

**“Environmental Degradation  
&  
Disaster Management In Nepal”**

Submitted by



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## 1. Country Background;

Nepal is roughly rectangular in shape. The country's landmass stretches 885 km from east to west and has a non-uniform width of 193km north to south. It has a total land area of 147,181 sq. km and an estimated population of 21.84 million in 2000. It lies within the sub-tropical to the mountainous region at 26°22' to 30°27' N latitudes and 80°4' to 88°12' E longitudes, with an altitude that ranges from 90 m to 8,848 m. The country is landlocked and is bordered by India in the East, West and South, and China in the North.

Nepal is ethnically diverse. It is home to several race, tribes, languages and religions. The Nepalese population consists of Indo-Aryan and Mongol races. Two major religions, Hinduism and Buddhism, have moulded the country's cultural fabrics. Administratively, Nepal is divided into 5 development regions, 14 zones, 75 districts, 58 municipalities and 3,912 Village Development Committees (VDC).

Geographically, Nepal represents a transitional mountain area between the fertile Gangetic Plain of India and the arid plateau of Tibet, China. The country is rich in ecological diversity with slightly over 80 per cent of the land covered by rugged hills and mountains. From the low-lying Terai plains in the south, where elevation in some places is less than 100 m above sea level, the landscape rises through a maze of valleys and spurs culminating in the majestic heights of the Great Himalayas, including the Mount Everest - the highest peak in the world.

The narrow strip of flat alluvial terrain along the southern border, known as the Terai, is an extension of the Gangetic Plain and comprises about 14 per cent of the country, including most of the fertile and forest areas. Its general slope towards the south is less than 1 per cent. The Churia and Mahabhrat Ranges punctuate the Terai plains with an approximate width of 50 km. The elevation ranges from 60 m to 330 m above sea level and constitutes the most productive agricultural region of the country, with a good potential for the development of agro-industries. Its northern edge is the Bhabar, which is characterised by boulders and freely drained gravelly soil. This area is unsuitable for agricultural purposes. The first elevation next to the Terai is the Siwaliks (also known as Churia Range), which covers about 13 per cent of the country. Their average altitude is 900 m (elevation difference from 120 m to 2,000 m) and is about 8 to 10 km in width. The Churia range is the youngest member of the Himalayan family and has dry and immature soil. There are a number of Terai-like valleys lying between the Siwaliks and the Mahabharat range, commonly called the Dun Valleys (inner Terai plains), such as Chitwan and Dang.

To the north, running parallel with the Churia range is the Middle Mountain Zone, also known as the Middle Hills or the Mahabharat Range. The altitude ranges from 500 m in low-lying valleys to over 3,000 m. This maze of valleys and spurs has been the traditional zone of human occupancy in Nepal. It is extensively cultivated and pressure of population on these lands is high.

The Middle Mountain zone constitutes the traditional and cultural heartland of the country. The total area equals approximately 30 per cent of the country and is typified by extensive terraces, large numbers of landslide scars, as well as tracts of eroded land. The Mahabharat girdles Kathmandu Valley - the capital of Nepal, a geologically structured trough with an average altitude of 1,300 m. This Valley has long remained the jewel among the Nepalese hills. The Valley is endowed with deep, fertile, lacustrine soil and was nurtured as the

focal point for trade between Tibet and India until the end of the last century. The rapid rise in population, and consequent problems of ecological degradation have been the most conspicuous feature of this hill region in the recent years.

The High Mountain Zone, located north of the Middle Mountain Region, covers about 20 per cent of the country. It is characterised by long, straight and steep slopes, and narrow valleys which are sensitive to erosion. Few areas are cultivated and the productive capacity is comparatively low.

The High Himal zone occupies about 23 per cent of the Kingdom and is mostly snow covered. The snow line is at 5,000 m in the East and 4,000 m in the West. This zone is an area of rocky, ice-covered massifs, rolling uplands, snow-fields, valley glaciers, and sweeping meadow lands. It forms the northern boundary of the monsoon climate and the geo-political border between Nepal and China. This region has over 200 peaks exceeding 6,000 m. Eight of the ten highest peaks exceeding 8,000 m on earth, including the Mt. Everest (8,848m.), are located in this zone.

## 2. Land Systems by Physiographic Regions of Nepal;

Physiographic Regions/ Elevations	Land Forms	Climate
High Himal Region (>4000 m.)	Alluvial, colluvial and morainal depositional surfaces.	Alpine and Tundra
	Steep to very sloping mountainous terrain.	
High Mountain Region (2200 - 4000 m.)	Past glaciated mountainous terrain below upper altitudinal limit of arable agriculture.	Warm to Cool temperate
Middle Mountain Region (500–3000 m.)	Ancient lake and river terraces (Tars-elevated plains) (erosional). Moderate to steep mountainous terrain.	Warm temperate
	Steep and straight mountainous terrain.	
Siwalik Region (120-2000 m.)	Active and recent alluvial plains. Fans, Aprons and ancient river terraces (Tars).	Sub-tropical
	Depositional basin (Duns).	
	Moderate to steep to very steep hill and mountainous terrain.	
Terai Region (60 - 330 m.)	Active and recent alluvial plains (depositional). Alluvial fan apron complex (erosional).	Sub-tropical

Source: CBS, 1994

Soil type also differs in the physiographic zones. In the Terai, the soil is alluvial and usually fine textured, with good water-holding capacity. In the Siwaliks, the dominant soil texture is sandy with pebbles. These soils are poorly developed and prone to erosion, and cannot retain high-intensity precipitation. In the Middle Mountains, the soil type varies from medium to light textured coarse-grained sand, which is also prone to erosion. The upper region also consists of hard rocks in many places.

These physiographical variation concentrated rainfall and high population density with environmental degradation coagulates the problems of natural disasters like flood, drought landslides, debris flow, occurring every year causing human life losses and enormous damages to public property.

Nepal has initiated various efforts to reduce the impact of natural disasters. With enactment of the Natural Calamity (Relief) Act (NCRA) 1982 which can be taken as a milestone in disaster management, Nepal has taken some concrete steps towards improving disaster management situation in the country. As per stipulated in the Natural Calamity (Relief) Act, 1982, a high level Central Disaster Relief Committee headed by the Home Minister has been constituted which carries out rescue and relief operation at the time of disaster.

Various government agencies of His Majesty's Government of Nepal are involved in disaster prevention/mitigation works. International agencies such as UNDP, International Center for Integrated Mountain Development (ICIMOD), International Red Cross, JICA, USAID, ADPC, ADRC etc. are also contributing significantly in the area of capacity building. Besides, professional and non-governmental organizations are providing valuable inputs in disaster mitigation activities as well.

### 3.Environment and disaster:

Primarily based upon secondary information, this report is designed to describe the national state of environment in diverse sectoral areas in the format approved by the Conference of the Fourth SAARC Environment Ministers held at Colombo from 30 October to 1 November 1998. It addresses relationships between different development activities and their impact on the environment. The report also encompasses the prevailing environmental conditions, illustrates the current environment friendly policies as a basis for integrating environmental aspects into developmental activities, and describes emerging environmental concerns.

Current environmental issues in Nepal which have emerged from ongoing land degradation, depleting forest resources, unplanned urban development, discharge of untreated effluents and disposal of wastes brought on by inadequate consideration of the environment in development planning have also been discussed herein. The existing opportunities for effective implementation of environment friendly policies to redress the environmental problems are also discussed in this report. This report strives to provide a foundation for future environmental policies and programmes.

### 4.Main causes responsible for environmental degradation;

Shortage of land for housing and cultivation, shortage for firewood, timber, wood and green grasses are seen due to the increase in population. Similarly medicinal herbs are disappearing and the problem of water shortage for drinking, irrigation has begun to appear. Natural disaster such as; flood land slide soil erosion are increasing .So the main causes responsible for environmental degradation are following;

**Deforestation:** Forest is one of the most important natural resources. Firewood, timber, herbs, grass and green leaves are available from the forest. The human settlement has also increase the village and cities .The people take their cattle to the forest for grazing because of the shortage of pastures. In some place plants and trees are exhausted. Hills have begun to appear naked and dry. Deforestation results disappearance of water resources. The problem

of soil erosion, flood and landslide disaster are increasing. This also destroys the fertile alluvial soil. Carbon dioxide gas increase in the atmosphere due to the deforestation, thus, the situation of environment will degrade.

Flood; There is heavy rainfall during the monsoon seasons. The rain comes down to plain areas from the hills and slopes. The water level of the rivers and rivulets increases. This overflow of the water in the rivers and rivulets is called the flood. Large part of the Nepal is covered with the steep mountains and hills. The mountains have slopes. In such slopes, unmanaged cultivation and denotation of forest cause landslide and soil erosion. The soil becomes light and the rainwater easily flows down. It helps the flood to swell.

With the increase in population, the problems of deforestation, soil erosion and overgrazing arise. It makes soil weak. The land cannot absorb the rainwater. It also helps the flood to rise. The flood transports the soil from the naked hills. The flood also transports the alluvial and fertile soil. The problem of soil erosion and land slide increases.

Landslides and soil erosion; The downward movement of the detached earth materials is known as landslides. The over grazing and deforestation makes the soil loose. The rainwater easily enters this loose soil cracks and gullies are formed. Water enters those cracks and land starts to move gradually downward. Many people, animals are killed and several houses are washed away each year in the country by the landslide and soil erosion. Thus the landslide and soil erosion also destroys the environment.

Pollution; Environment pollution has been observed as a big problem in Nepal. There has been greater utilization of natural resources due to increased population. Smoke, dust and gas emissions cause air pollution. Soil pollution such as; chemical, pesticides, medicines, sewage etc and water pollution such as; washing clothes, mixing sewerage, industrial outlet dirty filth and sound pollution are observed. It degrades the condition of environment.

#### 5. The National Environment Management Policies in Nepal;

The future of the Nepalese people, which is so much dependent upon the environment, has bearings on the commitment and interest of the people themselves. So what Nepalese people are getting or expecting to get from the utilisation of environmental resources is important. Therefore environment protection programmes need to be directed towards creating a condition in which Nepalese people can lead a happy, prosperous and peaceful life. Since Nepal is a country of villages, it is necessary to pay special attention to the problems of village people, especially flood, land erosion, loss of forest cover, and fulfillment of daily needs: wood, grass, etc. Likewise, it is equally necessary to eradicate the problems associated with the process of urbanisation, especially the problems of solid waste, air and water pollution. In view of these interests and concerns, it has been an imperative to implement laws and regulations to ensure sound environmental programmes, and people's participation in the implementation of development programmes.

The concept of sustainable resource management adopts the theory of carrying capacity of the natural eco-system. Nature can recreate the resources consumed by human beings. Especially, this principle is associated with the consumption of renewable resources. According to the concept of sustainable resources, consumption of resources should go without affecting natural life cycle so that nature can recreate the natural resources on a continuous basis.

The Ninth Five Year Plan (1997-2002) encompasses the principles of sustainable resource management. Realising the differences between urban and rural environmental problems, vis-à-vis utilisation of common resources, the plan appreciates the community forest management programmes. Retro-inspecting the Eighth Plan, following are some major objectives of the Ninth Plan with regard to the environment sector:

Institutional strengthening of line ministries in environmental field;

- ✓ Integrated approaches for development and environment;
- ✓ Legal provision for national resource conservation;
- ✓ Expansion of the scope of biological diversity;
- ✓ Scientific forest management;
- ✓ Pollution control programmes;
- ✓ Involvement of private or civil society in management of municipal wastes; and
- ✓ Economic incentive and disincentive measures for pollution control.

Some policy directives of the Ninth Plan are:

- ✓ Priority to environmental programmes which involve women and poverty stricken classes of people;
- ✓ Special programmes for environment conservation in remote areas;
- ✓ Involvement of non-governmental organisations in environmental education;
- ✓ Training and research on pollution control, solid waste management, etc.;
- ✓ Development of environmental management information system;

#### 6. Implementation of environmental standards

The Ninth Plan also discusses environment specific issues, and programmes and activities have been planned in relation to these areas. The Plan has emphasised the harnessing of solar energy by establishing 38,000 photovoltaic systems in remote area households. Moreover, about 300 solar dryers will be set-up in different rural communities. The plan also has a target of establishing micro-hydro projects worth 5,200 kilowatt (kW). Similarly, it envisages spreading the biogas (methane gas) plants to a total of 90,000 during this period.

The Ninth Five Year Plan explicitly indicates that resource mobilisation, conservation and management of forests will be at par with the demand and supply of forest products. For long term purposes, implementation of forest management programmes is envisaged in the plan. It also emphasises the involvement of private sector and introduction of market economy for sustainable forest development.

As per the APP objectives, increased agro-inputs such as chemical fertilisers and pesticides will be required to increase the per unit agro-yield. While these have certain negative environmental impacts, new strategies are being taken into consideration in the integrated plant nutrient management (IPNM) and the integrated pest management (IPM) systems.

The need for air and water pollution control has also been addressed in the Ninth Five Year Plan. The Plan has also stressed the conservation of the national cultural heritage by planning for an ethnographic museum.

#### 7. The National Disaster Management Policies in Nepal;

For the first time, national disaster has been included in the planned document. The concept paper of the ninth five-year plan (1997-2001) envisages following programme as regards natural disaster management:

- Disaster management information system will be established to exchange information on natural disaster management;
- Various hazard maps of disaster prone areas will be prepared and necessary preventive measures will be taken thereafter on the basis of geological, hydrological and meteorological studies;

- Fire fighting capabilities will be extended;
- A center each will be opened in all five regions to store relief and rescue materials;
- A permanent relief team will be constituted; trained rescue workers will be provided, a loss assessment team will be deputed at district level.

#### 8. The Environment and Disaster Action Plans;

Nepal started the preparation and implementation of the Environment-related Action Plans (EAP) after her participation in the United Nations Conference on Environment and Development (UNCED) held at Rio de Janeiro in 1992. In response to the growing awareness about the importance of mainstreaming environmental programmes in the development planning and implementation, Nepal prepared the (Nepal) Environmental Policy and Action Plan (NEPAP) which was endorsed by the Environment Protection Council in 1993. Based on previous assessments of environmental issues, challenges and opportunities, a number of actions were proposed in the following five prominent areas.

Sustainable management of natural resources;

- ✓ Population, health and poverty;
- ✓ Safeguarding the national heritage;
- ✓ Mitigating adverse environmental impacts; and
- ✓ Legislation, institutions, education and public awareness.

The Action Plan clearly documents the issues, objectives, activities and time frame and responsible agencies for implementation. HMG is implementing the selected activities of this Plan in a phased manner.

The Ministry of Population and Environment (MOPE) has also recently prepared a five-year Strategic Plan with a view to mainstreaming environmental aspects in socio-economic development plans and programmes. This Plan outlines MOPE's mission, goals, strategies, priority activities and outputs. The recommended mission of the Ministry is "to promote environmentally sound and sustainable development and thereby safeguard human health". This Strategic Plan aims to integrate environmental instruments in economic development planning and decision-making; develop and strengthen human resources (knowledge based and technical/scientific) and institutions; institutionalize stakeholders' participation on environmental management; and minimize pollution load through the enforcement of environmental legislation and standards.

National Action Plan of His Majesty's Government of Nepal has been prepared under the direction of the IDNDR National Committee. The National Action Plan includes activities on disaster relief activists with specified time frame according to which they should implement their disaster reduction jobs by formulating special course of action and should mobilize the available resources in the given period. In this way the objectives of National Action Plan are under implementation.;

#### 9. Legal provisions:

Environment Protection Act, 1997 and Environment Protection Regulations, 1998 have been effective. Environmental Impact Assessment Guidelines as a tool to minimise environmental impact has been enforced in formulation and implementation of projects. Separate Environment Impact Assessment Guidelines for forest and industry sector have been formulated and implemented. Though there are various provisions to protect environment and control pollution in the Environment Protection Act, 2053, no effort has been made to



institutionalise the process and the system in the sector agencies. Likewise, necessary knowledge and skill have not been disseminated to change working capacity and mentality of the people. The concerned agencies have not been effective to successfully implement various existing provisions for the promotion of environment. Realising the concept of sustainable development, various legal provisions have been made. But the acts and regulations related with environment have not been effective due to the lack of integrated environmental policy, lack of co-ordination among various agencies, and lack of adoption of holistic approach. The maximum permissible limit of vehicle emission has been determined. However the implementation is not effective due to failure to enforce it throughout the country. The tolerance limit for the quality of exhausted air and the standard of drained water of some industries have been determined, but its implementation has yet to be made effective. Governmental and non-governmental agencies are creating awareness among people about environment protection. Participation of NGOs, local communities and consumers is in the rise in land-use, plantation, protection of water resources, improvement of public health, development of small and cottage industries, and protection and promotion of bio-diversity. In formal environmental education, achievements made by the Ministry of Education, National Planning Commission, World Conservation Union and some other NGOs is encouraging. Primary level course on environmental education has been designed and incorporated and the same is being incorporated in the course of secondary and higher secondary levels.

Environment subject is also included in the university. Nevertheless, environmental awareness programmes have not been disseminated at the people and at the village level. No adequate provision has been made towards encouraging joint participation of NGOs, community and private sector in environment protection. Small hydro-electricity projects, community forest, watershed management and income generation programmes of agriculture sector were successful programmes in the past. The capacity 21 programme prepared with the spirit of Agenda 21 can be taken as an example. This programme is now being operated in three districts (Dang, Surkhet and Kailali) of western Nepal. Under the programme, groups are formed for economic and social development and environment and resource protection at village levels. The programme, which mobilises village community, has helped in village development, resource protection and to uplift of the living standard of villagers. The Environment Protection Council established in 1994 has been reformed from time to time. The Council has been preparing environment policy, formulating plan and working policy and publishing them. The Ministry of Population and Environment was established in 1996, and the Ministry has been working as a secretariat of the Council. It has been necessary to make a detailed provision in the Environment Protection Act about the duties, responsibilities of the Council. In order to make the Council effective, its capabilities needs to be enhanced in areas of policy direction, inter-sectoral coordination, supervision and evaluation, and problem solving in the field of environmental management. Though HMG has ratified various international conventions in the Plan period, no homework has been done in regard to the impact of these conventions on the development agenda and the subsequent role to be played by the Government.

## 10.Environmental Legislation;

Environmental legislation is a key to the promotion of environment management activities in a democratic society. Prior to the reinstatement of democracy in 1990, sectoral policies were directed to the utilisation of natural resources for infrastructure development, even at the cost of environment. The present Constitution of Nepal, 1990 clearly indicates the need for environmental conservation in the 'Directive Principles of the State'. It states that "The State

shall give priority to the protection of the environment of the country and also prevent damage due to physical development activities by making people conscious of environmental cleanliness, and by making special arrangements for the protection of rare animal species, forest and vegetation" [Article 26(4)]. According to the Constitution, the State shall adopt a policy for mobilising natural resources of the country in a manner which will be suitable, useful and beneficial to the interests of the country [Article 26(3)]. In accordance with the Article 64 of the Constitution, the House of Representatives (Lower House) has constituted an Environment Conservation Committee to deal with environmental issues.

Legislation plays a significant role in meeting environmental obligations, creating public awareness and resolving conflicts. Various sectoral laws enacted after 1990 contain provisions to institutionalise an ex ante consideration of the environment in development planning and their subsequent implementation. There are a number of sectoral laws dealing directly or indirectly with environmental issues. Some of the complementary Acts are briefly summarised in Table 1 to provide an insight into the spectrum of legislative provisions related to environment.

Following the establishment of the Ministry of Population and Environment (MOPE) in September 1995, the Environment Protection Act (EPA), 1996 and the Environment Protection Rules (EPR), 1997 came into existence. This environmental legislation emphasises environment conservation and management through internalisation of the environment assessment system, pollution control and prevention, conservation of natural heritage sites, operation of environmental funds, additional incentives to minimise pollution, and compensation for environmental damages. Emphasis has also been laid on carrying out environmental impact assessment of the prescribed development projects and programmes. More than 200 types of developmental activities must follow the environmental assessment process. MOPE reserves the right to accept or reject the environmental impact assessment report(s) of the prescribed proposal(s), whereas the concerned ministries could approve the Initial Environmental Examination (IEE) report(s). Regarding pollution management, the EPR, 1997 envisages an environmental permit system, and the polluters shall have to comply with the environmental standards. A maximum penalty of 0.1 million rupees (1 US \$ = Rs. 69) may be imposed upon those who implement projects without receiving approval for the IEE/EIA report (MOPE, 1997).

The EPA, 1996 also empowers the Environmental Inspector to inspect and report on the implementation status of agreed upon conditions. The Act also empowers HMG to constitute the Environment Protection Council and provide policy guidance and suggestions to the government. The Council will consist of environmental experts and representatives of the recognised political parties at the national level. The EPA, 1996 and EPR, 1997 have emphasised public consultation process during the preparation and approval of the EIA reports (MOPE, 1997).

Table -1

## Environment-related Provisions in Some Contemporary Acts

Acts	Relevant Provisions
Local Self-Governance Act, 1998	Specific environmental scope of work for DDC, VDC and TDC comprising local level environmental planning; forest and biodiversity conservation, land-use management, pollution control, public sanitation, etc.
Environment Protection Act, 1996	Maintain clean and healthy environment and contribute to sustainable development
Forest Act, 1992	Conserve and manage forest and biodiversity
Water Resources Act, 1992	Promote environment assessment, water quality standard, and avoid significant impacts on local environment in the course of water use
Electricity Act, 1992	Avoid environmental effects during electricity generation and transmission
Vehicle and Transport Management Act, 1992	Regulate vehicular exhaust emission according to the standard
Industrial Enterprises Act, 1992	Promote the adoption of industrial pollution control measures, including incentive and disincentive provisions
Pesticide Act, 1991	Regulate the use, production and distribution of pesticide
Labour Act, 1991	Adopt preventative and curative measures for occupational health and safety
Solid Waste (Management and Resource Mobilisation) Act, 1986	Ensure solid waste management through the collection, transportation, recycling, disposal, and the classification of hazardous wastes
Soil and Water Conservation Act, 1982	Ensure soil conservation through land use regulation
King Mahendra Trust for Nature Conservation Act, 1982	Generate fund and manage the nature with people's participation
Tourism Act, 1978	Minimise environmental pollution during mountaineering activities
National Parks and Wildlife Conservation Act, 1973	Declare and manage national parks, wildlife reserves and conservation areas

Public Consultation on EA: A Legally-binding obligation The Environment Protection Act (EPA), 1996 obliges the approving agency - the Ministry of Population and Environment - to make necessary arrangements to open the EIA report for the general public to render opinions and suggestions. The Environment Protection Rules (EPR), 1997 (amendment 1999) further elaborates the public consultation process in order to ensure the participation of different stakeholders right from the scoping to the approval processes. The EPR, 1997

obliges the proponent to issue public notice on the contents prior to the preparation of a scoping report. Once the draft EIA report is prepared, based on the approved Terms of Reference (TOR), the proponent should conduct a Public Hearing at the project site. Following submission of the EIA report to the Ministry of Population and Environment (MOPE), it should be made public. The MOPE has to legally approve the EIA report within 60 days upon receipt. These legal provisions are meant to enhance the participation of different stakeholders right from the project inception to the implementation of the proposal.

#### 11. Conclusion;

In view of the physiographical situation and resource constraints of the country it is very difficult to cope with natural disaster and environment degradation in Nepal. Undeveloped physical infrastructure, poverty, fatalistic nature of some people, low literacy rate, lack of political commitment and various other factors make the situation more complex. At this juncture, a concrete, effective and practicable environment and natural disaster policies are of utmost importance. Therefore, improvement of physical infrastructure, poverty alleviation, change in the people's perception, literacy campaign, public awareness raising programs and capacity building are very necessary.

A holistic integrated environmental management (IEM) approach will arrest environmental degradation and increase national productivity. Implementation of this approach would promote ecosystem-based participatory management of natural resources and address environmental pollution through a mix of command and control (CAC) and non-regulatory market based incentive measures. A sustainable society could thus be achieved.

