Agricultural Land Use Change in Nepal

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ABSTRACT

Zero hunger, one of the Sustainable Development Goals, demands an intensification of production on available land.Leaving land fallow, misuse, fragmentation, and encroachments are rampant in Nepal.Average landholding per family is being decreased gradually which was 1.23ha in 1991; 0.94ha in 2001 and 0.75 ha in 2011 in Terai, Nepal.However, agriculture is still the main source of employment. This paper reviews the agricultural land use pattern of Nepal based on secondary data. The recent trend showed that among the major three crops- maize, paddy, and wheat; production area of wheat is decreasing. Similarly,among major three livestock-cattle, buffalo and goat;the number of goats has been increased. Agricultural land and arable land decreased by 0.29, and 3.85 percent, respectively from 1990 to 2000. Grassland declined in hill and mountain posed a problem to livestock farming. The annual rate of increase in cropland is 0.37 percent in the high mountain proved encroachment on biodiversity. Poor land management practices have significantly affected soil quality and crop production.The most pronounced land- use changes in the Terai region between 1989 and 2016 were the rapid increase in urban built up. Multiple factors like migration, real-estate business, fragmentation of land, and an increase in land use in off-farm activitieswere found responsible for the decrease in crop area and livestock production. ThoughGovernment of Nepal has endorsed the Land Use Act, 2019 to regulate the land use, proper implantation at field level deemed necessary to check land misuse.

Key words: *Agricultural land use, Nepal*

INTRODUCTION

Sustainable Development Goals (SDG) 2 aims to end hunger, achieve food security and improved nutrition and to promote sustainable agriculture by 2030. In the meantime, The Constitutionof Nepal, 2015 recognizes the rights to food as one of the fundamental rights of every citizen (GON, 2015). Ensuring rights of every citizen to food means ensuring food security to everyone. One of the means to increase food security situationis intensification of production on available land (Khatiwada, *et al*., 2016; Tilman *et al*., 2011).Food security problems are particularly acute in densely populated South Asia, which records the highest number of extremely poor people living on less than USD 1.25 per day (World Bank, 2015).

In case of Nepal, the average landholding per family is less than 0.8 hectares (CBS, 2011). It is being decreased gradually which was 1.23ha in 1991; 0.94ha in 2001 and 0.75 ha in 2011 in terai (CBS, 2013; CBS, 2003). However, agriculture is still the main source of income and employment in Nepal. Thus, proper land use is regarded as the best alternative to meet food demand in countries having limited cultivable lands (Dahal *et al*., 2009). This paper reviews the agricultural land-use change pattern in Nepal, mainly based on secondary data.

RESULT AND DISCUSSION

Nepal is a landlocked country between China and India with its varying topography from plain to the high mountain. Farming is fundamental for the livelihood of 65 per cent of the population. Nepal has a total land area of 147,181 square kilometers (MOALD, 2019).

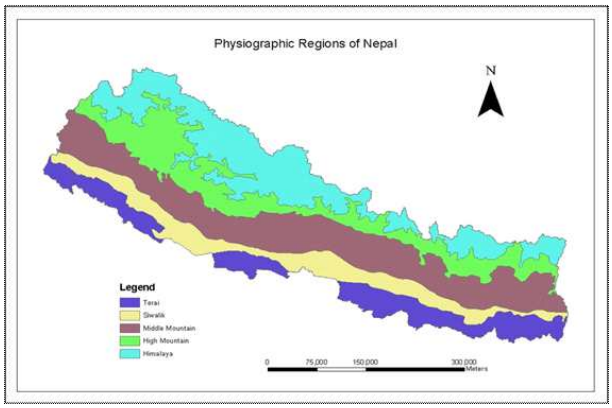

Figure 1: Five physiographic regions of Nepal

It has been divided into mainly three physiographic regions; lowland (Terai) along the Southern border with India; the central band (Hills) and the high Himalaya (Mountain) along the Northern border with China. Terai, Hills, and Mountains cover 23, 42, and 35 percent of land area, respectively (ABPSD, 2013). However, from the climatic perspectives, Nepal has been divided into five major categories as depicted in figure 1, namely; Terai, Siwalik, Middle Mountain, High Mountain, and Himalaya.

Major crops grown in Nepal

Paddy, maize, and wheat are the major three cereal crops grown in Nepal. These days, maize became cash crop due to increasing demand in the poultry industry for feed ingredient. Thus the import of maize is also increasing. Similarly, soybean is a major pulses crop grown in Nepal having a high demand for the same reason. The data in Table 1 shows that maize and paddy production area is increasing whereas wheat production area is decreasing. Though vegetable farming considered as income-generating option for farmers, the area under production was found more or less constant. Similarly area of lentil, Soybean and Fruits is also decreased last year. The multiple factors like migration, labor shortage, land fragmentation, land fallow and increase in land use in off-farm activities might be responsible for the decrease in crop area, posing threats to the commercialization of agriculture.

Livestock farming in Nepal

The numbers of cattle and buffalo were found stagnant during the last three years as shown in Table 2. However, the number of goats has been increased. The reason could be the import of boar goat and government support on goat farming. Increased demand for pork in the meat industry also increased the pig number in recent years.

Table 1
Trend of major cereal crops grown in Nepal (Area: Hectare, Production: metric tons)

Years/ Crop	2016		2017		2018	
	Area	Production	Area	Production	Area	Production
Paddy	1362908	4299079	1552469	5230327	1469545	5151925
Maize	891583	22315117	900288	2300121	954158	2555847
Wheat	755823	1736849	735850	1879191	706843	1949001
Lentil	205939	253041	206969	254308	197662	247950
Soybean	23446	23563	23563	29061	22507	28335
Fruits	150387	110617	157199	110802	130449	1058519
Vegetables	280807	3580085	284135	3859492	286864	3958230

Source: (MOALD, 2019)

Table 2
Three years trend of livestock population in Nepal

Livestock	**Years**		
	2016	**2017**	**2018**
Cattle	7302808	7347487	7376306
Milking cattle	1026135	1029529	1039538
Buffalo	5168809	5177998	5277819
Milking buffalo	1355384	1509512	1535948
Goat	10986114	11166509	11647319
Sheep	800658	801975	800749
Pig	1291308	1328036	1435369

Source: (MOALD, 2019)

Cattle, buffalo, goat, and pig are the major livestock mainly found in mid-hills of Nepal. However, sheep are mainly found in high Himalayan regions. In terms of number, Mid- hill has four times more cattle than mountain and two times more than Terai (MOALD, 2019). The high mountains are mainly used for grazing sheep, yak, and mountain based cattle. The decline of grassland area by 3.64 per cent in the mountain threats livestock farming (LRMP, 1986; Uddin *et al.* 2015). Agricultural lands in the mountains are less fertile and less productive. They are fragile and vulnerable to landslide and erosion losing fertile topsoil. Thus the government should give priority on cattle farming in mid-hills and mountains region of Nepal, instead of agriculture.

Land-use change in Nepal

Misuse and encroachments on land are rampant in the country. Even agricultural land is plotted for residential use. Government of Nepal has recently endorsed the Land Use Act 2019to ensure land use properly. The act has been introduced based on the types of land, population growth, requirements of land for various purposes like food and habitation and the need for economic development and infrastructure building (GON, 2019).

Out of the total land area of Nepal, agricultural land is 28 per cent (of which 21 per cent is cultivated and 7 per cent uncultivated), forest area is about 40 per cent and grassland and pasture is 12 per cent as shown in Table 3. Table 4 shows that the land area has been increased by 0.22 per cent. However, agricultural land and arable land had decreased by 0.29, and 3.85 per cent, respectively from 1990 to 2000.

Table 3
Land use statistics of Nepal

Region	Area (000 ha)	Per cent
Agriculture land cultivated	3,091	21.0
Agriculture land uncultivated	1,030	7.0
Forest (including shrub 1560 ha)	5,828	39.6
Grass land and pasture	1,766	12.0
Water	383	2.6
Others	2,620	17.8
Total	14,7181	100

Source: (MoAD, 2016)

Table 4
Land use change pattern in Nepal

Land use categories	1990-2000	2001-2002	Change in area	Percentage change
Agriculture area	4192.70	4180.47	-12.23	-0.29
Arable land	2337.20	2247.31	-89.89	-3.85
Permanent crops	65.41	142.63	77.22	118.06
Meadows and pastures	1790.09	1790.53	0.43	0.02
Forest area	4358.50	3680.00	-678.50	-15.57
Other land	5751.98	6474.53	722.55	12.56
Inland water	414.82	383.00	-31.82	-7.67

Source: (FAOSTAT, 2016)

Similarly, decreased in forest area by 16 percent during ten years pose threats to biodiversity. Thedecline in agricultural land is even faster in these days posing threats to agriculture (WECS, 2010).

Land use pattern in Mountain, Hill, and Terai region of Nepal

The land-use change process is very dynamic and occurs in different modes, with differences in magnitude and rate. This dynamism depends on scale (Keyser and Kaiser, 2010). Urbanization in developing countries is pulling factor for people to move urban and semi-urban areas from rural settings(Goldman, 2011). Growing cities of Nepal is attracting people and changed rural economies into real estate (Goldman 2011; Locher, Steimann and Upreti, 2012).

Acquisition of farmers land for non-agricultural commercial purpose is increasing rapidly in Nepal. This directly affects agriculture production and the system as a whole. Research data depicted that forest land decreased during the middle ten years from the 1980s to 1990s (Gautam, Shivakoti and Webb, 2004). However, it again increased by 1.01 percent between 1979 and 2010. Cropland slightly increased by 2.64 per cent overall, while grassland declined over the same period. Forest land, in particular, increased in the middle of the country (Hill region and Siwalik), while in some parts of the Terai region it slightly decreased. Poor land management practices have significantly affected soil quality and crop production, with the average annual crop production rate decreasing by 3.5 percent in 2014–2016 (MOAD, 2017).

Land use and management practices are closely interrelated with soil quality, and the adoption of appropriate land management practices and land use planning would be helpful to both restore the degraded soil physicochemical quality and ensure steady and sustainable productivity (Oyetola and Philip, 2014).

The Mountain Region begins where high ridges begin substantially rising above 3,000 above mean sea level. These subalpine and alpine zones mainly used for seasonal pasturage. By geographical view, it covers 16 percent of the total area of Nepal. Nepal's territory is a major part of the Himalayan region, which is mostly mountainous and has a large area of snow and glacier. Of the total snow and glacier cover, the High Mountain region accounts for over 95 percent area. The barren land distribution of the country is generally similar to snow and glaciers cover. The majority of barren land is distributed (83.59 per cent) in the High Mountain region. The region is consecrated with nine out of the 14 world's highest peaks that rise above 8000 meters, including Mt. Everest, the top of the world.

Mountains of Nepal are suitable for vegetable seeds andoff-season vegetables cultivation. However, the lower part of the mountains is suitable for paddy, maize, barley, and buckwheat production. Potato, cole crops, beans, and low temperate fruits are also cultivated in the region. Crop area is increasing by 0.37 per cent in the High Mountain, yearly(Poudel, 2016).

The Terai forms a low flat land (plain), is a fertile low-lying densely forest region of Nepal. The forest area in the Terai was found to have decreased with the annual rate of 1.3 per cent during 1979-1990. Literature showed that the Terai forest had decreased by 0.44 percent and 0.40 per cent per annum during the periods of 2001–2010 and 1991–2010, respectively (Pandey *et al.,* 2016).The most pronounced land use land cover changes in Terai region between 1989 and 2016 were the rapid increase in urban built-up cover (420 per cent) and associated decrease in cultivated lands by 4 per cent (Rimal, *et al.,* 2018).

CONCLUSION

Though agriculture isthe main source of income in Nepal, misuse and encroachments on land are rampant causing area of crop production decreased. The average landholding per family is also being decreased. The fast trend of decreasing agriculture land is a major constraint of food security and sustainability. Similarly, the decline of grassland area in hill and mountain posed problems to livestock farming. On the other hand, 0.37 percentannual rate of increase in cropland in the High Mountain is likely to affect the rich biodiversity of Nepal. The most pronounced land-use changes in the Terai region between 1989 and 2016 were the rapid increase in urban built up. Thus Government of Nepal should stop land misuse to meet food security and biodiversity conservation by implementing Land Use Act, 2019 at the field level as soon as possible.

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