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Impact Of Changing Land Use Pattern On Environmental Degradation In Tansen Municipality Area, Nepal

Puspalal Pokharel*

INTRODUCTION

Land use change is not only local but global phenomenon. It implies the dynamic relationship between land and man. Man has been managing land resource since long to fulfill his essential requirements In fact, land use/land cover reflects the management of the land at the backdrop of his requirements and cultural and technological achievements. The changing land use parttern demonstrates the changing human strategy of land resource management under the changing socio-economic and cultural circumstances. The growing human population and the developmental needs has put on the immense pressure on the land resources as result it has intensified the conflict for space for settlement, agricultural land, infrastructures a forest, pasture and other use types (Hussein 1972). Since more emphasis has been given to agriculture, settlement and infrastructures, much of the land has been put under these purposes without duly recognizing the environment capabilites on one hand and at the cost of forest resources and bio-diversity on the other hand. Hence the changing land use pattern in the recent context has put the environmental resources under tremendous stress. Consequently it has raised the future productive capacity of the environment and the sustainability of the development.

In the context of the above facts, Nepal is not an exceptation. The growing population, urbanization, and the expansion of infrastructures in varying magnitude and rate has caused varying change in land use/land cover with space and time. It has been estimated that the expansion of the agricultural land has been highest at the cost of land under forestry. This tendency is likely to increase in the coming years and likely to cause the unsustainability of the development efforts (Khanal 1998). The degradation of the forest and expansion of the agricultural on the marginal land and the urbanization in the parts of middle hills of Nepal has further complicated the problems regrading the optimum use of marginal land and steep slopes.

It has been experienced that urban areas of mid-hills of Nepal are characterising the growing demand for land resource for various urban use types against the limited suitable land. In this regard there has been

* *Mr. Puspalal Pokhrel is Assitant Lecturer, Tribhuvan Multiple Campus, Palpa, Nepal.*

concern for the judicious use of land without disturbing the precarious balance of the environment.

Tansen municipality of Palpa district located in the mid-hills confronts the problem of optimum utilization of land for various urban uses in the context of urbanization, expansion of urban built up and other infrastructures within the limit of environmental feasibility. Most area of Tansen is moderately steep to steep, 10-30°. The urban growth of Tansen has been characterised by the encroachment of sloppy and marginal land for residential purpose. For this purpose, moderately to steep slopes have been terraced without considering the terrain capability.

It is this context the present paper attempts to inverstigate the changing land use pattern and evaluate its impact on the environment.

METHODOLOGY

The present study is based on the review of land use, land ownership and land revenue records and documents of both before and after the period of the fall of Rana regime and the establishment of the democracy in 2007 B.S. Besides this, the potential informants who posses the oral and written records of land were also interviewed to obtain the information.

The land use data of 1974 B.S. is based on the personal diary of Prem Bahadur Silwal who was *Nausinda*, the land revenue collector before 2021 after the implementation of land reform program, during 1990-1995 B.S. Land use information of 1996 B.S. and 2016 B.S. is based on *Athasatha, the* records of land use before 2021 B.S., which is obtained from land revenue office Palpa, Tansen. The recent land use information is based on the records of Tansen Municipality.

GEOGRAPHICAL SETTING OF THE STUDY AREA

Location

Tansen municipality is located at the central part of Palpa district. It is an ancient hilly town with its architecture strongly influenced by Newar migrants from Kathmandu valley. It is an emblematic hilly town and a renowned and alluring hill resort of Nepal. This town offers an opportunity to experience genuine untouched Nepalese culture the cobbled streets, ups and downs, emblematic Newari row houses, old and artistic pagoda temples shape the townscapes while loosing green rural scapes surrounds this beautiful town. Geographically it is located within 83° 30' 34.66" east longitude to 83° 34' 48.74" east longitude and 27° 49' 52" north to 27° 52' 40" east north latitude. Area of municipality is 3973 hectares.

TOPOGRAPHY

Tansen is stretehed towards the southern slope along the Mahabharat range, *Shrinagar Danda*. The core area of Tansen is situated in a relatively flat land. Flat, gently, and strongly sloping are the general landscapes of Tansen. There is predominance of south facing slope. Tansen lies at an altitude of 1310 meters. The slope gradient varies from less than 3° at *Bansbari* and 15° at *Darbar Square* as well as more than 34° on the southern part of *Shrinagar Danda.*

CLIMATE

Climatically, Tansen has a warm temperate climate. The peculiar and pleasant warm temperate and equable climat , not hot in summer as well as not cold in winter, are experienced in Tansen through out the year. This peculiar type of climate is the major asset and feature of this beautiful town. Average temperature is 24° Celsius. The daily maximum temperature reaches to 32° Celsius. The Daring the winters, the winners the daily minimum temperature falls at 10° Celsius. The maximum temperature of the hottest month is 35° Celsius and minimum temperature of coldest month falls till 5° Celsius. The period of summer monsoon receives 80 % of rainfall between June to September. The winter monsoon (wastrels. pre and post monsoon) dedicated 20 percent rainfall. Average annual rainfall is 200 centimeter (DSCO Tansen Palpa).

GEOLOGY AND SOIL

Tansen Municipality is composed of soft and medium rocks. Mahabharat rock is general and comprises with only little differences rather has uniform metamorphic rocks and some granites. Lands of Tansen are either too steep to be terraced and cultivated, 30° slope or lie above latitudinal limit of arable agriculture soils which are more than 20 cm. deep and imperfectly grained. These lands are suitable for firewood, fodder and timber production. These types of trees provide a good permanent vegetative cover and minimise erosion. Red brown soil occupies in Tansen and it's texture has coarse gravel and coarse sand and there are a lot of mix stone particles on the oil.

LAND USE PATTERN IN 1974 B.S. (1910 AD)

It has been reported that the land of Tansen had been first surveyed in 1930 B.S. Popularly known as *Mahajanch* but no written evidence of this survey exists at present. A second survey was conducted in 1974 B.S., It has also no written testimony in *Kand* revenue office of Palpa. Only the Personal diary of Prem Bahadur Silwall bears some evidences of it. According to the diary there were only 150 houses and 350 ropani land had been used for different purposes in Tansen. Before 1986 settlements were

scattered and population was sparsely distributed particularly due to lack of infrastructure of development. In chaitra, 1986 B.S. drinking water was brought from *Kuran Khola Bajha* in Tansen. It is only after 1986 B.S. that the infrastructure of development was developed. from that time, the population of Tansen started to increase.

Table 1
Changing Landuse Pattern In Tansen

Time B.S.	Number of Land Ownerships	Number of Households	Cultivated+Residential area of Land (ropani)	Forest Land (ropani)	Percentage of Forest Land
1996		282	564	21554.60	97.45
2016		633	2414.25	19704.35	89.08
2036		2398	3097.5	2756.99	12.46
2045		2600	19758.75	2359.84	10.67
2056		3440	19758.75	2359.00	10.67

Source : Rana Bahadur Thapa, Tansen, Jamindari Patuwari Record of 1996, B.S., Palpa Land Revenue Office, Tansen Survey Maintenance Branch Office Palpa.

Table 2
Population Pattern of Tansen

Time B.S.	Population	Number of Households	Annual Growth Rate
1996	1600	282	-
2014	4000	600	2.70
2028	6434	941	5.09
2038	13125	2422	5.09
2048	13599	2699	0.03
2056	19651	3440	3.85

Source : Mohan Silwall, former chairman of Tansen Nagar Panchayat; Rana Bhadur Thapa Tansen ; Tansen Municipality office.

CHANGING LAND USE

The Table 1 indicates a significant change in land use pattern between 1996 B.S. to 2056 B.S. This indicates the modification of forest land to a great extent with a rapid socio-economic pressure on land. The major agents responsible for bringing about land use changes here in Tansen Municipality are drinking water supply of 1986 B.S., the declaration of the place as a Municipality in 2014 B.S., 1957 A.D., construction of Siddhartha highway in 2929 B.S., physical infrastructure as well as the unplanned increasing urbanization.

Before 1996 B.S., due to the lack of infrastructure of development and the scarcity of drinking water only a few people used to live in Tansen. After the construction of transportation network, establishment of Mission Hospital and favourable climate, urbanization rapidly grew here. People from rural hilly areas with better economic status started to migrate here with slow motion.

The Table 1 also shows that before 2016 B.S. the forest land was high and cultivated and built up area was very low, but during the period of 2016-20s the forest land decreased fast and agricultural as well as residential land increased rapidly. The loss and gradation of forest in Nepal is perhaps the most serious national environmental problem. Forest are an integral part of human community. They provide for subsistence economy, providing firewood, the main source of energy for cooking and heating, grass and leaves for animal fodder and timber for building materials. Before 2025 B.S. growing population density and scarcity of residential land have resulted in vastly increased pressure on forest and sloppy land resources. Forest land of Tansen has suffered a vigorous decline in the regime of Pratap Shamsher. The extent of deforestation has been exaggerated and that the area of forest cover in the middle hills has remained largely intact over the last thirty years, this view down plays to the significant deterioration in the quality of existing forest, which have been reduced through excessive pillage to shrubby wastelands (Gilmour 1988).

In the period between 2016 B.S. to 2036 B.S. the forest land decreased to 76.62 percent. The Table 2 clears that before 2038 B.S. population growth rate was very high at different period. It has brought drastic change in land-use pattern and environment. The present population growth rate of Tansen is higher than national level. If the rapidly growing population is not checked and scientific land use planning not applied, the natural resources of Tansen cannot sustain and it has to face the natural calamities.

SYNOPSIS OF ENVIRONMENTAL SITUATION IN TANSEN

Nepal has been suffering environmental problems. Environmental conditions is being serious day by day. Tansen is also entangled in it and other small towns of mid-hill region of the country like Ilam, Dhankuta, Surkhet and Dipayal as well. Among them Tansen lies in the highest environmental degradation index. The most significant environmental problems of Tansen relates to unscientific land use planning, construction of work without geological and geomorphic survey, soil erosion, watershed degradation, unplanned urbanisation, solid waste deposit, open sewerage and steam pollution. Burgeoning population has been one of the major course of the environmental degradation in Tansen (Table 2). If present population growth rate continues the carrying capacity of land and water resources will lacking the level.

SOIL EROSION AND WATERSHED DEGRADATION

Deforestation, marginal and steep mountain slope used for residential purposes, in Tansen has far reaching consequences. It has brought to earnest problems of soil erosion, landslide and thereby affecting agricultural productivity. There are four subwatershed catchment areas in Tansen, namely *Holangdi stream, Majhare stream*, Upper *Majhare stream* and *Barangdi stream*. These *streams* wash away 126.69 ton per hectare per Year (Table 3). These watersheds are binge damaged day by day. Damaged watersheds have direct bearing on water retention capacity and water resources as well. Degraded catchment areas have been affecting local irrigation and water supply as well as other recreational survives. Human activities have been playing major contributory role on soil erosion in Tansen.

Table 3

S.No.	Name of sub Watershed (Catchment Area)	Soil erosion Per/hectare/Per Year	Total Soil Erosion
1	Holangdi Stream	30.03	43.59
2	Majhare Stream	34.09	28.38
3	Upper Majhare Stream	25.96	27.51
4	Barangdi Khola Stream	30.89	27.31
5	Total		126.69

Source : Soil Conservation Office, Tansen Palpa, 2000.

Landslides are the results of complex interation of geological and geographical environments and have a variety of causes: heavy rains, weathering, earthquake volcanoes, deforestation and human activities. Among these heavy rainstorm and unscientific land use planning constitute two of the most important landslide inducing agents in the Municipal area of Tansen. Landslides are triggered by road construction, building construction and highly exploitation of natural resources. Best examples of landslide have been clearly seen due to construction, North western part of Masjid, western part of District Hospital as well as ring road.

CONCLUSION

Land use pattern is unstable or mobile natural resource. It is changeable. Where there is a village or town, there is increasing population in what proportion, according the same rate land use has been changing. This changing land use pattern has negative impact on natural eco-system. It means environment has been degrading. Human activities are the main cause of environmental degradation. From 2014 B.S. to 2038 B.S. there was rapidly growing population in Tansen. Growing population in Tansen has great changes in land use pattern and environment. Natural springs of

Tansen have been lacking the volume of water. Landslide, sheet-erosion and gully -erosion are increasing due to the use of marginal land. Building construction is continuing on very steep slopes. Other kinds of construction work are beginning without geologic and geomorphic survey. Municipality is found uninterested to control it. According to watershed management, Tansen lies on a more sensitive fragile area. If rapidly growing population and settlement are left uncontrolled the present condition, there may be natural calamities. Thus, population, unscientific land use planning and urbanisation are strong factors in bringing change on the land use pattern as well as environmental deterioration.

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