management, participation in urban environmental management—including air pollution control and sewage management—and development of green areas within the metropolitan area. It conducts its activities

in collaboration with MOEST, the Nepal Tourism Board, and other environmental NGOs active for environmental improvement of Kathmandu Valley.

The other two sub-metropolitan cities of Kathmandu Valley, Lalitpur and Bhaktapur, have also created environmental sections to implement and monitor environmental programs within their jurisdictions.

Other large municipalities in the country outside Kathmandu Valley have also initiated environmental management programs.

Overall Performance of Environmental Governance

Environmental governance refers to the functioning of stakeholder organizations under the framework of prevalent rules and regulations to deal with environmental problems. Environmental governance in Nepal has not been very effective.

Key reasons for ineffective environmental governance in Nepal have been the frequent changes in governments, government's poor functioning, and inadequate attention paid to the increasing urban and rural environmental problems. Others include absence of long-term environmental policies, weak enforcement of environmental laws, malfunctioning of national decision- and policymaking bodies, inability of environmental institutions to streamline activities into the national socioeconomic development process, insufficient funding, and low morale. These deficiencies have been compounded by inefficient public administration in general, weak monitoring, non-responsiveness of the environmental agencies to public opinion, and non-execution of recommendations of many studies conducted for the environment sector through donor support.

The Government has created and dissolved environmental institutions frequently, without providing them sustainability or continuity, being guided mainly by political motivations. This has brought instability and distortion to the process of environmental governance. One of the most recent examples of such change was the dissolution of MOPE in 2005 after 10 years of existence and annexation of its environment division to MOEST. Some think it might have been more effective to restructure MOPE and strengthen it to maintain its independent identity and improve its performance.

Institutional and regulatory efforts in Nepal towards the conservation of natural resources and management of environmental issues have had little impact due to the different factors and constraints encountered. The underlying reasons for poor

environmental governance can be better understood by reassessing environmental performance to date and identifying areas where changes are needed.

Socioeconomic Factors Impeding Good Environmental Management

Nepal's poor record on the environment stems from the fact that Nepal is a country in transition with a poor economy and is confronted by many other major challenges of infrastructure development. The continuing political instability and security problems are adversely impacting both the economy and the environment. Frequent changes in governments, the lack of a parliament for prolonged periods, and the present conflict situation have all contributed to undermining organizational capacity, and outreach and monitoring at all levels. These have severely undermined progress in environmental management. Poverty is forcing poor people to indiscriminately use and overexploit natural resources for daily survival.

Although the Government maintains that promoting environmental activities is a high priority, budgetary allocations remain grossly inadequate, and provisions for obliging communities to sustainably manage environmental resources remain lacking. Inadequate advocacy and awareness of the importance of protecting and managing the environment are prevalent. Lack of awareness in urban areas has resulted in increased pollution from the misuse and abuse of resources and environmental mismanagement, while lack of awareness in rural areas has resulted in unsustainable use of natural resources.

Under-funded Environment and Natural Resource Mandates

Public sector institutions such as ministries, departments, and corporate bodies are short of technically skilled human resources specialized in the various environmental fields. Lack of the funds needed to execute their mandates means that the databases, research facilities, and laboratories needed for environmental monitoring are lacking (see Chapter 10). This situation has made environmental institutions dependent on external facilities. For example, MOPE, even after 9 years of existence, did not have a laboratory of its own for emission testing of vehicles and depended on the facilities available with the traffic police office. Local government bodies at the district and village levels also need technical staff, facilities, and funding, without which they cannot execute their mandated environmental activities as promoted by the Local Self Governance Act 1999. The same situation with

respect to instrumentation and staff prevails among NGOs and the private sector. Lack of logistical support has prevented agencies concerned from making field trips to project sites to carry out environmental surveillance and monitoring activities.

Well-trained technical staff are in short supply and while two universities (and a number of colleges) have taken up the challenge of training environmental experts and giving environmental training to students in related disciplines, they need to be more actively encouraged and supported. Environmental departments need to make costly investments in instrumentation for hands-on training, and this also needs to be reviewed. To date it has been difficult to attract young people to environmental disciplines since it is known that environmental staff are poorly remunerated. The morale of graduate-level environmental staff is low. Because they are not categorized as an "environment group" by government administrative rules, they are deployed under miscellaneous groups, which not only negatively impacts their careers but also discourages new recruits.

Conflicting and Overlapping Mandates

Conflicts and problems related to overlapping mandates appear in many areas but are especially prevalent between institutions with long histories and those that are relatively new. There is a strong need to review all existing sectoral environmental legislation and harmonize it. Here we cite examples that can arise between different agencies and ministries to show how pervasive the problems are.

Conflicts arise, for example, in cases which involve forested areas. As per the provisions of the Environment Protection Act and Regulations, MOEST is authorized to approve EIA reports on development projects (like transmission lines and hydropower plants). Nevertheless, the Forest Act 1993 says that in cases where such projects involve forested areas, MOFSC also has the right to review and reject them. Lack of expertise and facilities means that the approval process by MOFSC may take a long time, and often these delays compromise project viability. Experiences of program implementation reveal that while awaiting an environmental decision, developers often take matters into their own hands and clear extra forests and inflict other damage. Legislation and human resources to monitor or prosecute this behavior are weak or lacking, and in the process projects of possibly national importance are jeopardized.

Similarly, the National Parks and Wildlife Conservation Act 1973, amended 1993, prohibits any outside interference in projects undertaken in protected areas. While MOFSC cannot overrule the

park management, this legislation nevertheless conflicts with MOFSC's mandate to oversee all forest administration. Similarly, if in trying to fulfill its mandate as the overseer of all forests MOFSC undertakes projects in forested protected areas, these can be vetoed by park authorities. Other conflicts over forested areas arise from the fact that under Environment Protection Act rules, MOEST can declare certain forested areas to be conservation areas. MOFSC has the same mandate under the Forestry Act. While the discussions over jurisdiction continue, important forest areas continue to degrade, as do watersheds, wetlands, and river basins.

Agriculture-based private industries registered with the Ministry of Industry, Commerce and Supplies can sell imported products such as fertilizers and pesticides to farmers. When these products are of low quality, they can wreak havoc on agricultural production, the soil, the environment, and people's health. Since these industries are not registered with the Ministry of Agriculture and Cooperatives and one ministry cannot interfere with the jurisdictions of another, the Ministry of Agriculture and Cooperatives cannot prosecute their wrongdoing. In this turf war, the farmer ultimately loses. Yet another area of conflict arises because ministries have an obligation to monitor projects implemented under their jurisdiction; however, MOEST can also intervene to monitor them under the Environment Protection Act and Regulations. This creates confusion and conflicts between MOEST and the ministries concerned.

These examples illustrate the need for harmonization. In this process the advisory and policy making public sector bodies should coordinate efforts in consultation with the private sector organizations, corporate bodies, and local bodies.

Lack of Consolidated and Participatory Actions

Although government policies and plans commonly advocate the need for greater participation between the public sector, its central and local bodies, local NGOs, communities, and users' groups, it is difficult to see sufficient progress in this direction. While it is commonly acknowledged that the participation of all of these groups is a prerequisite to securing holistic support, timely delivery, and continued implementation of almost any environmental program, this advice remains largely unheeded; moreover, the will to secure this common participation needs prompting.

To date there are a few concrete vehicles for active community feedback. One such is the EIA

process. Public hearings and consultations at project sites are required several times as part of the EIA process. These consultations take place with different public and private agencies, NGOs, and the media. Major projects on hydropower development such as the Kali-Gandaki A project, the Pancheswor High Dam Project, Upper Karnali Hydro Project, and Middle Marshyangdi Hydro Project; some large irrigation projects like the Mahakali irrigation, the Sunsari Morang irrigation, and the Narayani Irrigation; and the Melamchi Water Supply projects have been widely discussed. The local communities, media, donors, and major stakeholders all participated; however, there is still room for improvement which would involve standardizing the process and ensuring that it is conducted more frequently.

Public consultations also take place in projects that involve community water supplies, farmer managed irrigation systems, and others. Here citizens' groups are actively encouraged to give feedback through public hearings. There is also regular coverage in the media on major environmental issues, mostly related to different types of pollution. Many environmental NGOs like the Martin Chautari Society, the Society of Environmental Journalists, and others have been voicing environmental concerns in different seminars and through FM radio and television channels.

Experiences of MOFSC and Nepal Water Supply and Sewerage Department indicate that projects that have active community participation like the community forestry programs and water supply schemes in rural areas often have better success rates. Efforts should be made to foster this participation by encouraging greater interaction among the project teams, contractors, consultants, communities, and local social groups on environmental projects, especially by promoting the involvement of Nepali environmental experts as consultants, advisors, and monitors, and by involving Nepali field-based NGOs.

Difficulties in Utilizing Donor Support

As government allocations are admittedly marginal, environment management in Nepal has been essentially donor-driven, and this situation has occasionally led to difficulties. It is often felt that donors could spend more time interacting with the Government to better understand Nepal's development needs, since it is always useful to harmonize government priorities and donor concerns, terms, and conditions. Donors often apply common models for all developing member countries when formulating their programs, whereas local socioeconomic and environmental conditions

can vary considerably. Both sides have recognized that more face-to-face interactions between the Government and donors are needed. The Nepal Development Forum, a group of different development partners of Nepal, has been addressing this need. Another common complaint is that the Government's lack of coordinating capability has often led to duplication in selection and implementation of projects. The Nepal Aid Group is helping donors to sort these issues out among themselves to enhance effectiveness of their assistance to Nepal.

Another common difficulty is that Nepal can often not accept all of the needed aid in a given sector because it does not have enough absorptive capacity to utilize all the available assistance from the donors. Often, significantly more capacity must be built before sophisticated or wide-ranging projects on the environment can be undertaken.

There are also occasional differences of opinion on the conditions set by different donors for providing loans, as their requirements, terms, and conditions often differ from each other. A common disappointment is that donors tend to select and approve consultants unilaterally, only completing the formalities of consultation with the client country just before signing the agreement. Given that payments to foreign consultants often take a significant amount of the loan, the frustration is understandable.

Institutional Strengthening and Capacity Building

After the establishment of MOPE (now MOEST) in 1995, a substantial number of environmental laws and regulations were developed. About half of the prevailing environmental laws now in force in Nepal date from 1992. Widespread public concern over pollution led to legislation to curb emission of effluents and airborne pollutants, while concern over the depletion of natural resources led to legislation for preserving conservation areas such as national parks and wildlife areas with special biodiversity value. While the laws exist in principle, institutional weaknesses continue to prevent the effective monitoring and implementation of these laws.

Institutions at all levels are weak, including the NPC, line ministries, local governments, and VDCs. Requisite technical skills are commonly lacking, and poor morale is a systemic issue. These deficiencies stem from the general weakness of the public administration system itself—over-staffing, low salaries, political interference in appointments and transfers, and inadequate performance recognition.

These in turn affect public resource management. The capacity to monitor the implementation of laws and public expenditures is weak at all levels. Inadequate supervision, poor financial management, dilatory government procedures, and lack of coordination among government entities are some other indicators, all of which lead to poor performance generally and to a serious neglect of environmental issues in particular.

Nepal needs to build up its capacity for national and regional development so that it can effectively participate in the global economy. There is a need to strengthen the public and private sectors, institutions, systems, processes, procedures, and practices that support development efforts. Improved capacity is needed to entrench and sustain good governance, design and manage effective policies and programs, manage the environment, address poverty, and apply science and technology to development problems. Capacity is also needed to accelerate regional development and for Nepal to participate with other regions as an effective partner in the global economy.

Improvements in the Legislative System

A large number of environmental acts and regulations have been promulgated in Nepal during the last 10–15 years to facilitate the implementation of environmental plans and programs, but these have had only limited success. This legislation now needs to be updated and amended to make it responsive to the present requirements of complex environmental concerns³ and rigorously enforced.

In addition, new regulations are needed to help Nepal take full advantage of World Trade Organization membership, which Nepal recently entered, becoming the 147th member. The main aim of membership is to improve Nepal's economy by opening up trade with the entire world. Policymakers and businessmen need to be aware of how to make the most of these opportunities and how not to be overcome by an open trading regime. One commitment made by Nepal was to amend the Environment Protection Act 1996 to complement the requirements related to trade and the environment. Nepal also needs to include provisions for developing additional environmental standards for protection of human and plant life. Amendments to existing legal provisions for capacity building of environmental cells in the Federation of Nepalese Chambers of Commerce and Industries and other major associations of commerce and industries will be required. Industries should be motivated to adopt

³ For example there is no provision in the Environment Protection Act and Regulations for control and management of hazardous waste from hospitals and nursing homes; and there are no guidelines on control of effluents being discharged by industries. Some other regulations related to the protection of the environment, conservation of biodiversity, and sustainable use of non-timber forest products also need amendments to prevent over-collection and illegal trade.

and comply with International Standards Organization (ISO) standards and eco-labeling of industrial products.

While it is clear that the existing environmental laws and regulations need to be reviewed, they also need to be enforced. Nepal's poor performance in the environmental sector has largely been a failure to fully empower regulatory bodies to enforce regulations, monitor compliance, and impose penalties. The environmental commitment of institutions nominally responsible for enforcement, such as NPC and MOEST, is weak and the enforcement piecemeal—there is a lack of enforcement modalities and a lack of coordination among the different agencies.

A strong institutional base is needed to monitor and back up the legal instruments applied to environmental conservation. In many cases law enforcement is thwarted due to poor institutional infrastructure, lack of institutional decentralization, or the constant shifting of responsibilities from one institution to another resulting in no one institution taking up the task at hand. A strong, transparent, and effective monitoring system that can support proper enforcement of laws and regulations is needed.

For example, to comply with international treaties, a list of rare and endangered species has been prepared by MOFSC. However, whether the aforementioned species are still endangered or rare is never scientifically monitored. Surveillance of legal instruments both internationally and nationally is lacking. Creating a repository of all the relevant environmental information in the country and making it accessible to all stakeholders through electronic means would help to make the system more transparent and easier to enforce.

Strengthening the EIA/SEA Framework

An effective monitoring and evaluation mechanism to review compliance with existing environmental laws is also needed. Under the provisions of the Environment Protection Act and Regulations, it is mandatory to assess the technical, industrial, and socioeconomic impacts of development projects on the environment and on the population. The agency concerned needs to approve the requisite EIA reports before any project is started. Projects without significant environmental impacts only need an IEE to be conducted by relevant agencies. The NPC has adopted and applied the concept of SEA for project development policies and programs included in the Tenth Five-Year Plan (2002–2007). While the EIA assesses environmental impacts of development projects at the project level, the SEA assesses environmental impacts of development projects at the planning, policy, and programming stages and

can be used in evaluating strategic proposals for appropriate decision making.

EIA and SEA capacity issues are acute. The EIA is still largely considered an “add-on” project burden, and EIA reports are commonly based on inadequate data. Although MOEST has already approved 25 EIA reports from different projects, it has not been able to monitor the proposed mitigation of identified impacts. Recent experience based on a cross-section of development projects shows that the EIA process is usually enforced as part of the initial approval process during approval of EIA reports by MOEST. However the problems come later at the implementation stage when actual site conditions differ from initial preliminary assessments.

From this perspective, capacity development in augmenting, mobilizing, and enhancing the EIA and SEA capability of a country, organization, professional body, or group of individuals is much needed for strengthening this sector. The knowledge, tools, and skills necessary to operate an EIA or SEA system to an acceptable level of performance have to be developed. The scope of capacity development can range from establishing preconditions for EIA or SEA development to benchmarking good practice. Supporting measures include research, policy analysis, institutional design, information exchange, training and skills transfer, building networks, professional development, and guidance on implementation of good practices.

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Appendix 9.1: Environmental Standards Developed by Different Public Sector Agencies in Nepal

Standards related to air quality are presented in Chapter 7, Appendix 7.1.

Table A9.1.1: Generic Standards: Tolerance Limits for Industrial (Wastewater) Effluents Discharged into Inland Surface Waters and Public Sewers

Serial Number	Parameter	Tolerance Limit		
		Industrial Waste into Inland Surface Waters	Wastewater into Inland Surface Waters from CWTP ^a	Industrial Effluents into Public Sewers ^b
1	TSS, mg/l	30–200	50	600
2	Particle size of TSS	Shall pass 850 -micron sieve	Shall pass 850 -micron sieve	
3	pH Value	5.5–9.0	5.5–9.0	5.5–9.0
4	Temperature °C ^c	< 40	< 40	<45
5	TDS, mg/l, max			2,100
6	Color and odor			
7	BOD for 5 days at 20 °C, mg/l, max	30–100	50	400
8	Oils and grease, mg/l, max	10	10	50
9	Phenolic compounds, mg/l, max	1.0	1.0	10
10	Cyanides (as CN), mg/l, max	0.2	0.2	2
11	Sulfides (as S), mg/l, max sulfates (SO ₄), mg/l, max	2.0	2.0	2.0 500
12	Radioactive materials: Alpha emitters, c/ml, max Beta emitters, c/ml, max	10 ⁻⁷ 10 ⁻⁸	10 ⁻⁷ 10 ⁻⁸	
13	Insecticides	Absent	Absent	Absent
14	Total residual chlorine, mg/l	1	1	1,000 as chlorides
15	Fluorides (as F), mg/l, max	2.0	2.0	10
16	Arsenic (as As), mg/l, max	0.2	0.2	1.0
17	Cadmium (as, Cd), mg/l, max	2.0	2.0	2.0
18	Hexavalent chromium (as Cr), mg/l, max	0.1	0.1	2.0
19	Copper (as Cu), mg/l, max	3.0	3.0	3.0
20	Lead (as Pb), mg/l, max	0.1	0.1	0.1
21	Mercury (as Hg), mg/l, max	0.01	0.01	0.01
22	Nickel (as Ni), mg/l, max	3.0	3.0	3.0
23	Selenium (as Se), mg/l, max	0.05	0.05	0.05
24	Zinc (as Zn), mg/l, max	5	5	5
25	Sodium, %, max.			
26	Ammonical nitrogen, mg/l, max	50	50	50
27	COD, mg/l, max	250	250	1,000
28	Silver, mg/l, max	0.1	0.1	0.1
29	Mineral oils, mg/l, max			10
30	Inhibition of nitrification test at 200ml/l			< 50%

°C = degrees Celsius, c/ml = count per milliliter, max = maximum, mg/l = milligram per liter, ml/l = milliliter per liter, BOD = biological oxygen demand, COD = chemical oxygen demand, CWTP = combined wastewater treatment plant, TDS = total dissolved solids, TSS = total suspended solids

^a Under enforcement since B.S. 2058/1/17 (30 April 2001) .

^b Under enforcement since B.S. 2060/3/ 9 (23 June 2003) .

^c Shall not exceed 40 °C in any section within 15 m downstream from the effluent outlet.

Source: MOPE (2003)

Table A9.1.2: Industry-Specific Tolerance Limits for Industrial Effluents Discharged into Inland Surface Waters ^a

Serial Number	Parameters	Generic	Leather	Wool Processing	Fermentation	Vegetable Ghee and Oil	Paper and Pulp
1	TSS, mg/l	30–200	100	100			
2	Particle size of TSS	Shall pass 850 - micron sieve			100		100
3	pH Value	5.5–9.0	6.0–9.0	5.5–9.0	5.5–9.0	6–9	5.5–9
4	Temperature °C ^b	< 40		40			
5	TDS, mg/L, max		2100				
6	Color and odor		Absent ^c				
7	BOD for 5 days at 20 °C, mg/l	30–100	100	100	60	100	100
8	Oils and grease, mg/ l, max	10		10		10	
9	Phenolic compounds, mg/l, max	1.0		5 (as C ₆ H ₅ OH)			
10	Cyanides (as CN), mg/ l, max	0.2					
11	Sulfides (as S), mg/ l, max	2.0	2.0	2.0			
12	Insecticides	Absent					
13	Total residual chlorine, mg/l	1	600 max.				
14	Hexavalent chromium (as Cr), mg/l, max	0.1	0.1 Total 2.0	Total 2.0			
15	Nickel (as Ni), mg/ l, max	3.0		250			3
16	Sodium, %, max		60				
17	COD, mg/l, max	250	250				250

°C = degrees Celsius, max = maximum, mg/l = milligram per liter, BOD = biological oxygen demand, COD = chemical oxygen demand, TDS = total dissolved solids, TSS = total suspended solids

^aUnder enforcement since B.S. 2058/1/17 (30 April 2001).

^b Shall not exceed 40 °C in any section within 15 m downstream from the effluent outlet.

^c No standards for color.

Source: MOPE (2003)

Table A9.1.3: Industry-specific Tolerance Limits for Industrial Effluents Discharged into Inland Surface Waters ^a

Serial Number	Parameters	Dairy	Sugar	Cotton Textile	Soap
1	pH	5.5–8.5	5.5–8.5	6.0–9.0	6.0–9.0
2	TSS mg/l, max	150	100	150	200
3	BOD (5 days at 20 °C) mg/l, max	100	100	100	100
4	Oil and Grease, mg/l, max	10			10
5	COD, mg/l, max	250	250	250	250
6	Phenolic compounds mg/l, max				1

°C = degrees Celsius, max = maximum, mg/l = milligram per liter, BOD = biological oxygen demand, COD = chemical oxygen demand, TSS = total suspended solids

^a Under enforcement since B.S. 2060/3/9 (23 June 2003).

Source: MOPE (2003)

Appendix 9.2 Some Major Environment-related International Conventions Participated in by Nepal

Conventions Related to

a. Natural Resource Management

- 1. Plant Protection Agreement for the South East Asia and the Pacific Region**
Date of entry into force in Nepal: 12 August 1965
Major Objectives: To prevent introduction and spread of destructive plant diseases and pests
Major Obligations: Regulate trade in plants and plant products
- 2. Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES)**
Date of entry into force in Nepal: 16 September 1975
Major Objectives: To protect and regulate the trade of wild fauna and flora and their products
Major Obligations: All species threatened with extinction should be legally protected with appropriate measures and trade regulated
- 3. Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)**
Date of entry into force in Nepal: 17 April 1988. At the beginning Koshi Tappu included in the Ramsar List; Bishajariya Tal in Chitwan, Ghodaghodi Tal in Kailali, and Jagadishpur Reservoir in Kapilvastu districts included in the Ramsar List by the Ramsar Bureau on 17 September 2003
Major Objectives: To prevent the loss of wetlands
Major Obligations: Parties should designate at least one national wetland and ensure conservation and sustainable use of migratory stocks of wildfowl
- 4. International Tropical Timber Agreement**
Date of Ratification or Accession: 3 July 1990
Major Objectives: To ensure conservation and sustainable use of timber and enhance international timber trade
Major Obligations: To implement activities for forest management and any decisions on timber trade
- 5. Agreement on the Network of Aquaculture Centers in Asia and the Pacific**
Date of Ratification or Accession: 4 January 1990
Major Objectives: To develop aquaculture for increasing production, improving rural income and employment, and increasing foreign exchange earnings
Major Obligations: To expand network of aquaculture centers, strengthen institutional capacity, and promote exchange of information
- 6. Convention on Biological Diversity (CBD)**
Date of entry into force in Nepal: 21 February 1994
Major Objectives: To ensure conservation, sustainable use, and equitable sharing of benefits of biological diversity
Major Obligations: To prepare and implement national strategies, plans, and programs, including a national biodiversity action plan, for the conservation of biodiversity under both in situ and ex situ conditions. Nepal Biodiversity Strategy approved by the Government of Nepal in August 2002
- 7. UN Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa**
Date of entry into force in Nepal: 13 January 1997
Major Objectives: To combat desertification and mitigate the effects of drought through effective actions at all levels
Major Obligations: To prepare and implement National Action Programmes, and to integrate strategies for poverty reduction; National Action Programme approved by the Government of Nepal on 2 February 2004

b. Cultural Heritage

8. Convention for the Protection of the World Cultural and Natural Heritage

Date of entry into force in Nepal: 20 September 1978

Major Objectives: To protect cultural and natural heritage of universal value

Major Obligations: To ensure implementation of effective measures for the protection, conservation and preservation of national cultural and natural heritage

c. Nuclear Weapons

9. Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water

Date of Ratification or Accession: 7 October 1964

Major Objectives: To put an end to the armaments race and eliminate incentives to the production and testing of all kinds of weapons

Major Obligations: To prohibit, prevent any nuclear weapon test at any place

10. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies

Date of entry into force in Nepal: 10 October 1967

Major Objectives: To establish an international legal regime for the exploration and use of outer space

Major Obligations: To prohibit placing objects carrying nuclear weapons or other weapons of mass destruction in outer space and avoid harmful contamination of outer space

11. Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-bed and the Ocean Floor and in the Subsoil Thereof

Date of entry into force in Nepal: 18 May 1972

Major Objectives: To reduce the arms race and international tensions, and to maintain world peace

Major Obligations: To prohibit placement of any weapons of mass destruction on the sea bed, ocean floor or in the subsoil thereof, and observe and verify the activities of other parties on the sea bed

d. Marine Environment

12. Convention on the High Seas

Date of entry into force in Nepal: 27 January 1963

Major Objectives: To codify the rules of international law relating to the high seas

Major Obligations: To take measures to prevent pollution of the sea by any activity

e. Waste Management

13. Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter

Date of Ratification or Accession : 1 January 1973

Major Objectives: To control pollution of the sea

Major Obligations: To prohibit dumping or deliberate disposal of wastes in the sea

14. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes (Basel Convention)

Date of entry into force in Nepal: 13 January 1997

Major Objectives: To regulate the transboundary movements of hazardous waste

Major Obligations: To define hazardous waste, and prohibit and/or regulate the movements of such waste

f. Ozone Layer Protection

15.a Vienna Convention for the Protection of the Ozone Layer (Vienna Convention)

Date of entry into force in Nepal: 4 October 1994

Major Objectives: To protect human health and the environment against adverse effects of the modification of ozone layer

Major Obligations: Limit and/or eliminate the use of ozone-layer depleting substances

15.b **Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol)**

Date of entry into force in Nepal: 4 October 1994

Major Objectives: To protect the ozone layer by controlling the emissions of substances that deplete it

Major Obligations: To control annual consumption and production of substances that deplete the ozone layer

15.c **London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer (London Amendment)**

Date of entry into force in Nepal: 4 October 1994

Major Objectives: To strengthen the control procedures and to establish financial mechanisms for the protocol

Major Obligations: To amend the protocol to phase out the production of some of the substances that deplete the ozone layer, and to establish financial mechanisms and a clearing-house function for the implementation of the protocol

g. Climate Change

16. **United Nations Framework Convention on Climate Change (UNFCC)**

Date of entry into force in Nepal : 31 July 1994

Major Objectives: To stabilize greenhouse gas concentrations in the atmosphere within a time frame

Major Obligations: Adopt precautionary measures to minimize or prevent the release of greenhouse gases and mitigate the effects of climate change

Conventions Only Signed

17. **Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxic Weapons and on their Destruction**

Date of Adoption: 10 April 1972

Date of Nepal's signature: 10 April 1972

Major Objectives: To prohibit the development of biological weapons and eliminate them

Major Obligations: To prohibit development, production, stockpiling, or acquisition or retention of any biological weapons, and promote their destruction

18. **UN Convention on the Law of the Sea**

Date of Adoption: 10 December 1982

Date of Nepal's signature: 10 December 1982

Major Objectives: To develop a comprehensive new legal regime for the sea with environmental provisions

Major Obligations: To define territorial sea and exclusive economic zones, and to develop sea resources for human beings

19. **Convention on Fishing and Conservation of the Living Resources of the High Seas**

Date of Adoption: 29 April 1958

Date of Nepal's signature: 29 April 1958

Major Objectives: To conserve the living resources of the sea

Major Obligations: To adopt necessary measures for the conservation of the living resources of the high seas, and supply of food for human consumption

20. **Convention on the Continental Shelf**

Date of Adoption: 29 April 1958

Date of Nepal's signature: 29 April 1958

Major Objectives: To delimit the rights of states to explore and exploit the natural resources of the continental shelf

Major Obligations: To regulate the interference with navigation, fishing or the conservation of the living resources of the sea by the exploration or exploitation activities of coastal states

21. **Stockholm Convention on Persistent Organic Pollutants (POPs)**

Date of Nepal's signature: 5 April 2002

Major Objectives: to eliminate or restrict production and use of Persistent organic pollutants including pesticides and industrial chemicals as well as to restrict their trade with the final goal of banning production, trade and use of POPs

Major Obligations: Signatory countries are obliged to support and comply with the provisions of UNEP's policy of phasing persistent organic pollutants out or limiting their production and use.

Appendix 9.3: Some Prominent Environmental NGOs in Nepal

- (i) Association for Protection of Environment and Culture (APEC-NEPAL), established in 1988, applies a multidisciplinary approach to protection of wildlife, forests, and wetlands, and to management of renewable resources. Numerous programs are described.
- (ii) Clean Energy Nepal (CEN) promotes conservation and sustainable energy use, especially in Kathmandu Valley, through campaigns and public education. It has a newsletter and publications.
- (iii) Concern for Children and Environment — Nepal (CONCERN), established in 1993, works in child development.
- (iv) Discover Nepal, established in 1998, places trained volunteers in rural and urban secondary schools, as well as in environmental, health, and tourism programs.
- (v) Institute for Himalayan Conservation — Nepal (IHC-Nepal) continues programs initiated by IHC-Japan, which created the Multi-dimensional Annapurna Conservation (MAC) Project in Mustang and Myagdi. These programs focus on forestry management, environmental education, use of appropriate technologies, health awareness, ecotourism, and local capacity building.
- (vi) International Institute for Human Rights, Environment and Development (INHURED International), since 1987, monitors violations of human and environmental rights. In 1993 it won a major campaign on the Arun III Hydroelectric Project. It has publications, audio and video cassettes, and articles.
- (vii) IUCN Nepal, since 1973, works to protect environmentally sensitive areas and wildlife species through numerous projects. Many publications are available. It is in the World Conservation Union (IUCN).
- (viii) King Mahendra Trust for Nature Conservation (KMTNC) works broadly to protect and conserve the natural and cultural heritage of Nepal.
- (ix) Nepal Forum of Environmental Journalists (NEFEJ), begun in 1986, promotes the participation of mass media in raising public awareness about the environment and sustainable development.
- (x) Nepal River Conservation Trust (NRCT), established in 1995, works towards conserving Nepal's Himalayan river system, preserving cultural heritage, and developing an environmentally responsible river tourism industry.
- (xi) Rhododendron Research Project, sponsored by the Norwegian Research Council, aims to identify climatic limits for rhododendrons found in Nepal, with the long-term aim of stimulating local economies and helping with reforestation.
- (xii) South Asian Network for Development and Environmental Economics (SANDEE), started in Kathmandu, addresses environmental and developmental challenges for participating South Asia countries.
- (xiii) The Mountain Institute (TMI) operates projects to protect the biodiversity and cultural heritage in the Himalayas.
- (xiv) World Wide Fund for Nature (WWF) Nepal Programme, working in Nepal since 1967, has numerous conservation projects and programs.
- (xv) SEEDS (Social Educational Environmental Development Services), since 1998, funds a wide range of grass-roots development and relief projects in remote rural areas.
- (xvi) Alliance for Environmental Protection, Nepal (AEPN), provides consultancy services for matters related to environmental management and protection.
- (xvii) Environment and Public Health Organization Nepal (ENPHO), conducts water and air quality analysis and provides laboratory services for the same.