

# Environmental Risk in Nepal: A General Assessment

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## INTRODUCTION

Mountains are regarded as extremely important components of the earth's surface. It has been estimated that out of total land area of the world about 30 percent of the land is composed of the mountains, high lands, and hill country (Gerrard, 1991). Nepal being a mountainous country occupies 147181<sup>2</sup> km area which constitute about 0.09 percent of the total land surface of the earth. Nepal has been considered to be a country of environmental, geographical, ethnic and social diversities as well as complexities with the characteristics of least development economy and land locked situation. This is the country having almost all mountainous environment. Wide altitudinal variation within a small area, makes the physiography of the country unique in the world.

At present Nepal, a country of mountainous environment, is facing many challenges due to the rapidly increasing rate of population along with decreasing rate of agricultural production. It has been commonly believed that the soil is losing its fertility which was higher once. Thus the agricultural soil of the country is continuously degrading and the consequences of population pressure has been shifted to the remaining forests. Intensive cultivation with constant rate of chemical fertilizers ignoring other side input, has created a declining fertility within last ten years. A recent workshop focussing on soil fertility in the middle mountains of Nepal warned us a serious problems looming on the horizon and there was a general consensus that the management of organic matter in Nepalese soil was inadequate and seemingly unsustainable (Corson, 1992).

There is no doubt that soil plays an important role for the development of Nepal for it is basically an agro based country. However, Nepal is under going a process of degradation as a result of rampant deforestation and subsequent erosion. Therefore the objective of the study is to evaluate the overall environment of mountainous Nepal.

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# PHYSICO-ENVIRONMENTAL RISK

Nepal has predominantly varied land feature. It may be divided roughly into three natural regions namely: Tarai, hills and mountains which cover 17 percent, 68 percent and 15 percent of the land of Nepal respectively. Regarding the ecological zones it is readily sub-divided into 5 physiographic regions; the Tarai, siwaliks, middle mountains, high-mountains and the high Himalayas.

Tarai region covers 14 percent out of total land area of Nepal. It is made of exclusively recent and past Pleistocene alluvial deposits forming a vast piedmont plain adjacent to the main Himalaya range. The elevation ranges within 60 metre to 300 metre from the sea level. The recent alluvial plain of the Tarai makes up over 7.9 percent of the total land area of Nepal and could be considered as the bread basket of the country. At present this region is being subducted at the rate of 4cm. a year (Corson, 1991). There are, however some serious constraints centred around a population dominated by traditional landlord with tenants which could have been a low agricultural productivity.

The Siwaliks covers 12.7 percent land area of Nepal. This area ranges from 300 metres and rarely exceeds 1000 metres within any watershed. Within the mountainous landscape of Siwaliks slopes are seen to be generally too steep and unstable. Soil of this region is being rapidly eroded which is responsible for the creating harsh environment.

The middle mountain region covers about 29.5 percent land area of Nepal. Relief up to 1000 metres is common between valley bottom and adjacent hill-top while maximum relief of 2000 metres occurs throughout the Mahabharat Lekh. The majority of the Nepalese population traditionally lives in the region. Kathmandu valley having gentle slope and lacustrine soils at 1200 metres elevation is a small and heterogeneous part of this region. The forest of the middle mountains are heavily exploited for the purpose of fodder, firewood, litter and timber collection.

The High mountain region occupies 19 percent of land area of Nepal. The relief here in the order of 2000 metres with common 'V' shaped valley are found throughout the region. Mostly intensive cultivated lands swifts away due to land slide. Forest in high mountains tend to be better than the middle mountains because of the in accessible condition.

The high Himalayan region covers about 23.7 percent land area of Nepal (Corson, 1992). This area is sparsely populated because of the shortage of agricultural land and cold winter. Some settlement area like that of the inner

Himalaya like Manang, Mustang etc. are going to be deserted due to continuous exploitation of forest resources for fire wood.

## LAND DEGRADATION

Nepal is a classic area for land degradation. With an immensely varied environment including the world's highest mountains, a strip of the Gangetic plain and high-altitude desert of the trans Himalaya, Nepal is among the world's least development countries with a high and rising density of population on its limited area of arable land.

Soil erosion, sedimentation and land slides are the frequently occurring processes on the land-scape which create the hazardous environment. Annually 1.7 mm of fertile top soil gets lost from Nepal. It has been said that it takes 100 years to form 1cm. top soil. Yearly the four major rivers and with over 6000 tributaries of Nepal carry 240 cubic metre of fresh fertile soil into the Bay of Bengal (Panday, 1987). The soil erosion rate has been 20-50 tons per hectre per year and critical areas up to 200 tons may get lost it leads to desertification and decline in land productivity. The soil erosion is affected by nature but it is also accerlated by human activities. Excessive grazing over farming, over exploitation of firewood, unplanned settlements etc. are some of the artificial causes for soil erosion.

A loss about 30 percent of the revenue in plains and about 2 percent in the hills have been estimated due to floods. The estimate of average sediments contribution from the watersheds of some major rivers originating from the high Himalayan region is: Tamur 38.0, Sunkoshi 21.0, Saptakoshi 15.0, and Arun 7.6 tons sediments per hactre per year (Jha, 1992). These rivers flow lacking the load of sediments from Hill region to Tarai or low land and deposited. This sedimentation causes the Tarai river beds to rise 15-30 cm. per year and destroy the land occurring flood flow. Many rivers change their course during the time of rainy season and low land of Nepal suffers from the flood havoc which have been destroying the environment of land area.

In the Hilly region land slides is responsible for the damage of the landscape which often causes loss to the lives and property. Land slide in the Hilly region mainly occurs during the monsoon period. The run off water pushes down the load towards downward area as a flood. It damages high land as well as low land productivity.

Earthquake is another natural hazard which destroys natural as well as cultural heritage. Nepal rests in the mid continental seismic belt which experiences moderate earthquakes frequently. Sometimes disastrous earthquakes also takes places because of the alpine mountain system. Especially the western region containing folded mountain frequently causes earthquake hazards. It is a common experience of Nepal being affected by disastrous earthquakes which could be listed in 1310, 1316, 1438, 1464, 1866 and 1880 A.D. The terrible earthquakes were experienced in the year 1890, 1990, 2033, 2037 and 2045 B.S. which took away 10351 persons and destroyed 66548 houses (Gautam, 1991). The above fact indicates that the earthquake also oftenly creates the hazardous environment due to the erection of mountains on the seismic belt with their folding characteristics. So before striking a certain area by the earthquake experiences the accurate prediction should be provided as far as possible.

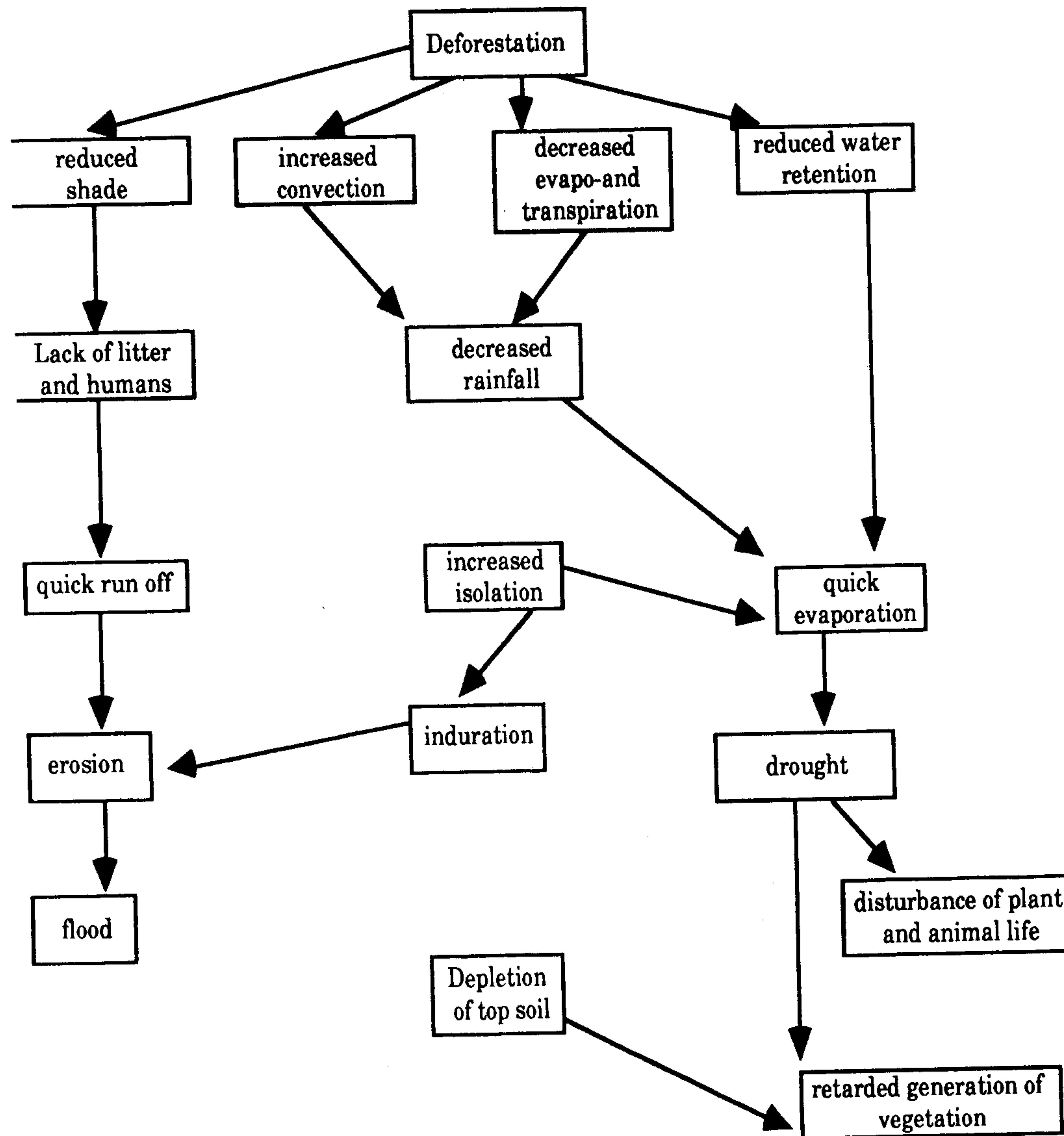
### **RISK CREATED BY THE POPULATION**

The alarming growth rate of population is the major cause of environmental crisis in Nepal. According to the 1991 Census report, the population of Nepal is increasing at the rate of 2.1 percent annually which never synchronizes with the agricultural production rate. The migrating activities of the people from a rural Hill and mountain to an urban and plain area of the kingdom, the people's tendency of settlement on the most productive land and forest areas are creating serious problems with regard to the environment. The eastern Tarai is densely populated compared to the western Tarai. Forest and other resources in the eastern and particularly central Nepal are vanishing very fast whereas in the far western region the forest is still conserved due to low population density. If the trend continuous at the current rate, environmental deterioration around these area will be irreparable. Thus the highest population densities with rapidly increasing population are the major causes for environmental degradation.

### **DEFORESTATION: AN ENVIRONMENTAL RISK**

The population growth has eliminated many forest covering areas and converted into cultivation. It is the established fact that the environmental crisis has caused deforestation which can be restored only through massive plantation. More than one third of the land of Nepal has been covered with forest and this area also is going under decrement particularly in the Tarai and inner Tarai regions. Exploitation of forest was estimated at about 70000 hactre per year during the period of 1965-1979 and by 12000 hactre per year after the year 1979. Altogether 240 hactre of forest land was destroyed every day during the period of trade and transit treaties

between Nepal and India 1989-1990. And at about 1200 hactre of forest land has been destroyed after the restoration of multiparty system in Nepal. According to the forestry master plan draft, the estimation of national demand for fuel wood in 2001 and 2011 would be 13.1 and 15.5 million metric tons respectively. Annual productivity per hactre of natural forest are 2.3, 4.8 and 6.4 metric tons for the hill, inner Tarai and Tarai respectively (Jha, 1992). This production will never fulfil the demand of fuelwood. If serious efforts for the rectification is not taken in time, Nepal may have to import even fuelwood from next countries for the coming decades. Nepal has been catagorized in the list of those countries that have high rate of deforestation with big losses of forest area. Between 1981-1985 the annual rate of deforestation was 3.9 percent. However, Nepal is losing 84000 hactres of forest annually (ESCAP, 1990). The major causes of deforestation could be listed to include for the commercial purposes, livelihood agricultural purposes and firewood purposes etc. There is still a lack of alternative employment in many hills except the selling of firewood just for hill people's survival. It is estimated that the average family in the mountains and hills produces enough food for about 190 days and 255 days respectively (HSD, 1985).



**Fig1. Causes of Deforestation**

The destruction of forest for firewood and timber collection and defoliation of fodder trees has caused serious ecological damage as well as increasing soil erosion and decreasing agricultural fertility.

## **CONCLUSION**

One of the significant remarks drawn from above discussions is that the initiation on the environmental reforms in the country can never be an effective effort unless they could well integrate the management in the context of sustainable development policies. Poverty, lack of consciousness, poor management and lack of development are contributing to environmental degradation. Dense population in the mountain areas has become the major cause of resource depletion. As a consequence, people from this area are forced to move to the Terai region. Nepal has many emigrants communities in Tarai region encroaching upon the forest. The interwoven relationship between man and mountain is being deformed with increasing ecological imbalance. Fragile mountain, steep slope earth flow, rugged relief, floody plain, high altitude etc. are causing this country cataclismic effects. However, mountain hazards is directly related to the vegetation which helps to preserve the fertility as well as the quantity constraints. So the vegetation must be well planned to preserve top soil which is washing down to the Indian ocean.

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