

Problems and Issues of Present Land Use Systems in Nepal

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1. Abstract

This paper reviews the present problems and issues of sustainable land use in Nepal. Land represents one of the major natural resources available for a developing country like Nepal. However, it is observed that the main cause of environmental degradation in Nepal is mismanagement of the land. The forest land area covers about 38% of the total land area in the country. However, the population increase in the lowland region has caused a great loss of forest cover where agricultural activities are prominent. The imbalance between production and requirement of food requests that some of the middle hills and the high Himalaya region have to import much of their food, while the Terai (lowland) surplus could cover these. From the present study, it is concluded that not only cropland but also the other land uses (such as forestry, grazing land) should be intensified, especially in hills to cover the deficits. The future management strategies for sustainable land management are also described in this paper.

Key-words: Land-use, forest, agriculture, Himalaya, population

2. Introduction

Nepal is a land of extremes; climates range from subtropical (lowland) to arctic (high mountain) and vegetation ranges from sub tropical forests to arctic like Tundra (**Stainton, 1972**). Nepal has been divided into mainly 3 physiographic regions; i. Lowland (*Terai*), ii. Middle Hills and iii. High Mountains.

Land represents one of the major natural resource available for a developing country like Nepal. More than 90% of the country's population is dependent upon the land for their fulfilment of basic needs (food, fodder, fuel, fibre and timber). However, one of the important reasons of environmental degradation is the mismanagement of land resources.

About 31% of Nepal is potentially arable, although less than 18% of the total land area of Nepal is presently being cultivated (**LRMP, 1986a**). Without major changes in forest management and use of synthetic fertilizer, soil fertility will restrict future expansion of the cultivated area, particularly in the mountain region. The soil capability classification also indicates that only 4.1% of Nepal is suitable for grazing, although at least 22.8% is being used for livestock grazing (**LRMP, 1986b**).

With the drastic population increase from 8 million in 1950 to almost 20 million in 1994, Nepal now suffers from lack of cultivated land. Understandably, already in the 50s some agencies embarked on "modernizing of agriculture by application of modern techniques" which was successful in lowland but the hills are not suited for such one-sided intensive farming. In *Terai*,

the average deforestation rate has been 15% or 1.3% per annum. At present, only Terai consists for 37% of forest cover (LRMP, 1986b). However, only 14% (490,000 ha) of the total area consists of potential production forests. Nepal Terai is a narrow lowland bordered by the Siwalik hills to the north and India to the south. The objective of the present study is to discuss the different land use issues in relation to the growing population. The future management strategies for sustainable land use are also described.

Table 1. Summary of Land Use types for Nepal by region. Land use in 1000 ha and (% of region)

Physiographic regions	Paddy	Arable	Grazing	Open forest	Well stocked Forest	Wasteland
Terai (2122)	1070 (30.4)	131 (6.1)	93 (4.4)	46 (2.2)	547 (25.8)	235 (11.1)
Siwalicks (1879)	139 (7.4)	100 (5.3)	126 (6.7)	161 (8.6)	1280 (68.1)	73 (3.1)
Middle Mountains (4350)	317 (7.3)	657 (15.1)	970 (22.3)	1558 (35.8)	787 (18.1)	61 (1.4)
High Mountains (2900)	41 (1.4)	159 (5.5)	1172 (40.4)	861 (29.7)	426 (14.7)	241 (8.3)
High Himal (3497)	7 (0.2)	--	997 (28.5)	80 (2.3)	80 (2.3)	2333 (66.7)
Country Total 14748	1574 (10.6)	1047 (7.1)	3358 (22.8)	2706 (17)	3120 (21)	2943 (19.9)

Source: LRMP, (1986b)

The major land use categories for the different physiographic zones (table 1) are; forest land (open forest and well stocked forest) 38%, a very substantial proportion of the total land area in the country. Of lowland areas, only 28% is covered by forest, low compared to the forest cover in other ecological zones: Siwalik (74%), Middle Hills (54%) and High Mountains (44%). The percentage of forest cover in the different regions, ranges from 1.1% in the high Himal to 15% in the middle hills. The middle hills have the highest proportion of forest cover (40%) followed by Siwalik (25%), High Himal (22%), Lowland (10%). The high Himal is mostly covered with the pastureland. Although only 4% of the country is suitable for grazing, the present land use indicates a minimum of 22.8% being used for cattle grazing. In the Terai region, the percentage of land used is less than its land capability. The opposite is true for the hills region.

3. Population pressure and land use

As long as Nepal's population grew at or below 1% per annum and as long as there were reasonable quality land reserves available for conversion from forest or grassland into arable land, Nepal could both feed its population and export small surpluses of agricultural products to the neighbouring countries. Under the impact of improved health care, the population growth has now increased to 2.7% per annum and it is expected to accelerate further to 3% per annum by 2005 (Hrabovszky and Miyan, 1987). The population growth rate in Terai is much higher (3.2%) than in the hilly areas (2.8%). In view, the slow economic transformation process in Nepal, the overwhelming majority of the population have to be accommodated in the agricultural sector. At present, about 80% of the Nepalese are still dependent upon agriculture. In Terai, the man/land ratio is already higher than that of the hilly areas.

4. Present status of land use pattern in Nepal

South Asia consisting of India, Pakistan, Bangla Desh and the Maldives with a total land area of 412.7 mha, is inhabited by over 1000 million people. In South Asia, only 19.5 % of the total land area is under forest cover, ranging from 2.7% in Sri Lanka to about 70.2% in Bhutan (Table 2). It is estimated that the actual area under vegetation cover may be only half that reported. South Asia occupies about 3.2% of the global land surface, but has 13.8% of the World's agricultural land. Forest and woodland cover 1.9% of the earth's surface.

Table 2. Land Use Pattern (000'ha) in South Asia

Land Use	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka	Total
Total Area	14400	4700	328759	30	14080	79610	6561	448140
Land Area	13391	4700	297329	30	13680	77088	6474	412692
Arable Land	8895	96	165570	3	2310	20320	912	198106
Forest and Woodland	2115	3300	67100	1	2308	3140	1747	79711

Source: FAO (1988).

It is observed that the population density in the Lowland and Middle Hill range is dense and forest cover very small. (Fig. 1). The high Himalaya range is almost without any population having only the grass land area. Destruction of the forest has two aspects: forest depletion through over exploitation and outright clearance for agriculture and other land uses. The former occurs near settlements and is due to extraction of products and overgrazing. Expansion of cropland at the expense of forest land is indicative of the increasing population pressure, while commercial exploitation is facilitated by road-access. From 1964/65 to 1978/79, there was a loss of 382,000 ha of forest land. The rate of forest destruction varied widely among elevation zones. The mountain zone is assumed to have gained marginally. In the hills, the loss was as low as 0.2%. Nearly 90% of the forest area lost was in tropical *Terai*, at a rate of 1.8% per annum. This is mainly because of agriculture and the large flux of migrants from the hills.

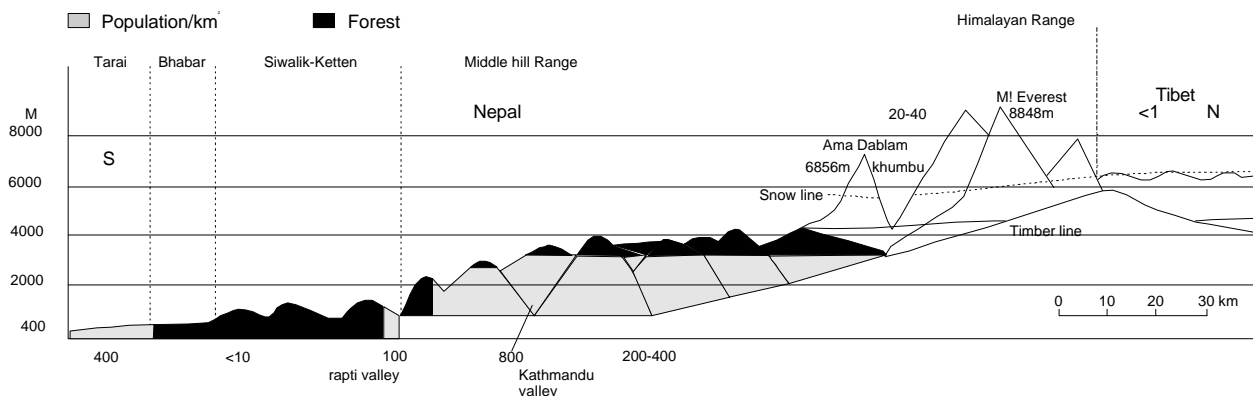


Figure 1. Nepal Himalaya: Forest Distribution and Population Density Profile.

In terms of production and requirement of food, *Terai* shows a positive balance (i.e. surplus), the balance is negative in the case of the hills (Gills, 1996). They provide a warning that some of

Middle hills and High Himalaya region have to import large volumes of their food, while Terai surpluses could cover these (Table 3).

Table 3. Food grain Production-Consumption Balance in Three Major Ecological Zones

Ecological Zones	Food grains production ('000 MT)	Consumption requirement ('000 MT)	Surplus/deficit '000 MT %	
Mountains	123	180	-57	-46.3
Hills	988	1175	-157	-18.9
Terai/Plains	1641	1123	+418	+25.5
Nepal	2752	2578	+74	+2.7

Source: Gill (1996)

5. Future Management Strategies

The Nepal *Terai*, being a “store house” for foods, needs proper management strategies for sustainable land use. The middle hills and the high mountains, are very fragile ecosystems, and need suitable land use systems. The following management strategies are suggested:

5.1 Development of a proper land-use systems:

- to avoid intensification of the land-use in Terai, production of fruits and vegetables should be promoted in the hills and mountain regions.
- Irrigation facilities should be greatly intensified in the Terai region to enhance crop production. So far it is suggested that even in context to irrigation, the Terai region has no priority over the hill region. Most of the development funds given by foreign donor agencies are invested in the hill regions, from where there is no significant return from agricultural crops in the sense of economical perspectives.
- No further degradation of the Terai forests should be allowed.

5.2 Sustainable agriculture in the Terai

- an inventory of current research programs directed towards sustainable agriculture should be prepared.
- crop varieties resistant to various soil climatic and biotic factors through the use of modern biotechnology and genetic engineering should be produced.
- suitable cropping and farmig systems should be developed e.g. multiple cropping systems in irrigated areas, tree based systems in arid regions.
- integrated fertilization e.g. combined use of both organic and inorganic sources of nutrients, recycling of organic sources (crop residue and compost) in cropping systems, inclusion of N₂ fixing crops (pulses and legumes) in cereal crops.
- Integrated pest control systems e.g. in addition to the use of chemical pesticides, the use of non-chemical means like cropping systems, use of indigenous management systems, use of bio-agents should also be intensified.

5.3 Agroforestry systems

- a proper agroforestry system for the *Terai* as well as the Hills region should be developed to promote tree plantation.

5.4 Community forestry concept

- this concept has been successful to some extent in the hill forests, whereas for the Terai forest it is still not clear. Therefore, the problems of community forestry application in the Terai forests should be intensively studied.
- the modified community forestry concept can certainly be applicable to this region.

5.5 Community participation and conservation education

Before applying any kind of forest- or land-use policies, decisions should be based on the ideas and perceptions given by the local community. That is, no program will be successful in the region without community support. To enhance community participation, environmental awareness should be incited in the local people.

5.5.1 Conclusions

Based on the above analysis, the following conclusions can be drawn:

- Not only the cropland but also other land uses (such as grazing land and forestry) must be intensified. The present study concludes that bringing new lands into cultivation is a less effective measure than land use intensification.
- In *Terai*, crop production must be kept increasing to cover the shortage of food in hills and mountain regions. For this reason, high technology and irrigation should be promoted in Terai.
- Close cooperation between the government and the local people is essential for sustainable land use.
- Due to the tremendous variation in landscape, the transfer of biophysical information from one region to another is not possible and the solution to a particular region is highly specific.

6. References

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