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Are doomsday scenarios best seen as failed predictions or political detonators? The case of the 'Theory of Himalayan Environmental Degradation'

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The so-called 'Theory of Himalayan Environmental Degradation' predicted an environmental collapse by the end of last millennium, threatening the life of millions of people. Fortunately, the all-encompassing crisis did not materialize. The article shows that the 'Theory' failed to take into account the vast ecological variation in Himalaya and thus generalized its contentions to the whole mountain range on the basis of deficient data. But, on the other hand, what would have happened if the prediction had not been made? A doomsday scenario like the Theory of Himalayan Degradation can, from the perspective of positivist hypothesis testing, be viewed a posteriori as a failed prediction; but from another perspective it can be seen as an alarm clock that triggered a series of policy initiatives and new knowledge.

Keywords: Environmental degradation; Himalaya; farming systems; ecological variation

Introduction

From time to time, doomsday scenarios enter global academic and political discourses. The gloomy future that was intimated in The Limits to Growth created great havoc in the 1970s (Meadows et al., 1972). More recently, Huntington's notion of the Clash of Civilisations (1993) activated a heated debate over the future of multiculturalism. A hallmark of such scenarios is that they rarely come true. The 1984 passed much more pleasantly than Huxley envisaged. But should we thereby dismiss them as useless, as failed predictions that the world would have made better without?

This article looks at one such prediction. The 'Theory of Himalayan Environmental Degradation' predicted an environmental collapse in the world's greatest mountains by the end of last millennium, threatening the life of millions of people. Fortunately, the all-encompassing crisis did not materialize. But what would have happened if the prediction had not been made? The article asks if doomsday scenarios like the Theory of Himalayan Degradation could be regarded as an alarm clock which sets academics and politicians in motion, rather than ridiculing them on hindsight as nothing more than failed predictions.

The Theory of Himalayan environmental degradation

On an international conference on Development of Mountain Environment in Munich 1975 several alarming observations were disseminated, creating a general feeling among the participants of a pending catastrophe in the world's mountain regions (Ives, 2006). Later the same year, Erik Eckholm published an article in the journal 'Science' that triggered a debate over the fate of Himalaya that has persisted to the present day (Eckholm, 1975). The article expressed grave concern that an environmental collapse would occur in the near future, affecting millions of people in the mountains as well as on the downstream plains.

Eckholm's argument ran thus: Assisted by international donor countries, improvements in medical- and veterinary services lowered the death rates of human and animal populations in the 1950s without also lowering birth rates. Because the resulting population increase was not followed up by economic modernisation, perpetuation of the traditional agro-pastoral farming system came to exert intolerable pressure on the natural resource base. Ever more forest was cleared for cultivation and steep slopes were converted into terraced fields. By that, two negative spirals of environmental degradation started. Firstly, the torrential rains which are brought on by the monsoon caused sheet and gully erosion on deforested land and landslides on terraced slopes. Instead of being retained by forests, surface run-off brought rainwater directly to streams and rivers, thus causing flooding on the plains. The second spiral relates to energy. Since Himalayan households mainly rely on firewood for cooking and heating, the receding forests implied that animal dung came to be used for burning, like it is on the plains. Depriving the land of the previously applied manure lowered productivity; and because the per hectare productivity decreased, ever more areas came under the plough in order to feed a growing population, thus further depleting the forests.

This reasoning has later become known as "The Theory of Himalayan Environmental Degradation" (Ives & Messerly, 1989). In short, it postulates that a

growing population of agro-pastoral cultivators causes deforestation and serious land degradation in the mountains and flooding on the plains. The catastrophic floods in Bangladesh and on the Gangetic plain are, in other words, caused by the hill farmers.

Figure 1 below summarises the 'Theory of Himalayan Degradation'. The agro-pastoral farming system implies a combination of cultivation and animal husbandry. In the middle hills of Himalaya, staples like wheat, rice, potatoes and maize are cultivated on irrigated (khet) or rainfed (bari) terraced fields. Since cultivation implies the removal of nutrients from soils, artificial re-fertilization is necessary in order to maintain productivity. For that purpose a mixture of animal manure, litter from forests and crop residues are traditionally used. Thus, domesticated animals are not only an addition to cultivation but an integral part of the farming system as such. Human population increase is paralleled by an increased demand for staples, which in turn can only be met by more animals producing manure to be applied on a widening area of cultivated land. An increasing number of agro-pastoral households, then, lead to more land being cultivated and more land being transformed into pastures. The extension of farmland takes place at the expense of forests which are diminished. The ultimate consequences of this process are degradation in the mountains and flooding on the plains, which is the basic message in the 'Theory of Himalayan Environmental Degradation'.

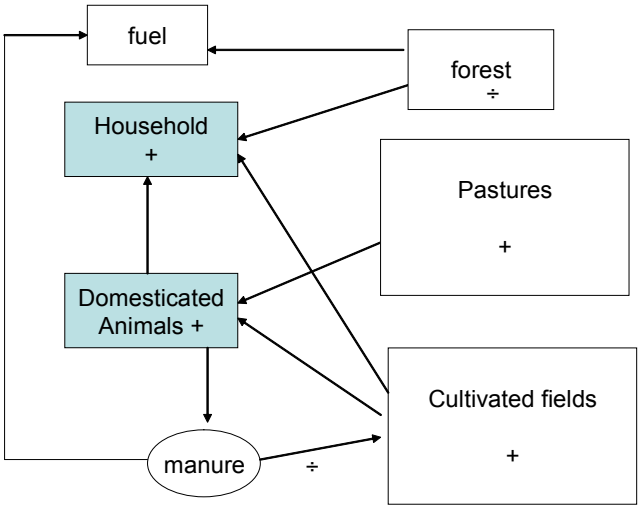

Figure 1. Population growth and deforestation in the Himalayas (after Eckholm 1975).

The 'Theory' soon became a hegemonic narrative throughout the community of mountain researchers and policy makers. The World Bank wrote

"Nepal has lost half its forest cover within a thirty year period (1950-80) and by AD 2000 no accessible forests will remain" (World Bank, 1979).

In a similar vein, the Asian Development Bank mentioned that "(there is a) distinct danger that all accessible forests, especially in the hills, will be eliminated within less than 20 years" (ADB, 1982:12).

The World Resources Institute was clear in identifying the cause of the pending disaster "a few million subsistence hill farmers are undermining the life support of several hundred million people in the plains" (World Resources Institute 1985).

Jack Ives (2006), from whom these citations are taken, lists a number of doomsday predictions that emerged in research publications, in policy documents, and in the popular press during the fifteen years to follow the Munich conference. And the persuasive power of the 'Theory' has not only been limited to western writers. In 1981, a Nepali geologist published a book where the policy message was that "half of the hill population needs to be settled in the Terai (plains) and at the same time birth control should be considered seriously" (Sharma 1981:58). Sharma (1981) recommended that the remaining hill population should turn to horticulture in order to prevent further erosion.

The 'Theory' soon achieved wide credibility since "it was an intellectually satisfying concept, an environmental 'theory of everything', so plausible that it was widely accepted as a fact" (Ives, 2006:8). Furthermore, it was approved because it corresponded to the problem-solving capacity of international donors and national policy makers (Thompson & Gyawali 2007:XIX).

Eckholm (1975) claimed that the Theory was valid throughout Nepal and Kashmir, but it proves that it was based on case studies carried out in the middle hills of central Nepal only. This way of generalising on the basis of a few case studies invites, of course, to criticism. Adherents to the epistemological position called 'post-development' claim that universalising, nomothetic theories ignore the complexity that makes up the whole and are thus not more than misrepresentations of reality (Tucker, 1999). And even worse, in our case, Ives claims that the 'Theory' was "based on reports of 'experts', prepared in Kathmandu's best hotels, but preferably not during the summer monsoon, the peak season for landslides, leeches, and maximum discomfort for field travel" (Ives, 2006:234). Rather than aiming for 'grand narratives' that claim validity

across time and space, post-development opts for local idiographic analyses of phenomena in their proper time-space context. And indeed, if we proceed from the middle hills of Nepal to the Pakistani part of Kashmir, a radically different picture emerges.

More people produce more forests in Northern Pakistan

Cultivators in the mountainous north of Pakistan practice the same kind of agro-pastoral farming system as the farmers Eckholm was writing about in Nepal. Wheat, maize, and vegetables are cultivated in the valley bottom and farmers keep cattle, sheep and goats for manure, milk and meat. But climate and environment are different from those in the middle hills of Nepal, and that fact produces quite opposite results of population growth.

The Gilgit-Baltistan Province of Pakistan is a semi-arid area. In the administrative headquarters of Gilgit annual precipitation is a mere 125 mm. Valley bottoms are barren, the only vegetation being grasses and scattered brushes. But on high elevations, above 3500 meters, natural forests of Himalayan blue pine and birch thrive, succeeded by alpine meadows between 4000 and 5000 meters. The presence of high mountain forests above the dry valleys is produced by orographic conditions. When air becomes cooler due to increased elevation, moisture is condensed into mist and rain, and higher, into snow. In addition, evaporation is less on high altitudes.

Settlements are found in the main Indus valley and its numerous side valleys. Since the valleys are barren from nature, the vital task for farmers is to combine cultivable land (*das*) with water. Impressive canals of several kilometres are constructed in mountain sides to divert water from glacial streams to irrigate the das land. The problem of maintaining soil fertility is here, like in Nepal, solved by collecting animal manure and spreading it out on the land. Domesticated animals are vital for cultivation. A challenge for farmers, then, is to feed the animals.

In summer, animals are taken to the high alpine meadows where pastures are plentiful in a typical transhumant manner. The bottleneck in the farming system is to feed animals during winter when high pastures are covered in snow. At that time, animals mostly have to be stall-fed in the villages. They are given straw of cereals that are dried after harvest in the autumn and other agricultural

residues. In addition, trees are lopped for foliage and used as fodder. Forests are thus essential units in the farming system.

People distinguish between two kinds of forests. The natural high mountain forest is called tom, and due to its high elevation it is inaccessible for daily use. People have traditionally brought timber for house construction from the high forest, but it is too remotely located for collecting firewood and foliage. The farming system hardly interacts with the high forest at all, human activity being limited to some modest logging and hunting for wild game.

The other forest is labelled bonni. Deciduous bonni forests are found around villages in the valley bottoms. But since the valleys are semi-arid, all bonni forests are artificially irrigated. It is the bonni forests that keep domesticated animals alive during winter. Various tree species with leaves of high nutritional value are deliberately planted and irrigated. There is a correlation between productivity on farmland, number of domesticated animals, and bonni forest. The more fields a farmer cultivates the more manure he needs, and the more bonni forest he must have access to in order to feed animals over the winter.

The corollary of agro-pastoral farming in the semi-arid Pakistan Himalaya is that population growth leads to increase of bonni forest cover. This is quite opposite to the situation described by the 'Theory', according to which population growth leads to deforestation. The Northern Areas of Pakistan have, like Nepal, seen a population growth lately. In Nepal, the 'Theory' contends that an increasing number of villagers are sustained by expanding the cultivated area on expense of forests that are becoming depleted. In northern Pakistan, quite contrary, the problem of supporting a growing population is solved by constructing ever longer canals from glacial streams to new das land, which is quite abundant in the area. And in order to practice the traditional agro-pastoral farming, bonni forest must be planted. In the semi-arid northern areas of Pakistan the formula is: more people – more forest!

The same kind of agro-pastoral farming has quite opposite effects on forests when it is practiced in different climate-ecological environments. In the wet middle hills of Nepal, extension of the active farming area encroaches on the forests. In semi-arid Gilgit, on the other hand, forests become more abundant when the cultivated area increases.

It must be noted that deforestation is also a serious problem in Pakistan. But it is important to keep in mind the two kinds of forests in that area. Deforestation is only taking place in the natural high mountain forests and not in the irrigated valley bonni groves. The completion of the Karakorum Highway which passes through the Upper Indus Valley opened up previously inaccessible forests for logging in the 1980s. Especially in the Tribal Areas where the central government has limited authority, the high mountain forests of blue pine are decimated rapidly. Trees of 250 years or more of age which are highly valued by furniture makers in Pakistani cities are cut, transported on slides, sledges or tractors to the nearest road and sold to waiting contractors from the plains. Little replanting is done. But it is important to underline that this environmental tragedy has nothing to do with the agro-pastoral farming system. Rather, it must be related to the political system. The Tribal Areas of Pakistan are mostly acephalous, meaning that there is a lack of central political authority. In such a system, the primary social unit, the family, is in the last instance the architect of its own fortune. It has to defend its interests – most importantly land, water, and female reproductive capacity – against predatory neighbours by its own means. And for that, weapons are needed. The concomitant arms race between competing and frequently feuding families creates a next to insatiable demand for cash, which is obtained through logging. Remnants of the western Himalayan forests are, so to speak, converted into weapons (Aase, 2002).

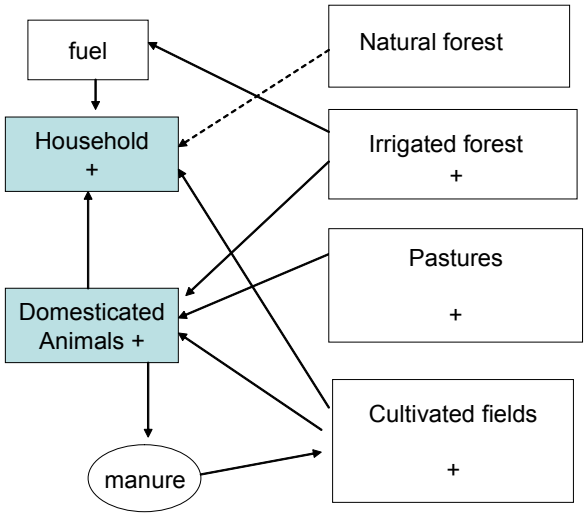

Figure 2. Population growth and forestation in Northern Areas of Pakistan (dashed line refers to minor flow).

The Pakistan case shows that the one and the same phenomenon, in this case deforestation, can be caused by radically different circumstances. Indeed, the vast complexity of man-nature interactions in the Himalayas was one of the grievances against the 'Theory' that started to be formulated ten years after it was introduced.

Refuting the 'Theory'

The pioneering opponents to the 'Theory' were Thompson, Warburton and Hatley who published *Uncertainty on a Himalayan Scale* in 1986. The book contends that the 'Theory' (or "the orthodox definition" as they call it) violates the vast complexity of environments and human practices to be found in the region by claiming universal validity and by appointing the poor subsistence hill farmers to be the culprits behind the emerging tragedy. By applying their special version of 'cultural theory', Thompson et al., (1986) claim that the discourse on the Himalayan environment has been heavily biased in favour of one 'voice' – or one out of four possible stakeholder positions – namely, the international donor position. The "environmental orthodoxy" "has provided the basis for decades worth of research and development aid in the whole region" (Thompson & Gyawali 2007:xix).

A few years later, the opposition to the 'Theory' was strongly reinforced by Ives and Messerly (1989). Their book: *The Himalayan Dilemma: Reconciling Development and Conservation* (1989) thoroughly documents the variable state of Himalayan landscapes and communities. They do not deny that there are problems and challenges in the region, but maintain that "a supercrisis is not imminent and the scene is set rather for a deepening of a series of chronic problems" (Ives & Messerly, 1989:237). The problems are not, however, created by the hill farmers; rather, they are combined outcomes of international border conflicts, failed mega-projects, mismanagement of aid funds, and a general lack of understanding of the situation of the poor.

Ives claims that the 'alarmist discourse' of the 1970s and 1980s was founded on misleading perceptions, misconceptions, and distortions (Ives, 2006:227). In the same vein, Thompson and Gyawali contend that "millions and millions of dollars' worth of aid has been directed at solving the wrong problems" (Thompson & Gyawali 2007:xxiii). There is a salient gloating over the failure of the 'Theory' in their recent publication, since "Today Nepal's middle hills are better canopied than they have ever been since they were first settled" (ibid.:xvi). It is thus close at hand to write off the Theory as just

another doomsday scenario that did not materialize. But there is an alternative way of perceiving it. What had happened if the Theory was not published thirty-five years ago? Would the forests have been as healthy as they prove to be today? This we cannot know, of course, but it is possible to regard the Theory as a kind of self-denying prophesy rather than a failed prediction.

Was the Theory of Himalayan Degradation a flop or a timely warning?

Most writers agree that the state of Himalayan forests was deteriorating during the 1950s and 1960s, but the recent development is less clear. The former Director of the International Centre of Integrated Mountain Development (ICIMOD) agrees with Thompson and Gyawali when he maintains that "community forestry has reversed deforestation trends in Nepal" (Campbell, 2008:25). On the other hand, forest cover in Nepalis reported to have decreased by 1.0% annually during the 1980s while the annual loss was 1.1% during 1991-1995 (Kaosa-ard & Rerkasem, 2000). Jack Ives, after scrutinising various parts of the Himalayas, offers a more varied conclusion: "some areas of this vast and complex mountain region have been ruthlessly stripped off most forest cover while other areas still have well maintained forests, or have even been reforested to various degrees" (Ives, 2006:79). At least, time has thoroughly refuted the gloomy predictions of the Theory.

The positive turn of forest development during the last twenty years is ascribed to community forestry by most writers on the topic. Ives, for example, writes that "between 1978 and 1992 community forestry activities at lower altitudes have had beneficial impacts on the local forests and the overall stability of the land-use system" (Ives, 2006:50); and Thompson and Gyawali (2007) claim that Nepal's healthy canopy is thanks to efforts of Community Forestry that began in the mid-1980s.

The leading voices on the counter-narrative side, Thompson et al. (1986) and Ives and Messerly (1989), leave no doubt that the 'Theory' was wrong. The saviour of Himalayan forests emerged to be Community Forestry organised according to the principle of local participation. But it may well be that it was exactly the Theory, inspiring the 'alarmist discourse', that paved the way for Community Forestry. Looking at things from that perspective, the Theory was an eye-opener that set policy-making in motion. The Theory was the hare, to speak metaphorically, in the race against deforestation and massive land degradation in the Himalayas.

The new orthodoxy: Local participation

Nepal can now boast 20,000 community Forest User Groups (FUG) who manage a total of 1.2 million hectares of forest (Campbell, 2008). The FUGs are headed by a committee in which all castes and all genders must be represented. FUGs implement and to a certain extent make rules for local use of forest resources, and extract taxes from the users. The taxes are used for community projects like building of bridges, maintenance of village roads and irrigation canals. The FUGs report to the State via the Forest Ranger, whose task is to watch the community activities that are carried out within the limits set by the Government.

The introduction of FUG is a success story in Nepal; indeed, it is one of the few development initiatives that Nepal can proudly show to the outside world. But the institution has its flaws. Critiques claim that FUGs may care for the forest in an excellent manner, but their success is more modest when it comes to poverty alleviation which is another stated objective of the institution. Poor low caste people are the ones who occasionally must harvest forest resources illegally in order to survive, and for that they are often expelled from the FUG, loosing whatever rights they might have had to the forest. In that manner, the FUGs reproduce and even reinforce village power structures.

Because influential villagers are usually endowed with substantial social capital, it is sometimes tempting to convert that capital into material gains by undertaking various kinds of transactions with the forest officials. In India, Saxena contends that "The best friends of the Forest Department are the village elite who dominate the Joint Forest Management Committees" (Saxena, 2008:45). Powerful members of the Community Forest Committees (CFC, corresponding to the Nepali FUG) manage to enrich themselves in various inventive ways, for which Saxena prefers to label their activity committee forestry rather than community forestry.

A third problem relates to local monopoly of forest resources. In the Nepali valley of Mustang, the FUGs allow the original settlers to collect fungi, fodder, and other forest resources two days before the new settlers are allowed into the forest, thus reserving the best pieces close to the settlements for the 'authentic' villagers.

Adherents of Community Forestry are aware of these problems. But the advantages allegedly outweigh the shortcomings. The defects of FUGs are categorized

as 'second generation issues' and should be addressed now when the principle of local participation has gained momentum (Sharma et al., 2008). It is correct to argue, then, that the trust in local participation has become the new paradigm in environmental policy making. It is not least so in the Himalayas, where Sharma contends that "The notion that "conservation and management of natural resources are impossible without people's participation" is now becoming the guiding principle of community-based biodiversity management" (Sharma et al., 2008:84). 'Local participation' has become the new mantra of development.

History sometimes repeats itself. The discourse on local participation now holds an uncontested position much like the 'alarmist discourse' did during the 15 years to follow the publication of the Theory of Himalayan Degradation. And criticism runs off the new discourse like water on a duck's back. Sumitra Manandhar Gurung, an experienced Nepali NGO worker, puts it this way: "But anyone who dares to question (the success of FUGs) will tear away the national pride around an established "successful case" from Nepal, a model worthy of being exported elsewhere" (Gurung, 2007:249).

What is the origin of the belief in local participation? FUGs in Nepal and CFCs in India neatly fit into the present global ideology claiming that social capital, democracy, accountability, and good governance are necessary steps on the path to sustainable development. These ideas have travelled from the same institutions which embraced the Theory of Himalayan Degradation thirty years ago, to eventually reach recipient countries in need for development (whatever that may be). "Since globalization is not taking place in Nepal through trade or investment, only Indianization, it is the aid regime that has largely been the main harbinger of globalization" (Subba & Upreti, 1998:136). The World Bank, UNDP, international NGOs and overseas development agencies are the vehicles on which the new ideas have travelled to Nepal, like they were also carriers of the'Theory' thirty years ago.

Once the hegemonic voice has had time to speak for some time, its message tends to be internalized by the audience. Gurung noticed that the global discourse has been engraved in the national Nepali discourse on development and environment: "Now after twenty years in the "development game", I have come to realize that the myth-makers of today are no longer foreign experts, but the new Nepali elites, academics, consultants and the government" (Gurung, 2007:253).

I shall not speculate over the origin of global development discourses. Thompson et al. (1986) relate ideologies to the stakeholder positions of powerful global actors like UN and WB who favour problem-identifications that match their available solutions, while Ives is inclined to blame quasi-research and hasty generalisations for narratives of dubious nature that are sometimes canonised into 'facts'. Suffice it here to confirm that global discourses, or, more accurate, perspectives on sustainable development insisted upon by powerful global actors, tend to be internalized by national and local actors in recipient countries and converted into practical policies. That happened with the alarmist discourse, which, according to Thompson and Gyawali, channelized billions of dollars into certain kinds of development projects; and it happens now with national pride in community forestry based on the fashionable paradigm of local participation. But that may not be an ugly fashion! Like the 'Theory' probably mobilised academics as well as policy makers thirty years ago, the present emphasis on local participation implies the triple ambition of alleviating poverty, empowering the weak, and saving the environment. In the last instance, this intriguing ambition can trace its trajectory back to the Munich conference in 1975 when the Theory was introduced. A doomsday scenario like the Theory of Himalayan Degradation can, from the perspective of positivist hypothesis testing, be viewed a posteriori as a failed prediction; but from another perspective it can be seen as an alarm clock that triggered a series of policy initiatives and new knowledge.

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Revisit to functional classification of towns in Nepal

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The present study on functional classification of the towns in Nepal is a revisit to the study made in 1980 applying the similar methodology. The previous study was based on census data of 1971 and the present study on census data of 2011. The percentages of surplus labour force in proportion to national level were computed considering five activities groups involved in non-agricultural sectors. Then, the arithmetic means of each activity group were calculated and the standard deviations from the means were taken for measuring the functional specialization.The study revealed that both the degree of urbanization and level of functional specialization have considerably increased during a period of four decades. There were only 16 towns in 1971, which increased to 58 in 2011. The number of specialized towns has increased by six folds from 4 in 1971 to 26 in 2011. The level of urbanization has now been a prominent phenomenon as compared to that in 1971. In 1971, even the then large towns were with high agricultural labor force. Now, the proportion of agricultural labor force has declined considerably. However, agriculture labor forces constitute to be dominant in more than 15 smaller towns. It indicates that urban economic base is not being taken into account while incorporating places as municipalities in several cases.

Keywords: Basic and non-basic components; goods and services; functional base; incorporated towns; range; threshold population.

Introduction

Urban centers exist where people gather in close proximity in order to carry on certain activities and satisfy certain needs which cannot be performed without such proximity. These may be commercial, industrial, administrative and others of like nature, which

support urban settlements. The measurement and interpretation of economic and functional bases of towns are as important as the studies of other urban aspects.

One major concept in connection with urban economic and functional bases is that urban centers exist because such activities are performed within them which provide services to the populations of areas within and outside the towns. Therefore, urban centers have focal or nodal character (Shrestha & Manandhar, 1994), and depend to a considerable extent on the outside area for their support. Determination of the extent to which each of the urban functions services the population outside the urban center, in contrast to the production of goods and services for consumption inside the towns, is an important part of most studies of the urban economic base (Alexander, 1954).

Another concept closely linked with the urban functional base is threshold and range (Alber, Adams & Gould, 1971). Threshold refers to the latent body of consumers of the goods or services provided by the towns. It can be expressed simply in terms of the population of the service area or in terms of purchasing power of the people. In those areas whose incomes are relatively homogenous, threshold can be referred to the population serving as consumers for a specific good and service. If there are significant differences in income levels, it would be desirable to consider gross income levels whether or not the threshold population is available to a certain function. At a particular location there is again a range of goods or services. Range is the distance beyond which the local cost to the consumer becomes greater than the value of good or service to him/her.

Another important line of thinking of the urban economic base is the notion of basic and non-basic components of urban functions (Mayer and Kulan, 1959). This notion persists that the activities which the urban centers perform for outside areas are labeled as basic to be different them from those which service the people engaged in basic activities. The activities serving to local population inside towns are non-basic.

Closely linked with the basic and non-basic concept is the approach developed for functional classification of towns (Harris, 1943;Nelson, 1955). Such studies are of two types (Sharma, 1969). One type includes studies which have followed qualitative methods, and the another type is based on quantitative method. One popular quantitative method is the use of arithmetic means and standard deviation (SD) from the means (Sharma, 1990). The quantitative method could be well linked with the national proportion technique for assessment of functional classification of towns (Watanabe, 1961; Shrestha, 1971; Shrestha, 1980; Yucesahin, Bayar &Ozgur, 2006; ESPON & Leuven, 2013; Shrestha & Rijal, 2016; Sharma nd). The notion inherent in functional

classification of towns is that no two towns are alike; nevertheless many towns are similar enough to warrant a classification. In this context, this writing is primarily based on national proportion technique. The functional classification of the towns in Nepal is a revisit to the study made in 1980 and both adopted the similar methodology. The previous study was based on the census data of 1971, and the present study on the census data of 2011.

Methodology

In the study of urban functions, employment data are more suggestive, and such data are commonly used in making functional classification of towns. Some have advocated the notion of the minimum requirement in measuring the functional base of the towns, and this notion has also been linked with arithmetic mean and statistically defined quantities. In the present study, this method is followed.

In this study, by employing the national proportion technique, the basic and non-basic functions were identified. The percentages of surplus labour force in proportion to national level were computed. The arithmetic means of these percentages for each activities group were calculated. The standard deviations from the means were taken for measuring the functional specialization. In both the studies six functions group were established, by regrouping related functional types. The functional groups established are: i) agriculture, forestry and fishing, ii) manufacturing, iii) services, iv) transport and communication, v) finance and insurance, and vi) trade and commerce. Agriculture, forestry and fishing, though not urban function was considered in assessing the extent of agricultural support to the towns. In both the studies, mining and quarrying was omitted, as the proportions of labour forces in this group were highly minimal.

Three types of data were generated: mean plus one standard deviation and above, value above the mean and value below the mean. The first data category measures the level of functional specialization, and the second category indicates the presence of basic activity without the functional specialization, and the third category is related to non-basic function which does not theoretically constitute to the growth of towns.

The arithmetic means adopted in the studies is the most important reference point, the importance of which is well appreciated by some scholars (Sharma, nd; Yucesahin, Bayar, & Ozgur, 2006). Though some have questioned its validityin the context of understanding urban-rural interactions (ESPON & KU Leuven, 2013), it is quite pertinent because one tend to feel that as much as expression supposedly is

representative of the average. The classification scheme of mean values and standard deviation (SD) of urban functions in non-agricultural sector are presented in Table 1.

Table 1. Classification scheme of urban functions

Categories	Criteria	Description
1	< Mean	Urban centres without basic urban functions
2	Mean to 1 SD	Urban centres with specialized urban functions
3	Mean + 1 SD to 2 SD	Urban centres with higher order of specialization in urban function
4	>Mean + 2 SD	Urban centres with strong economic base

Results and discussion

Present scenario

The notion of the functional classification of towns implies that the level of functional specialization is the extent of functional strength of the towns. The high degree of functional specialization measured in terms of the number of specialized towns and specialized functional components tends to reflect the sound economic bases of the towns, with high growth potentials.

The calculated value of mean and standard deviation for different indicators of non-agricultural sectors for 2011 is presented in Table 2. The mean score of services is 24.4 percent of labour force.

Table 2. Mean and standard deviation in non-agricultural sector, 2011 (% of labour force)

Classes	Manufacturing	Services	Transport and Communication	Finance and Insurance	Trade and Commerce
<Mean	10.1	24.4	5.1	6.9	16.0
Standard Deviation (SD)	3.2	5.2	1.3	1.7	4.5
Mean + 1 SD	13.3	29.6	6.4	8.6	20.5
>Mean + 2 SD	16.5	34.8	7.7	10.3	25.0

Source: Derived from 2011 Census Data, (CBS, 2012).

Likewise, the numbers of towns with different value groups for different functional categories are as presented in table 3.

Table 3. Number of towns under different value groups, 2011

Value Groups	Manufacturing	Services	Transport and Communication	Finance and Insurance	Trade and Commerce
< Mean	37	28	31	27	28
Mean to 1 SD	9	8	17	15	18
Mean + 1 SD to 2 SD	8	18	15	11	10
>Mean + 2 SD	4	4	5	5	2
Total	58	58	58	58	58

Source: Derived from 2011 Census Data, (CBS, 2012).

Specialization in urban function has been on rise as compared to levels during the past decades. Out of the 58 incorporated towns for which the data are reported by 2011 census (CBS, 2012, Subedi, 2014), 26 towns appear to be functionally specialized at least in one function. None of the specialized 26 towns have specialization in all five functional components (Table 4 and 5). Even Kathmandu Metropolis is with specialization only in four functional components (service, transportation and communication, finance and insurance, and trade and commerce). It is not yet specialized in manufacturing. There are other three cities which are specialized in four functional types and these are all sub-metropolitan cities (Pokhara, Lalitpur and Dharan). There are five other urban centers which are specialized in three functional components. Of those five towns, four are sub-metropolitan cities (Biratnagar, Birgunj, Butwal, and Bharatpur) and one is the Kirtipur municipality. Butwal and Bharatpur sub-metropolitan cities are very close to convergence to specialization in manufacturing and service components respectively.

Of the remaining four sub-metropolitan cities, three are with specialization in two components and Itahari is with specialization in one component only. Other municipalities with specialization in two to three functional categories are Banepa, Rajbiraj and Bhaktapur. There are 10 towns including Itahari sub-metropolis with specialization in one component. Eight other towns which are not presently specialized are closer to convergence to specialization in one or two functional categories.

Table 4.Number of specialized urban places, 2011

Functional category	Urban Places (Number)			
	Metropolis	Sub-Metropolis	Other Towns	Total
Five	0	0	0	0
Four	1	3	0	4
Three	0	4	1	5
Two	0	3	4	7
One	0	1	9	10
Total	1	11	14	26

Table 5. Functionally specialized urban places by functional sectors, 2011

Urban places with status	Manufacturing	Services	Transportation and Communication	Finance and Insurance	Trade and Commerce	Total
Kathmandu*	nq	x	x	x	x	4
Pokhara **	nq	x	x	x	x	4
Lalitpur**	nq	x	x	x	x	4
Dharan**	nq	x	x	x	x	4
Biratnagar**	x	x	x	nq	nq	3
Birgunj**	x	nq	x	nq	x	3
Butwal**	nq	nq	x	x	x	3
Bharatpur**	nq	nq	x	x	x	3
Kirtipur	nq	x	x	x	nq	3
Nepalgunj**	x	x	nq	nq	nq	2
Janakpur**	nq	x	nq	nq	x	2
Hetauda**	x	nq	x	nq	nq	2
Bhaktapur	x	nq	nq	nq	x	2
Banepa	nq	nq	x	x	nq	2
Siddharthanagar	nq	nq	x	nq	x	2
Rajbiraj	nq	x	x	nq	nq	2
Itahari**	x	nq	x	nq	nq	1
Bhadrapur	nq	nq	x	nq	nq	1
Lahan	nq	nq	x	nq	nq	1
Madhyapur	x	nq	nq	nq	nq	1
Ratnanagar	nq	nq	x	nq	nq	1
Tansen	nq	x	nq	nq	nq	1
Tulsipur	nq	nq	x	nq	nq	1
Malangawa	nq	x	nq	nq	nq	1
Mechinagar	nq	nq	x	nq	nq	1
Kalaiya	x	nq	nq	nq	nq	1

*Note: *Metropolis, ** Sub-Metropolis, X indicates qualified urban centre having values more than mean plus 1SD, and nq indicates not qualified.*

Among 58, there are 16 urban centers which have value of mean + 2 SD and above (Table 6). This is reflective of stronger economic base as compared to other towns without such values. Of the 16 urban centers, seven are large cities (metropolitan and sub-metropolitan cities) and the other nine are municipalities. Three sub-metropolises (Lalitpur, Dharan and Birgunj) and two municipalities (Kirtipur and Banepa) have such values in two functional categories.

Table 6. Proportion of population by urban centers with values of mean + 2 SD and above

Urban centers	Functional Categories				
	Manufacturing	Services	Transportation and Communication	Finance and Insurance	Trade and Commerce
Kathmandu	nq	37.8	nq	nq	nq
Lalitpur	20.6	35.8	nq	nq	nq
Pokhara	nq	nq	nq	11.5	nq
Tansen	nq	37.3	nq	nq	nq
Dharan	nq	nq	8.4	10.6	nq
Biratnagar	16.5	nq	7.8	nq	nq
Birgunj	nq	nq	7.8	nq	25.7
Butwal	nq	nq	8.4	10.7	nq
Kirtipur	nq	35.8	nq	10.3	nq
Bhaktapur	23.6	nq	nq	nq	nq
Madhyapur	16.7	nq	nq	nq	nq
Hetauda	nq	nq	10.3	nq	nq
Banepa	nq	nq	nq	10.7	25.7
Lahan	nq	nq	8.0	nq	nq
Itahari	nq	nq	8.4	nq	nq
Mechinagar	nq	np	8.8	nq	nq

Note: nq indicates not qualified

Source: Calculation based on Table1 and Census Data.

It is quite clear that most of the larger cities are with sound economic base and likely to grow. There are 18 urban places which are close to convergence to specialization in one or more functional categories, nine are the new comers in the specialized group and nine others are acquiring specialization in one or more additional components. Kathmandu is likely to acquire specialization in manufacturing and with this achievement

the metropolitan city is being acquired specialized in all the five functional categories. Towns which are close to convergence to specialization are shown in Table 7.

Table 7. Urban centers with their convergence points to specialization by functional categories

Manufacturing (M)	Services (S)	Transportation and Communication (T)	Finance and Insurance (F)	Trade and Commerce (C)
Kathmandu Butwal Nepalgunj	Illam Bhadrapur Inaruwa Bharatpur	Malangawa Nepalgunj Dhangadhi	Itahari Malangawa Dhulikhel Tansen	Bhadrapur Mechinagar Jaleshwor Birendranagar

Conceptually, the urban centers with values of mean + 2 SD and above are with stronger economic bases. It is to be noted that the strength as reflected in values is closely related to labor force size of the urban places. Therefore, the level of importance of towns with higher values cannot be interpreted directly in relative context.

Comparative scenario

The degree of urbanization and level of functional specialization have considerably increased from 1971 to 2011 (Table 8). In 1971 (Shrestha, 1980), there were only 16 incorporated towns (Figure 1), the number increased to 58 in 2011 (Figure 2); more than threefold increase. It is also found that the number of towns with specialization in functional categories also increased considerably. In 1971, there were only four towns with specialized functions namely Pokhara, Banepa, Janakpur and Biratnagar (Figure 3) and even Kathmandu did not then appear as the specialized city. The number of specialized towns in 2011 was 26 (Figure 4), nearly six time increased. Functional diversification of towns also has been on rise remarkably. All four functionally specialized towns in 1971 had functional specialization in one functional category only and functional diversification did not exist. In 2011, 16 urban places have been with specialization in two or more functional categories (Figure 4). Thus, the growth of specialization in multiple functional types has increased considerably during the period from 1971 to 2011.

Table 8. Number of towns with level of functional specialization in 1971 and 2011

Description	1971	2011
Category Five	0	0
Category Four	0	4
Category Three	0	5
Category Two	0	7
Category One	4	10
Values above the mean in at least one functional sector	12	20
Values below the mean	0	12
Total number of incorporated towns	16	58

Source: Shrestha (1980) for 1971 and computed from CBS for 2011.

It shows that the level of urbanization has now been a prominent phenomenon as compared to that in 1971, and several urban centers have now stronger economic base. In 1971, even the then large towns were with high agricultural labor force. Even in Kathmandu, agricultural labor force constituted then more than 15 percent of the total labor force. Other towns (50 percent of the towns) were with more than 50 percent agricultural labor force. Of them, three towns including Pokhara were with more than 60 percent agricultural labor force. Now, the proportion of agricultural labor force has declined considerably. In Kathmandu Metropolitan city, the agricultural labor force constitutes only 2.2 percent of the total and in eight sub-metropolitan cities the agricultural labor forces are less than 20 percent in each. As against stronger economic bases in the larger cities, agriculture labor forces constitute to be dominant in 15 smaller towns, with more than 50 percent of the total. Of the 15 towns, six are with more than 60 percent agricultural labor force. It indicates that urban economic base is not being taken into account while incorporating places as municipalities in several cases.

It is also notable that in 1971, all the 16 towns had values above the mean in at least one functional sector. It reflects that they had some economic base which would contribute to the urban growth. On the other hand in 2011, there are 12 towns without values above the means in the urban functional categories. It indicates that these towns do not theoretically have urban economic base.

Conclusion

Urbanization is a good indicator of economic development in the country. It becomes realistic, when the degree of urbanization is correctly measured. The labour forces engaged in proportion to national level force were compared considering five activities groups

other than non-agricultural sectors. During the four decades, the level of urbanization has considerably increased in Nepal. Even large towns were largely agricultural in nature in the past. Recent data clearly indicates that the proportion of labour force engaged in agricultural sector declined sharply in a few urban centres. However, agriculture labor forces constitute to be dominant in almost one-fourth of smaller towns in the country. The present practice of incorporating places into municipal towns without considering economic bases of the localities is unlikely to provide a basis for constructing cause-effect relationship of urbanization with the economic development in the country. In this respect, what will be the present scenario in the context of recent incorporation of a large number of places as municipal towns is yet to be assessed.

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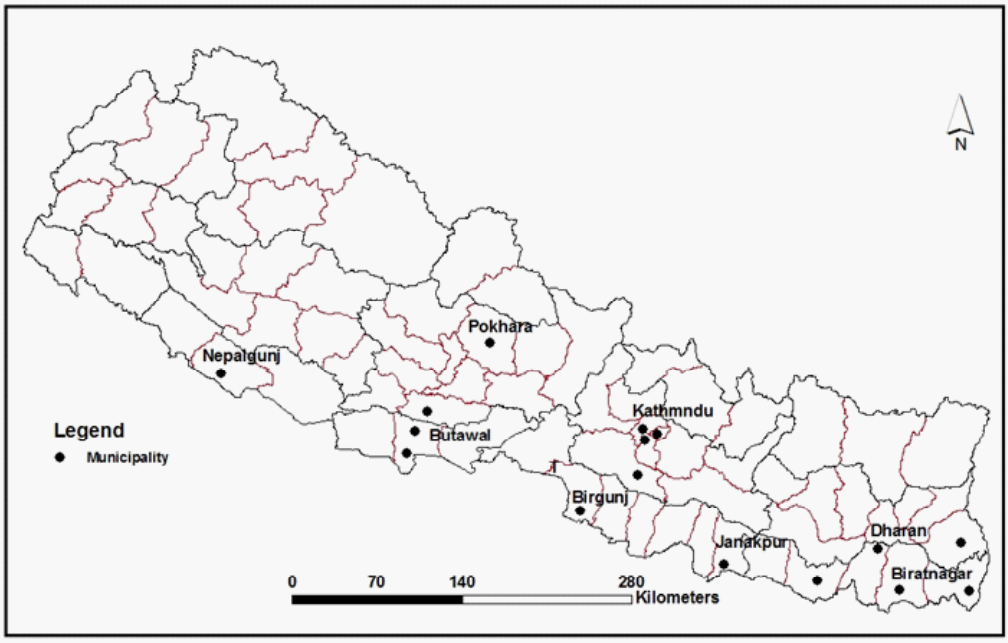

Figure 1. Distribution of towns, 1971

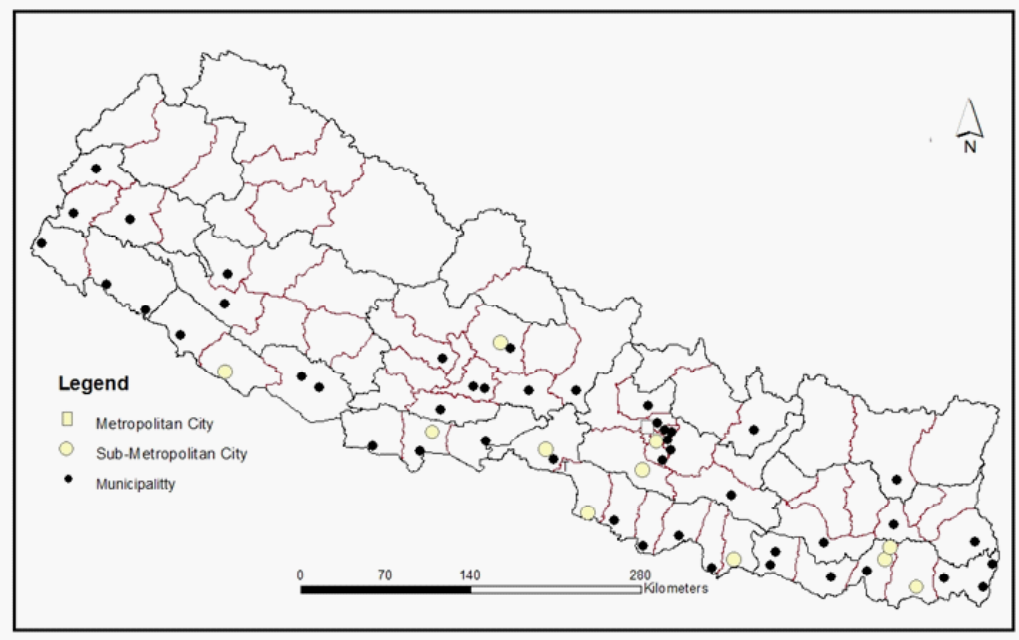

Figure 2. Distribution of towns, 2011

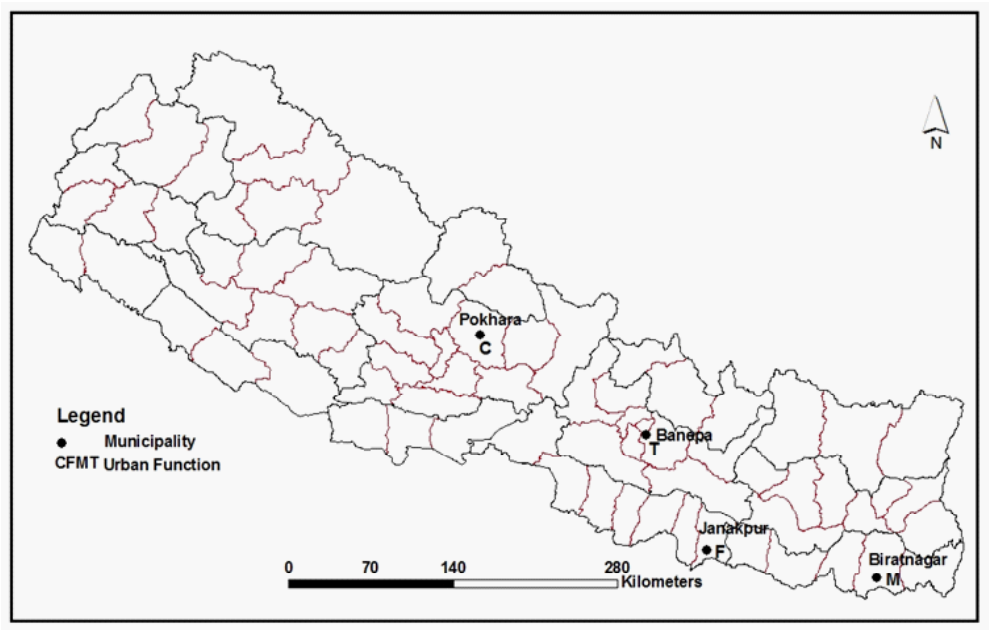

Figure 3. Distribution of towns with specialization categories, 1971

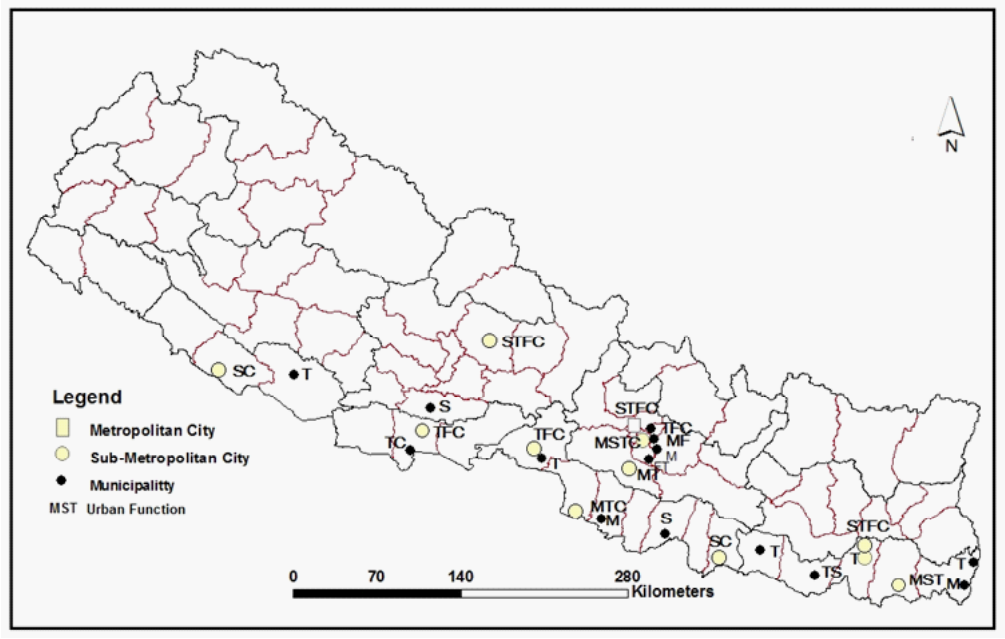

Figure 4. Distribution of towns with specialization categories, 2011

Note: Urban Functions: M- Manufacturing, S- Services, T- Transportation and Communication, F- Finance and Insurance, and C- Trade and Commerce

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Development of a decision support model for optimization of tour time to visit tourist destination points in a city

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There may be a number of tourist destinations in a city; however, a tourist may have limited time that can be spent for tourism. The tourist may be interested to visit as many tourist destinations as possible in the limited time. In this situation, the tourists want to optimize their travelling time and moments of leisure, taking the opportunity to visit the desired city attractions. This paper proposes a decision support model for optimization of tour time to visit tourist destination points in a city which deals with edge removal from a network and searching for alternate short routes to optimize the total tour time.

Keywords: Optimization; network; tourist destination; tour time

Introduction

Mostly tourists visit a city for a few days. It is not possible to visit every tourist destinations within a limited duration. Or, tourist may not be interested to visit all the destinations. Tourists want to use their free time in an optimal way (Oppermann & Specht, 1999; Keyson, 2004). Usually, the tourist has a preference list (wish list) of desired Points of Interest (POI). Generally, this personal selection is based on available information found on web sites, in articles in magazines or in guidebooks. Once the selection is made, the tourist has to decide on a route, to the POIs considering the available time.

Web based decision support applications can be very useful aids for tourists for tour planning. Based on the selection of POIs an optimal route between them can be identified (Vansteenwegen & Oudheusden, 2007). Travelling Salesperson Problem (TSP) (Dantizig & George, 1963) can be used as a starting point to plan tour trips (Godart, 2001). A mobile tourist guide (Vansteenwegen & Oudheusden, 2007) use the

Orienteering Problem (OP) (Chao, Golden & Wasil, 1996) and its extensions to solve Tourist Trip Design Problems.

As the tourist is not visiting all the tourist destinations in the city network, the problem is not a TSP. A feasible solution of the TSP contains all the tourist destinations. However, the solution of this problem is a sub-tour in the original network of the city which contains POIs only; however, sub-tour is not a feasible solution in the TSP.

The OP is a combination of vertex selection and determining the shortest Hamiltonian path between the selected vertices. As a consequence, the OP can be seen as a combination between the Knapsack Problem and the TSP. The OP's goal is to maximise the total score collected, while the TSP tries to minimise the travel time or distance. Furthermore, not all vertices have to be visited in the OP. Determination of the shortest path between the selected vertices will be helpful to visit as many vertices as possible in the available time. The OP is the selective travelling salesperson problem (Laporte & Martello, 1990; Thomadsen & Stidsen, 2003). However, the tourist usually may start tour from nearby tourist attraction from the hotel where s/he stays and has to return back to the same location after completion of the tour. Furthermore, time spending at a vertex and the time to reach the vertex are independent and often contradictory to each other. This makes it difficult to select the vertices that will be part of the optimal solution. Therefore, heuristics may not efficiently explore the whole solution space. As the selected number of vertices in the network increases, the complexity of problem and solution time increases rapidly (Oudheusden, 2008). In this context, solution of the problem as the TSP is less complicated rather than the solution as the OP.

This paper proposes a decision support model that optimizes tourist tour time based on the selected tourist destinations (POIs) by the tourist in the original network. The problem is proposed to be solved reducing the tour problem from TSP in the original network to a reduced TSP in the reduced network.

Modelling the problem

A tourist TSP is a mathematical optimisation problem that consists of a set of locations. The pairwise travel times between the locations are known. The goal is to find a tour that minimises the total length during visiting the tourist destinations. The total tour time (in route and time spent at POIs) cannot exceed the maximum amount of time the tourist has available. Each tourist destination can be visited at most once. Hence, the problem can be a TSP consisting of the POIs for optimization of travel time in the network and time to be spent at POIs can be added to find the total tour time.

The problem has a network with a set of N vertices in a graph G = (V,A) where $V=\{v_1, \ldots, v_N\}$ is the vertex set and A is the arc set. In this definition, the time to be spend T_i, is associated with each vertex $v_i \in V$ and the travel time t_{ij} is associated with each arc $a_{ij} \in A$. In this problem v_1 coincides with v_N. Using the notation introduced above, the problem is formulated as an integer problem. The following decision variables are used: $x_{ij} = 1$ if a visit to vertex i is followed by a visit to vertex j – 0 otherwise defined only for $i<j$.

For a symmetric TSP ($t_{ij} = t_{ji}$), the problem can be formulated as follows (Dantizig & George, 1963):

Minimise: $$z = \sum_i^N \sum_{j>t}^N t_{ij} x_{ij} \tag{1}$$

Subject to: $$\sum_{J>i}^N x_{ji} + \sum_{j>i}^N t_{ij} x_{ij} = 2 \quad \forall i \tag{2}$$

$$\sum_{i,\ j \in s} x_{ij} \leq |S| - 1 \quad \forall S \subset N \tag{3}$$

$$x_{ij} \in \{0,\ 1\} \quad \forall\ i,\ j \tag{4}$$

The objective function (1) is to minimise travelling time in the network. Constraints (2) ensure the connectivity of the pathand guarantee that every vertex is visited at most once. Constraints (3) are necessary to prevent sub-tours. Constraints (4) show the binary integrality. This formulation have a symmetric travel times betweenthe vertices ($t_{ij} = t_{ji}$). This corresponds to an undirected complete graph G.

Finally, the following equation (5) gives the total tour time which is minimum travel time plus time to be spent at each node i. This time is to be compared with time budget of the tourist ($T < T_{max}$), maximum time available for tourism.

$$T = Z + \sum_i^N T_i \ \forall\ i \tag{5}$$

Solution approach

A number of approaches offer solution of these types of problems. There are branch and bound and heuristic algorithms. Tour Planning in Mobile Tourism (Yu & Chang, 2009) uses a nearest neighbour approach, which iteratively adds the closest available visit to the tour. A dynamic tour guide search (Hagen et al., 2005) uses a tree based search. Genetic algorithm can also be used to find near optimal solutions (Moon et al., 2002).

A city includes a number of tourist destinations connected by a transportation (road/rail) network. Considering the entire tourist destinations, distance matrix can be formed in the transportation network. Commonly, shortest path algorithms such as Dijkstra (Gallo & Pallattino,1986) can be used to calculate distance between any two destinations in the network. Moreover, a short path matrix of the network can be found utilizing Floyd-Warshall algorithm (Floyd, 1962) which gives the shortest distance to other destinations. We can mark POIs in the network. One way of planning a custom trip to a city is selecting hotel(s) and next filling the available time with POI visits in a nearest neighbour fashion, which may also indicate the nearby tourist destination as a starting destination of a tour.

From the short distance matrix, we can form a smaller network considering only POIs taking the edge as short distances between the POIs. In this way, the tour utilises the intermediate nodes and edges of the network through which it would be shorter to reach the desired destinations resulting to removal of some edges and nodes from the original network.

If the tourist visits all the tourist destinations, the problem becomes a vertex weighted TSP. As the tourist usually have some POIs in the limited time budget, the network can be reduced to a smaller network. However, the entire network to be defined to minimize travelling distance between the POIs without considering the weight of non visiting nodes. Furthermore, the problem reduces to a smaller TSP which is a sub-tour within the original network. Then the problem can be solved as a TSP considering vertex weights using a standard algorithm such as Nearest Neighbour Algorithm. The complexity of the problem may be significantly reduced. The solution approach is implemented in the road network of Kathmandu city as a case study and presented in the following section.

Application of the model in Kathmandu city network

Kathmandu, Nepal's capital is full of historical palaces and temples. Major POIs of tourist in Kathmandu city are Basantapur Durbar Square (with temples dating back to the 12th century), Boudhanath Stupa (a world heritage site), the Pashupatinath Temple (country's the most important Hindu temple, on the banks of the Bagmati river), the Royal Palace (the site of the infamous 2001 massacre of the Royal Family, and now converted into the Narayanhiti Palace Museum), the Swayambhunath Stupa (meaning the 'self-created' Stupa, aka the Monkey Temple on a hilltop to the west of Kathmandu), the Kopan Monastery (a gated community of Buddhist monks on a hilltop north of Boudhanath), the Royal Botanical Gardens (surrounded by an evergreen forest), are

sites of outstanding beauty, and the Garden of Dreams is a beautiful enclave in 5 minutes walking distance from the tourist centre of Thamel.

Kathmandu is also the gateway to the Bhaktapur Dubar Square and Patan Durbar Square. All the tourist destinations lie in the city road network as shown in Figure 1. Each destination is represented by a unique node number. This network shows only the 12 major tourist destinations in the city. The distance between the tourist destinations are estimated as time required in minutes to cover the distance based on the data provided by tour operators in Kathmandu city and these distances are presented in Table 1 in the form of distance matrix.

The short path matrix (Table 2) shows only the travelling time required in route. A minimum time is necessary at each tourist destinations. However, the spending time at a tourist destination depends on her/his interest at the tourist destination. For this test instance, time estimated in each tourist destination is shown in Table 3.

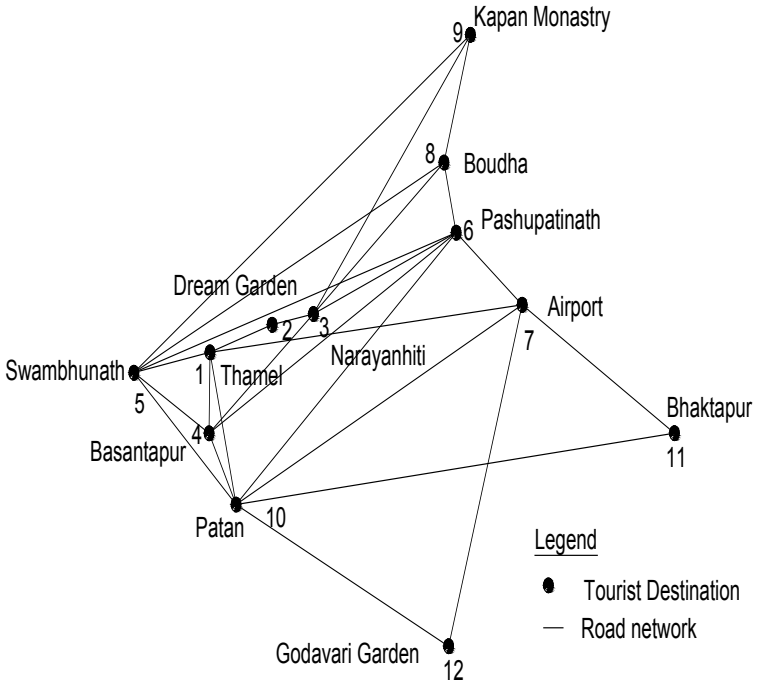


Figure 1. Major tourist destinations network in Kathmandu city

Table 1. Distance Matrix (time in minutes)

Destination	node	1	2	3	4	5	6	7	8	9	10	11	12
Thamel	1	0	5	0	10	15	0	35	0	0	45	60	0
Dream Garden	2	5	0	5	0	0	0	0	0	0	0	0	0
Narayanhiti	3	0	5	0	10	0	30	0	40	45	0	0	0
Basantapur	4	10	0	10	0	15	30	0	0	0	45	0	0
Swayambhunath	5	15	0	0	15	0	45	0	50	55	55	0	0
Pashupatinath	6	0	0	30	30	45	0	5	10	0	15	0	0
Airport	7	35	0	0	0	0	5	0	0	0	25	20	60
Boudha	8	0	0	40	0	50	10	0	0	10	0	0	0
KapanMonastry	9	0	0	45	0	55	0	0	10	0	0	0	0
Patan	10	45	0	0	45	55	15	25	0	0	0	40	45
Bhaktapur	11	60	0	0	0	0	0	20	0	0	40	0	0
Godavari Garden	12	0	0	0	0	0	0	60	0	0	45	0	0

Source: Interview with tour operators in Kathmandu valley

A short path matrix is calculated using Floyd-Warshall algorithm and presented in Table 2.

Table 2. Short Path Matrix (time in minutes)

Destination	node	1	2	3	4	5	6	7	8	9	10	11	12
Thamel	1	0	5	10	10	15	40	35	50	55	45	55	90
Dream Garden	2	5	0	5	15	20	35	40	45	50	50	60	95
Narayanhiti	3	10	5	0	10	25	30	35	40	45	45	55	90
Basantapur	4	10	15	10	0	15	30	35	40	50	45	55	90
Swayambhunath	5	15	20	25	15	0	45	50	50	55	55	70	100
Pashupatinath	6	40	35	30	30	45	0	5	10	20	15	25	60
Airport	7	35	40	35	35	50	5	0	15	25	20	20	60
Boudha	8	50	45	40	40	50	10	15	0	10	25	35	70
KapanMonastry	9	55	50	45	50	55	20	25	10	0	35	45	80
Patan	10	45	50	45	45	55	15	20	25	35	0	40	45
Bhaktapur	11	55	60	55	55	70	25	20	35	45	40	0	80
Godavari Garden	12	90	95	90	90	100	60	60	70	80	45	80	0

Source: Calculated using Floyd-Warshall algorithm

Table 3. Spending time at tourist destinations

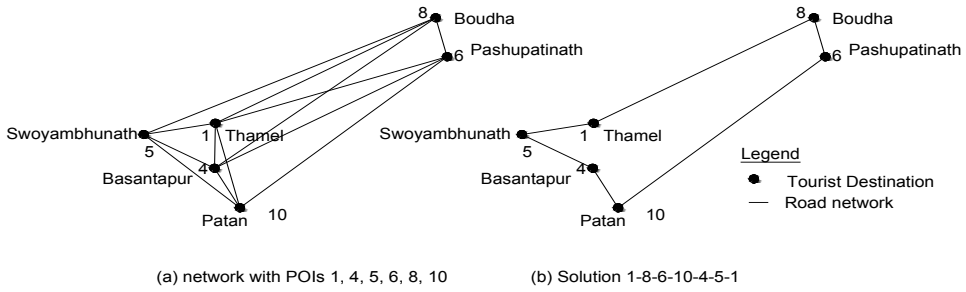
Destination	Node	Minimum Time in minutes (T_i)	Range of spending time(hours)
Thamel	1	0	2-8
Dream Garden	2	120	2-3
Narayanhiti	3	120	-
Basantapur	4	120	2-8
Swayambhunath	5	60	1-2
Pashupatinath	6	120	2-8
Airport	7	-	-
Boudha	8	60	1-2
KapanMonastry	9	120	2-8
Patan	10	120	2-8
Bhaktapur	11	120	2-8
Godavari Garden	12	180	3-8

Source: Interview with tour operators in Kathmandu valley

For this test instance of the model developed, let us assume a tourist has only a day (T_{max} = 8 hours) for tourism in Kathmandu city. Depending on her/his interest, s/he can design a trip in the city based on the information in Figure 1, Table 1, 2, and 3. For example, the tourist stays at Thamel and plans a tour her/his POIs are Basantapur, Swayambhunath, Pashupatinath, Patan and Bouda as shown in Figure 2, which is the reduced network from the original network (Figure 1) and time required for travelling is 95 minutes based on the solution of reduced TSP with nodes 1, 4, 5, 6, 8, and 10 and solution of this TSP is 1-8-6-10-4-5-1 (Figure 2b), using nearest neighbour algorithm. The time s/he has estimated to spend in the POIs is 480 minutes from Table 3. The total tour time is 575 minutes (T = 9 hours 35 minutes) which exceeds T_{max}, hence, is not be feasible and s/he may drop one POI (e.g. Patan, node 10). The network is further reduced because of removal of node 10 and edges 6-10 and 10-4 in the previous reduced network as shown in Figure 3a. Then solving for the network, total tour time required will be 435 (75 + 360) minutes (T=7 hours 15 minutes) with solution 1-8-6-4-5-1 (Figure 3b) which is a feasible solution in the time budget.

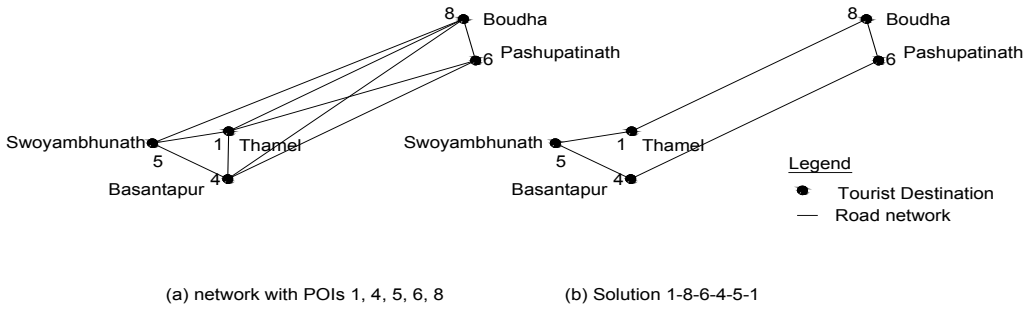
The network shown in Figure 2 is the reduced network from the original network which includes the POIs among the tourist destinations; however, the network inherits the properties of the original network. We can note that the distance between the POIs

is the shortest distance from the original network. For example, distance from 1 to 6 in Figure 3a is 20 minutes which is sum of distance 1 to 2, 2 to 3, and 3 to 6 although node 2 and node 3 is not seen in the reduced network. In this way node 2 and node 3 and edges 1-2, 2-3 and 3-6 is removed and replaced by 1-6. The problem size is reduced. Then, we can use simply nearest neighbour algorithm to solve the problem as a TSP in which the tourist starts from POI 1, makes tour to all POIs and returns back to POI 1. For this, the solution is 1-8-6-4-5-1(Figure 3b). A tourist can hire a car or consult a tour operator and enjoy the trip with maximum utilization and optimization of precise time for leisure.



(a) network with POIs 1, 4, 5, 6, 8, 10 (b) Solution 1-8-6-10-4-5-1

Figure 2. Reduced network with POIs 1, 4, 5, 6, 8, 10



(a) network with POIs 1, 4, 5, 6, 8 (b) Solution 1-8-6-4-5-1

Figure 3. Reduced network with POIs 1, 4, 5, 6, 8

This implementation of model to Kathmandu city shows that the model developed in this paper is applicable to solve tourist trip planning in a city. Also this model is applicable to urgent delivery of goods such as fuel at different locations.

Conclusion

The proposed decision support model can integrate selection and routing of tourist destinations taking as a TSP. A big network can be reduced to a smaller network considering POIs which significantly reduces the complexity of the problem. Standard solution techniques such as nearest neighbour algorithm can be used as the removal of nodes and edges reduces the problem to a simple and handy. Hence, the model can be considered as a practical way of solution for tour time optimization in a city network.

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Myth and reality of the eco-crisis in Nepal Himalaya

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The Himalaya extends from the Pamir in the west to the valley of the Brahmaputra in the east for nearly 2,500 km and passes through Pakistan, India, China, Nepal and Bhutan. The Himalayan area by virtue of its complex geologic structure, snow-capped peaks, a variety of natural landscapes, mountain peoples of unique socio-cultural diversities and adaptation mechanisms has attracted outsiders from the past. The favorable government policies and peaceful native people of the Nepal Himalaya have welcomed thousands of tourists, trekkers and researchers to fulfill their various aspirations and interests. However, the country is often blamed for causing the so-called eco-crisis in the region. During the 1970s and 1980s, publishing several books and articles with attractive titles, some mountain experts showed solidarity with those who propounded a hypothetical theory of Himalayan environmental degradation on the basis of the limited samples collected from a few localities. In this context, the present study is an attempt to review the available literatures and case studies in order to evaluate the potentiality of the so called eco-crisis/environmental degradation in the Nepal Himalaya areas. It also attempts to analyze the present scenarios in relation to the key factors within the area to judge its validity.

Keywords: Community-forestry; degradation; deforestation; eco-crisis; environment; globalization; Himalaya; diversification; myth .

Introduction

The mighty Himalayas are the youngest folded mountain ranges of the world. They extend from the Indus trench below Nanga Parbat in the west to the *Yarlungtsangpo-Brahmaputra* gorge below *Namcha Barwa* in the east, a northwest to east-southeast distance of about 2,500 km (Ives & Messerli, 1989). The ranges of the mountain pass

through Pakistan, India, China, Nepal and Bhutan. The Himalayan mountain areas are characterized by a complex geologic structure, snow-capped peaks, large valley glaciers, deep gorges, river valleys and a variety of natural landscapes. These areas are also homeland of millions of indigenous people who serve as the cultural guardians of rich storehouses of both knowledge and biological resources desperately needed by the world at large (Rhoades, 1997). However, before the first conquest of the Mount Everest by Tenzing Norgay and Edmund Hillary in 1953, the little known region was full of curiosity and a *Shangri La* for the outsiders particularly for the westerners.

The favorable policy of the Government of Nepal and warm hospitality of the native people have helped thousands of tourists/trekkers/researchers and others to fulfill their various aspirations and interests. Flows of a large volume of tourists/outsiders took place into the Khumbu valley to unfold the mystery of the highest snow-capped peak of the world. The Khumbu valley together with the other areas of the Himalaya also have attracted large numbers of university graduates and researchers to pursue researches on physio-geology, socio-economic dimensions of the local people, their interaction with the nature and adaptation mechanisms etc. The same period between the 1950s and the 1970s was also known for the boom of industrial development particularly after the end of the World War II. The industrial progress in the USA and the UK and the technological advent of Japan and Germany together with other developing nations took place in that period. The industrial affluence and pollutions caused by the industrial development drew alarm at regional level and worldwide concern to the environmentalist. The United Nations Conference on the Human Environment held in Stockholm in 1972, raised common people's profound awareness of environmental concerns and set major agenda in the writings of that period. Being influenced from the conference of Stockholm, another conference was organized in Munich jointly by UNESCO MAB-6 working group and GTZ-German Foundation for International Development in 1974. It was claimed that it had initiated the worldwide discussion on environmental problems of the Himalaya (Ives, 2004).

The launching of Earth Resource Technology Satellite (later renamed as LANDSAT) by NASA in 1972 has made revolution in acquiring and analyzing of the real time data for the earth surfaces. Based on the interpretation of the satellite images, Claire (1972) identified formation of islands in the Bay of Bengal and he claimed (1976) that the origin of the most of the materials was in the Nepal Himalaya. This event has inspired series of studies and researches within Himalayas and publication of articles/ books with attractive and alarming titles. Eckholm (1975) came forward and blamed the worlds mostly poor and their population growth for forcing farmers with traditional

agricultural technology onto ever steeper slopes and are associated with pristine environment, in some ways "the poor are damaging the environment even more than the rich". Eckholm (1976) went further ahead and stated, "Topsoil washing down into India and Bangladesh is Nepal's most precious export, but one for which it receives no compensation". In the mean time, a theory of *Himalayan Environmental Degradation* was developed by a group of scientists (*the vicious circles* as referred by Ives & Messerli, 1989) and was popularized by the Nobel Laureate Rudyard Kipling.

The essence of the Himalayan Environmental Degradation theory is that the increased flooding on the Ganges and Brahmaputra lowland was the result of extensive deforestation in the Himalaya. The deforestation was presumed to result from a rapid growth in the mountain subsistence farming populations dependent on the forests for fodder, fuel and for conversion to terraced agriculture. As steep mountain slopes were denuded of forest cover, it followed that the heavy monsoon rains caused accelerated soil erosion, numerous landslides, and increased runoff and sediment transfer on to the plain. This was assumed to induce progressive increase of flooding in river Ganges that was putting at risk the lives of several hundred million people in India and Bangladesh. The theory postulated a series of eight affirmations that started from – unprecedented wave of population growth – increasing demand on fuel wood, fodder, timber and agricultural land – massive deforestation – soil erosion and disruption in the normal hydrological cycle – increase in disastrous flooding and massive siltation – extending the Ganges/Brahmaputra delta and causing islands to form in the Bay of Bengal – a critical threshold for available human energy – repetition of the above steps for further worst case scenarios on the degradation of the region as a whole. It has been suggested that, in preparation for such an event, His Majesty's Government of Nepal should transfer its patronage of the Swiss technical-aid system (SATA) to that of Dutch and Nepal can begin the struggle to reclaim (and legally claim) land below sea level and establish polders in the Bay of Bengal, the product of its own topsoil (Ives & Messerli, 1989).

Forest depletion and degradation alarm within the Himalayan region was also raised by Bishop (1978), Blaikie *et al*. (1980), Lall (1981), Karan and Iijma (1985), Bandyopadhya *et al*. (1985), Singh (1985), Singh and Kaur (1985), Myers (1986), Allan (1987), Tucker (1987), Guha (1989), Joshi (1986) etc. Blaikie *et al*. (1980) came up with a bleak picture of Nepal and concluded, "The country is now in a period of crisis, a crisis whose major components, over the next decade - will include serious over population relative to employment opportunities, ecological collapse in the densely populated and highly vulnerable hill areas". The reports of World Bank (1979), Asian Development Bank (1982) and World Resource Institute (1985) possibly further exaggerated the

scenario. World Bank aggressively concluded, "Nepal has lost half of its forest cover within a 30 year period and by AD 2000 no accessible forests will remain". ADB (1982) blamed subsistent farmer's role for eco-crisis and quoted, "Terraces, especially on rain fed land, are often poorly constructed; they are outward rather than inward sloping and do not have a grassed bund on the edge*"*. Pereira in WRI (World Resource Institute), WB (the World Bank), and UNDP (the United Nations Development Program) Task Force (1985) went further ahead and stated, "Over 400 million people (in the plains) are hostage to the land use practices of 46 million hill dwellers". It is in this context, this paper seeks to evaluate the temporal status of the issue - the eco-crisis in Nepal Himalaya as well as continuity and changes that are taking place within it. The intention of writing this paper is to provoke a discussion on the topic so that flaws in our endeavours can be rectified.

Scenarios on the eco-crisis/Himalayan Environmental Degradation Theory after 1980s

After the 1980s, there were initiations from the native Nepalese scholars (Bajracharya, 1981, 1983a, 1983b; Gurung, 1981; Dahal, 1983; Chalise, 1986; Manandhar, 1988) to refute the hypothetical and exaggerated theories of possibility of the eco-crisis and environmental degradation in the Nepal Himalaya. The challenges had come through the extensive studies of the environmental factors and agricultural practices in Nepal Himalaya area. Similarly, several NGOs and INGOs together with governmental organizations had carried out specific researches on environmental theme within the country and had helped in developing awareness of the people as well as concerns on the ecosystem of the area.

Ruling out of the eco-crisis, Bajracharya (1981; 1983a; 1983b) and Dahal (1983) strongly concluded, "But not surprisingly the idea that environmental degradation (deforestation, accelerated erosion, and landslides) was not found in the villages nor among the conscious Nepalese in the country itself. Cultivation on steep slopes is not necessarily damaging at all times. The tradition of making terraces in hilly and mountainous terrain for agricultural purposes provides good protection if done with sufficient care" (as cited in Manandhar, 1988). Regarding the slopes of *bari land* (un-irrigable cultivable lands capable of producing crops and vegetables except rice) and *khet land* (irrigated terraces or lowlands used for production of rice crop) areas of Nepal, Gurung (1981) argued, "It takes more than an expert agricultural engineer to understand these differences" and added further that the outward facing dry terraces

were not products of native ignorance or indolence but represented the equation between labor and output. The observation of Hagen (1970), Kerasote (1987) and Blaikie and Brookfield *et al.* (1987) came in similar fashions. In the words of Hagen (1970), "These terraces are very neatly cultivated, and the low mud walls that enclose them also have the function that is elsewhere that of the woods, i.e. they retain the water from the monsoon rains and prevent avalanches of boulders from devastating the exceedingly steep slopes during the severe cloudbursts".

Kerasote (1987) come to the conclusion that the hypothetical crisis supposed to have been created by the depletion of Nepal's forests, and land degradation was produced by experts who had made brief visits, collected narrow data samples, and extrapolated the results to the country at large. Blaikie and Brookfield *et al.* (1987) questioned them who are pointing fingers at hill farmers, "It would not be difficult to present many examples of scientists and agronomists writing about degradation in a manner which places all blame on the folly, ignorance or ineptness of the people who actually work the land; remedies are not found simply in compelling or persuading the immediate land managers to mend their ways". Chalise (1986) patiently clarifies, "People in the hills who are held responsible - out of desperation, ignorance, shortsightedness or greed (in the words of Eckholm) are building and rebuilding their terraces constantly since centuries, trying to retain the topsoil and enriching the soil with animal droppings, gathering woods and fodder from forests without which they know cannot survive". It would not be less justifiable here to contextualize the thoughts of Chalise (1986) on the discourse of the eco-crisis/ Himalayan environmental degradation, which says:

> It will be interesting to see how many in the developed countries or in the urban centres of developing countries would like to trade places with a Hillman in any developing country whose occupation is limited to be a farmer and live life below poverty line, without any social security and without being covered by any medical or other insurance schemes. It is indeed ironic that the people who made terraces in the entire hill, from the base to the top and made agriculture possible in the hostile, unstable and extremely fragile environment, when the basic scientific concepts of soil conservation were far from being formulated, not to mention the understanding and application of such concepts and techniques, are now being accused of causing greater harm to the environment than those who have polluted the air and the water of this earth by their industrial wastes. (p. 14)

On the investigation of the belief that land degradation in Nepal due to population growth and deforestation has held eco-crisis, Manandhar (1988) concluded, "The eco-crisis scenario does not hold true in the Kakani area of the middle hills of Nepal". In her words,

> People have immense knowledge about the opportunities and problems the environment poses and about the interrelationship of soil, slope, vegetation and land use. Since around mid-1970s forests have been regenerating adequately and some villages have already produced more fuel wood than their requirements. Similarly, landslides are understood as natural phenomenon and farmers take advantage of landslides to help them develop cultivable terraces.

Thompson *et al*. (1986) immensely contributed to the exposure of the fallacies under-pinning the dangerous approach and stated, "Several aid agencies and governmental institutions were adopting the essence of the Himalayan degradation theory because it justifies their preferred agendas". Ives and Messerli (1989) claimed that the Mohonk Conference (1986) was leading to dismantle the widely accepted Theory of Himalayan Environmental Degradation and it also helped environmental paradigm shift. Ruling out the crisis of Himalaya, they concluded that it is not in environmental dimensions but is socio-economic and especially political one.

A study by Wu and Thornes (1995) on Likhu Khola catchments argued that the terracing did not change the hydrological behavior of the hill slopes and that the effects of human impacts were positive rather than the negative. They observed, "The individual terrace failures during torrential monsoon downpours don't contribute any sediments to the down slope nor augment lower slope stream flow". Khanal and Watanabe, (2006) have found "Out of a total of 640 agricultural plots in the Sikless area, 43% were abandoned and 7% under agriculture were completely damaged due to land slide". This finding contradicts the Himalayan degradation theory in that deforestation for agricultural land triggers the landslide and flow of top soil. Gardener and Gerrard (2003) also were able to confirm that there was less cause for concern about erosion on agricultural terraces than hitherto assumed. Based on the assessment of landscape change in the Khumbu region of Nepal using repeat photography Byers (1987) observed improvement in the areas under the forest covers.

Scenarios in Nepal Himalaya after 1990s

It is not uncommon to observe that the post 1990 AD Nepal has been very much characterized by globalization in effecting socio-cultural changes, agricultural transformations, market-based economy, and accessibility for diversified livelihood mechanisms within the household's level. The eight-point scenarios –as discussed above-ascertained for the eco-crisis/Himalayan environmental degradation theory are no more valid as per the existing situations within the rural areas of Nepal Himalaya. It was basically due to the outcome of the less pressure exerted by agricultural lands and livestock on forest resource as well as community-based forestry management system of Nepal.

Undoubtedly, Nepal has witnessed several paradigms in forest protection and management policies overtime. The deforestation of the 1970s could be explained as the results of the Forest Nationalization Act, 1956 which snatched the ownership of the local people on the forest areas (Koirala, 2006). As a result, the first forestry sector policy was declared by the Government of Nepal in their Sixth Five Year Plan (1981-1985) and emphasized community participation in the management, conservation, and use of forest resources. Mahat (1987) strongly advocated for people oriented forestry development activities which have high potential for creating additional income and employment opportunities, particularly for the poorer section of hill-rural populations, while re-establishing the resource base for supplying their basic needs and reducing environmental deterioration, too. The Forest Act of 1993 has opened the roads for the user group or community forestry in the country. As a result, in 2010 approximately 1.24 million hectares (34.9% of the potential community area) had been handed over to 14,500 forest User Groups by 2008, benefiting over 1.66 million households, which is about 40% of Nepal's total households (DoF, 2010). The forest covered 39.6% of Nepal's land area in 1994 survey. Similarly, altogether 23.23% of Nepal's total area was under some form of protection (protected areas and buffer zones). Apart from the community level, households also started tree farming particularly *Uttis* and other varieties of fast growing trees. Trees supply fodder for animals and timber and fuel wood for household use. These trees are sold easily for the production of woods and plywood (Timsina, 2003; Yadav 2004; Koirala, 2006). The overall increase in areas of forest cover has helped to improve the ecosystem in the mountain areas of Nepal.

The Figure 1 summarizes that the subsistence farming-based rural households of the country are now showing a sign of diversification in their economic structure. The demands in local market centers and international job markets have led to a large flow

of migration of the productive age group population and made shortage of laborers for subsistence farming and large size livestock farming in the rural areas. It has resulted in the change of agricultural practices particularly prioritization to the high value crops (Sharma, 1997) and optimization to other livelihood opportunities for household inputs (tourism, business and services) as well. Hence, adjustment to the situation has led to a change in food habits, energy and forest resource use, management practices, and livestock raising system, forestation in marginal lands led to the overall increment in forest cover. The cumulative effect is reduced pressure to cultivable lands (Khanal & Watanabe, 2006) and forest resource reducing landslide and soil erosion finally to a better eco-system of the region. However, the rates of diversification vary from area to area based on the level of accessibility, market linkage, innovations in the primary productions, and households' capacity for diversification as well.

Nepali hill farmers are by no means passive, inflexible, ignorant 'victims' of unsustainable development, but they are highly active, adaptive and dynamic actors (Adhikari, 1996). The case studies carried in different parts of the country such as Ilam district (Sharma, 1997); northern Dhankuta (Koirala, 2006); hinterlands of Pokhara (Adhikari, 1996); Bhimeswar municipality (Koirala, 2011) etc. show a diversification of livelihoods at household levels. Cereal crops and livestock raising together with high value cash crops (tea, cardamom, broom grass, ginger, potato and other commercial seasonal/off-seasonal vegetable growing), remittance, service, off farm works and business led to a significant development in livelihood options of the local farmers of the rural Nepal. Studies carried out in Indian mountain areas such as Himachal Pradesh (Sharma, 1996); Nainital district of Uttaranchal (Badhani, 1998) and Sikkim (Sharma & Sharma, 1997) have also observed almost similar trends in diversification of household's economy.

The records of migration particularly to the local market centres are not known. However, the number of workers visited to West-Asian countries and Malaysia from Nepal is 2.37 millions in the last three fiscal years (Kantipur, 2012), out of which the shares of Malaysia, Qatar, Saudi Arabia and United Arab Emirates are 33.1, 29.3, 21.6 and 13.4% respectively. Koirala (2006) observed 58 out of the 195 sampled households (8% of the economically active population) had remittance earners in three Village Development Committees (lowest administrative unit) of the northern Dhankuta in 2006 and it had 39% contribution to the total income of the total households. The same survey revealed 7% of the economically active population engaged in off-farm works. The studies carried out in other areas (Adhikari, 1996; Thapa, 2001 as cited in Khanal & Watanabe, 2006) also concluded in similar fashions. Khanal and Watanabe observed

13.1% of the total population of the Sikless area in foreign country owing to employment which was more than 48% of the total economically active population. The large flow of out-migration certainly led several consequences in rural landscapes of Nepal.

A change can be seen in agricultural practices where abandonment of agricultural land and shift to high value crops in which less labor inputs are required. The abandoned agricultural land covers particularly marginal and less productive areas (Koirala, 2006; Adhikari, 1996; Virgo & Subba, 1994; Jackson et al., 1998; Thapa, 2001 as cited in Khanal & Watanabe, 2006). Khanal and Watanabe (2006) observed 49% of all *khet* land and 37% of all *bari* land of the total 149.6 hectare area of Sikless of the Gandaki basin in the Nepal Himalaya as abandoned agricultural land.

The diversification of economies and remittances are leading to several changes in mountain areas of Nepal. The foremost change is taking place in dietary habits of the people- earlier local products such as maize, millet and buckwheat used to comprise in staple foods whereas there has been a shift of staple food from local to imported rice for the last few years (Koirala, 2006). Similarly, there has been a change even in the Tiffin (*khaja*) stuffs with the introduction of noodles, *momo*, biscuits and ready made items by replacing the native items. In earlier days the Nepali households were more or less self-reliant on food items produced by themselves and had a consumption habit with minimum commodities from the market. On the contrary, the households of the present days are experiencing changes not only in expenditure pattern but also in using a range of commodities made available by the modern markets (Koirala, 2006). The consumption pattern in turn led to the less pressure in agricultural land, livestock raising and forest resources use. The National Sample Census of Agriculture 2001/02 has recorded a net decrease in numbers of cattle and sheep population in the country whereas there was an increase in the overall numbers of milking animals in comparison to the Census 1991/92 (CBS, 2001/02). It also signals for the important changes in the livestock sector - a switch over from larger numbers of low quality grazing animals to the lower numbers of animals with improved breeds with stall feeding. It has released the pressure on the forest areas as well as helped in protection of the badlands and ditches through the plantation of good quality fodder to fulfill the demands of the livestock sector. The changes on consumption patterns of light and energy sources over time by the population in Nepal also exemplify the lesser pressure exerted on the forest resources. According to the National Population and Housing Census (2011) more than two third (67.26%) of the households of Nepal have access to electricity for lighting which was 64% in 2001. There is also decrease in percentage of households using fuel

wood day by day and is currently 64% followed by liquefied petroleum gas (21.03%), cow dung (10.38%), bio gas (2.43%) and kerosene (1.03%).

Of course, the steep slopes, unpredictable violent weather and ongoing tectonic activities lead the mountain areas susceptible to weathering, mass movements, erosion and transportation of materials through the surface runoff and overall denudation of the landscape at any time. Weathering that changes hard-massive rock into finer material often prepares rock materials for transportation by other agents of land erosion, including mass movement of material down slope. Further, the Himalaya is also prone to glacier lake outburst flood (GLOF) hazards. Mool et al. (2001) observed a total of 3,252 glaciers and 2,323 glacial lakes with a total area of 75.7 sq. km situated above an altitude of 3,500 m in Nepal Himalaya. According to Khanal (2009) altogether 21 GLOF events with large scale damages in downstream have been experienced in Nepal. The country has 20 potentially dangerous glacial lakes leading to GLOF with catastrophic consequences for nature and human alike (Mool et al., 2001). Therefore, the potentiality of environmental hazards is natural and likely to occur in some areas of the Himalayas. These areas become hazardous because human elects to use areas susceptible to these natural phenomena. Hence avoidance of the hazard is often better than the almost impossible task of making everything hazard-proof. However, Timsina (2003); Yadav (2004) and Koirala (2006) observed that community forestry had led control of landslides and soil erosion within Dhungeswari VDC of Kabhre district, Koshi Hills (parts of Dhankuta, Tehrathum, Bhojpur and Sankhuwasabha districts) and northern parts of Dhankuta district respectively. It seems that the Nepali people have been doing their best to maintain ecological balance and ecosystem for centuries through their limited technology and resources. However, the further awareness and continual efforts should be made to mitigate the natural hazards, control human triggering factors and maintain the ecosystem as far as possible.

Conclusion

By virtue of its unique physiography, people with cultural diversity and varieties of interactions for livelihood, adaptation and sustainability mechanisms, the Himalayan regions have been the place of attraction for the outsiders over the years. However, the region was blamed through a mythical theory of eco-crisis/environmental degradation of the whole Himalayan regions. The books, reports and articles published with attractive and alarming titles such as *Loosing grounds,* 1976; *Nepal in crisis,* 1979; *Degraded upland watershed,* 1985; *Environmental stress in the Himalaya,* 1985; *Environmental repercussions of deforestation in the Himalayas,* 1986; *Land degradation and society,*

1987; *Himalayan dilemma*, 1989; *Karnali under stress,* 1990 etc. had helped to make grounds for several speculation on the issue.

In fact, the mountain areas are always potential to weathering, mass movements, GLOF (if glaciers exist), erosion and transportation of materials through the surface runoff and overall denudation of the landscape due to the existence of the steep slopes, unpredictable violent weather and ongoing tectonic activities including global warming and climate changes. Therefore, the potentiality of environmental hazards is natural, and it is likely to occur in some areas of the Himalayas with catastrophic consequences for nature and human beings. As a result, some of these areas become hazardous because human elects to use the areas susceptible to these natural phenomena. Therefore, if possible, avoidance of such hazard areas is often better than the almost impossible task of making everything hazard-proof.

It can be concluded that the eco-crisis/Himalayan environmental degradation paradigm was more or less baseless to postulate the depletion of Nepal's forests and land degradation and it has been produced by experts who made brief visits, collected narrow data samples, and extrapolated the results to the country at large. The country is not in isolation from the globalization and changes in food habits, health, sanitation and environmental awareness. Dramatic change has also taken place in the subsistence farming areas of the past and economy of the households. Ultimately, the success of participatory forestry system and the coverage of 39% area under forest have diminished the potentiality of the eco-crisis within the region. The role of several governmental organizations, NGOs and INGOs particularly ICIMOD, WWF Nepal and CARE Nepal etc. could not be ignored in improving awareness of the local people on environmental concerns as well as to increase in the forest areas, biodiversity and for overall improvement of the ecosystem. Finally, the proponents of the discourse of eco-crisis/environmental degradation can be thanked for their substantial contribution in developing awareness on the theme and creating ground for the researchers to gather more empirical knowledge on the whole Himalayan region.

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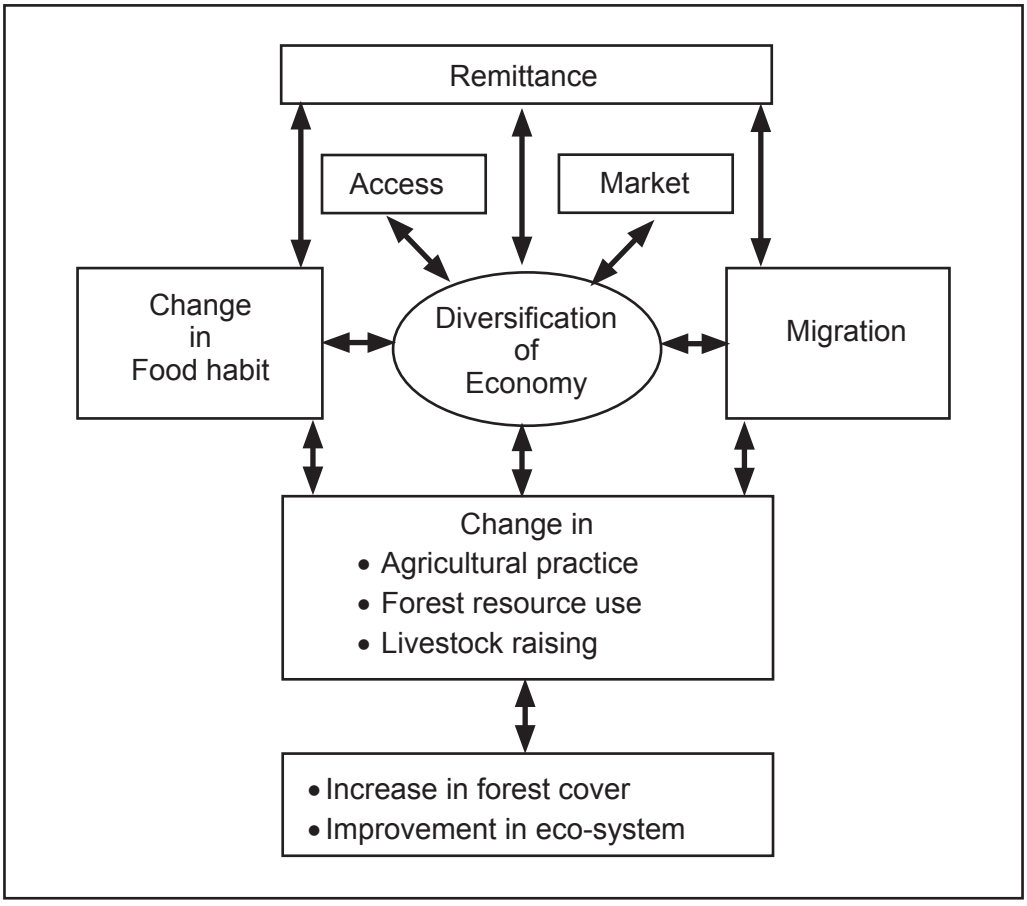

Figure 1. Factors shaping present rural landscapes in Nepal

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Firewood management practice by hoteliers and non-hoteliers in Langtang valley, Nepal Himalayas

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Langtang Region is the third largest trekking destination in Nepal. The annual tourist flow was about 8000 by 2000. However, after 2000, the number of tourists were increased to about 15000 annually. Out of it, one third tourists visit to the Langtang Valley. With increasing number of tourists, the number of hotels and lodges are also rapidly increased there. Firewood has been the major source of energy for both hoteliers and non-hoteliers for a long time and its demand has been abruptly increased with increasing number of hotels and lodges. Both hoteliers and non-hoteliers collect firewood from nearby forest and also transport from the valley bottom to Langtang village and Kyanjing. However, there are major differences in collection places, and collection strategy especially in terms of distance, preference of tree species, purpose, and relation to nature.

Keywords: Firewood; Langtang; tourist; trekking; tree species; collection strategy; access; forest situation.

Introduction

Firewood is a major source of energy in Nepal as it covers about 77 percent of the total energy demand in the country (WECS, 2010).There are many studies regarding the factors associated to the amount of firewood consumption.Studies from outside Nepal show that the amount of firewood consumption is determined by family size, collection time and labor cost (Fleuret&Fleuret, 1978;Heltberg et al., 2000; Bewket, 2005). However, studies from Nepal claims that differences in private assets like land and livestock holdings (Chapagain, 2011; Kandel el al., 2016),household income, family size, education, ethnicity, location of settlements, proximity to the urban center and

labor cost effect it (Bajracharya & Chaudhary, 1982; Mahat et al., 1987; Regmi, 1994; Sapkota & Odén, 2008).

Mountains are the area of harsh environment.Poverty and environmental degradation are common in the Himalayas as there is growing pressure on environmental resources for managing livelihood (Sharma, 2001). The negative effect of tourism on forest has already been noticed in western Himalayas such as Kumaon and Garwal (Ives, 2006).Firewood is the major source of energy even in the major tourist destinations such as Everest, Annapurna and Mustang regions in Nepal (Nepal, 1999, 2008). The increasing tourism activities in Langtang have also heavily depended on firewood for fulfilling their energy demand (Chettri et al., 2002; Chapagain, 2015). Importantly, firewood and other forest resources are sometimes collected ignoring the existing rules that effect on sustainability of those resources (Campbell, 2005).Langtang is one of the major tourist destinations in Nepal. Ghodatabala, Langtang village, and Kyanjing are the three major places of tourist destination in Langtang Village Development Committee (VDC) where all the hotels are owned and operated by the local entrepreneurs and firewood is used as the major source of energy for cooking and heating by both hoteliers and non-hoteliers. In this context, this paper discusses the firewood collection and consumption pattern by hotels and non-hotel households as there has been no such comparative studies from mountain tourist destinations. It further aims to explore the firewood collection places, collection strategy and local peoples' understanding on firewood availability and forest situation in the valley in particular.

Methods and materials

This study is based on the field data collected in 2012 using household questionnaire survey, key informant interview, and observation methods. The detail questionnaire survey was conducted to 21 hotels of the three major settlements such as Lamahotel, Langtang village and Kyanjing. It covers about 40 percent of the total hotels and restaurants in the area. Similarly, 21 non-hotel households were covered in the survey from Langtang village, Gumbagaon and Mundu village of Langtang VDC that comes to about 33 percent of the total households of these villages.

The semi-structured *questionnaire* was used to collect socio-economic and other data such as firewood collection places, preferred tree species for firewood, amount of firewood they collect by season, firewood consumption amount, distance and forest situation from where they usually collect firewood (Figure 1 and 2). Six *Key Informant Interviews* were conducted that focused to collect information related to institutions

and access pattern to forest resources in the valley. Discussion was also held informally with many people both male and female while having tea and food in the morning and evening. Importantly, the researcher was participated with local people and hired laborers and visited firewood collection places and observed the way that they choose and collect firewood, places they usually visit and the situation of the forest there. It was marked the firewood collection area on the map; took pictures and also asked with hoteliers and non-hoteliers about it. In addition, an inventory sheet was also used to collect information about the number of hotels, establishment date, size, location and details of the available services.Information on tourist data, demographic situation was collected from secondary sources.

Figure 1. Having discussing with hoteliers in Kyanjing.

Figure 2. Conducting questionnaire survey in Langtang

The data were tabulated and analyzed in Microsoft Excel. The firewood data were reported in local unit (*bhari*) that was converted to kilogram taking an average of 40 kilograms (Kg) per bhari.

Study area

The Langtang Region lies in the north east of Kathmandu. The government of Nepal declared Langtang National park (LNP) in 1976 that cover 1710 km^2 area. Later, the park size increased to 2130 km^2 included the extended buffer zone area of 420 km^2. The LNP covers parts of Rasuwa District (56 %), Sindhupalchok district (38%) and Nuwakot District (6%). There are three main regions in LNP. These are i) Langtang Valley ii) Helambu and iii) Gosaikunda Lake region. Langtang valley is extended from Syafrubesi (2000m) to Langtang Lirung (7345m). The Langtang VDC covers major area of the Langtang Valley. This study covers five villages namely Lamahotel, Gumbagaon, Langtang village, Mundu, and Kyanjing (Figure3). Among these villages, there are only hoteliers in Lamahotel and Kyanjing while there are primarily non-hoteliers in Mundu

and Gumbagaon. Langtang village is the oldest and major village of the Langtang VDC where there are both hoteliers and non-hoteliers.

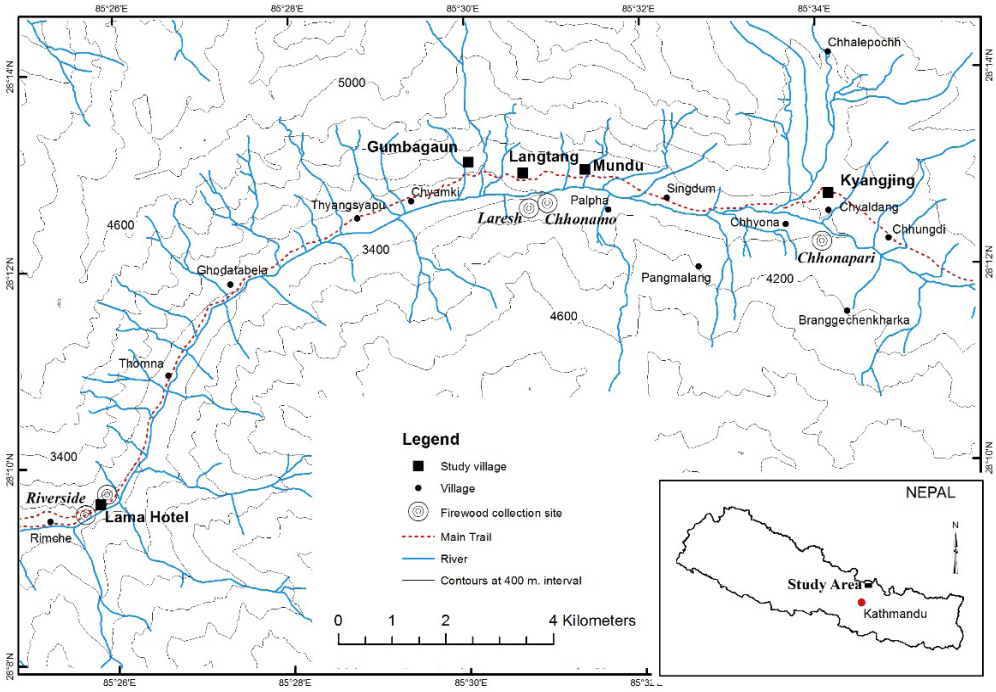

Figure 3. Study area: The Langtang Valley

The mean annual temperature is about 14°C. Winter's temperature is very cold and characterized by cold nights, usually near freezing, and days remains fairly clear. Snow occurs from November to May (Sayers & Norconk, 2008). Population size of the valley has been changing over the time. In 1973, there were 69 households with 353 population in Langtang VDC (Hall, 1978). In 2011, there were 152 households with a total of 415 people (CBS, 2012).Household size of hoteliers is 5 while it is 4.2 for non-hoteliers. Seasonal migration is common in both groups to Kathmandu and Dhunche. They send their children primarily to Kathmandu for the purpose of study. Literacy situation is quite different as 70 percent hoteliers are literate while it is only 44 percent for non-hoteliers.

In the economic sphere, land is an important asset for both groups. All are small land holders. About 60 percent non-hoteliers and 68 percent hoteliers have less than 0.25 hectare land. Besides land, livestock is traditionally remained a major livelihood

basis. The herd size is higher i.e. 6.6 of hoteliers and 5.5 of the non-hoteliers. Hoteliers have focused to keep *chauri* and horse while non-hoteliers to *chauri* and cow. Bigger households' size has more livestock number among the non-hoteliers. Regarding the occupation, 79 percent hoteliers are fully involved in hotel and limited agricultural activities, other are engaged in services etc. while agriculture is the main occupation of 86 percent of non-hoteliers. It is the food deficit area where about 43 percent of both groups manage food for 3-6 months from their own production in a year.

There are many attractions for tourists in the valley. It has mountain peaks and glaciers, different types of vegetation including Langtang pine (*Larix griffithiana* Carriere).The valley is famous for the endangered wildlife such as Red Panda, Musk deer, Himalayan Thar, Wild-boar etc. Tamang and Bhotias are the earliest settlers who are believed to be migrated from Kyirong, Tibet, before the mid-1600s. While migrating from Tibet, they also brought their animals, high-altitude crops and their culture. Besides them, Sherpa also migrated to the valley (McVeigh, 2004). The Langtang valley is the nearest mountain trekking destination from Kathmandu. Tourists start from Kathmandu in the morning and reach to Syafrubesi by bus in the evening. The next day, they trek to Lamahotel via Bambo village. From Lamahotel, they reach to Langtang village in the same day. Langtang village is the oldest village of the valley. From Langtang, tourists take half-day's trek to Kyanjing, the uppermost village of the valley.

Results and discussion

Tourism development and firewood consumption

Trekking and mountaineering are very famous in some pocket areas of the mountain region in Nepal.After Annapurna and Everest regions, Langtang is the third most preferred trekking destination in Nepal.

The number of tourist to Nepal has increased from 162 thousands in 1980 to 790 thousands in 2014. The percent of trekkers visiting LNP ranged from 4.4 percent in 2005 to 15 percent in 2010 (MCTCA,2015). The overall national trend of tourist arrival has also reflected in the case of Langtang valley (Table 1).

Table 1. Tourist to Langtang national Park

Year	Total tourist to Nepal	Total trekkers in Nepal	Trekkers in Langtang	% to total trekkers
1980	162,897	27460	4113	15.0
1990	254,885	61472	7826	12.7
2000	463,646	118414	10917	9.2
2005	375,398	61488	2735	4.4
2010	602,867	70218	10603	15.1
2014	790118	97,185	12552	12.9

Source: MCTCA, 2011 and 2015.

In 1980, more than four thousand tourist visited Langtang region and the number was increased to about thirteen thousand in 2014. It is important to note that all the tourist visiting to Langtang region do not visit Langtang Valley as there are other destinations such as Helambu, Gosainkunda and these three regions together constitute the Langtang region.

Tourism activities in Langtang valley were started even before the establishment of the Langtang National Park in 1976 as the first hotel in Lamahotel was established before 1970. With increasing numbers of tourist, the numbers of hotels, lodges and restaurants have rapidly increased in Lamahotel, Langtang village, and Kyanjing especially after 1980 (Baskota and Sharma, 1998). There were only 10 hotels by 1990 and mainly established in Lamahotel. By 2000, the number of hotels was increased to 18, 31 by 2005, 45 by 2010 and 49 by 2012. In the beginning, hotels and lodges were concentrated in Lamahotel. But after 2000 such infrastructures were built in Kyanjing and Langtang village.Among the three villages, the highest numbers of such facilities are in Kyanjing (20) followed by Langtang village (17) and Lamahotel (12) (Table 2). The total number of beds available in these villages is 333 in Kyanjing, 175 in Langtang and 152 in Lamahotel.

Table 2. Establishment of hotel and lodges in the study villages

Village	Before 1990	1990-'99	2000-'04	2005-'09	2010 and After	Total
Lamahotel	6	4	1		1	12
Langtang	1	1	3	9	3	17
Kyanjing	3	3	9	5		20
Total	10	8	13	14	4	49
%	20.4	16.3	26.5	28.6	8.2	100

Source: Field survey, 2012.

Firewood is still the major source of energy for hotels in Langtang Valley. They use other sources such as LP gas, cow dung and kerosene in varying quantity which is less than 15 percent of the total energy they consume. Firewood is mainly used for cooking, heating and camping. The average annual firewood consumption is 6229 kg per hotel. Average consumption per hotel by village varies. It is 6760 kg in Lamahotel and 5950 kg in Kyanjing (Table 3).

Table 3. Annual firewood consumption by hoteliers

Settlement	Number of hotel	Annual Firewood consumption (kg)	
		Total consumption	Average consumption per hotel
Lamahotel	5	33800	6760
Langtang	8	49400	6175
Kyanjing	8	47600	5950
Total	21	130800	6229

Source: Field survey, 2012.

The average quantity of firewood consumption is higher in Lamahotel and lower in Kyanjing. The average firewood consumption per bed is lower in Kyanjing compared to other two villages i.e. Lamahotel and Langtang village. Annually, it consumes 400 kg firewood per bed in Kyanjing, 456 kg in Lamahotel and 461 kg in Langtang (Table 4).Lamahotel is close to forest whereas Langtang village is about 4 hours' walking distance from Lamahotel. From Lamahotel, it takes about 7 hours' walking to Kyanjing.

Table 4. Average annual firewood consumption per hotel bed

Description	Villages		
	Lamahotel	Langtang	Kyanjing
Number of total sample hotels	5	8	8
Number of total bed of sample hotels	74	107	119
Firewood consumption per bed/year (kg)	457	461.7	400
Total number of available beds in the village	152	175	333
Estimated annual total firewood consumption in the villages (kg)	69464	80797.5	133200

Source: calculated based on field survey, 2012.

Based on the data of firewood consumption per bed per year, it has estimated 283 thousands kilogram firewood that annually extracted and consumed from the near by forest in the valley. Based on table 4, if lodges are occupied for six months (180 days) in a year, the per day per bed firewood consumption is 2.5 kg in Lamahotel and Langtang village while it is 2.2 kg in Kyanjing. This figure is close to the study done by Watanabe (1997) in Sagarmatha and Langtang region. His estimation was at least 2 kilogram per visitor per day. In a study, Nepal (2000) has estimated 43 kg firewood per lodge per day in the Everest region. In the case of Langtang valley, the per lodge per day firewood consumption ranged from 16 to 18 kg. The wide variation between Everest and Langtang region might be due to hotel occupancy rate, the size (number of beds) of hotels, firewood camping facilities, size of the trekkers team and associated staff, and availability of alternative energy.

In addition to hotel and lodges, there were two restaurants/*bhattis* without having bed in Langtang village and one in Lamahotel that provided services to tourists and associated staffs. Such restaurants and *bhattis* used 6800 kg firewood annually in Lamahotel and 6000 kg in Langtang village. The firewood consumption by hotels varies by the number of beds available in the hotel. The hotels with less than 20 beds consumed 6400 kg per bed firewood annually in Langtang village but hotels with more than 20 beds consumed 5600 kg per bed annually. Thus the amount of firewood consumption by restaurants/bhatti is higher compand to hotels with more than 20 beds. These restaurants and *bhattis* consume higher amount of firewood as they served food, snakes, prepare local alcohol (*raksi*) and serve to tourists, trekking guide and porters. These local restaurants and *bhattis* are relatively cheap, provide fresh food and also are the places of socialization, and entertainment to tourist guide and porters (Chapagain et al., 2012).

Firewood is the major energy used by non-hoteliers in the Valley. In an average, each non-hotel households consume about 7000 kg firewood per year in Langtang and Mundu village while it is 6500 kg in Gumbagaon.But the daily per capita firewood consumption is higher in Gumbagaon followed by Mundu and Langtang village (Table 5).

Table 5. Per capita firewood consumption by non-hoteliers (kg)

Description	Villages			Total
	Langtang	Gumbagaon	Mundu	
Annual total firewood consumption of sample households	57400	52000	34800	144200
Total sample households	8	8	5	21
Average annual per household firewood consumption	7175	6500	6960	
Total population of sample households	26	20	14	60
Per capital daily firewood consumption	6.0	7.1	6.8	6.6

Source: calculated based on field survey, 2012.

Annual volume of firewood consumption depends on the size of households. Household size with less than 3 member consumed 5240 kg firewood, 3-4 household size consume 8440 kg and household size 5 and above consume 9400 kg firewood annually.There is lack of data for comparative analysis of percapita daily firewood consumption from Mountain region. The Forestry Sector Master Plan reported that the annual per capita firewood consumption ranges from 480kg to 600 kg in Hill and Mountain region (MPFSP, 1989; Kandel et al., 2016). However, results of this study shows higher amount (2200kg) of annual per capita consumption.

Firewood collection places and preferred firewood species

Both hoteliers and non-hoteliers collect firewood from different places of the LNP.Non-hoteliers collect firewood from the park across the Langtang River especially from, Laresh,Chhonamo and around the Riverside. The hoteliers collect firewood primarily from Riverside near Ghodatabala and also from Chhonapari - forest across the river- in Kyanjing (Figure 4),Laresh, and Ghodatabala. The Riverside (Figure 3 and 5) is close by Ghodatabala where firewood is available in abundance. The old trees, dried one and trees brought by the flood of Langtang Khola are collected there. The large amounts of firewood is collected there and brought to Langtang village and Kyanjing.

Figure 4. Forest across the Kyanjing

Figure 5. Forest in the Riverside.

In the Langtang forest, the commonly available forest species are *uttis*, rhododendron, pine, juniper, birch, and oak. *Uttis (Alnusnepalensis)* and oak are very dominant species upto Lamahotel. Pine and rhododendron are dominant in higher altitude. Juniper and birch are available from Lamahotel to Kyanjing but these species are not in abundance.

In terms of the choice of firewood species, birch and rhododendron are best for the firewood. Big branch and main trunk is the first priority what they refer as the 'good' firewood. Firewood from these two species is called *kadadaura* (strong firewood). *Kadadaura* gives more heat and remains for longer time while burning. The second choice is pine, oak, and juniper. The third choice is *uttis*. There is mixed forest with domination of pine in the higher elevation. *Uttis* is commonly available around Lamahotel and along the river bank up to Langtang. Birch is not so common. Rhododendron is commonly available but its trees are small.

Access to forest and firewood collection

Firewood and other forest resources are opened by LNP for one month in summer and one month in winter in the study area. For summer season, forest is opened for the month of Jestha (May 15 to June 15) and for winter season it is opened for the month of Mangsir (November 15 to December 15).There is an equal access to hoteliers and non-hoteliers so that they can go and collect firewood from the park.

As per the official rule of the park, no green trees are allowed to cut. It is allowed to collect dry branches and fallen branches of trees. However, there is an exception by practice that the fallen green trees and trees brought by river flood are allowed to cut. This is monitored by buffer zone management committee and its sub-committees

together with park authority. The management committee people are local and they are both users and managers.

How much firewood that one household or hotel is allowed to collect and how much they actually collect is a matter of interest. As per the rule, there is no such a limitation. Household members of both hoteliers and non-hoteliers themselves, and together with hired and exchange laborer collect firewood during the opening time. It is further interesting that outside labor also can go alone and collect firewood for hotels and non-hotelier households. Both men and women of non-hoteliers involve in firewood collection. Women collect dry branches and small fallen branches of trees. Women do not go farther away into the forest and mostly collect from nearby distance. So it is said that women cannot collect 'good firewood'. The good firewood is categorized as the major branches of birch, and rhododendron tree (Figure 6 and 7). It is good because those species of firewood give high energy that is known as *kadadaura*. The fallen trees or major branches of such species are bigger in size and it is difficult for women to use big knife (*khukur*i) or axe to chop it down.

Figure 6. 'Good firewood' of birch in Langtang

Figure 7. Firewood stored by hotel in Kyanjing

There is a gender division of work in which men mostly involve in firewood collection, women remain at home looking after children and household affairs. Men can carry more firewood. Generally, men from non-hotelier household collect firewood together with children and exchange labor. Although, they prefer to get wage laborer but it is difficult as the wages is high that non-hoteliers hardly manage to pay. The non-hoteliers only use 10 percent outside laborer in firewood collection. These outside laborers usually go together with household member in most of the cases.

The hoteliers are busy in hotel and they have capacity to pay for laborer so that they use hired labor to collect firewood. Out of total firewood they collect annually, 80-90 percent is collected by outside laborers. The outside laborers also collect firewood from long distance such as Riverside and carry up to Kyanjing village (Figure 8).

Figure 8. Firewood collected in Riverside.

(Labors stay in the hut, prepare food there and cut down trees for making more firewood).

The outside hired laborers in the study villages usually come from Solukhumbu and Rasuwa district. Usually the same laborer visits and work for hotels in Langtang and Kyanjing villages. While coming the next time, the laborer invites his new friends and make familiar to the hoteliers and the forest from where they collect firewood. They collect firewood during the day and live in the hotel at night. Sometimes they stay on tent at forest and make firewood. They often help in agriculture activities. While working for the hoteliers, outside laborer either work on daily wages basis or they are paid based on the quantity of firewood they collect. The choice is up to the laborer. Laborer's decision depends upon his knowledge of firewood availability. If they collect more than two *bharis*, they work on quantity basis. Usually, one bhari firewood in Kyanjing cost 500-700 rupees depending upon the firewood quality. The birch and rhododendron with main branch and pieces of the trunk gets higher price. Pine, uttis's firewood are considered low quality firewood so such low quality firewood gets lower price. While on a daily basis, they get 700 rupees plus food for the whole day labor.

The way that hoteliers and non-hoteliers manage their firewood are quite different with respect to different dimensions such as gender of collector, types of firewood, motives, instruments used for firewood cutting, purpose and relation to nature (Table 6).

Table 6. Dimension of firewood management by hoteliers and non-hoteliers

Sn	Dimension	Firewood management	
		Hoteliers	Non-hoteliers
1	Who collect	• Outside labor, male	• Household members and exchange laborer
2	Targeted type of firewood	• 'Good'. Cut so called fallen trees, *bangotiingo* trees	• 'Firewood', dead and fallen branch
3	From where	• anywhere in the forest	• nearby forest, regularly visiting places for firewood
4	What instruments	• Big *khururi*, axe	• *Khurpa, khukuri* (local knife)
5	Motives	• Maximum collection	• Satisfying basic need
6	Main purpose	• Profit maximization	• Energy (firewood) security

Hoteliers collect firewood by mobilizing outside laborers. Such outsider laborers target to collect 'good' firewood from anywhere in the forest. They use big *khukur*i, axes and often saw so that they can cut and make more firewood within the limited time. They are motivated by market factors as the more they collect the more benefit they get. It is important to mention here that although there is restriction to cut green trees, the outside laborers go to forest and sometime cut out the bark of green trees so that they can have dry trees for the next year.It is therefore, their purpose is profit maximization. The increasing distance and degrading situation of the forest as reported by both hoteliers and non-hoteliers is also the evidences of it. Although, the hotel owner does not like to have detached relation to nature, it is through the laborer working for them degrading the forest.

Firewood availability

It was asked the changes in time distance to collect firewood compared to the situation of 10 year ago. The time distance for firewood collection has increased as reported by 76 percent of hoteliers and non-hoteliers. Only about 5 percent reported the decreasing distance and 19 percent reported constant time distance for firewood collection. It is mainly due to the increasing demand of firewood. It is obvious that the number of

tourists and the numbers of hotels and restaurants have rapidly increased especially after 2005 and the demand of firewood has also increased. Hence, they require to travel farther into the forest to collect firewood and thus time distance has increased.

Forests were already under pressure in Langtang (Shrestha, 1985) and the situation has much deteriorated now.Firewood collection distance has increased compared to the situation of 10 years ago. On the one hand tourism sectors has demanded more firewood, on the other hand there is no planning for firewood management. Nearly 52 percent of both hoteliers and non-hoteliers have reported that forest has degraded compared to the situation of a decade ago.Forest degradation was observed in Chhonapari - area across the river in Kyanjing, and Riverside.Forest degradation has not only taken place in Langtang but also widespread throughout Nepal as there isincreasing trend of open forest class, having crown cover 10-40 percent, forest fragmentation and degradation (FAO, 2009).In early 1970s it was claimed that forest was degraded due to population growth and temptation of land for cultivation that resulted heavy deforestation and degradation in Nepal (Eckholm, 1976). It was later refuted and established that deforestation in poor countries is mainly resulted due to the necessity of making their livelihood. Lack of livelihood opportunities, income and employment leads to deforestation (Ives & Messerli, 1989; Gurung, 1981; Hagen, 2000).

Conclusion

Forest is one of the major elements of environment. It has greater role in maintaining ecological balance. Forest is the major base of energy requirement of tourists places in mountain. The increasing numbers of tourists have put questions on its sustainability and Langtang is not an exception as in the context of increasing energy demand by hoteliers. Firewood demand has increased over the years as number of hotels and tourists have rapidly been increased over the time.

Firewood is collected in one month in each season. Birch and rhododendron are the first preferred species for firewood followed by oak and *uttis*. Hoteliers mobilize hired labor for firewood collection and mainly collect from forest at Riverside and Lamahotel. The non-hoteliers collect firewood themselves together with exchange labor and visit nearby area across the Langtang River such as Laresh, Chhonapari.Distance from forest, cost of firewood and availability situation also influence in firewood consumption as per bed firewood consumption is higher in Lamahotel compared to Langtang village and Kyanjing. The firewood cost and availability is also higher in the latter two villages. While in the case of non-hoteliers, the per capita firewood

consumption is mainly determined by household size. Both hoteliers and non-hoteliers have experienced increasing time distance to collect firewood and forest degradation. The non-hoteliers usually collect firewood for their household energy requirement and collect dry and fallen branches while hotels mobilize hired laborers whose main purpose is to collect more firewood for earning more money.

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Note:

The 25 April 2015 Nepal earthquake of 7.8 Richter scale triggered an avalanche in Langtang that completely destroyed Langtang Village including Gumbagaon (Gumba village) (also see http://www.icimod.org/resource/18302). I talked to the displaced people in April 2016 who were migrated to Kathmandu and settled in monastery and their relatives' house. After the earthquake induced avalanche about 300 people living in Langtang and Gumbagaon left village. They claimed that 175 local people and 41 foreigners were killed. A few local people have just started returning back to the village and also started constructing hotels/houses in Langtang village. The Langtang National Park open purji (official license/permission) to collect timber from the forest for house construction.It has permitted to cut 125 cubic feet timber to each household by paying the royalty to the LNP.There are many dead and fallen trees due to earthquake induced landslides and river flood in the forest and along the Langtang river banks.

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Livelihood and coping strategies among urban poor people in post-conflict period: Case of the Kathmandu, Nepal

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Kathmandu is receiving large number of poor immigrants from the neighbouring districts. Many of them are living in the temporary or semi-permanent structure of dwelling on the bank of the river Bagmati and its tributaries. A traumatic experience of an unprecedented decade long armed conflict in Nepal between government security force and Maoist insurgents between 1996-2005 forced people migrate to the safer zones for their livelihood security, particularly in the urban areas like Kathmandu. As a consequence an increase in landlessness, joblessness, homelessness, livelihood insecurity, and disruption of the social fabric have been noticed. Now the country is in the post-conflict phase. This study, therefore, seeks to explore coping strategies of the poor people residing in Kathmandu in post-conflict phase by using primary data collected from sampled household based on multi-stage sampling procedures. Livelihood of the poor people is highly influenced by the armed conflict in the past. But the post-conflict phase is characterized by increasing mobility, expanding knowledge and opportunities. Working farther from the place of residence, change in food habits, mutual cooperation and borrowing are important coping strategies adopted by the poor people living in the poverty pockets.

Keywords: Conflict; post-conflict; livelihood; urban poor; coping strategies; Kathmandu city.

Introduction

The term 'conflict' is simply defined as an activity for political stress, instability and violence, leading to physical damages, psychological fear, death and deprivation. Conflict and political instability are often combined with a high susceptibility to violence, forced displacement, the denial of basic human rights, the deliberate destruction of livelihood and the incidence of serious poverty (Schafer, 2002). Conflict creates an insecurity perception which shapes the migration process as a whole (Sirkeci, 2009). Earlier studies have shown that conflict and violence have led to widespread asset depletion, displacement, increased levels of debt, blocked access and disintegration of markets, a politicization of ethnicity or the abandonment of traditional livelihood strategies (Jaspars&Shoham, 2002 cited in Schutte, 2006). Studies carried out in Afghanistan and other countries show that chronic conflict and political instability decisively influence livelihood strategies of the urban poor, and that increasing levels of risk and constant uncertainty most probably lead to a change of livelihood system (Pain&Lautze, 2002;Schutte, 2006).

Nepal has been suffering from political instability and conflict since 1989/1990, when the people's movement for the restoration of democracy started. Chronology of political events shows that not a single political party was able to complete its five-year term in the government. The situation has been getting worse especially after 1996, when the Maoists started their armed conflict in the rural areas in the name of *Janayuddha* (People's War). Within a decade of conflict, many lives and properties were lost; which, in fact, brought many changes in the perception, security and livelihood of the people both in rural as well as in urban areas; and generated fear, tension and insecurity. This period of time, generally ended in 2005, is known as conflict period. After the peace deal in November 2005, which is, in this study, known as 'post-conflict phase'.

Conflict in Nepal is only a part of politics, and result of poverty, social exclusion, deprivation and discrimination. Due to internal conflict, large numbers of people have been displaced and have migrated to urban areas including Kathmandu in recent years after 1995 for securing their livelihood. The armed conflict and violence have left various impacts on the sources of livelihood and income of poor people. Some of the examples of impacts created by conflict are:(i) undermining food security by blocking the movement of goods, services and people; (ii) travelling of young people outside the village to get alternative employment rather than to join in the *Janasena* (People's Liberation Army); (iii) reducing non-farming employment opportunities in villages; (iv) shifting of financial resources from basic service sector to unproductive

military expenditure; and (v) increasing pressure for pro-poor to a change in the rules and practice in natural resource use (Seddon & Hussein, 2002; Upreti, 2004; B.K et al., 2009). One of the major impact of conflict was the migration of the (poor) people of rural areas into an urban center. Being the capital city, Kathmandu attracted many people to live and work; and these migrated people have adopted different measures to maintain their livelihood. This study, therefore, seeks to explore the coping strategies of the poor people residing in Kathmandu in post-conflict phase of the country.

Study area

Kathmandu Metropolitan City has been taken into consideration for the present study (Figure 1). It is only one metropolitan city of Nepal, designated in 1995, covers only 50.63 km^{2}of land. Kathmandu, a primate city, ranks the largest among the cities of Nepal; and among the oldest settlement in the central Himalaya, situated in a valley in the Himalayan foothills at an altitude of 1,350 meters above mean sea level.Due to the concentration of services and facilities, Kathmandu, at present, is attracting many people from different parts of the country.Kathmandu has highest share of urban population in the country.

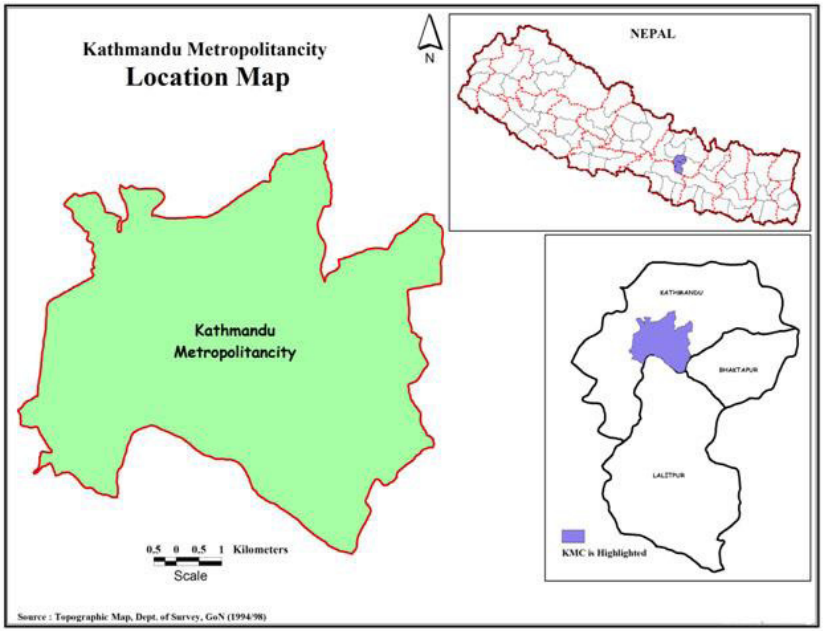

Figure 1. Study area

Urban poverty is increasing at high pace particularly in the Kathmandu Metropolitan City (Dahal, 2012).During a decade long political turmoil in the country, many poor communities have chosen Kathmandu as a best destination for securing their lives and properties.They are concentrated either on the bank of rivers or in the open space near the historical and religious monuments. There are altogether 34 locations, where poor people are concentrated in Kathmandu; and these areas where poor are concentrated are termed as 'poverty pockets' as the term used by Diana (2004)[1]. These poverty pockets are characterized by a mosaic of people in terms of age, gender, economic activities, culture etc.

Methodology

Pockets of poverty are developed randomly in the different corners of the Kathmandu Metropolitan City where poor slum dwellers and squatters have built a unique landscape in the city. Among 34 poverty pockets, 50% were randomly selected for the study. The entire analysis is based on the data and information gathered during the period between June-August 2009 from the sample poverty clusters and households; and later again verify the data through selected household in June 2013.

A multi-stage sampling framework was used in this study. According to this framework, the study area is divided into different zones: central, middle and periphery. There are 10 poverty pockets, which belong to the central zone, 16 in middle and 8 poverty pockets are in periphery zone in Kathmandu (Figure 2).

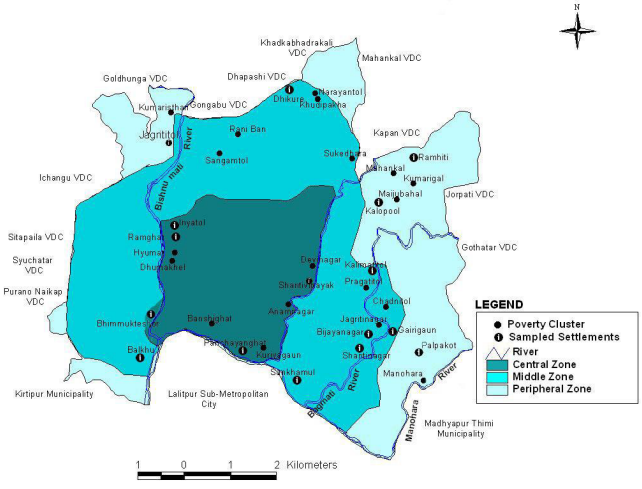

Figure 2. Distribution of poverty pockets in Kathmandu

Out of the total households in the sampled poverty pockets, only 20% were chosen from each stratum for the study purpose. Detail of methods of data collection is summarized in Table 1.

Table1. List of sampled poverty pockets, types of survey and sample size

Stratum/ Zones	Poverty Pockets/ Location	Types of Survey Carried out	Household Sample Survey	
			Total HHs	Sampled HHS
Central	Bhimmukteshwor	HH	33	7
	Inyatol	HH, KII	34	7
	Panchayanghat	HH, FDG, KII, CS	250	50
	Ramghat	HH, KII	20	4
	Shantibinayak	HH, KII	42	8
Sub-total			379	76
Middle	Balkhu	HH, FGD, KII, CS	300	60
	Bijayanagar	HH	25	5
	Dhikure	HH, KII	26	5
	Gairigaun	HH, FGD	45	9
	Kalimatidol	HH	16	3
	Narayantol	HH,FGD	30	6
	Shankhamul	HH, KII	106	21
	Shantinagar	HH, KII, CS	358	72
Sub-total			906	181
Peripheral	Jagrititol	HH, FGD, KII	126	25
	Kalopool	HH	6	1
	Palpakot	HH, FGD. KII	30	6
	Ramhiti	HH, KII, CS	126	25
Sub-total			288	57
TOTAL			1573	314

Household survey (HH), Focus Group Discussion (FGD),Key Informant Interview (KII), case studies and informal conversations were key tools of data collection. Altogether 314 household were selected for the interview. FGDs were conducted at six different poverty pockets i.e. Panchayanghat, Balkhu, Gairigaun, Narayantol, Jagrititol and Palpakot; participated minimum 5 persons at Gairigaun to maximum 12 at Balkhu; representing male, female, from the different ethnic background and income level. Chairman of *TolSudharSamittee*, promoter and aged persons in the poverty clusters were taken as key informants. There were 11 key informants contacted and interviewed

to collect information related to the livelihood and coping strategies of poor people in Kathmandu in the post-conflict phase. A set of checklist was prepared for discussion. Case Studies (CS) and informal conversation were also used to investigate the insightful information regarding the mobility, knowledge and livelihood. The conversation was conducted at work place and/or during the rest time or walking or waiting for work or at tea stall; and flagged the main points while talking to each other. Many informal conversations took place at Balkhu, Shantinagar, Panchayanghat, Shankhamul, Ramhiti, Bijayanagar, Shantinagar, Narayantol and Jagrititol.

Results and discussion

Livelihood between conflict and post-conflict periods

The conflict has an impact on the livelihood of the urban poor communities. Two-thirds of the households' respondent reported that their daily livelihood activities were hit by armed conflict in the past. Fear of tension and threat from other (political and ethnic) groups were profound among the conflict affected people and households. They were forced to donate or to join in the Maoist movement or spy against government or participate in the Maoist rallies and gatherings. Out of the total conflict affected households, nearly one-third was suffering from the fear of tension or threat. Low paid employment and loss of employment opportunities were also reported by almost one-fifth. Out of the total affected, around 18% households reported that they were affected because of the poor social security, which heightened social violence, looting and robbery (Table 2).

Table 2. Impact of armed conflict on livelihood (in percentage)

Affects	Zones			Average
	Central	Middle	Peripheral	
Fear of Tension/Threat	34.52	32.46	32.65	32.83
Low Wage Rate	27.38	22.90	26.53	24.29
Loss of Employment Opportunities	21.43	24.64	18.37	22.96
Poor Social Security	16.67	17.97	21.43	18.40
Displacement	0.00	0.87	0.00	0.57
Disturbing Child School	0.00	0.58	0.00	0.38
Others	0.00	0.58	1.02	0.57
Total	100.00	100.00	100.00	100.00

Source: Field Study, 2009.

The impact among three zones of the study area is found to be different. Disturbance schooling for children, reduction in mobility due to restriction were also reported and this is found only in the middle and peripheral zone(Figure 3).

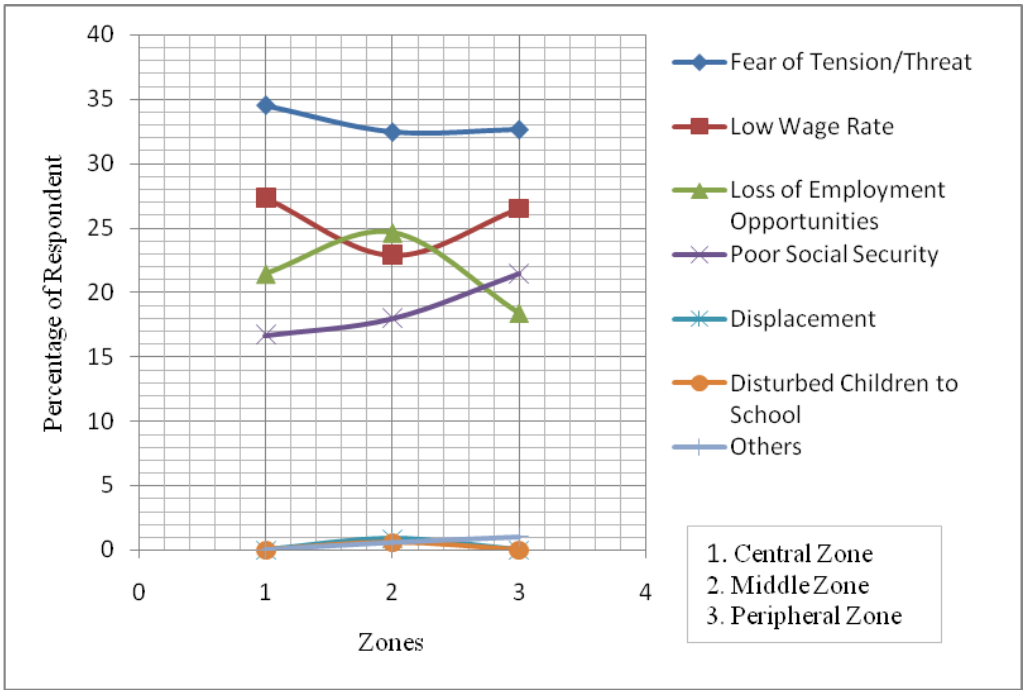

Figure 3. Impacts of armed conflict

The present study shows that livelihood options of poor urban communities changed in the conflict and post-conflict phase. In the post-conflict situation, people's involvement in the sectors like agriculture and livestock declined; whereas private and professional services, driving, and foreign employment have increased significantly. Case studies show that people engaged in small business (including mobile vending) have increased by 45% after the conflict. Similarly, private and professional services have been increased by 380% in the post-conflict period, followed by driving and fare collector and foreign employment. However, some of the activities, for example, government services, agriculture and livestock; and wage labour have decreased significantly during the same period. A very different picture is found in the government service sector, for example those who had a job in the government service before the conflict have not retained their jobs in the post-conflict phase which means that they lost their jobs due to conflict (Figure 4 & 5).

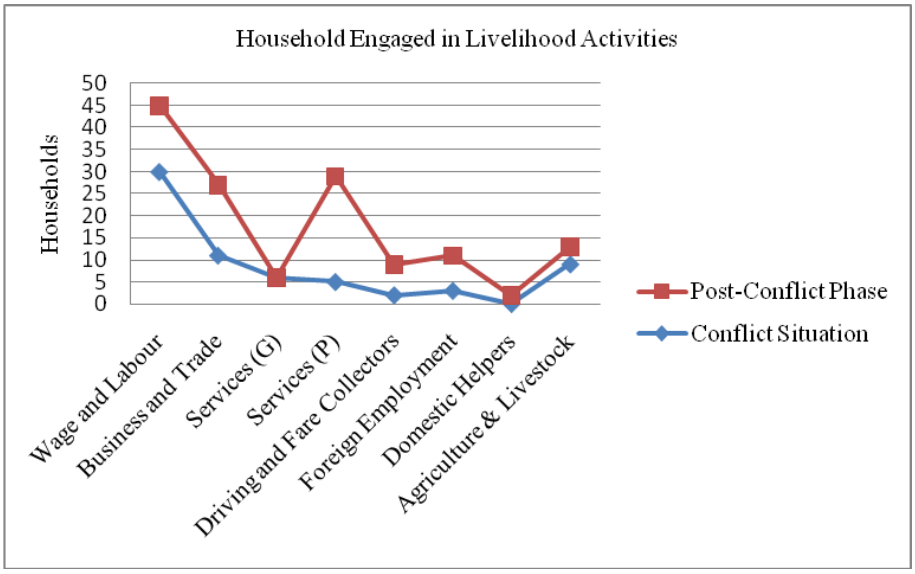

Figure 4. Household engaged in livelihood activities before and after conflict

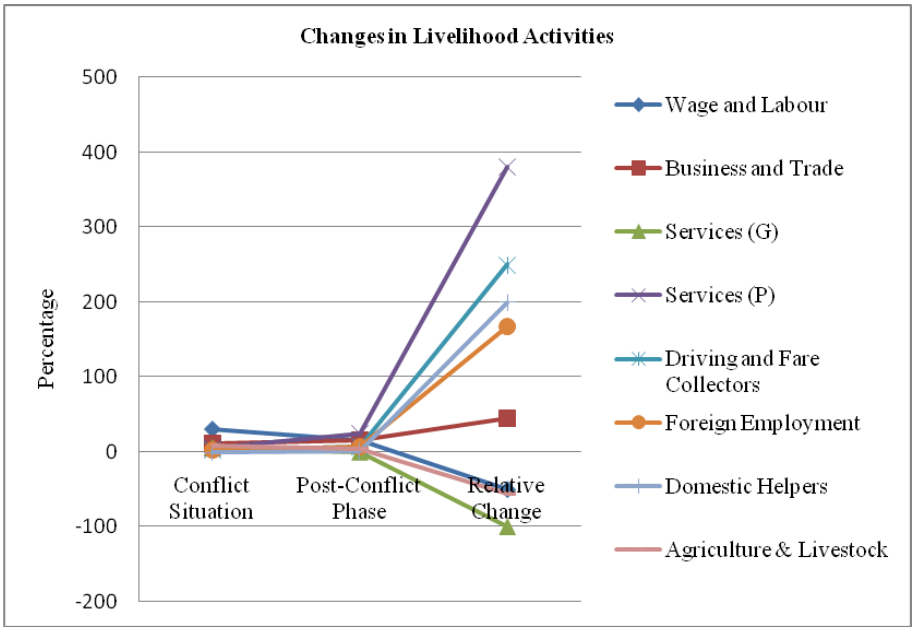

Figure 5. Changes in livelihood activities in conflict and post-conflict phase

Four main causes are identified for changing livelihood in the post-conflict phase. These are:(i) many people involved in private and professional services are working safely and expanding their scope in the post-conflict;(ii) after Maoists joined in the main political process (after 2005), the communities have increased their mobility and level of confidence for bargaining and negotiation with (private) employer; (iii) increasing informal sector of urban economy attracted many young poor entering the informal labour market in Kathmandu. The formal service sector is highly competitive and the poor, therefore, are not able to enter this sector due to their low competitive strength e.g. poor level of education;and(iv) the feeling and perception of poor have changed in the post-conflict phase.

The feeling and perception of poor have changed in the post-conflict phase (Table 3). According to them, post-conflict situation is characterized by increase in various opportunities for livelihood security and many youths are entering into the labour market to secure their family income. People have enlarged their business and get more employment oppertunities in the private and professional service sectors and increasing the household/family income. Conversion to Christianity among the urban poor is rising in the post-conflict phase; and some of the households respondents feared from the increasing social evils, for example drug abuse and alcoholism among the poor youths.

Table 3. Perception of change in livelihood

Conflict Situation	Post-conflict Situation
Fear and Threat (in Common life)	Increasing feelings of safety. Post-conflict phase is characterized by safety business and livelihood activities. The phase is very easy to look potential opportunities and work in the urban area.
Single earner with no secure income sources	The level of household income increased in the post-conflict phase. Multiple income sources of family reported to be the highest in this phase, such as wage labour and petty trade or vendor.
Less Employment Opportunity and Low Wage Rate	Post-conflict is also characterized by increasing employment opportunities for the poor in urban informal sectors.
Small scale and less profitable business e.g. wage labour and livestock	Enlarge and diversification of the size of business, e.g. vendor business
High discrimination	Discrimination is still reported in the community and neighborhoods.
Job loss and social insecuritye.g. army and security personnel lost their job in the conflict and insurgency period	Opportunity of other employment in the market; increasing religious activities and programmes e.g. Christian in the post-conflict, and improved social security.

Source: Field Survey, 2009 and 2013

Wage rate is found to be different before and after the conflict. During the conflict situation, wage rate for male was reported to be only NRs 150 to NRs200/day, and NRs 100-125/day for female. In the post-conflict, the wage rate increased by 50% in the initial years and increased by 150%in 2013 for male and almost double for female. Nonetheless, the skilled workers, for example, carpenters, masons, cement plasters, have received 25-50% higher wage rate than the skill-less worker. Skilled workers get NRs 700-800/day (FGD with a group of wage labour, July 2013).Though inflation is one of the reasons for such increase wage rate but the empowerment of the communities and increasing capacity of bargaining and negotiation after the conflict are other important causes of increasing wage rate in the post-conflict period in the urban area.

Livelihood insecurity and coping strategies

Urban labour market in Kathmandu is highly diversified and competitive. In the light of current social, ethnic and regional disturbances, the situation does not appear to become favourable for urban poor. Most of the dwellers are unskilled and illiterate; therefore, job opportunities are also unreliable, irregular and subject to high seasonal variation. Most people that were interviewed have many difficulties in securing sustainable sources of income. Change in the working trips and food habits are important coping strategies. In addition, mutual cooperation, increased social networking, borrowing and loan are other coping strategies when the livelihood is threatened. Number of children involved in activities, such as, collecting garbage as heating material and shelter (which are time-consuming and in hibit regular school attendance) increased, thereby contributing to overall decrease in educational level. Some of the children are able to trade-off successfully between school and work. They visit school in the mornings and pursue work in the afternoon, thereby keeping up hopes of a better future for themselves and their families (Dahal& Sapkota, 2005). Diversification of sources of income help to decrease food insecurity.

In the context of constant cash-flow problems, taking loans and borrowing are often practised among the poor to meet daily requirements, resulting in high levels of indebtedness. Access to loans from the local saving and credit groups and cooperatives managed by the local community often put them into the pressure for paying back with negotiable interest rate in the given time period. Therefore, borrowing from the close or immediate neighbors or relatives is often practised in the community which is a most important strategy of livelihood. Elderly and disabled are generally susceptible to loss of income and indebtedness.

In general, tendency of our family system, women and daughters often are the ones who eat last, and eat what has been left by the male household members. During the field work, a girl expressed her views as "there is never enough to eat for me and frequently, at night I am dreaming of food which I have eaten". This indicates that in the case of urban poor, most of the female members are under nourished.

Both loss of income and food insecurity have negative consequences on physical and mental wellbeing and investing money in their health care that may put livelihood of household/family for further risk and insecurity. Nearly one percent (0.98%) family membersare suffering from the chronic diseases especially Asthma and TB and nearly 4% population is either helplessness or has disabilities in the poverty pockets whose livelihood is more vulnerable. Sometimes children are the sole bread winners of the family, particularly when their parents have reached an age or face health problems that reduced to mobility for work. It has also been noted that many households do not attempt to seek professional medical treatment. People directly approach pharmacies and seek advice about their problems in order to avoid expensive consultancy fees of clinics or doctors.

Health hazard in poverty pocket is highly related to poor housing condition, lack of sanitation, poor water supply or inadequate waste and sewage disposal as well as polluted river water. Many houses of the poverty pockets such as Inyatol, Ramghat, Panchayanghat, Balkhu, Shankhamul, Shantinagar, Bijayanagar, Gairigaun and Jagrititol are built on the bank of Bagmati River; dumping site (Balkhu, Panchayanghat), and shrine area (e.g. Shankhamul) where health hazard is observed and susceptible to diseases and illness. Poor housing, water logging, dumping site in the proximity of their dwelling unit, narrow lanes between dwellings (in Balkhu and Shantinagar), are collectively creating high health risk. Some of the key voices of poor communities living in Balkhu area are as follows:

> *"Rich people getting poor while living in the poverty pocket. Culture of poverty makes them unhappy and vulnerable".* (Daniel Pun, a social activist).
>
> *"Sir, could you imagine, how you feel, living in the Jhupadi of plastic-sheet and thatch in the winter season and on the cold floor….?"* (A woman at Balkhu community).
>
> *Poor are getting poorer. We can generate cash from the casual work but that will not available in all days and in all season; in many cases, contractor/ sub-contractor will not pay our wage in time, that makes us more vulnerable and poor,". ….?"*
> (A wage labour at Balkhu community).

Perceptions of poverty and the coping strategies

There are differences and inequalities among the urban poor in the poverty pockets. They are facing different situations, experiences, and levels of livelihood security; largely defined by their household histories, household structures and composition, and by the types of works that they are able to access. In this study, different criteria were used to differentiate varying degrees of poor condition[2]. Finally, urban poor have been grouped into three broad categories: Poorest, poorer and poor; which is appropriate measures for understanding their situation (Schutte, 2006); and coping strategies adopted by these groups vary which is discussed below.

- Poorest families/household: Poorest families are those whose family income NRs 200/day or less, no saving, high dependency ratio (e.g. 75% or more), beggars, no electricity, no telephone and television, use kerosene or firewood for cooking, temporary (*Kachhi)* dwelling unit, no window and one storey, family at risk or threats, conflict affected, no properties at origin, no fridge or own vehicle, single earner, no male income earner and cannot eat properly every day.During the deficit or famine period, these people are involved in the distant wage labour, collection of garbage and begging activities. Similarly; change in food habit, engaged in small scale street shop, low paid labour, borrowing and loans are other coping strategies of this group.

- Poorer families/household: Those who can eat properly but cannot afford other basic necessities (clothes, housing etc.), headed by people with sickness and cannot work properly, have to take care of disabled members, and who have more regular but insecure work opportunities. Wage labour, vender shop and loan are their main coping strategies. Social networks and seeking employment in the private company are their other coping strategies.

- Poor families/household: Less poor families are those who have regular income, whose family income NRs 500 or more/day, daily saving amount NRs 200 or more, have multiple income sources, able to access credit from micro-finance institution, low dependency ratio (e.g. 25% or less), can eat properly every day, electricity connection, having telephone or mobile phone, having television, use LPG gas for cooking, semi-permanent or permanent dwelling, three or more window two or more story, family not at risk or threats, not conflict affected, properties at origin, fridge and own vehicle (motorcycle).These people are adopting coping strategies such as involvement in the vender shop, livestock rearing, seeking mutual cooperation and

social networking. Seeking jobs in the private and professional institutions, and borrowing loan are other coping strategies of this group.

The present study found that only 37% of the families are poorest. Peripheral zone has only 16% of poorest families compared to central and middle zone. About 36% families are found poor and most of them are in peripheral zone (51%) (Table 4).

Table 4. Percentage of households/families poor

Degree of poor	Zones			Average
	Central	Middle	Peripheral	
Poorest	43.42	40.66	15.79	36.83
Poorer	30.36	23.63	33.33	26.48
Poor	26.31	35.71	50.88	36.19
Total	100.00 (N=76)	100.00 (N=181)	100.00 (N=57)	100.00 (N=314)

Source: Field Study, 2009

Families, who are not falling in poorest or poor groups, are considered a poorer group. In this study more than 26% families are reported to be in poorer group. This study shows that poor families are highly exposed to their own business or foreign employment or skilled and highly paid work; while poorest have less exposure to wage labour, poor skill and low paid areas; subsequently are of having poor health and sanitary condition. A significant test shows that degrees of poverty (e.g. poorest, poorer and poor) depend on location (χ^2=15.88 at 0.05 significant level). Poorest group is found in central and middle zone whereas; poor is mostly in the peripheral zone of the metropolitan city.Wage/labour and vendor shops and services are the main livelihood activities in the central and middle zone; whereas, private and professional services and vendor trade/business are important sectors of employment in the peripheral zone.

Livelihood risk

More than two-third families/household still perceive a kind of risk or threat; and most of them are in the middle zone. For the purpose of analysis, all risks are grouped into six categories (Figure 6). Among them political threat and environmental risk are severe than others. It also indicates that the environmental risk is profound in center and middle zone and less in peripheral zone; whereas social threats, including communal discrimination, is relatively high in peripheral and middle zones. Though, people living

in the poverty pockets have adopted different coping measures, these measures are not free from risk in the future.

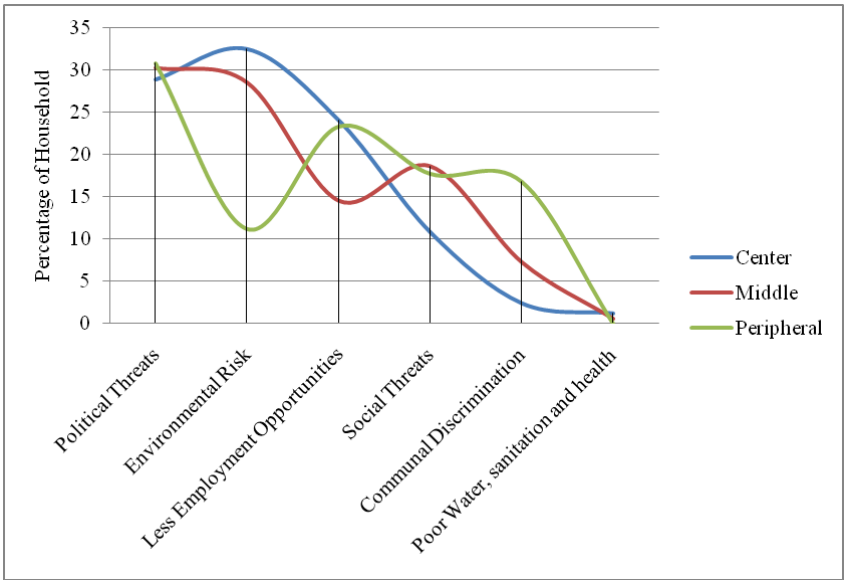

Figure 6. Household under risk/threats

Conclusion

In the post-conflict phase, variety of livelihood strategies are adopted by the urban poor.Private and professional services, driving and foreign employment are priority areas of interest of the poor youths in the post-conflict phase. They have changed their livelihood pattern and way of living in urban area through expanding their employment opportunities. Micro-saving and credit activities, social networks are encouraging them to increase their occupational mobility.Those families who are involved in the activities, such as, wage/labour or domestic helpers or agriculture and livestock are the poorest. They have weak socio-economic-political networks, suffering from the conflict and lack of health and education.Coping strategies such as involvement in the vender shop, livestock rearing, mutual cooperation, social networking borrowing and loan are adopted by poor class. Poorest group is mostly found in central and middle zones whereas; poor is in the peripheral zone of the metropolitan city.However, a decade long armed conflict also explores opportunities for maintaining social tie, reducing discrimination and makes people more powerful in the decision making process that has made livelihood easier than earlier.

Notes:

Mitlin Diana (2004) used the term "Pockets of Poverty" for the clusters or poor concentration location in the urban area. According to Diana ' there may be serious "Pockets of Poverty" within the urban area, that urban poverty may be increasing and that inequality may be higher in urban areas than in rural areas"

Twenty-one indicators are: level of household income, saving amount, dependency ratio, beggar, electricity connection, pipe water available, TV and telephone use, gas stoves and cylinder use for cooking, fridge use, types of roof, types of wall materials, number of building storey, available of window, number of room, access to health and school, conflict affected, HH at risk and threats, properties at origin and enough to food. All these indicators were grouped into eight main criteria of evaluation. These are: household income and expenditure, dependency ratio, access to physical facilities (e.g. electricity, telephone, TV, fridge, vehicle and gas stove/cylinder), types of house, risk and threats at present location, conflict affected household/families, access to organization (saving/credit institution, cooperatives, NGOs, INGOs, CBOs, and properties at origin.

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Tourism development and economic and socio-cultural consequences in Everest Region

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Being a mountainous country, Nepal is one of the destinations of tourist. Everest Region is one of the major destination trekking and mountaineering tourism and ranks second after Annapurna Region in term of number of tourists visiting different regions of Nepal. The number of tourist visiting this region increased from only 1406 in 1971/72 to 37124 in 2014. Such a growth of tourism has several socio-economic and cultural consequences. This paper discusses the consequences of tourism in Everest Region. Informations were collected along the trekking routes from Lukla to Dinboche through focus group discussion, key informant interview and tourism business survey. The results indicate that the number of hotels and lodges in many settlements along the trekking route has increased tremendously. The main base of economic life of Sherpa community has been changed from agro-pastoralism to tourism based business. The level of employment and income of local people has improved. However, tourism has undermined Sherpa culture by introducing new values and lifestyles influencing from westerners, eroded the central role of religion and traditional value in Sherpa community. For the younger generation the tourist and their norms of behavior and patterns of consumption can be seductive. This is the symptom of losing of cultural value of Sherpa community and world identity of Sherpa in the future.

Keywords: Everest Region; Sherpa; trekking and mountaineering tourism; consequences; hotel and lodges

Introduction

Mountain tourism holds about a quarter of the global tourist industry. In Nepal, trekking and mountaineering tourism keeps great value in tourism industry which ranks in the second position in terms of tourist arrival by purpose of visit, annually with a total of 97185 tourists (MOCTCA, 2015). Some fluctuations nevertheless, the proportion of tourist visiting in Nepal with the purpose of trekking and mountaineering has risen steadily from 0.1 percent in 1966 to11.8 in 1980, 15.7 percent in 1990, 25.6 percent in 2000,11.6 percent in 2010, and 12.30 percent in 2014. Tourism contributes 4.8 percent in foreign earning exchange and it shares 2.0 percent in Gross Domestic Products. Annually 544 million US dollar is earned from tourism sector (MOCTCA, 2015).

Trekking and mountaineering in Nepal is mostly confined in three major areas (Annapurna, Everest and Langtang/Helambu) which occupy 87 percent of the total trekking and mountaineering tourist arriving in Nepal (MOCTCA, 2013).Incidentally, these three areas are associated with National Parks and Conservation Areas. Annapurna Region comprises 58.61 percent of the trekking and mountaineering tourism followed by Everset Region (23.34 percent) and Langtang- Helambu Region (8.18 percent) (MOCTCA, 2015). Everest Region (Sagarmatha National Park) is known as the second popular trekking destination in Nepal after Annapurna Region. Tourist visiting in the Everest Region has increased from 1406 in 1971/72 to 37124 in 2014/15 (record of Sagarmatha National Park at Jorsale). Such an increase in trekking and mountaineering tourism in the area has several socio-economic and cultural consequences. This paper discusses the development of trekking and mountaineering tourism in Khumbu Region and its consequences along the main trekking route from Luckla to Dinboche.

Study area

The Everest Region liesin between 86˚31' - 86˚58' East longitude and 27˚47' - 28˚71' North Latitude. It is located about 90 km north east from Kathmandu. Everest Region consists of three sub-region – Khumbu (Namche and Khumjung Village Development Committees) in the north, Pharak (Charikharka) in the middle and Solu in the south. This study covers part of Khumbu and Pharak area along the major trekking route from Lukla to Dinboche.

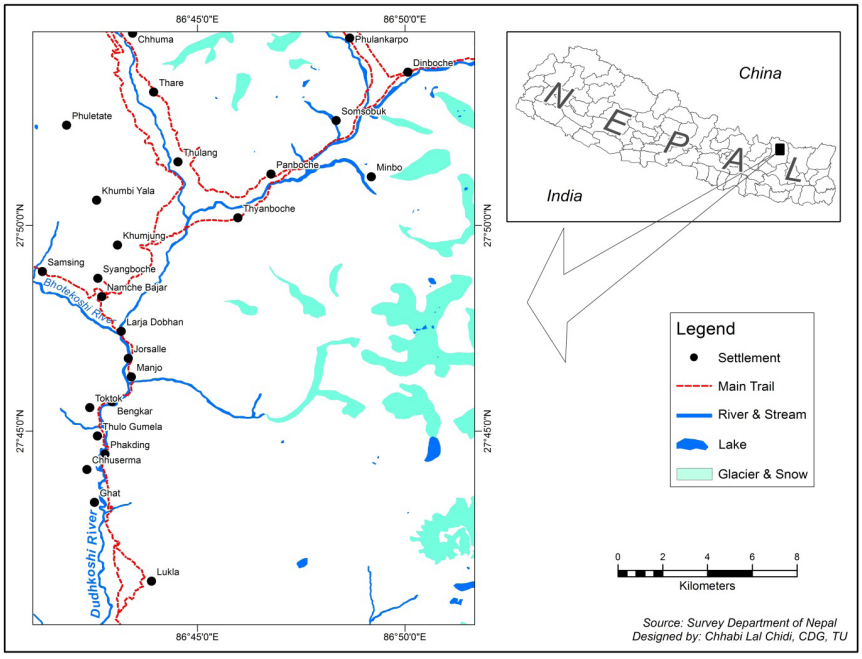

Figure 1. Location of study area

The main trekking route starts from Lukla, an airstrip and descent to Dudhkoshi River. Several large and small settlements are appeared along the route. The major settlements of the routes are Ghat, Phakding, Toktok, Benkar, Manjo, Jorsale, Namche, Khumjung, Panboche and Dinboche (Figure 1).

Method and materials

This study is basically based on primary data. Primary data were collected using checklist through key informant interview, in-depth interview and group discussions. Transect walk and direct observation from Lukla to Dinboche was carried out. Information observed during the fieldwork was recorded in topographic maps and notebooks. Key informant interview and focus group discussion were carried out in different settlements along the route. The size of the focus group ranged from six to ten people. Mostly, the main sources of information were local entrepreneur related with tourism business. In-depth interview were conducted with ten local business persons for understanding their views about present development and also to cross-check information collected through other different sources. School teachers, social workers, women and porters were participated in the FGD. They represented different caste/ethnic groups, occupations,

age and sex. Similarly, a total of seven key informants were interviewed. For KII, local school teachers, social workers, politicians, members of community organizations and VDC officials were selected.

Results and discussion

Development of tourism in Everest Region

The successful ascent of Mt. Everest (8,848m) the highest peak on the globe made by Tenzing Norgay Sherpa and Sir Edmound Hillary on 29 May, 1953 popularized Khumbu as the fertile and prospective place for trekking and mountaineering. Everest Region is one of the tourist attractions area because i) there are many Himalayan peaks including Mt. Everest, the highest peak of the world, ii) the area lies within Sagarmatha National Park with high biodiversity and iii) the area is designated as World Heritage Site.

The number of tourist visiting this area increased from only 1406 in 1971/72 to 11314 in 1990/91 and 16921 in 1996/97. Figure 2 shows the number of tourist visiting this region from 1998 to 2015. It shows that there has been tremendous growth in the number of tourist between 1998 and 2015. However strong annual variation is observed. There was rapid decline in the number of tourist visiting this area in the years - 2002, 2005, 2015. The number of tourist visiting this area remained quite low between 2001 and 2007. It was mainly due to Maoist insurgency in the country. Likewise, the decline in 2015 is mainly due to the damages of tourism related service infrastructures caused by massive earthquake of April, 2015. Most trekkers and mountaineers come from western Europe, UK, Germany, France and Netherlands.

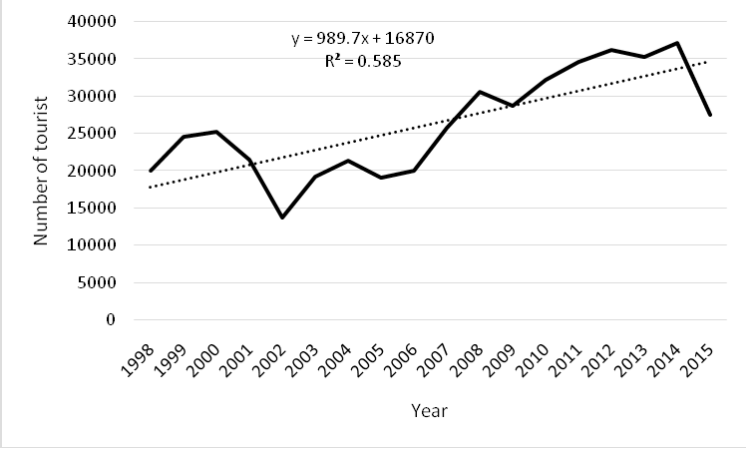

Figure 2. Number of tourist visited Khumbu by year (source: Sagarmatha National Park at Jorsale, 2016)

Another characteristics of the flow of tourist as in this area is seasonality. Figure 3 shows that there are two peaks – one in April and another one in October. Nearly 92 percent tourist visit the area in two seasons – September to November (57 percent) and March to May (35%). In other months the number of tourists remains less than 800. Such seasonality in the flow was also reported in the study of Sharma (1998).

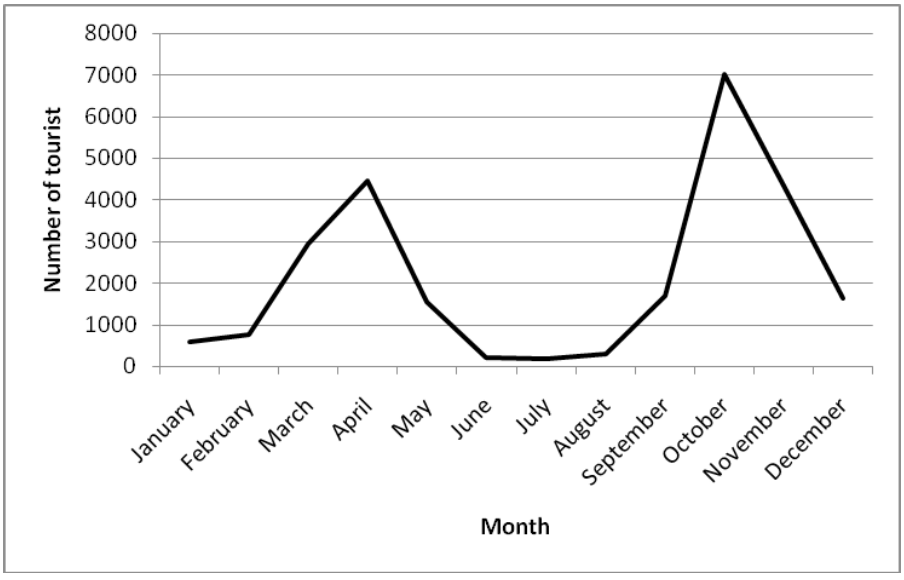

Figure 3. Average number of tourist visited Khumbu by month (1998-2015)

Many historical events, political change as well as administrative decisions and events being in the country have affected the real situation of tourist related activities in Everest Region. First climbing of Mount Everest, ending political autonomy of Khumbu after establishing Panchayat System, nationalization of forest, designation of Sagarmatha National Park, declaration of SNP as a World Heritage Site,Visit Nepal 1998 Programme, entrance of private airlines service to Lukla, Golden jubilee of Sagarmatha ascending etc are the main events that influenced to the positive development of tourism in Khumbu (Table 1). Construction of airstrip in Lukla, hospital in Lukla, Khumjung School, hydro-electricity project and facilities of communication (cell phone) etc. are important infrastructures which directly supported to the growth of tourism in Khumbu (Garrard et al., 2012; Garrard et al., 2016). Dig Cho GLOF in Dudhkosi River, ten years

conflict from 1995-2005 in the country and destructive massive earthquake of April, 2015 are some of the events which resulted the decline in tourist visiting the area.

Table 1. Major historical events in the Everest Region related to tourism development

Year	Important actions/events that influenced to Khumbu tourism
1951	Exposed Nepal in the world after overthrew of Rana Rule
1953	First ascent of Mt. Everest by Tenzing Norgay Sherpa and Edmond Hilary
1964	Lukla airstrip built in 1964 that facilitated tourist arrival in Khumbu
1973	First lodge, hospital and school established in this region
1976	Establishment of Khumbu Region as the Sagarmatha National Park (SNP) in 1976
1979	Declaration of SNP as a World Heritage Site by UNESCO in 1979
1985	Dig Cho GLOF in Dudhkosi which affected tourist arrival in 1986
1994	A hydroelectric project, 600 KW completed
2001	Ten years conflict started in 1995 and declared emergency in 2001 which resulted decline in visiting tourist.
2006	End of ten years conflict and rejuvenation of tourism activities
2015	Destructive Gorkha Earthquake 2015

Source: Field survey, 2010 and 2015.

Consequences of the growth of tourism

Growth of hotels and lodges

The first hotel was opened in 1971 in Namche Bazar for the purpose of tourism. By the end of 1979, there were 17 hotels and lodges in this route. Tourism activities increased rapidly in Khumbu Region in the decade of 1980s and 1990s. As a result the number of hotel and lodgesalso increased significantly. There are 282 delightful hotels and lodges excluding small hotel and tea shops along the major trekking routes from Lukla to Everest Base Camp serving the tourists visiting this area. About 90 percent hotels and lodges are operated by Sherpa community and rest of the hotels and lodges by Rai and Tamang arriving from outer area. According to the available data, the number of hotels and lodges increased from 1979 to 1999 with more than six times (from 17 to 108 in this route). Similarly, the growth rate has remained 1.66 percent from 1999 to 2009 in this ten years period.

The section from Lukla to Dinboche is more important for tourism activities because most of the stays of tourist lie in this section. In the total of Everest Region, more than 80 percent hotels and lodges are operated here. There are ten major settlements locating hotels and lodges in this route. Namche, Lukla, Khumjung, Phakding, Dinboche, Manjo, Panboche, Benkar are notable among them. Namche is the most popular tourist center of Khumbu located at 3400 meter altitude which covers about 18 percent hotels and lodges along this route followed by Lukla (14 percent) and Khumjung (12 percent). Namche is also a permanent market place. In Namche, most of the people have adopted tourist business especially hotels and lodges. Agricultural activities also happen in small quantityin Namche. Namche is the old settlement of upper Khumbu area inhabited by Sherpa community. It is the gateway to Mount Everest base-camp (Gurung, 1980). The second largest settlement is Lukla where an airstrip all round the year for Everest Region has been operated. Lukla occupies 14 percent hotels and lodges of this region (Table 2).

Table 2. Hotels and lodges along the route (Lukla to Dinboche)

SN	Settlement	1979*	1999**	2009**	2012***
1	Lukla	na	25	34	39
2	Ghat	na	4	6	14
3	Phakding	na	7	16	29
4	Bengkar	na	2	4	23
5	Manjo	na	5	10	25
6	Jorsalle	3	3	5	15
7	Namche Bazar	10	35	45	51
8	Khumjung	1	9	25	35
9	Panboche	3	4	14	24
10	Dinboche	na	14	21	27
	Total	17	108	180	282

*Source: *Stevens, 1996; ** Field survey, 2010 and *** Rai, 2013.*

Figure 4 shows the growth in the number of hotels and lodges in major settlements located along the main trekking and mountaineering route. There has been increase in the number of hotels and lodges in all these settlements.

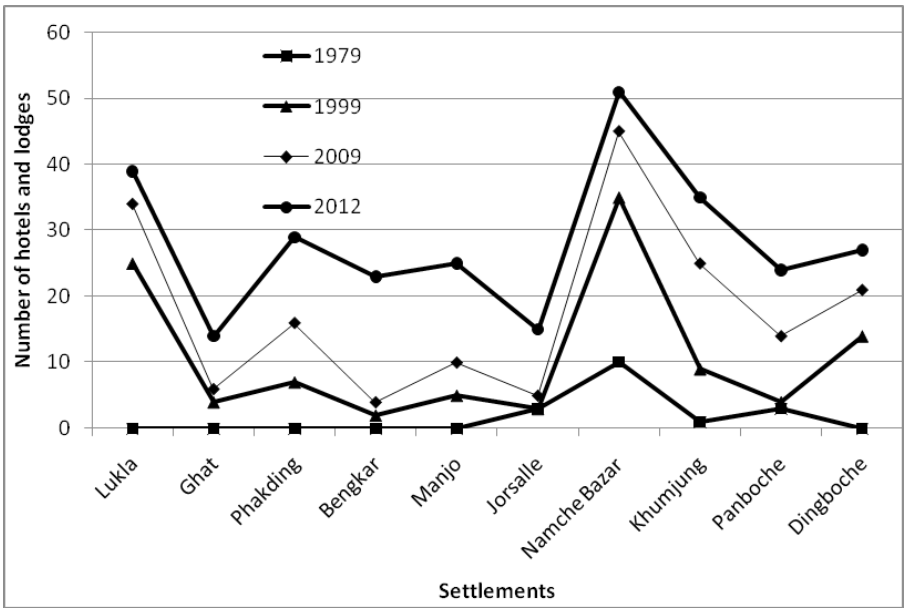

Figure 4. Number of hotels and lodges in different periods

Economy

According to the oral traditions, the Sherpas migrated and settled in the high homeland that they call Khumbu more than four centuries ago (Stevens, 1996). Khumbu was the Trans-Himalayan trade route before long time (Furer-Haimendorf, 1975). In the 1950s and early 1960s, it was far less developed and could only be reached by foot or on the back of an animal. The major option of livelihood was based on agro-pastoral activities.

After the growth of tourism in this area, their economy is mainly based on tourism business. The majority of people living in the region are now engaged in the tourism business in one form or another since 1960s. Overall, most people consider their livelihoods to have improved in recent years. Employment opportunities in the region have increased significantly due to an increase in tourism-related businesses such as hotels, lodges, trekking and climbing expeditions. Some now even own and operate Kathmandu-based trekking companies that organize mountain journeys throughout Nepal including Khumbu. Porters, guides, high altitude guides, cooks at the hotels, and jobs in retail shops have become a major sources of employment in the region. Because of the rapid growth of tourism in the region, occupations are shifting from

agro-pastoralism to tourism as more and more people establish lodges, campgrounds, hotels, and pack animal services.

Most of the Sherpa households have adopted income-generating activities based on tourism. Sherpas are employed in trekking and mountaineering activities as group leaders (*sirdars*), porters and cooks as a part of trekking groups or mountaineering expeditions. While due to their growing positive reputation Sherpa men are most likely to find trekking or mountaineering job easily, participation of women have been relatively small though some women are employed as kitchen or camp crews or as pack-stock drivers. As Sherpas of Khumbu continue to discover better opportunities brought about by tourism, they have started considering a job of porter inferior due to low pay. So, in recent years most of the porters in Khumbu are from outside the area; they are mainly the Sherpas, Rais and Tamangs from lower areas.

Since the late 1960s, tourism based businesses and entrepreneurship has also mushroomed in the region. Numerous lodges have been built to cater to the trekkers and mountaineers. Gradually, tourism based services have established at major touristic centers like Lukla and Namche. Stores selling food, souvenirs and selling or renting trekking or mountaineering equipments are also quite popular. At the beginning, Sherpas used to merely modify their own houses or herding huts as lodges, nowadays there are specially built lodges with modern facilities. However, the cost of building a lodge is increasing because of the high cost of land and rising cost of materials especially wood.

Table3. Economic consequences of tourism development in Everest Region

Nature of impacts	
Positive	**Negative**
• Diversification in income source • Entrepreneurship development in local people • Improvement in the life standard • Infrastructure development • Beginning of high value cash crops • Growth of market towns and settlements	• Seasonal unemployment • Lack of labor in agricultural sector • Over dependent in imported goods • Growing expensiveness • Inflation and dependency

***Source**: Field survey, 2010 and 2016.*

Running a lodge in Khumbu is a highly lucrative business as informed by participants of FGD and key informants related with hotel business in Namche, a

popular lodge can earn as much as $10,000 a year, and most lodges earn at least $20000 annually. That provides enough funds to purchase supplies at the local weekly market or Kathmandu and to hire wage labor. A committee of local lodge owners has been formed to monitor prices of Khumbu lodges to avoid any price conflicts. Though employment as a part of expedition is seasonal, most of the Sherpas are employed throughout the year by the mountaineering and trekking agencies based in Kathmandu. Also the income earned during the tourism season is sufficient for the rest of the year for sustaining their livelihood. A woman, proprietor of a hotel in Panboche expresses her views thus when I asked about the earning situation from hotel business;

> Operating hotel/lodge is our main occupation from twenty years ago. It is our main base of livelihood. We earned about six/seven million NRs in one season. This amount becomes sufficient for running household and for education of children. I am satisfied with this business.

Trekking seasons occur during the period of important agricultural works like plantation and harvesting. The absence of so many men during part of the year has had lifestyle impacts on their families. Though women have always played the fundamental role in the cultivation of land, subsistence activities, and family decision making as well. Some works like field preparation in early spring and hay cutting during late summer season are performed by men due to the off-season of tourist. In this circumstance, most of the works and responsibilities have to be accomplished by women as the in-charge of home. It has increased women empowerment and whole local community as well in the Everest Region. Seasonal labors for carrying out hotel-lodge business and cultivation from lower areas of Solukhumbu, Okhaldhunga and Khotang have become main basis of workers in the region. The worker earns Rs. 1200-15000 in a month.

In some areas in Sagarmatha National Park tourism related activities are emerging as more important than traditional agro-pastoralism. New economic opportunities opened up due to tourism have impacted land use along major trails. High value /cash crops such as vegetable, off-season vegetable, fruit farming have been started in this area. Dependency of local economies on outside forces has increased with all its negative effects. Seasonal unemployment, lack of labor in agricultural sector, over dependent in imported goods, growing expensiveness, and inflation and dependency are some of the major negative consequences of tourism in Everest Region.

Socio-culture

Tourism is today one of the world's most significant sources of cultural contact, creating situations of both enormous cross-cultural communication and conflict (Lama, 1997).

Tourists not only bring money to region; but they also carry along with them a strong and visible life-style (Kunwar, 2006). It causes the interaction of peoples from diverse parts of the world, fostering the diffusion of ideas, values, technology, consumer tastes, and lifestyles. Such interactions may weaken local culture and lead to a variety of types of socio-cultural change. In the context of Everest Region, cultural imitation has increased due to tourism. This is reflected in dress, language, food and festival. The impact is seen in more influential in especially new generation of this area. Due to this cause, it has increased artificialness, socio-cultural conflict and conflict in the society. Sometimes there happen criminal activities too.

Table 4. Socio-cultural consequences of tourism development in Everest Region

Nature of impacts	
Positive	**Negative**
• Cultural exchange between local people and tourists • Preservation of local culture and tradition being realized • Growth in sense of pride of cultural heritages • Exposure of the local people in the world • Growing awareness and educational expansion • Empowerment of local community especially women • Diffusion of ideas, values, technology, consumer tastes, and lifestyles	• Imitation of Western culture • Growing artificialness in the community • Socio-cultural and inter-generational conflicts • Local cultural values and traditions are loosing • Commercialization of art and local heritage • Social tension between those benefitting from tourism and not benefitting • Work burden to women

***Source**: Field survey, 2010 and 2016.*

The arrival of tourists in another people's homeland always brings with it the possibility of cultural frictions between hosts and their new (and often uninvited) guests. There is also the commoditization of culture dial takes place when everyday crafts are sought after for souvenirs and locally meaningful ceremonies and festivals become tourist attractions. This can lead to art and cultural performances losing their meaning for local residents (Stevens, 1993). In some cases both art and ceremonies may even be deliberately altered to fit tourist tastes.

Tourism has changed lifestyles of Khumbu people in other ways. In the past before tourism, there used to be a distinctive seasonality in economic activities by the

altitudinal locations of settlement in the region. After the autumn crop harvest most families used to leave the region and traveled and traded in the warmer, lower-altitude regions to the south until it was time to return for spring planting. This migration no longer takes place, in part because of the new demands of the autumn and spring tourist seasons and in part because new affluence from tourism has replaced the earlier winter barter-trade journeys. A new pattern is now emerging, with many families using some of their tourism income to make mid-winter journeys in the coldest months to Kathmandu for shopping, pilgrimage, and visiting city-based friends, relatives, and children. Older people especially value the opportunity to spend a few months in the warmer capital.

There have also been tourism-related changes in a number of facets of local lifestyles including diet and clothing which are related to new affluence and to new, tourism-introduced consumer fashions. Sugar, chocolate, coffee, and beer, for example have become parts of Sherpa life. Tourism income has also enabled families to purchase more tea and coffee, processed foods such as noodles manufactured in other parts of Nepal, and larger amounts of lower-altitude grown grains including rice, wheat, maize, pulse and millet. A lot of meat (pork, buffalo, mutton and chicken) is consumed which is supplied by porter carrying on back from lower parts of Khumbu. Clothing styles are also changing which are observed vividly along the route. Men almost universally have adopted tourist clothing, giving up their wool cloaks for Western-style shirts and pants. Sun glasses are also very popular. Women have maintained more traditional styles of dress, although some unmarried young women have taken to wearing jeans and other tourist clothing. And no visitor to Khumbu today can help but be struck by the popularity of Western consumer electronics. Many families have radios, television and tape players, and there is an abundance of personal stereos. For many Sherpas listening to Western, Nepali, and Tibetan music and Nepali news broadcasts on these devices has become a part of daily life, even something that is often done while hiking along the mountain trails. In this respect, an old local Sherpa people of Namche says that,

> Gradually, we are losing our old traditions and culture now-a-days. The language is going to extinct in the near future. The new generation doesn't understand Sherpa language but they are perfect in English language. The youths, both boy and girl feels uneasy wearing Sherpa dress.

All Sherpa people attending in focus group discussion agreed that the traditional Sherpa culture has been influenced and sometimes replaced by western culture and technologies, such that many people have partially abandoned their traditional value, dress, religious rituals and functions. Many Sherpas, for example, resent tourists' lack

of respect for Buddhism. They are angered by tourists' violation of the most basic local religious customs, which require the *chorten* shrines, prayer wheels, and walls of carved prayer stones always be passed or circumambulated with the religious monument kept to the right. Doing so signifies respect for Buddhism, while passing to the left demonstrates the opposite.

Sherpas continue to be proud of their traditions and continue to observe Buddhism. An interview with senior local Sherpa people informed that new wealth has been used for restoration of temples, building of new shrines, and expansion of monasteries which have all worked in strengthening their cultural ties. Cultural pride and value has increased among local people. They have spirit of preservation of local culture and tradition that is found during survey as suggested by Kunwar (2006). However, there have been some instances when tourism is seen to hamper the traditional culture. Inability of tourist to maintain respect in the shrines and photographing without consideration has often angered local people. Tourism has influenced Sherpas to send their children to school and also to learn English. Sherpas have been able to send their children to good school through their tourism earnings. Locals have greater access to health facilities due to establishment of infrastructure for health by government as well as charitable donation from foreign visitors.

Tourism has also created a potentially socially-disruptive social problem by encouraging emigration. On the one hand it may have prevented possible large-scale migration from the region during the late 1960s and early 1970s, when the decline of the trade with Tibet undermined many households' economies. Yet while the opportunities in tourism have probably slowed total out-migration from Khumbu over the past 25 years, some talented and bright men have migrated to Kathmandu. Several of these men work in the offices of the Kathmandu-based trekking agencies and others have opened their own trekking agencies and other businesses. Out-migration may well increase in the future, for many families are now using their new wealth from tourism and support from tourist sponsors to send their children to boarding schools in Kathmandu and an increasing number of children are now studying abroad. Local people are concerned that many of these children may not return to the region.

A more important social impact of tourism development is revealed in the increasing social tensions between those benefitting from tourism and not benefitting, and between big stakeholders (big hoteliers) and small stakeholders (small teashop owners) and local entrepreneurs and newcomers. Such social tensions are experienced in this region especially in taking benefits and using resources. A newly established hotel

owner of Rai community of Phakdin who is immigrated from lower Solu expressed his view such;

> I established this hotel four years ago. Before starting hotel business, I used to engage in trekking in the Everest route. I have understood all kinds of practices and know to local people. Despite so, we have to face various problems in this place especially in terms of resource use.

Conclusion

The Everest Region is the home of outstanding mountain scenery and the renowned Sherpa people in the world. It is more of native and a little bit culture and known for its unique natural and cultural landscape characteristics. Today, Sagarmatha National Park is one of the most important mountain tourism destinations in Nepal, as well as in the world. The number of tourist visiting the area has increased from hundred in the late 1960s to more than 37,000/year in 2014. Tourism is of critical importance to the region and represents the main source of income along the trekking route of Everest Region especially from Lukla to Dinboche in Sherpa community. Most households have converted their household economies in order to participate in the new emerging tourist economy. This major economic change has been accompanied by social and cultural change. Income level of local Sherpa people has been increased significantly. Not only this, it has diversified in the income sources of local people too. Not only on communities located on the main trekking routes but even on villages that are located out of main tracks. Traditional social and economic aspects of especially Sherpa people of this region have been greatly influenced by the surrounding mountain environment and towering Sagarmatha. Similarly tourism is making local people more dependent leaving other profession like agro-pastoralism. The impact of tourism on society and culture begin to appear as the economic dependency on tourism grows and the demonstration effects and commercialization of culture become more evident. There are not all negative impacts of such tourism in this region. Growing awareness towards environmental issues, economic upliftment of the local people, women empowerment, sense of pride of cultural heritages etc. are positive impact of trekking/mountaineering tourism in the Everest Region. Despite being critical of tourism, we have to use it as a window through wihich we can spread our cultural values far and wide. The income that people earn from this sector should be used in different sustainable income generating

activities giving due care in maintaining the region's unique ecological diversity and ecosystem.

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Biodiversity resources and livelihoods: A case from Lamabagar Village Development Committee, Dolakha District, Nepal

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Biodiversity resources are essential to both ecosystem and livelihood function of human population. The present paper discusses the availability of biodiversity resources and its contribution in the livelihood of local people in Lamabagar Village Development Committee, Dolakha district, Nepal. The results show that the livelihood of local people depends on biodiversity resources and people use these resources as fuel wood, timber, fodder and forage for household consumption. In addition, these resources are used as raw materials for local industry such as paper industry and are exported to other market towns to sell and generate income. Bio-diversity resources contribute about 22 per cent of the total household income in the study area. However, the biodiversity resources are at risk due to deforestation mainly for the development for infrastructures such roads and hydropower projects; over exploitation and absence of effective management practices.

Keywords: Biodiversity; flora; fauna; forest products; livelihoods; threat

Introduction

'Biological diversity' means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems (CBD, 2000). Biodiversity as potential resources is referred to as biological resources, and is the greatest treasure on the earth. The most important

attribute of the resource, if properly maintained, is its renewability. Biodiversity should be seen as a necessary pre-condition for the long-term maintenance of biological resources, and an essential environmental condition (Jha, & Poudel, 2013). Therefore, in addition to terrestrial biodiversity, it also covers marine and other aquatic biodiversity as well. As such, biodiversity means richness and variety of living things in the world as a whole or any location within it. Biological resources include genetic resources, organism or parts thereof, populations or any other biotic component or ecosystems with actual or potential use or value for humanity. Change in relative abundance of species over an area or a distance is referred to as an ecological gradient. In mountainous areas, change in elevation led to same biographic change that occur with change in latitude (Botkin & Keller, 2000).

The relationship between livelihood of the human being and biodiversity is complex and interdependent throughout the world. The issue of biodiversity conservation for livelihood has been raised since the Second World War. However, significant efforts in this regard only started from Stockholm Conference in 1972 and it has become major issue of most in the developing countries of the world (Atchia & Tropp, 1995). In developing countries, significant number of people is living in subsistence agriculture and majority of them are still dependent on biodiversity resources for their livelihood.

Livelihood are maintaining from making of leaf to collect gum and seeds to hunting of wildlife. Such biodiversity resources based livelihoods generally, vary with seasons, forest, trees and CPRs support livestock's of local communities/groups in three ways: (i) by providing for subsistence needs of fodder, fuel etc.; (ii) as source of income, and (iii) as a capital goods or savings to be cut and encased to meet contingencies (Chambers & Conway, 1991). The complexity and variety of living systems in the Mountain region are not only limited to geographical distribution but also present extreme biological diversity in terms of ecosystems, species and genetics.

Biological diversity in Nepal is closely linked to livelihoods of many people and their economic development, and touches upon agricultural productivity and sustainability, human health and nutrition, indigenous knowledge, gender equity, building materials, climate, water resources and aesthetic and cultural well-being of the society (MOFSC, 2002). The indigenous people and local communities have shaped the unique landscapes of the Nepal Himalayas that have been maintaining environment and delivering ecosystem goods and services for centuries. Biodiversity provides various

types of ecosystem services ranging from habitat conservation and essential materials linked to livelihoods of people and economic development to maintain genetic diversity, such as maize diversity (Chaudhary & Shah, 2010).

Though the strong linkage between biodiversity resources and livelihood has been recognized, information on the availability and use of biodiversity resources in terms of quantity and value in different socio-economic and ecological context is scanty. This paper discusses the availability of biodiversity resources, its utilization and contribution in the livelihood of local people. It also discusses the sources of major threat to biodiversity resources and livelihood of local people in Lamabagar Village Development Committee (VDC) in Dolakha district, Nepal.

Study area

The study area is located in Lamabagar VDC of Dolakha District, Janakpur Zone in the Central Development Region (CDR) of Nepal**.** Geographically, it lies between the latitudes of 28^0 10' 00" and 27^0 50' 00" North and longitudes of 86^0 15' 00" and 86^0 05' 00" East. The area is accessible from Kathmandu via 122 km long asphalt road up to Charikot bazaar and by another gravel road of 68 km up to Lamabagar village (Figure 1)

The Lamabagar Village Development Committee (VDC) with an area of 4330 km^2 is settled by 394 households (CBS, 2012). The majority of land use is covered by barren (60.2%), followed by forest (22.6%), bushes (8.2%), cultivated land (1.3%), and remaining (7.7%) by grassland, glacier and lake. Ethnically, the area is inhabited by Tamang (57.46%), (Sherpa (11.72%), Dalit (4.70%), Newar (2.57%) etc. The other castes/ethnic groups are Magar, Sunuwar, Chhetri, Thakuri, Brahman and Gurung (CBS, 2012).

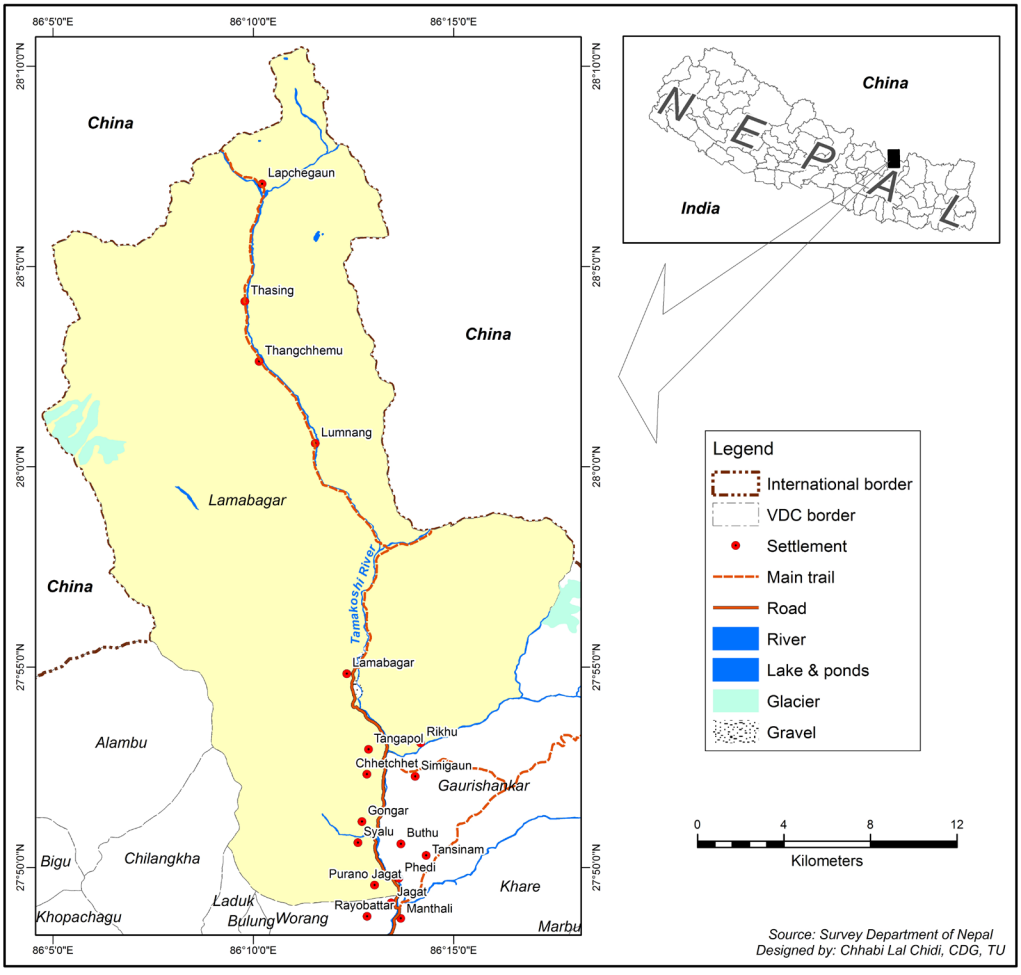

Figure 1. Location Map of the Study Area

Materials and methods

This study is based on information collected through field survey in Lamabagar Village Development Committee. For acquiring the information on flora and fauna, the transect walk from Purano Jagat to Lapche, and adjoining settlement was carried out for two weeks during April 1-15, 2012 along the access route and adjoining trails to settlements. The vegetation and forest types were identified and recorded based on species composition and dominance. The indirect observations such as, pugmarks, footprints were carried out to identify specific habitat of the wild animals and their habitat. For information on the consumption and use of biodiversity resources at household level,

household survey with semi- structured questionnaire was carried out. Table 1 shows total number of households by settlements and sample size adopted for household survey. The total number of household interviewed was 92. Households for interview were selected randomly based on the list of households prepared by the VDC office. Similarly, information on the use of biodiversity resources for local industry and for marketing at VDC level was obtained through focus group discussion. Moreover, Key Informants Interviews (KII) was conducted with District Forest Officer, local traditional medicinal practitioners and Lamas to collect information on the harvesting of ethno-botanical or medicinal plants at VDC level.

Table 1. Number of households by settlements and sample size

S.N	Name of Settlements	Total Households	Sampled Households	Percent
1	Purano Jagat	20	5	25.00
2	Jagat	26	7	26.92
3	Gongar	40	11	27.50
4	Chetchet	8	3	37.50
5	Thansingh	8	3	33.50
6	Lamabagar	208	56	26.92
7	Lumnang	8	3	27.50
8	Lapche	13	4	30.76
	Total	331	92	27.79

Source: Field survey, 2012

The information on threat to biodiversity resource and ultimately the livelihood of the local people was collected through Focus Group Discussion (FGD) and Key Informant Interview (KII) with personnel's of district offices like forest, livestock, and highland pasture. Information on illegal hunting and their current values in the market were also obtained through discussion with business executives in market centre like Gumukhola, Singati, Dolkha and Charikot Bazar.

The collected data were analyzed at VDC level. Data on the use of biodiversity resources for industry and cash income through marketing of those resources that are collected by a limited number of household was obtained at VDC level. Those were converted at household level by dividing total unit of resource used by the industry or marketed in the nearby market centres by total number of household in the VDC.

Results and discussion

Biological resources

The indigenous people (Thamgni, Sherpa, Surel, etc.) since ancient times have been dependent on biodiversity resources. The occupational castes that did not have other means of skill were involved in production and selling of various goods extracted from bio-goods in Lamabagar Village Development Committee.

A rich biodiversity has been found in the study area consisting of significant composition of flora and fauna. The species like Gobre Salla (*Pinus wallichiana),* Thingure Salla (*Tsuga dumosa*), are dominant in the study area. The higher altitudes of the study area provide excellent habitat for Himalayan wildlife. Different species of flora and fauna are abundant in this VDC. A brief description major flora and fauna found in this VDC is given below.

Flora

From the survey altogether, 224 plant species have been recorded in the study belonging to 78 genera of 80 families. The important species are Quercus *sp*., *Abies spectavilis*., *Acer sp., Rhodoendron sp*ecies. Other species commonly found in the study area are Gobre Salla, (*Pinus wallichiana),* Thingure Salla (*Tsuga dumosa*), Chilaune (*Schima wallichii),* Uttis (*Alnus nepalensis),* Katus (*Castanopsis tribuloides),* Khasru (*Quercus semicarpifolia),* Champ (*Michelia champaca),* Kafal (*Myrica esculenta),* Painyu (*Prunus cerasiodes),* Bhalayo (*Semecarpus anacardium),* Dudhilo (*Ficus nerifolia),*Banmara (*Chromolaena odorata),* Chiraito (*Swertia chirayita),* Satuwa(*Paris polyphylia*) Jatamasi (*Nardostachys grandiflor),* Panchanule (*Dactylorhiza hatagirea),* Bikhamoha (*Acontium bishma),* and Sisnu (*Urtica dioca).*

Fauna

The major species found in the study area are tiger (*Panther tigris tigris*), bear (*Selenarctos tibetanus*), Himalayan Ghoral (*Nemorhaedus hodgsonii*), Himalayan screw (*Naemorhedus sumatraenis*), and monkey(*Presbytis entellus*). Other species found in this VDC are Red panda (*Ailurus fulgens*), musk deer (*Moschus moscifernous*), Himalayan black bear (*Selenarctos tibetanus*), snow leopard (*Unic unica*), Jharal, and blue sheep (*Ovius anamon hodgosni*). The mammals like barking deer (*Muntiacus muntuik*) rhesus monkey (*Macaca mulata*), jackal (*Canis aureus*), squirrel (*Funanbulus sp*.), and Langur (*Macacca assamensis*), leopard (*Panther pardus*), and Dumsi (*Hystrix indica*)

are also found in the study area. Himalayan bear (*Selenarctos tibetanus*) and Sloth bear (*Melurus ursinus*) are found at higher altitude. Altogether 20 species of mammals are found. Out of that 13 species have been included in CITES categories under different Appendices. Similarly, fox (*Canis lupus*) and black bear (*Selenarctos tibetanus*) are under the vulnerable IUCN category and Thar (*Nemorhaedus sumatraensis*) is under the insufficiently known IUCN category.

Large attractive pheasant such as Himalayan Monal (*Lophophorus impejanious*) and crimson horned pheasant *(Trajatpan satyra*) are also found in the study area. Among the 32 species of bird recorded in the study area, eight species of birds are endangered and they need to protect.

The valley of Tamakoshi basin of Lamabagar VDC is important migratory route for birds that migrate from Koshi Tappu Wildlife Reserve (Ramsar site of Nepal) to Siberia and vice versa. The migration is popular during spring and autumn.

The study shows that the diversity of fish follows the common Nepalese pattern of progressively increasing towards downstream. The two species of fish i.e *Schizothorax richardsonni*, and S*chozothorax annandalei* are recorded. There is significant variation in the river morphology due to natural dam causing restriction of the migratory fishes from downstream near Gongar to Lamabagar. At present, the fish species found in the study area are not local species.

Livelihood

The major occupation of the people living in the study area is still subsistence agriculture. The other secondary sources of household income are trade and wage labour. Another important source of livelihood of local people is the biodiversity resources – both flora and fauna. A brief description of the use of flora and fauna used in sustaining the livelihood of the local people is given below.

Livelihood based on flora

Local people have been using various plants for fodder, firewood, food timber as well as for medicine. The plants like Uttis, Chilaune, Khashru, Phalat, Gobre Sall, Thingr Salla are abundantly and they use it for firewood and trading also. Majority of people use Chilaune for firewood, the plants like Dudhilo and Kutmer for fodder/forage, Allo (*Giradinia diversifolia*) for cloth making. The plant species used for various purposes are given in Table 2.

Table 2. Commonly used floral species by purposes

Purposes	Species
Fuel wood	Chilaune (*Schima wallichi*)
Fodder/ Forage	Utis *(Alnus nepalensis)* Mauwa *(Spicata,)* Nimaro (*Ficus sp.)* Dudhilo *(Neriifolia sp.)*, Kutmero (*Lyonia avalifolia)* Anjeri (*Rhus wallichii* Bhalayo (*Rhus wllichii Hook)*, Bikhma (*Acountium Dalmontum*), *Desmondum florvundum*, *Desmodium*, *Heterocarpan*, *Eurya acminate* and *Inula cappa*, *Erthring*, *Vaircrgate*, *Shorea robusta*, *Minapetalna* and qurecu and ficus Sughandhiwala (*Valeriana wallichii)* Dhupi pat (*Cryptomeria japonica*), Silajit (*Sphaltum rock exudata*), Jhau (*Lichens sp.*) Bhir Maha (*Begonia rubella Buch*) Ghobre Salla (*Pinus wallichiana*), Ban Karela(*Momordica charantia)*
Handmade paper	Lokta (*Dhaphane Bhauluwa*) and Argeli (*Sureil white skin, Edgeworthia gardenerii*)
Medicine	Chirito (*Sweritia chirayita*), Amala (*Phylllanthus emblica*), Laut Salla (*Taxus baccata*), Jhau (*Lichens sp.*) and Kurilo (*Asparagus racemosus spp.*)
Timber	Sal *(Shorea robusta)*, Dursul (*Terminalia alata*)
Religious purposes	Bhalayo (*Rhus succedanea*)
Food/fruits	Kaphal (*Myrica esculenta*), Katus (*Castanopsis indica*), Amala (*Phyllanthus emblica*), Tusa (*Bambusa arundinacea wild*), ,
Trade for cash	Amriso (*Thysosolaena maxima)* and Dry Allo *Fibre (Giradina diversifolia)* Chiraito (*Sweritia chirayita)*, Orchid (*Oreorchis prophyranthes*), Lokta (*Dhaphane Bhauluwa*), Argeli (*Sureil white skin, Edgeworthia gardenerii*), Jatamasi (*Nardostachys grandiflora*), Kutki (*Picrorhiza scrophulariflora)*

Source: Field Survey 2012

People in Lamabagar consider community forest as the major source of forest products both timber and Non Timber Forest Products (NTFP). Fuel wood is commonly used for cooking and heating space. The use of timber and NTFP at household level is discussed below.

Firewood and timber

Almost all households use firewood for cooking food and for preparing feed mainly *Kundo* for animals. The average firewood use per household is equivalent to 35 kg/ household/day. In annual basis, average consumption of firewood is equivalent to 62

bhari or 2500kg/household/year (Table 3). This amount is lightly higher than that reported from Lalitpur (i.e 2100kg/household/year) (Shrestha, 2009) and lower than that from the eastern Nepal (4290 kg/household/year) (Bajracharya, 1983).

Firewood is also collected for cash earning by selling firewood. The local people specially from Lamabagar, Gongar, Purano Jagat collect firewood from national forest and sell at the cost of NRs. 70 per bundle (*bhari* which is equivalent to 32.5 kg). In addition, there is demand of timber wood in the southern part of village. Households from Purano Jagat also sale timber from the forest to furniture industry and earns minimum of NRs. 37,500 per year and the average income at household level is NRs. 215 per year (Table 3).

Fodder and forage

Fodder plays an indirect role in livelihood of local people. It is collected by lopping the tree, shrubs, herbs and grasses. Among the recorded 88 species, most of species are used for fodder (Table 2). Local people use many plants for different purposes like ritual, thatching roofs, fiber, ornamental values. The result shows households consume nearly 21,600 kg/household/year fodder. Of the total fodder collected so far, large quantity of fodder is collected from community forest (53%) followed by private forest and cultivated land (34%) and remaining (13%) from national forest. The species like *Bauhma vahlii, Desmondum florvundum, Desmondum spp., heteroprcarpan spp., Eurya acminagte and Inula capa* have been used as animal forage.

Medicinal herbs

Formerly local people were more enact with use of biodiversity resources to cure diseases like Jundice, nostials problems, ecylipse**,** white skin diseases, ganorrea, sterile, diabetes, pressure, gyastroicpiles, cough, etc. Local people can easily distinguish edibles and non-edible plants like mushrooms, yam, etc. Many people are involved in collecting hers for marketing purposes.

Although a number of plants are used for healing ailments and illness, 34 important plants species are reported from the study area (DDC, 2001). Among them some medicinal plants like Charito (*Sweritia chirayita*), Amala (*Phylllanthus emblica*), Laut salla (*Taxus baccata*), Jhau (*Lichens*) and Kurilo (*Asparagus sp*) are exported to the south from the study area. It is reported that 24 different types of medicinal plants and their products are exported from the study area (DDC, 2001) and by which one person earns more than NRs. 22,500 per year. Informal discussions with local people

told that about a total of NRs.100, 000 business are held based on the herbs in the VDC. At present, the mediators used to come in the study area for collection of the herbs. The herbs like red mushroom **(***Trametes sanguine***),** Binaune, Bojho, Satuwa Gainu are sold at the price of Rs. 1500 per kg. The total income from the sale of Panchaule *(Dactylohi za htagirea)* and Yarsha Gomba(*Cordyceps sinensis*) in the VDC is nearly NRs. 400,000 (equivalent to US$ 4000) per year. These activities are taking place more in Lapchi village and its surrounding areas near boarder with China.

Allo Sisnu (*Giradina palmanuts*) has high medicinal value. People make powder from its leaves and consume it as a soup. Some people sell the powder in the local market. The price of powder is Rs. 300 per kg. The cloths from the *allo* are famous and sold in high price even in the Dolakha market at the price of Rs. 700 per piece. Nearly 60 per cent of total households in the study area are involved in collection of *Allo* and earn NRs. 20,000/household/ year. Such activity is not only confined in this VDC, it is common in the district as a whole. In Dolakha district, 113 medical remedies, derived from 58 species of plants to treat a wild range of aliments collected and used (Prasanna et al., 2003).

Lokta

There is one paper factory located in study area which uses Lokta as raw material. The factory is seasonal, generally operating for nine months of a year from March to November during which raw materials Lokta (*Daphne bholua*) are collected from nearby forests. The factory has employed 15 persons both skilled and unskilled male and women. The workers are paid wage of Rs. 300 per person per day. The factory has been operation since one decade and manufacturing process consumed lot of firewood. On an average this factory produces 150-200 tau (one tau equal almost 1.5 meter = 16 A4 size paper) in a week and a factory earns net profit of at least NRs. 450,000 per year. The paper factory has its market in Dolakha and Kathmandu valley.

Table 3 and Figure 2 shows of biodiversity resources used in the VDC both in quantity and monetary value. The average annual income for the whole VDC is estimated to be NRs. 304,452. Of the total annual income per household per year, nearly 22 percent is from floral species. In the total contribution of flora in the livelihood of the local people, nearly 60 percent is from medicinal herbs followed by 12 percent from fodder and 9 percent from forage. Firewood comprises only 8 percent in terms of monetary value though the quantity of firewood consumption is very high as compared

to other items from floral species. It is mainly due to the fact that the price of firewood is nominal in the study area.

Table 3. Use of floral species

S.N	Types	Quantity in kg/per household/year	Value in NRs.	Percentage
1	Fuel Wood	25000	5,384	7.95
2	Timber	Lump sum	215	0.31
3	Fodder	4,400	8,112	11.97
4	Forage	4,960	5,760	8.50
5	Medicinal Herbs	2.7	40,000	59.06
6	Lokta	4.3	2,150	3.17
7	Edible Foods	2.2	9,00	1.32
8	Non-timber Products	25	3,700	5.46
9	Aallo	1.85	1,500	2.21
	Total		67,721	100.00

Source: Field survey, 2012

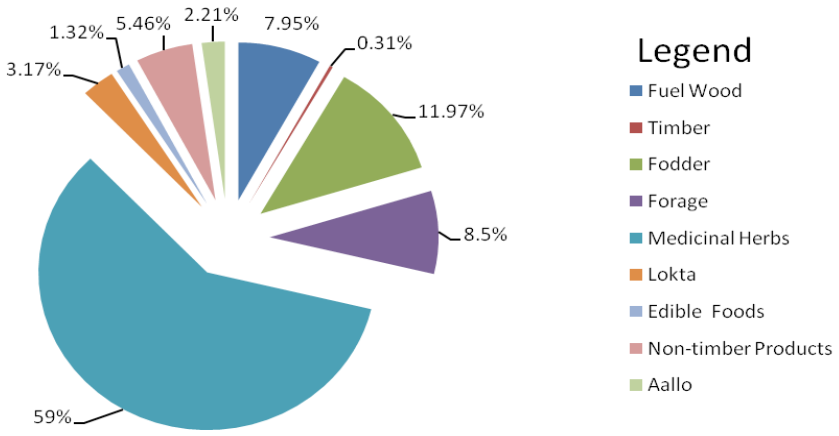

Figure 2. Percentage share of different items used for household consumption in monetary value

Livelihood based on fauna

Another important source of livelihood of the people living in the study area is fauna. The demand for wild meat is increasing. The traditional taboos in restricting the consumption of certain species of wild animals such as *Emorchaedus* hodgsonil and *Moschus chrysogatus hystik indica* are increasing being ignored and traditional resources management system is breaking down. Such changes are not unique to this study area, it is common in other areas too (Malnket and Trivedi, 2002).

Hunting and poaching/smuggling

Though hunting and poaching of wild animal is strictly prohibited by Wild Life Conservation Act 1972, but these activities are common in the study area. Wild animals are killed by using net (*paso)*, trapping and shooting. The other techniques used for killing wild animal are digging trap hold in known animal route (used for porcupine) and use of smoke in dens and nests. Dogs are also used to locate fresh dens of porcupines. People do not sell meat in the market due to legal restriction, however, they do hunt and sell them at the rate of NRs 1000-2000 per unit of Kaliz *(Himalayan screw)* in the local market. At least 20-30 persons are involved in such activities and generate income. The Himalayan Ghoral (*Emorhaedus hodgsonii*) is also killed illegally. Local people also use hides of wild animal like deer, bear and jackle as mattresses. The purpose of hunting and poaching of faunal species is given in Table 4.

Table 4. Use of wildlife

Purposes	Faunal species
Meat	Ghoral (*Emorhaedus hodgsonii*), Mirga/Black musk Deer (*Mosc hus focus*), Jharal (*Moscchus cysoganterhr*), Red panda (*Ailurus fulgenus*) Himalayan Screw (*Naemorhedus goral*), Kasturi/Himalayan Musk deer (*Moschus chrysogastes*), Porcupine (*hystix indica*)
Skin /Bone	Bengal Tiger (*Penthera tigris tigris*)
Medicine	Golden Jackle (*Canis aureous*), snow leopard (*Unica unica*), porcupine *(Hystix indica*), frog, honey bees

Source : Field Survey, 2012.

Livestock and crop loss by wild predators

Wildlife has positive and negative role in livelihood. Positive aspect is the use of wild animal for meat and leather for shoes, meat consumption and income through its

marketing. The negative aspect is the loss of livestock and crops predation from wild animals.

Livestock are more threat to wild predicators in the study area. The main predators are leopard, wildcat, jackal, common mongoose and yellow-throated marten. During the FGD, it was reported that around 15 domestic animals are killed by wild animals each year. Assamese Monkey (*Macaca assamensis*), porcupine (*Hystix indica*) and barking deer**,** Himalan screw are the main animals and birds damaging crops in the study area. The maize, wheat and potatoes are major crops damaged by these animals. In total half of the crops is damaged by wild animal each year. According to the local estimate monkey and deer damage 15 per cent of total damage. Similarly, by Kalij, jackl, porcupine and wolf damages around 75 percent crop of total damage. Major crops damaged by animals were maize (55%), millet (15%), and paddy (10%) and rest potatoes, wheat, vegetables etc. Altogether around 100 households lose their crops from wild predators'.

The fishing in the area is religiously prohibited as most of them follow Buddhist religion. However, some of them fish during night. The livelihood from the fishing is almost negligible in study area, However, it is some sort of cash income to people follow Hindu religion. The local people fish about 2 kg per year, which is equivalent to Rs. 500 per household.

Threat to biodiversity and livelihood

The development intervention has risen within the last three decades in the study area. The road from Charikot to Singati(1986/87), and further extension of road up to Lamabagar in 2009 is threatening the biodiversity of the area. In total stretch of road from Singati to Lamabagar (36.5km), 50% road length (18km) lies in forest area. During construction the total of 8420 trees with equivalent to 2380 cubic meter of timber volume were lost. (NEA, 2006). The road has widened the existing valley of Gongar more than 20 meter. The other major development activities are: widening of road construction up to Lamabagar and further development towards boarder village. Similarly, the biodiversity resources are likely to be depleted and degradation due to development of infrastructure such as proposed hydroelectricity projects at Lapche. Moreover, the system of systematic and effective management of biodiversity resources at VDC level has yet to be developed.

Conclusion

The people of Lamabagr VDC have adopted subsistence agriculture system and small proportion of non–agricultural activities to support their livelihood. As VDC is composed of only 1.3 per cent cultivated land, the majority of them are maintaining their livelihood through using biodiversity resources. Biodiversity resources contributed 22.17% of the total household revenue. However, the number of biodiversity resources (flora and fauna) which were recorded to 244 species of plants, 20 species of mammals are in threatened stage. The increasing number of people and their pressure on existing biodiversity resource and rising number of infrastructure development activities is also responsible for decreasing the biodiversity. Therefore, the situation would degrade if the present system of development activities unabated and livelihood of local people remain as it is. Therefore, the government must come up with appropriate policy to address the existing biodiversity conservation and livelihood of local people.

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Humanistic Geography: How it blends with human geography through methodology

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Humanistic geography is a genre of geography born in late 1960s. A series of theories came out which criticize the knowledge system of logical positivism. The philosophical fundaments of humanistic geography are existentialism and phenomenology. Yi-fu Tuan, Edward Relph, Anne Buttimer, David Ley, Marvyn Samuels and Nicholas Entrikin are the leaders of humanistic geography. Yi-fu Tuan published the first article about humanistic geography, which was collected in *Human Geography* (1976). The focus of humanistic geography is on people and their condition. However, in different geographic traditions, humanistic geography is often criticized for its weak methodology. I argue humanistic philosophy, can provide a sound epistemologicalframework in which to organize and strengthen this methodology in human geography research. The topics of geographical knowledge, territory and place, crowding and privacy, livelihood and economics, and religion are briefly noted from the humanistic perspective. The basic approach to these topics is by way of human experience, knowledge, and awareness. The application of this approach is emerging in the Nepalese context, however for long time Nepalese geographers followed the Western Eurocentric view and appear to be content in following western notions and ignored understanding our own social and cultural aspects/landscapes that enrich our knowledge of geography. The researcher claims that there is a need to rethink our research practices towards better understanding of the world with austerity of philosophical and methodological consistency.

Keywords: Humanistic approach; methodology; epistemology; ontology; sense of place; landscape

Introduction

Humanistic geography reflects upon geographical phenomena with the ultimate purpose of achieving a better understanding of man and his condition (Tuan, 1976). It belongs with the humanities and the social sciences to the extent that they all share the hope of providing an accurate picture of the human world. What is the nature of the human world? The humanities gain insight into it by focusing on what man does supremely well in the arts and in logical thought. The social sciences acquire knowledge of the human world by examining social institutions, which can be viewed both as examples of human inventiveness and as forces limiting the free activity of individuals. Humanistic geography achieves an understanding of the human world by studying people's relations with nature, their geographical behavior as well as their feelings and ideas in regard to space and place (Tuan, 1976). Relations with nature and geographical behavior are, however, also the concern of other geographers. For example, a physical geographer examines the biophysical environment and a regional analyst studies the "laws of spatial interaction." What can the humanist geographer contribute? The question presupposes that we know the meaning of humanism and of the humanistic perspective.

For geography, the 1960s was a decade of methodological innovation and development. Quantification and the evolution of 'spatial science' required a better of new techniques whose development was only tacitly attributed to an underlying philosophy of Comte or logical positivism. However, by 1973, David Harvey had carefully distinguished social and moral philosophy from the philosophy of science; and now the eager recipient of a wide range of philosophical innovations.

The humanist approach in geography developed as a criticism against positivism and quantitative revolution in geography (Ley & Samuels, 1978). It developed as a result of dissatisfaction with the mechanistic models of spatial science developed during the quantitative revolution. The basic objection of humanists against quantitative revolution is that its tools and assumptions do not adequately explain the human world and human issues, especially those relating to social institutions, attitudes, morals, customs, traditions and aesthetics. These concerns have framed the emergence of geography's 'new humanism' and it most obvious weaknesses is methodological. It is therefore in response to Johnston's largely unanswered changes of 'much preaching and little practice' (Johnston, 1979, p. 138) and then discussed on contemporary research ideas in a phenomenological or existential vine. It addresses the two most popular humanistic philosophies which rely in practice on observational and experimental strategies. Since its inception, humanistic geography has often been contested as a "real" discipline.

Sometimes used interchangeably with the concept of humanism because of its focus on the human in all its forms (e.g., agency, awareness, consciousness, creativity, etc.), humanistic geography focuses on products of human activity. Humanistic geography[1] can also be seen as a way to understand those events considered valuable and meaningful to humans. Although usually seen as a specifically human geography pursuit, as aphilosopher, author, and geographer Yi-Fu Tuan alludes, it can also play a role in physical geography. This new physical geography critique notwithstanding, humanistic geography is usually historically equated with the French School of Human Geography such as the writings by Paul Vidal *de la* Blache along with Neo-Kantianism and Robert E. Park's Chicago School pragmatism, while also focusing on the sense of place and the individual's interpretation of place although "people" and "humans" also collectively fall under its umbrella.

Humanistic geography is a conceptual perspective which claiming that a comprehensive understanding of human-environment relationships must consider individual and group experiences and meanings of space[2], place[3], landscape[4], region[5], mobility, and related geographic phenomena (Johnston, 1979).The basic feature of humanistic approaches is their focus on man as a thinking being, as a human, rather than as a dehumanised responder to stimuli in some mechanical way, which is how some feel the man is presented in the positivist and structuralist social sciences (Johnston, 1984). Partly propelled by 1960s research in behavioural geography and environmental perception, humanistic geography incorporated a wide range of philosophical approaches that included phenomenology, existentialism, idealism,pragmatism, grounded theory, and symbolic interactionism (Ley & Samuels, 1978). In the meantime it is also a claim for human geography with the human being at its very centre, a people's geography and about the real people for the people's development as human being for all.

One of the first geographers to attract a wide audience with his advocacy of a humanistic approach was Kirk in 1951. But, it was Yi-Fu Tuan (1976) who powerfully argued for humanistic geography. He defined the approach to the geographic study of human beings'experiences and understandings of space, place, and the natural world. Other geographers most commonly associated with humanistic geography in the early days included Edmunds Bunkse, Anne Buttimer, James Duncan, J. Nicholas Entrikin, David Ley, David Lowenthal, Douglas C. D. Pocock, J. Douglas Porteous, Edward Relph, Graham Rowles, Robert David Sack, Marwyn Samuels, David Seamon, and John Western (Pocock, 1983). In fact, humanistic geography is a perspective that discloses the complexity and ambiguity of relations between man and environment or people and place. Consequently, humanistic geography achieves an understanding of the human

world by studying people's relation with nature, their behaviour as well as their feelings and ideas in regard to space and place.

Ley and Samuels (1978, p. 50) identify three building blocks of humanistic geography as anthropocentrism, inter-subjectivity, and the concept of place. This viewposits that requires acquires the acquisition of knowledge is an experimental process and it demands that there are no essences or absolutes existing independently of the observer. Therefore, it implies that the only authentic means of appreciation the world is through direct confrontation with it.

The main aim of this paper is to make a discourse on humanistic methods on contemporary human/social geography. For this purpose, I have reviewed a number of literature on humanistic approach, humanism, humanistic geography, and related philosophical debates and discourses on humanistic geography and its methodology used in the contemporary disciplinary practice of geography.

Humanistic geography and the sense of place

In geographical term sense of place is an individual awareness of the 'spirit' or identity of place. It may be related to physical properties (landscape, urban history), to practical layout and organization (traffic links, location of services), social relations (family, friends) and roots (personal history at this location)[6]. Because it focuses on the individual as well as people in general, sense of place lies at the heart of humanistic geography. Gaining an understanding of how people interact with their environment (physical and cultural), represents a powerful tool in the humanistic geography arsenal. Indeed, of all humanistic geography traits, discovering your ownor another person's or other people'ssense of place remain paramount. Sense of place studies often incorporate behavioural geography and environmental perception in their endeavours. However, these subfields are only tools for exploring the vast literature available relating to sense of place. Owing to its focus on humanistic geography, most of the bibliographies included in this section come from geography as a discipline. Sense of place, however, has strong ties to history, philosophy, psychology, sociology, landscape studies, and anthropology. Although these fields may not openly call their works "humanistic geography," these can and do incorporate and utilise many of its core tenets; the chief among them being an individual's perspective. For example, Edward S. Casey, a philosopher, completeda massive project (Casey, 2009) that attempted in three volumes to re-conceptualize evolving connections among space, place, and individuals, demonstrating the immense power even the concept of place can have. On the otherhand, Cresswell (2004) offers

readers a concise introduction to the concept of place, utilising many excerpts from leading scholars of place related research, with the majority coming from the discipline of geography, whereas Feld and Basso (1996) offers a very good representation of humanistic geography elements as portrayed from outside the discipline. J. B. Jackson (1995) is perhaps the forefather of modern landscape studies thought and practice and is responsible for bringing the individual experience and sense of place to the masses with highly readable topics and accessible themes. Malpas (1999) acknowledges place as a considerably multifaceted structure but one that is cohesive, fused together with other components that surround and/or help to create place: space, time, subjectivity, and objectivity. Tuan (1991) takes a different route, provocatively discussing how language can lead to experiencing a greater sense of place, and the earlier Tuan (1974) entertains the idea that our surroundings and ethics are important in helping us to understand our own place.

Conceptual and methodological themes of humanistic approach

Humanistic geography is a perspective which emerged in a particular intellectual context as a reaction to a human geography that had been reduced to the abstract study of space and structures. As such the humanistic perspective has revived earlier geographic traditions which treated human values and intentionality more seriously. It has fortified such traditions by giving them a more critical and philosophically and theoretically informed orientation. The aim is to integrate the humanities and the social sciences building upon the empirical and literary strengths of Vidal de la Blache and Sauer's geography to the scholarship of social theory and the philosophy of science, as well as to the historical context of an advanced and urbanized industrial society.

Major priorities within this work include firstly a more penetrating analysis of culture itself, and particularly the dominant culture of our times, the culture of consumption. The lack of theoretical treatment of consumption in geography has been as notable as the over commitment to theories of production, but there are now several useful starting points in social science for the development of a geography of consumption (Hirsch, 1977; Diggins, 1977; Leiss, 1978). Secondly, associated with this is the greater attention to the semiotics of landscape, the interactions between place, identity, and social context (Godkin, 1977; Duncan, 1978; Rubin, 1979; Harvey, 1979). Thirdly, the need to clarify the place and nature theories of power within a humanistic perspective and this is a major problem within social theory and is unlikely to be easily resolved within human geography. To date, much of the humanistic writing has followed an implicit Weberian line, akin to the managerial position in urban geography which

stresses the role of institutional (especially government) decision-makers (Saunders, 1979; Ley, 1980). These connections need to be examined more explicitly, and it is likely that they will be joined by alternative materialist positions centered about the views of culture and society found in the eclectic writings of Raymond Williams (1977) and E.P. Thompson (1978).

Scientific approaches like positivism, empiricism, and quantification tend to minimize the role of human awareness and knowledge. Humanistic geography, by contrast, especially tries to understand how geographical activities and phenomena reveal the quality of human awareness. Humanistic geography does not consider the human being as an 'economic man. In this regards, the profounder of humanistic geography, Yi- Fu-Tuan (1976) explored five themes of general interest to geographers, namely: (i) geographical knowledge (personal geographies), (ii) territory and place, (iii) crowding and privacy, (iv) livelihood and economics, and (v) religion. However, broadly, one can identify four central conceptual and methodological themes relating to humanistic geography as it developed:

i. Humanistic geographers understood human life and experience to be a dynamic, multivalent structure that incorporates bodily, sensory, emotional, attitudinal, cognitive, and transpersonal dimensions. Humanistic researchers argued that a comprehensive human geography must describe these many dimensions; understand what they contribute to the environmental experience, action, and meaning; and seek out integrated frameworks identifying how these many dimensions relate and interact in supportive and undermining ways. For example, Edward Relph (1976) delineated a spectrum of spatial experience that ranged from the instinctive, bodily, and immediate; to the cerebral, ideal, and intangible. He probed how the experience of space differs from the experience of place and contended that space becomes a place when it gathers human meanings, actions, and identity environmentally and temporally. Similarly, Tuan (1974) delineated a conceptual structure of environmental attitudes and values by consolidating similarities and differences in the ways that human beings respond to their geographical worlds physiologically, psychologically, socially, and culturally. He concluded that every person is, simultaneously a biological being, a social being, and a unique individual. He demonstrated how environmental perceptions, attitudes, and values arise from and contribute to all three aspects of human being.

ii. Humanistic geographers emphasized that much of human experience is opaque, ineffable, or beyond taken-for-granted awareness. To identify and describe these less

accessible aspects of human life, humanistic geographers largely turned away from the conventional scientific method that required tangible, measurable phenomena explicated and correlated mathematically and statistically. Instead, humanistic geographers turned toward ontological perspectives that accepted a much wider range of experience and presence. They drew on epistemological perspectives[7] that sought to be open to phenomena and to accept all aspects of their constitution. The aim was an empathetic, wider-ranging mode of discovery whereby the phenomenon was given time and space to present itself. The emphasis was on "methodologies of engagement" that allowed researchers to encounter and understand the worlds and experiences of their subjects carefully, accurately, and comprehensively. In working toward a more intimate encounter with the phenomenon under study, some humanistic geographers used directed intuition and self-reflective explication; others carefully studied real-world situations, for example, a specific urban neighborhood or a small number of individuals asked to describe their environmental experiences and actions as accurately and as thoroughly as possible.

iii. Many humanistic geographers argued that, as much as possible, the evidence, general principles, and understandings of humanistic geography should arise from self-knowledge grounded in researchers' firsthand experiences. Research should work toward a forthright engagement with the experiences of others, whether those "others" are people, places, landscapes, elements of nature, aspects of the human-made environment, or other sentient beings. Humanistic geographers called into question conventional empirical research that defined the topic of research in objectivist fashion as a thing or situation separate from and unrelated to the life or experience of the researcher. Humanistic geographers argued that, by understanding the significance of environmental and geographical experiences in their own lives, individuals might act more responsibly and generously toward other human beings and toward the places and environments that one inhabits or knows (Tuan, 1976). In this regard, Edward Relph (1981) advocated for an environmental humility - a way of engaging with the world whereby things, places, landscapes, people, and other living beings are all respected just for being what they are and, therefore, are thoughtfully cared for and intentionally protected.

iv. Broadly, humanistic geographers grounded their work in two complementary research models, the first of which can be identified as explications of experience; and the second, as interpretations of social worlds. Explications of experience were most often associated with "place studies" and represented by such geographers as

Anne Buttimer, Douglas C. D. Pocock, Edward Relph, David Seamon, and Yi-Fu Tuan.

Much of the above mentioned work was grounded in phenomenology and, for its place interpretations, drew on a wide range of descriptive sources that included first-person experience, philosophical argument, archival reports, accounts from imaginative literature, and experiential evidence from photography, film, and other artistic media. Typically, this work emphasized lived commonalities in relation to environmental and place experience, though these humanistic researchers also asked how those commonalities varied in terms of individual and group differences. In the 1980s and 1990s, this work wascriticized as essentialist - claiming generalizable, universal structures such as "place" and "home" and largely ignoring lived variations grounded in social, cultural, and historical factors (Cresswell, 2013).

The second research model for humanistic geography - interpretations of social worlds - as represented by the work of such geographers as James Duncan, David Ley, Marwyn Samuels, Susan Smith, Graham Rowles, and John Western. This work incorporated a wider range of philosophical traditions than experiential explication and included pragmatism, grounded theory, symbolic interactionism, post-structuralism, and Marxist perspectives. Typically, this research was grounded empirically in a specific place or social situation -for example, David Ley's work on inner-city subcultures, housing, and gentrification; John Western's documentation of the impact of apartheid on Cape Town, South Africa; or Graham Rowles's research on the everyday environmental and place experiences of American elderly populations. These researchers interpreted place and related geographical phenomena as a "social construction" arising from purposeful actions of people-in-place. Place was interpreted as a negotiated reality via which people facilitated places, which in turn facilitated the lives of people associated with those places. In the 1980s and 1990s, this "social-constructionist" approach to place became one significant bridge to post-structuralist thinking and the "new cultural geography" (Adams, Hoelscher, & Till, 2001; Cloke, Philo, & Sadler, 1991).

Therefore, methodologically, the emphasis on subjectivity leads humanism to be more qualitative and intuitive than either positivism or structuralism. But subjective meanings are interpreted as logically and as rigorously as possible (Subedi, 1993). Generalization is analytic induction and historical reconstruction, based on methods that are eclectic and largely personally selected. Data may be macro and micro but a focus on the community is reflected in an analytical concern with the meso or intermediate level.

To improve understanding and interpretation a range of sources from archival records through field work or oral history and personal testimony is utilized (Subedi, 1993).

In humanistic geography, as discussed above, central importance is given to the actor's (man's) definition and behavior for examining the social world. The researcher needs to discover the actor's definition of the situation, namely, his or her perception and interpretation of reality and how these relate to behavior. A succinct example of this research in Nepal is that of Subedi (1993) where he interprets forms and meanings of territorial mobility in a rural context of Nepal. In other words, the researcher must be able to see the world as the actor sees it.

Methodological strengths of humanistic approach

Several years ago David Harvey maintained that it was absolutely vital for any serious investigation into "explanation in geography" to distinguish between philosophy and methodology (Harvey, 1969). The philosophy engages into the issues of belief, so he argued, while methodology dealt strictly with logical procedures; and that methodology, did not necessarily entail, philosophy. That argument, itself a philosophical position derived of logical positivism, has no salience in a humanistic epistemology. On the contrary, even as one may distinguish between the "how" and "why" of inquiry, the central methodological demand of a humanistic geography is to assure the coincidence of method and philosophy. The "means" of analysis, in short, are intimately tied to the "meaning of analysis." Methodology is but a further, if sometimes more specialized, branch of epistemology.

Most if not all of the early complaints leveled against positivist geographies on the part of humanists have been aimed to decry the inappropriateness of certain methods, especially that of quantitative reductionism. In fact, one can argue that positivist methods are appropriate to a thoroughly positivist philosophy of man but that an alternative view of the human condition requires its own method. Phrased differently, a humanistic geography requires an appropriate methodology. The question remains, however, Just what sort of methodology could fulfill the manifold epistemic demands of humanism? In one sense, of course, a humanistic methodology intends the rejection of abstract, statistical, and aggregate measures of the human subject, emphasizing instead a more particularistic, concrete, or highly empirical mode of inquiry. Empiricism and often radical empiricism are hallmarks of an approach that demands greater attention to the subjective roots of man's place, to the insider's perception. Methodologies appropriate for such research are particularly methodologies of encounter, requiring field work; these

would include observation, participant observation, the use of unobtrusive indicators, and various forms of interviewing (Lofland, 1971). Each of these is a method designed to maintain rather than eliminate the richness and variety of experience. They have been challenged on occasion as being overly subjective, though it is not apparent why a method retaining the diversity of real world places should be more subjective than research referred to sterile or abstracted settings with an impoverished conceptualization of experience. Too much social science research conducted under idealized or laboratory conditions with pretensions of precision can be little more than speculative. In such work subjectivity is not banished, as is claimed, but rather it is the often unrecognized subjectivity of the theorist that is projected into the research design and the research results, in place of the humanist's quest for the subjectivity of the actor in the social world. Alfred Schutz has commented eloquently on the fallacy of social research abstracted from its proper contexts, which "consists in the substitution of a fictional world for social reality by promulgating methodological principles as appropriate for the social sciences which, though proved true in other fields, prove a failure in the realm of inter-subjectivity" (Schutz, 1970).

But field work is only a first step in a humanistic method, to be followed by reflection - interpretation and understanding. The method of verstehen is usually conceived of as the attempt to recapture the subjective meanings of experiences and situations; but, as Weber himself asserted, understanding must go beyond a narrow definition of verstehen to consider the broader contexts within which actions unfold. Useful here is the notion of several levels of meaning to a cultural act, acts that might well, of course, include the construction of landscapes. Most superficially there is the objective or functional meaning of an action; secondly, its expressive meaning, that intended by the actor; and, thirdly, the documentary meaning, that reflective of the broader currents of the time and the place (Mannheim, 1952). The documentary meaning reveals influences and contexts beyond the actor himself, indeed, commonly contexts of which he is unaware despite their impact upon him (Schutz, 1970). For a full interpretation, an understanding of these influences is necessary. The researcher cannot rest content with the actors' own definition of their situation but must immerse himself in a place and a time to uncover the relevant factors at work. For this purpose, a variety of other sources may be consulted, including archival material, literary works, government and other organizational documents, and even statistical data. Whenever direct field contact with a problem is limited, as with historical research, or where access is restricted, as it might be in an investigation of organizations, then interpretation and understanding must rely more heavily on such sources.

Humanistic geography, especially tries to understand how geographical activities and phenomena reveal the quality of human awareness.The methodology of humanists is characterized by a self-conscious drive to connect with that special body of knowledge, reflection and substance about human experience and human expression, about what it means to be a human being on this earth, namely, the humanities. Similarly, its methods are essentially those of literary criticism, aesthetics and art history. It is essentially based on hermeneutics (the theory of interpretation and clarification of meanings). Its interest is the recovery of place and the iconography (the description and interpretation of landscape to disclose their symbolic meanings), of the landscape. In other words, the interpretation of the landscape as a carrier and repository of symbolic meaning, widening the traditional definitions of iconography the study, description, cataloguing and collective representation of portraiture as revealing of the prevailing aesthetic of an age to include the landscape specifically.

Finally, methodology in humanistic geography lays emphasis on participant observation, interviewing, focus groups discussion, filmed approaches and logical inferences, rather than statistical and quantitative techniques for establishing a correlation between people and place (environment). It is also a philosophy which seeks to disclose the world as it shows before the scientific inquiry, as that which is pre-given and presupposed by the sciences. Humanists argue that 'objectification' is never the simple exercise which conventional forms of science assume them to be.

Criticisms of humanistic geography

Humanistic geography thereby, its approach has, however, been criticized on more than one grounds as below. Beginning in the 1980s, humanistic research faced increasing criticism from quantitative analytic geographers, on the one hand; and Marxist, feminist, and post-structural geographers, on the other hand (Cloke, Philo, & Sadler, 1991; Cresswell, 2013).

Quantitative geographers largely criticized humanistic work in relation to research method. In turning away from deductive theory, pre-defined concepts, and measurable validation, how could humanistic geographers be certain that their interpretive conclusions were accurate, comprehensive, and trustworthy? In response, humanistic geographers emphasized that their approach was generally inductive in that it drew on the richness and complexity of human situations and events to locate generalizable descriptions and theories. Humanistic geographers pointed out that the conclusions of any humanistic study were no more or no less than interpretive

possibilities open to the public scrutiny of other interested parties. Theyemphasized that their interpretive sources were wide-ranging and included field notes, focus groups, autobiographical descriptions, accounts from participant-observation, and material texts like photographs, films, buildings, landscapes, imaginative literature, and archival documents. One methodological device used by humanistic geographers to better assure accuracy and trustworthiness was triangulation, whereby researcher drew on multiple modes of evidence gathering methods to identify different lived perspectives and to corroborate different information sources.

The criticisms of feminist, Marxist, and post-structural geographers emphasized conceptual, ideological, and ethical concerns. Feminist geographers claimed that humanistic research was essentialist in uncritically assuming an unchanging, universal human condition that ignored individual and group diversity, including gender, social, cultural, and economic differences. These feminist geographers argued that humanistic work was authoritative in that it appeared to privilege the interpretive powers of scholarly experts who arbitrarily claimed the status to identify and describe the geographical situations of "more ordinary" people. Feminist critics contended that humanistic work presupposed an implicit masculinist bias that assumed academically trained men (mostly) could understand all others' situations; for example, the experiences of women, the less able, gays and lesbians, ethnic and racial communities, and so forth. Marxist geographers criticized humanistic geography because they saw it as voluntarist in that it uncritically interpreted social life as a function of intentional, willed plans and actions of individuals. The Marxist claim was that humanistic thinking gave too much weight to the autonomous human agency at the expense of entrenched, transparent social structures and power relations. Marxist critics pointed out that humanistic geographers gave little attention to the underlying economic and political dynamics shaping places and peoples' everyday lives.

Humanistic geographers responded to the essentialist, authoritative, and masculinist charges by arguing that, in fact, humanistic work recognized human differences and sought conceptual and methodological ways for thoroughly engaging with the uniqueness of individuals and groups. They pointed to studies that used participant-observation and other qualitative methods to understand particular geographical situations. For example, David Ley's work on of how African-Americans negotiated their lives in the place context of Philadelphia's inner city. In regard to the Marxist charge that they neglected the role of societal structures in constraining human freedom, humanistic geographers responded that their perspective could examine phenomena such as power, exclusion, resistance, and conflict, though little work was done in this direction, partly

perhaps because most humanistic geographers instinctively favored freedom, creativity, and personal and group autonomy. Humanistic geographers accepted the Marxist claim that structural conditions are critical for understanding human action but, equally important, they argued, was the role of peoples' values, beliefs, worldviews, intentions, and taken-for-granted ways of coping with the world. Humanistic geographers focusing on interpretations of social worlds probed the structural constraints of places and social worlds directly but gave equal weight to human agents' being aware of and being able to change their life ways in relation to limiting social and economic structures.

Post-structural geographers questioned humanistic work in yet other ways. Some post-structural critics claimed that humanistic geographers ethically favored place, insideness, and rootedness over non-place, outsideness, and mobility; place itself was assumed to be centered, static, bounded, and exclusionary. Instead, post-structural critics spoke of a "progressive sense of place" and focused on how places relate and respond to their wider social and environmental contexts. For these critics, places held their importance geographically, but the crucial theoretical and practical aim was finding ways whereby places could better incorporate diversity and partake in constructive interconnections and exchanges with other places. Another group of post-structural critics questioned whether "place" even existed in the postmodern world, claiming that real world places were becoming marginal and obsolete because of trends toward globalization, non-places, and hyperspace. Some post-structural critics went so far as to suggest that, in our proliferating 'hyper-real' world of digital environments and virtual realities, the lived distinctions between 'real' and 'imagined' places should be critically called into question. These critics challenged the rigid, unchanging stasis of physical places and environments that they claimed humanistic accounts encompassed. These critics spoke instead of provisional, shifting connections and flows among people, spaces, places, nation-states, information, worldviews, and digital representations. Key themes were mobility, flux, hybridity, relativity, relationality, discontinuities, rhizomes, assemblages, hyper-worlds, virtual places, and smooth and striated spaces.

Humanistic geographers responded to these post-structural criticisms by suggesting that, even as globalization eroded some places, it strengthened other places and contributed to new kinds of places. Humanistic geographers pointed out that, even with the growing importance of digital communication, hyperspace, and virtual realities, real places retain their importance because people are bodily beings who always unavoidably live a life in some physical place. This inescapable embodiment-in-place was often ignored by the post-structural critics who aimed for a more progressive sense of place grounded in a dynamic, ever-shifting network of intertwined, porous places.

Humanistic geographers contended that a good portion of such dynamic exchange remains grounded in the habitual regularity of emplaced bodies. Humanistic geographers also emphasized that any dynamic interchange among places presupposes a robust integrity of each place itself; this robust integrity is at least partly founded in the habitual regularity of lived bodies inescapably bound to a physical place (Seamon, 2013).

Humanistic geography at the turn of the new millennium

Though humanistic geography as an explicit subfield largely disappeared by the early 1990s, interest in humanistic themes continued inside and outside the discipline, particularly on the part of phenomenological philosophers concerned with the phenomenon of place. Humanistic geographers' interpretations of place in the 1970s were largely subjectivist in that place was understood as a cognitive or affective representation inside the human being and ontologically separate from the objective environment outside. As phenomenological philosophers Edward (2009) and Jeff Malpas (1999) probed the topic in the 1990s and 2000s, they argued that place is a primary ontological structure that encompasses both human experience and the physical world in which that experience unfolds. This argument that human being is always human-being-in-place highlighted an important new way of geographical thinking because it claimed that place is necessarily an integral, inescapable contributor to human existence and life. This understanding meant that places are not material environments existentially apart from the people associated with them but, rather, the holistic unit of human-beings-experiencing place.

Prominent geographers, Anne Buttimer's "Sustainable Landscapes and Lifeways" (2001); Robert David Sack's "A Geographical Guide to the Real and the Good" (2003); Edmunds Valdemars Bunkse's "Geography and the Art of Life" (2004); and Yi-Fu Tuan's "Humanistic Geography" (2012) were the milestone of the development of humanistic approaches in geography. Sometimes called lived emplacement or embodied place, this phenomenon was understood to be complex, dynamic, and incorporating generative processes via which a place and its experiences and meanings shift or remain the same (Seamon, 2013).

Partly because of Casey and Malpas's writings, researchers inside and outside geography brought renewed scholarly attention to the lived qualities of place and to other topics associated with the humanistic tradition. For example, geographers Soren Larsen & Jay Johnson (2012) worked to link a place-grounded ontology[8] with affinity

politics, and geographer Sara Johansson (2013) developed a method of "rhythm analysis" to understand how the "lived body" encompasses and is encompassed by the urban environment as experienced. Echoing earlier claims on lived embodiment by French phenomenologist Maurice Merleau-Ponty, Johansson argued that the bodily dimensions of environmental experience are as meaningful and as important in understanding the place as environmental cognition and intellectual geographic knowledge.

We also find a continuing body of work involving a humanistic approach to geographical and environmental topics in research by non-geographers. One example is philosopher Ingrid Stefanovic's efforts toward a phenomenology of sustainability via an examination of how place and lived emplacement provide a foothold for grounding environmental responsibilities and actions in relation to particular individuals, groups, and localities (Stefanovic, 2000). A second example is the research of literary scholar Anna Westerståhl Stenport, who drew largely on Swedish writer August Strindberg's works relating to Paris and Stockholm to examine how the nineteenth-century city shaped imaginative literature and how, in turn, that literature shaped perceptions of the nineteenth-century city (Stenport, 2004). A third example is ethnographer Urzula Woźniak's (2009) examination of at homeness and placelessness in the context of current global migration. Drawing on Ukrainian, Turkish, and Vietnamese examples, she used the concept of community attachment to understand the contrasting degree of identification that different immigrant groups feel for their place of relocation; she demonstrated how mental associations with immigrants' original home place play a significant role in their understanding of and feelings toward their new place of residence.

These studies exemplify a new generation of researchers who are interested in such humanistic topics as place experience, at homeness, community involvement and identity, out-of-place-ness, environmental personhood, lived emplacement, mobility and place, supportive or undermining processes shaping place, and the lived similarities and differences between real places and virtual places (Seamon, 2013). All these works remain grounded in a central humanistic aim as to bring "human beings in all of their complexity to the center-stage of human geography" (Cloke, Philo, & Sadler, 1991, p. 58).

Most generally, however, the perspective of humanistic geography largely fell from sight or metamorphosed into the "new cultural geography" molded from poststructuralist, feminist, and critical perspectives. In this regard, many human geographers shifted their attention to the cutting-edge work of philosophers Michel Foucault, Jacques Derrida, Gilles Deleuze, Félix Guattari, Bruno Latour, and another poststructuralist, critical, and relationalist theorists (Cresswell, 2013). One example of

how humanistic themes shifted in the new millennium is Textures of Place (Adams, Hoelscher, & Till, 2001) an edited collection dedicated to Yi-Fu Tuan and the humanistic tradition. Overall, the volume's twenty-seven chapters demonstrated how an engagement with critical social theory worked to transform earlier humanistic understandings of place, environmental experience, and geographical meaning. The editors of the volume called for a reconsideration of humanistic geography in the context of "revised assumptions about human subjectivity, the transparency of language, and the use of descriptive categories based upon Western traditions of understanding"(Adams, Hoelscher, & Till, 2001, p. xvii).

New direction in humanistic geography

Following humanistic geography's turnand even during the turna variety of up-and-coming research agendas continue to arise, all centered on how human actions take place, how humans practice and interact with their place in space, and how humans move and interpret their place in space. These endeavors encompass psychoanalytic theory, performativity, feminist theory, space-time convergence, and increased interaction between physical and human geography, with specific attention paid to the individual's role in influencing his or her perception of place in the physical landscape. Of these, performativity and feminist theory have been extremely influential, although an often veiled attempt has been made in the humanistic physical geography realm. On humanistic geography's future, perhaps Massey (2005) conveys the most comprehensive approach, tackling epistemological and ontological issues related to space, place, and people in a fairly straightforward, but often heady, manner, such as explaining that space is time and space is place and further arguing that space is foundational to every person's well-being. Although Pile (1996) uses the city as its stage and evaluates the role that psychoanalysis plays in a person's creation of space, it also uses ethnography as a way in which to portray how researchers might better understand individual behavior in regard to place and space creation. In a series of essays spanning roughly a decade, (Harvey, 1979) suggests that the cyborg, as an entity, exists beyond gender and that this line of thinking may create huge opportunities for women by breaking away from traditional dialectic/dualistic models, whereas Buttler(1990) outlines the social norms and ideas surrounding gender differences, expanding theoretical underpinnings of feminist geography (and feminist theory in general). Meanwhile, Allen (2011) uses actor-network-theory to advocate for bridging the human–physical geography divides through individual interpretation of a given landscape, noting the inherent connections already available between the physical and human landscapes.

Finally, the humanistic geography achieves an understanding of the human world by studying people's relations with nature, their behavior as well as their feelings

and ideas with regards to space and place. The humanist approach is 'methodologically obscure'. The goals of understanding man's meaningful experience and knowledge seem to lead to a situation in which any method is acceptable. It isa philosophy that involves thinking rather than practical activity. Its methodology is eclectic and sources of interpretation are numerous and therefore it takes the stance of multiple realities. The application of humanistic approach in geography is emerging in the Nepalese context since the beginning of 90s. For long time Nepalese geographers followed the Western Eurocentric view and appear to be content in following western notions and ignored understanding our own social and cultural aspects/landscapes that enrich our knowledge of geography(Subedi, 2014). Therefore, there is a need to rethink our research practices towards better understanding of the world we live in from our own eyes with philosophical and methodological rigor. Humanistic approach is one way forward in this direction.

Endnotes

1 Humanistic geography is a term used by Yi-Fu Tuan geographies based on the methods of the humanities that strive to synthesize subjective and objective studies and that lay particular importance on human creativity. For more details please see, Gregory, D.; Johnston, R.; Pratt, G.; Watts, M. &Whitemore, S. (2009). The dictionary of human geography. West-Sussex: Willey-Blackwell, pp. 356-358).

2 Space is a central concept in geography, used in the form of absolute, relative and relational space. It also contents spatial analysis, spatial diffusion, spatial exclusion, spatial factor and spatial science. For more details please see, Gregory, D.; Johnston, R.; Pratt, G.; Watts, M. &Whitemore, S. (2009). The dictionary of human geography. West-Sussex: Willey-Blackwell, pp. 707-710).

3 Place is a portion of geographical space. Sometimes defined as 'territories of meaning' or 'a node of activities.' In a generic sense, a place is a geographical locale of any size or configuration, comparable to equally generic meanings of area, region or location. In human geography and the humanities more generally, however, place is often attributed with greater significance (cf. landscape). It is sometimes defined as a human-wrought transformation of a part of the Earth's surface or of preexisting, undifferentiated space. For more details please see, Gregory, D.; Johnston, R.; Pratt, G.; Watts, M. &Whitemore, S. (2009). The dictionary of human geography. West-Sussex: Willey-Blackwell, pp. 539-540).

4 Landscape geography refers to the study of cultural and natural landscpaes, their particular features and their evolution. It is used in different dimensions of the explanations, i.e. landscape chronology, landscape ecology, landscape morphology and landscape geography (Holt-Jensen, 2006). For more details please see, Gregory, D.; Johnston, R.; Pratt, G.; Watts, M. &Whitemore, S. (2009). The dictionary of human geography. West-Sussex: Willey-Blackwell, pp. 409-411).

5 Region is a distinct segment of the earth that, in the traditional sense of the world, has developed a particular character through a long process of interaction between humanity and

nature (vertical connections). Regions have also been defined on the basis of interactions between centers and hinterlands (horizontal connections) (Holt-Jensen, 2006). For more details please see, Gregory, D.; Johnston, R.; Pratt, G.; Watts, M. &Whitemore, S. (2009). The dictionary of human geography. West-Sussex: Willey-Blackwell, pp. 630-632).

6 For more details please see, Gregory, D.; Johnston, R.; Pratt, G.; Watts, M. &Whitemore, S. (2009). The dictionary of human geography. West-Sussex: Willey-Blackwell, pp. 676-677).

7 Epistemologyis the application and development of knowledge; a theory of knowledge that seeks to determine correspondence between the realm of knowledge (concepts, propositions) and the realm of objects (experiences, things). An epistemology guides the formulation of research problems (Holt-Jensen, 2006). For more details please see, Gregory, D.; Johnston, R.; Pratt, G.; Watts, M. & Whitemore, S. (2009). The dictionary of human geography. West-Susses: Willey-Blackwell, pp. 206-208.

8. Ontology is the theory of being and the nature of existence. Empiricism and realism may be regarded as two ontological traditions. For more details please see, Gregory, D.; Johnston, R.; Pratt, G.; Watts, M. &Whitemore, S. (2009). The dictionary of human geography. West-Sussex: Willey-Blackwell, pp. 511-512).

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Gender development perspective: A contemporary review in global and Nepalese context

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For the empowerment of women several international meetings, conferences and seminars have been taking place globally. Consequently, women are becoming stronger in social, economic, and political sectors. The numbers of women state heads have revealed that internationally women are being empowered politically. Women's struggle in Nepal has also brought a remarkable change in establishing women rights in social, economic, and political spheres. After democratic restoration, few efforts have been made for their empowerment. Still the Human Development index of women is not so encouraging. However, they have been involved in multi sectoral activities such as household economy, environmental conservation, social functions, and infrastructure development. After 1990, political parties have involved women in their political organizations and have provided opportunities to be elected and nominated in the national legislature, executive and judiciary. Few of them have already got chances to be Minister and Member of Parliament.Similarly, women have been working as District Development or Village Development Committee chairperson. In the inaccessible remote areas still they are not much empowered and their involvement is less. It is necessary to make them empowered.

Keywords: Women; participation; household economy; social service; environmental conservation; infrastructure development; Nepal

Introduction

Women's history in the world is full of sorrow, disdain, oppression and contempt in every dimension of their life. They fought a long battle against various kinds of social

brutality, economic exploitations and different systems of discriminations. Still the battle is incomplete; rather some new methods of deprivations are adopted within the society (Gabriele&Thomus, 2007). Now the freedom and prosperity of the women has been the exciting slogan in the world, but no concrete commencement has seemed to have been implemented in practice. There are laws or the legal provisions outburst in the law making procedures of the countries, and several international conventions are taken place frequent.The member countries of UN have signed various international treaties on women's rights, child rights, and other several dimensions of human rights but they are not translated into practice. Women are employed but their contribution is devalued or their works are not taken as the works equally important with that of male workers. Wage level is highly different between male and female workers in the works of the same nature and weight. Male workers get almost double wage than female workers (Dahal, 2001). But the evaluation of the quantity and quality of works done by both sexes envisages almost equal or still more qualitative of the women workers than that of male. In terms of the responsibility and sincerity towards the works women pose an absolute worthiness indeed. Prejudices between men and women envisage everywhere in the society or family or the community and the nation.

In Nepalese context, it is more acute in the common life of the people everywhere in the rural or urban areas. Rural areas are still more backward in this gender issue where the people don't agree with the modern thought of gender equality and equity particularly for the freedom of the women in every spheres of their life equally to those of the male members. Therefore, the role of women in the local developmental contexts in Nepal, particularly in the rural areas is very much destitute because the word gender is not understood appropriately in our society.

The word ‘Gender’ doesn’t mean ‘sex’, rather it covers a wide concept of sex and related feelings and behaviors including the physical structure , and inequalities generated by that structural differences, and even the problems caused by such inequalities (Wikipedia, 2017). Therefore, gender needs a wide definition of wrapping up all such sex related problems, inequalities, differences and behaviors.

Our social pattern in living style astonishingly guided by traditional norms and values, our beliefs and attitudes are extremely related with our social consciousness and surrounding environment. Women and men are the two sides of a single coin and have been evolving historically with the modern development processes of reciprocal contradiction between both sexes. Positive transformation of the society needs an equal inter- relationship and equal participation of both sexes that is absent in our patriarchal

society of male domination. Such unequal socio-cultural status of male and female has been obstructing socio- economic and political development of our society where women are obliged to launch various kinds of social struggles from international, national and local level.It is in this context that this paper discusses on the contemporary perspectives and participation of the women in both global level and in the context of Nepal. This is a review work. Books, reports, and articles, are the sources of information used here.

Results and discussion

Gender perspectives in global context

Women's rights are now, the most important universal subject of human rights. There are several international laws, declarations, conventions and protocols formulated and signed by the member countries of United Nations Organization in favor of women's socio-cultural, economical, and political rights. Although women are the poorest segment of the society who don't have the equal access on education, health , employment , skill trainings, public offices, decision- making authority , freedom and control over their own body and life. Any kinds of social values , laws and political philosophies developed in the world are found success for the emancipation of women from the complications of traditional attitudes , norms and values of child bearing and rearing (UNO, 2014), "Indeed, Aquinas revived Aristotle's misogynous perception of women as 'misbegotten man' and wondered why God would create woman a defective creature in the first production of things"; such an ancient gender perception prevailing in Europe reveals a strange and much ferocious status of women (Maggee, 2015). Coming in the modern time, several new philosophers or the progressive thinkers have focused on concept of equity and equality of gender as a social problem. But the efforts are not still satisfactory. Jean Jacques Rousseau, a progressive philosopher had advocated on the political freedom and rights of the women, but could not accept the notion of equality of the sexes. French declaration of the rights of men and citizen [1789] articulated satisfactorily but could not be succeeded to emancipate women from the prevalent culture of sexism (Foster, 2015). Pamela Nevertheless, French playwright and essayist Olympe de Gauges(1748-1798) and English Philosopher Marry Wollstonecraft [1759-1797] raised their objections and defended women's rights by issuing the declaration of the rights of women [1791] and vindication of the rights of women[1791] respectively (UN, 2008a).The first women's liberation movement is the French revolution-1789, formed the first "revolutionary women's club", and declared 'Men's and women citizen's rights' empowered women's organization to end all kinds of exploitations, oppressions, subordinations, and discriminations over the past two hundred years (UN, 2008b).

Yet gender bias prevailed throughout the 20th century. Human rights commission members also could not abandon the feeling of biasness towards the word 'man' in reference to the holder of the rights which was not accepted by the Soviet Delegate Vladimir Koeretsky. For some time, game of the words was playing in the field of gender equality and equity. The final draft mostly employed the gender-neutral terms of 'human being', 'everyone', and 'person'. Preamble of the declaration included the principle of "equal rights of men and women" in the regular efforts of Hansa Mehta of India, and Minerwa Bernardino of the Dominican Republic (UN, 2008c).

Gender gaps were not prevailed only in some countries; it was visible even in the UN where women were not in high posts as they were employed in clerical and low paying jobs (UN, 2008a). The UN general assembly resolution of Dec. 1972 declared "International women's years" in 1975 was the most important effort in gender equality. The first world conference on women held in Mexico City declared 1976 to 1985 as the UN decade for women. Yet the results of such world attempts for women's emancipation and equal status of both sexes are not positive. Majority of the women among the total world population living in the rural areas are suffering from poverty (UN, 2008c). In political field women's participation is very low in the world as shown in Table 1. Still there is male domination in political field.

Table 1. Women head of the states in the world since 1990 to 2017

Years	Numbers
1990	4
1999	7
2001	7
2010	14
2011	14
2012	16
2013	14
2014	19
2015	18
2016	19
2017	17

Source: Wikipedia, 2017

There are 17 women as head of the state at present in the world. This number was 4 in 1990 and 7 in 1999 and 2001 whereas it was only 14 in 2010 which is double as compared to that of 2010. After 2010 the number of women head of the state has notably increased. But it is very nominal in number as compared to that of men. Number of total women Prime Ministers at global context reaches to 43. Similarly total number of women presidents till to date reaches to 36. The number of women queens as head of the state is 4. This kind of political scenario gives us a message that women representation in political field has been increasing after 2001(Wikipedia, 2017).

Several countries in the world are now, deeply concerned in gender issues. They have included women in policy formulation and development planning. In Kenya, Maldives, and Tunisia governments have committed to involve women into their national development plans. Philippines and South Africa have also adopted Australia's model of gender budget; in the same way international community is now fully convinced that without women's participation sustainable development cannot be achieved. They realized that women have a key role to preserve environment and natural resources that contribute sustainable development. The 4th world conference on women in Beijing 1995, also identified needs for the active involvement of women in environmental decision making at all levels (UN, 1995).

Gender perspectives in Nepalese context

Nepal has patriarchal type of society having gender discrimination and has just realized the needs of women's involvement in the overall development programs and strategies. The history of the efforts made by the Nepalese society for the gender equality and equity is not so long. During Rana regime nobody could raise the voice in this matter. When political parties were established in the country as the underground political organization against Rana rule raised the voice of women's emancipation in Nepal. Nepal Women's Association, All Nepal Women's Association and related political organs of political parties started their mob for the liberation of women from the traditional feudal oppression after political parties included this agenda in their manifesto. After 1950, when people removed Rana autocracy from the rule and established parliamentary system, a change in women's social status started. They got a chance of reading and writing and have any kinds of services in the different sectors of the government or non-governmental organizations. They took part in parties in different levels and women's leadership slowly established. But the influence of change did not approach to the rural women. Majority of the women living in the village could not enjoy the freedom due to poverty, illiteracy, and traditional customs. Again in 1990 after the down fall of

panchayat, women's associations became legal and started to carry out struggle within their party and outside the parties, and within families and society against the gender discrimination. Focusing to the equal rights to women in ancestral property, Nepalese Women's Associations organized several national and international conferences on women's rights. In Nepal, All Nepal Women's Association (ANWA) played a vital role. The 3rd national conference in Butwal (2002) passed a resolution for equal rights of sons and daughters on family property with the slogan "Equal property to equal children'. It was the national campaign launched all over the country. (Gabriele, 2007). The glorious history of Nepalese women's movement has several declarations, treaties, constitutional provisions, policies and laws that have been adopted. But the efforts remained in the paper and not effectively implemented into practice during Panchayat system.

In the sixth five years plan (1980-85) Nepal focused the need for integrating the women's development program into the overall development strategies. The 7th plan (1985-90) recognized that women constitute half of the work force in rural areas and gave more recognition than before and equipped with skills to operate on their own (Joshi, 1987).

Nepal's women's year 1975 initiated deep concern for women's recognition or identity. In the same year Women's Services Co-ordination Committee was established which launched several programs in agriculture, education, health, social services and law (Joshi,1987).

After 1981,effort to develop Human Development Indices (HDI) were started to take for the measurement of human individuals and society in the member countries of United Nations Organization (UNO) in the world. It shows Nepal's HDI of 0.325 which is almost lowest in the world. It increased in the preceding decades and became 0.416, 0.499, and 0.526 in 1991, 2001, and 2005 respectively (Acharya, 2007). Gender development index was lower than those human development indices. HDI is the combined indicators of Per Capita Income, Life Expectancy, and Educational Attainment. In all these three indicators there was a vast difference between male and female population. Per Capita Purchasing power (PPP) of male was $ 1776 whereas it was only $ 891of female (Acharya, 2007).

Participation of women in multi-sectorial activities in Nepal

Women are involved in several activities such as contribution in household economy, conservation of environment, development of infrastructure and strengthening of social justice and harmony. These are briefly discussed below.

Household economy

Farm, forest and fisheries are the main areas of employment in rural areas where women's involvement is higher than that of male (Table 3). More than 92 percent women are engaged in farm, forest and fisheries. This is mostly the agriculture field including forest related activities such as firewood collection, collection of grass and tree branches, grazing of animals etc. Fisheries in the rural areas are not notably found in spite of those areas where traditionally local communities are fishing in the river. There is a huge gap of women's in the employment pattern between rural and urban areas. In urban areas women are educated and they have a lot of opportunities of employments whereas in rural areas there is no alternate employment of traditional agriculture and they are back in education, health and other modern facilities. Women in such rural areas are mostly engaged in agriculture and internal home affairs.

Table 2. Occupational structure of Nepalese women, 1991 (in percentage)

Major Occupational Group	**Rural**		**Urban**	
	Male	**Female**	**Male**	**Female**
Farm, Forest & Fishery	80.2	92.7	19.4	14.7
Non-agriculture:	**19.5**	**7.0**	**80.0**	**61.5**
Professional and Technical	2.3	0.4	5.1	7.4
Administrative and Related work	0.2	0.0	3.4	1.2
Clerical	1.0	0.1	7.5	4.4
Sales	2.5	1.2	17.6	11.6
Services	6.8	3.3	17.7	16.7
Production	4.4	1.4	19.5	14.7
Others	2.3	0.6	9.2	5.4
Not Stated	0.3	0.3	0.6	0.6

Source: Population Monograph, CBS, 1995

Women contribute substantially to sustain the subsistence household economy. Table 2 shows the time devoted by women and men in income generating activities. It shows that almost 50% time is devoted by women, 44% by men and 6% by children in household income generation (Joshi, 1987).

Table 3. Average time devoted by men and women in household income generation (hrs/day)

SN	Time allocation	Men	Women
1.	Conventional economic activities (agriculture, animal husbandry, manufacturing etc.	4.62	5.81
2.	Only in Agriculture	1.73	2.79
3.	Household affairs (food processing, water fetching, fuel collection)	2.16	0.91
4.	Daily productive activities	6.71	6.72
5.	Whole household activities	50.02	49.04
6.	Domestic work	4.04	0.79
7.	Total daily work burden	10.01	7.51

Source: Joshi, 1987

Environmental conservation

Women in our society are closer to those activities related to forest, water, sanitation or cleanliness. These are the important elements of environment. Women are responsible to protect these environmental resources that help to protect biodiversity through healthier environment. From early in the morning up to the late night they are busy in collecting, processing, bowing, planting, harvesting, cooking, cleaning and servicing etc activities. Such works are directly and indirectly related with environment conservation. They collect fuel woods, grasses; cut branches of the tree and bushes, and graze their animals. Women are active in tree plantation, take care of planted trees, cultivation of herbal plants and preserve them.

Now women are active in the conservations of environment through user's group formation. But in the remote areas, women's involvement to keep home and surrounding environment safe and clean is not found so active. Therefore Non-governmental Organizations (NGOs) and International Non-governmental Organizations (INGOs) are actively working for awareness creating activities. For example, "SAGUN", a program launched by CARE Nepal, has been supporting women to make them aware and trained in different environment protection activities. SAGUN has supported to community forestry program and good governance in a dalit settlement of Malakheti VDC -3 of Kailali district where 90% population out of total is very poor. People in this settlement have been facing an acute problem of health and sanitation. SAGUN program provided support to make toilets in the village and also trained them about local community forest protection and its commercial use to earn money. They became conscious to protect bio-

diversity and patrol forests to control illegal hunting activities. Other examples are the works carried out in the buffer zone areas of Lantang National Park and Kanchanjangha National Park. SAGUN carried out activities for the protection of forest.Now, people are actively involved in the protection of forest and wildlife. The Anti-poaching Operation Units are actively working in the preservation of bio-diversity where the active role has been played by women (SAGUN, 2008).

Social justice and harmony

Nepalese women are widely participating in social services in these days but there are still some remote areas where women are the poorest and illiterate segment of the society. They are suffering from double discrimination of social backwardness and gender inequality. Women rights are written in the constitution but the discrimination adhered with, and hence social, cultural, and individual behavior have not been changed particularly in those remote villages. In the urban or developed society women's social status has been improving day by day because they are conscious and active to utilize their rights in the social sector. After 2005/06 when Republic set up of the country accomplished, government has formulated different policies and laws of guarantying 33% involvement of women in social and political sectors. Every social organization, NGO and INGO should have 33% participation of women. In education, government jobs and other socio-economic sectors women are reserved certain seats.Still there are some traditional practices of kitchen works and other internal home affairs which are being obstructions in the development of women in social, economic and political sectors. First of all they have to come out from kitchen and internal home affairs.

Women's responsibility in social sector is to fight against women's violations. In rural areas due to lack of education women are dominated by men. Women are fighting against such dominations and violations which are happening within families and in the society. Some of the NGOs and clubs are actively working in empowering women to fight against the violations. An example of action taken against violation is given in box below

Barapak village of Gorkha,a remote village inhibited by the poor and illiterate people, a husband [kanchha] disgraced his wife [kanchhi] and started to chase from the house. The advocacy forum discussed over the case and decided that kanchha should give NRs 200000 to his wife as the compensation and have divorcé between them. Kanchhi took the money and divorced with her husband.

SAGUN has been supporting in such activities happening in the society in favor of women. Women are struggling in rural areas against social taboos like over drink of alcohol. It has been the serious problem for women in their family and society. Advocacy forum provide supports to the women who fight against the drunkard husband within their family and tries the best to bring compromise between husband and wife. Advocacy forum inspires women's clubs or mother's groups to provide different kinds of helps to the poor women in the time of delivery and other health problems. Women in some rural areas are found active against domestic violence like *chhaupadi*.

Infrastructure development

Not only social services and environment conservation,women are equally active in infrastructure development. They are involved in the development of roads, bridges, buildings, drinking water supply etc. Due to acute starvation problem in Karnali region many men and women were involved in the road construction through "Food for Work" program where Women were working as petty contractor. Another example of women's work in infrastructure development is from Dhamilikuwa VDC 2, Garambesi of Lamjung district by 2007/08 when Mid Marsyangdi Hydro-project was being constructed. SAGUN Program supported by CARE/ Nepal was helping in those VDCS influenced by the Hydro-Project. Women constructed a temporary wooden bridge over a small stream near by the Marsyangdi River which is rested on the stone wall. The bridge shortened the road that passes through a dense forest. The previous round about long trail had frightened local and outside commuters by frequent robbery. Mostly women pedestrians were harassed by such robbery where money and jewelries of them would be looted. In the remaining part of forest along the present short road women cut down the trees and bushes 10 meters either sides of the road and made open so that it could reduce the robbery over pedestrians. It reveals that "women can do everything whatever men do" the statement is being justified.

Another important thing is the participation of women in budget allocation and development planning in local, district or in central level. As an important context we can take another example of Lamjung district where the women of 15 literacy centers jointly requested VDCs to allocate budget for the women's empowerment programs. Accepting the request of women's groups VDCs allocated budget of NRs 5000 to 388000 for one year. Likewise in Gorkha district the women representatives of Gairi Women's Community Forest User's Groups visited headquarters to observe women's programs running through the support of DDC and all other development line agencies and suggested to allocate development budget for women's participation. Such types of

combine efforts of the women have brought a change in budgeting pattern of Village Development Committee (VDC) and District Development Committee (DDC).

Conclusion

Gender perspective has been a global issue at present. Several international meetings, seminars and conferences frequently and regularly organized in different countries on different issues of women. UNO has also been taking deep concern on it. Several international laws and protocols in gender issues have already been prepared and signed by the member countries of UNO. Still the women in the world are back in social, economic and political spheres. It is reflected in the representation of women in different social, economic and political sectors. The number of women as head of the state, prime minister, presidents and queen reveals that women are remarkably back in politics. It means that they are still not empowered and are dominated by men in different sectors of development.

In the Nepalese context status of the women is not encouraging.After democratic set up in 1990 perhaps a change has been experienced in this issue. Women are being empowered and have been involving in different sectors like household economy, environment conservation, infrastructures development and social sectors. Nepalese women are actively working against women's violation.

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The contested common pool resource: Ground water use in urban Kathmandu, Nepal

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Groundwater has always played a critical role in meeting the water demands of traditionally water-short areas of urban Kathmandu. Studies show that ground water level is depleting and is under immense pressure due to over-extraction.The current study focuses on existing situation of ground water availability and use in urban Kathmandu, conflicts among households for ground water use and changing social setting and policy implementation.The study found that the traditional culture of using public well and sharing and optimizing groundwater resource is gradually fading due to scarcity of water. Private deep wells are being constructed inside house for household use altering traditional social setting of a public well and culture of sharing public resource is declining. There is no authority and policy to control and monitor the ground water extraction for private use. The increasing number of groundwater extraction, uncontrolled and unregulated use for private and commercial use has contested the use of common pool resource and traditional social setting.

Keywords: Common pool resource; drinking water problem; groundwater user; Kathmandu municipality; open access; private use; public policy; social conflict

Introduction

Theory of Common Pool Resource also commonly termed as common property resource, (CPR) refers to natural resource which is physically and legally accessible to more than one user and said to be free-for-all (Wantrup& Bishop, 1975). One of the influential model on use of common natural resource by individual is defined by Hardin (1968). He illustrates that degradation of the environment is expected whenever

increasing number of individuals use a scarce resource in common. Exclusion (difficulty in controlling access to users) and Subtractability (reduction in resource availability with increasing number of users) are considered as two basic characteristic of CPR (Ostrom, 1990, 2008; Berkes, 2006). Management of CPR is another issue which has been long discussed. Some argue that Government institutions should manage CPR to prevent their destruction; others recommend that privatizing those resources will resolve the problem. It is also emphasized that understanding traditional social structures and relationships (cooperation) and how it shapes the common pool resource use as number of users increase (competition) is essential for evaluating resource use and management for sustainability (Sick, 2008).

Ground water is one of the major sources of drinking water in Kathmandu, and about 50% of the water used in the city is derived from groundwater (Aryal, 2011). The supply is however, facing acute shortage due to increasing urbanization. The combined production of the in-valley surface water sources and ground water is insufficient to meet the ever increasing demand of the water supply. Rapid urbanization has become major characteristics of Kathmandu Valley with 4.45 growth-rates as compared to 1.34 national growth rate. Over the last decade the population increased by 61.2% (CBS, 2012). This process of urbanization and subsequent expansion of the built-up area has increased demand of household water use.In spite of Nepal having abundant water resources, water demand is ever increasing with increasing population. A study show that projected water demand for 2016 for Kathmandu Municipality was 195mld whereas water availability from all sources is 104.5 mld in wet season and 58mld during dry season (Sada et al., 2013). It is projected that by 2021, the water demand is expected to increase to 540.3 mld (Udmale, et al., 2016).This shows the big gap between production and demand. The short supply in municipal level has forced people to look for alternative sources of water supply and excessive extraction and use of groundwater is becoming common in urban Kathmandu. Besides, inequitable distribution of water across the Kathmandu is another problem which has forced ground water extraction for household use.

Water is also regarded as CPR and both social and economic good. One argument is that water is basic resource, and should be regarded as social good on the other hand it is regarded as economic good and commoditized. With the increasing population, scarcity of resource is more common and in this context most of the resources which were shared earlier are now being sold (Jaffee, D. & Newman, S., 2012). Access to resources has been restricted or in other cases controlled by group of people where no legal or state institution exists and CPR is bound to be over-exploited in the absence of

an external enforcer such as legal state institution (Wade, 1987).This paper discusses the existing situation of ground water availability and use in ward number 28 of Kathmandu municipality and its effect on the social relation and role of public institutions on public policies and their implementation.

Approach and methodology

The current paper is based on the aforementioned concept and framework of common pool resource management and follows integrated approach using both primary and secondary data sources. GIS tool is used for mapping of groundwater storage volume and public wells. Spatial data layers such as ward boundary, building footprints and courtyard location of ward no 28 was obtained from Kathmandu Municipality. Public well mapping(well in public court yard, side of the road, dug by community people, social service groups or state authority) is carried out through field observation, using structured field protocol and checklist and data are recorded in data sheet and wells located in a map. Key informant interview and informal discussion are conducted for exploring traditional social setting of public resource management and current trend. A checklist is developed for key informant interview and informal discussion with locals and institutional officials of the study area. Review of reports, policy documents and relevant journal articles is carried out and concerned institution visited and officials consulted in order to examine existing policies and role of institutions.

Water resource mapping and water resource data at lower spatial scale i.e. ward level is non-existence for Kathmandu valley. In this context, secondary data available for Kathmandu valley and municipality is used as reference for ward level analysis beside field survey.

Study area

Kathmandu has been a densely inhabited urban center from historical times. Ward no 28 of Kathmandu municipality is no exception. Ward No. 28 occupies less than 6.8 hectares of area and the total household of the ward is 1370 and population is 5611 which comprises 2920 male and 2691 female population (CBS, 2012). Population density of the ward has increased from 802 people per hectare during 2001 to 825 persons per hectare in 2011. Geographically, it is surrounded by ward number 18 in the west and south, ward no 17 in the north and ward no 27 in the east. Drinking water supply from water supply authority is irregular and out of the total area, 5 percent of the ward doesn't have drinking water service. There are five public taps on the side of the

road and total of 68 courtyard with public well. However, among total,15 are in good condition (water availability during wet and dry season), 25 are in fair condition (water availability during wet season only) and 28 are in poor condition (low water during wet season) (KMC, 2005). Among identified five serious problems of the ward, drinking water problem ranks the first.

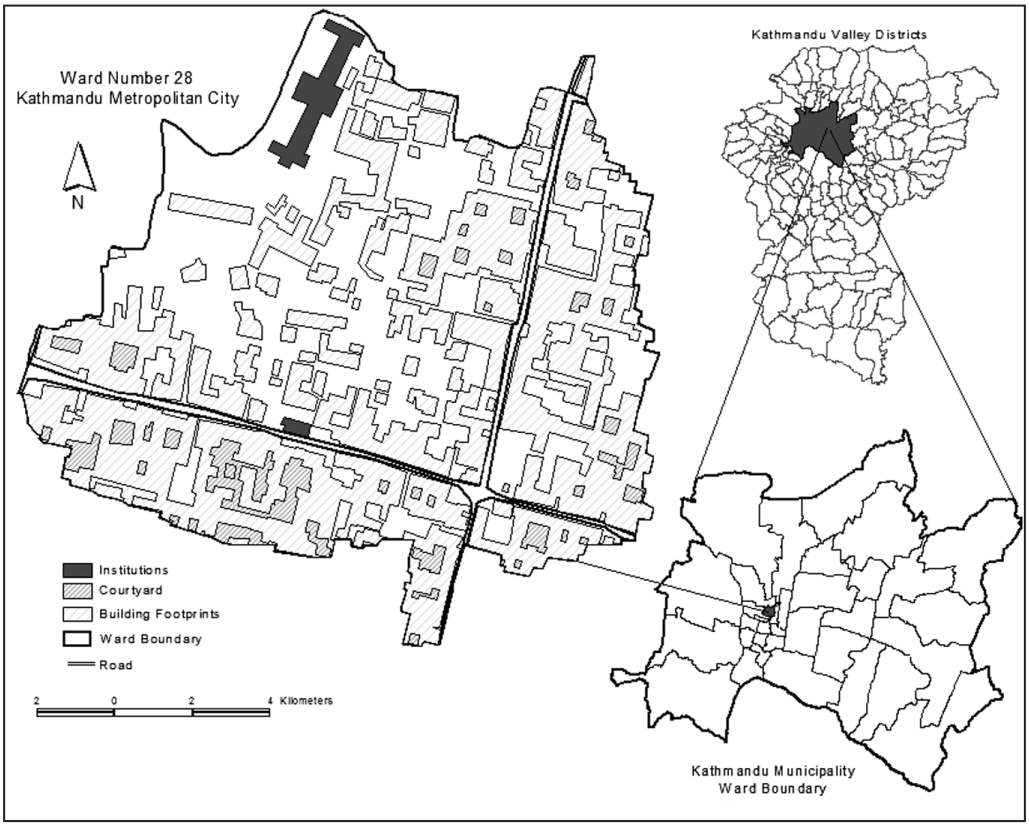

Figure 1. Location map of the study area

Results and Discussion

Ground wateravailability and use

Geographically, northern part of the Valley is richer in ground water storage which decreases gradually from north-east to south-west. The swallow aquifer is thicker towards northern part whereas deep aquifer is thicker towards central and southern part of the valley and the estimated volumes is 7260 and 56813 million cubic meters respectively (Pandey & Kazama, 2011). In terms of deep aquifer (Figure 2) ward number 28 lies in

the zone of lower storage capacity (100-200m^3) whereas in terms of swallow aquifer (Figure 3), it lies in the zone of medium storage capacity (800-200 m^3). Ground water use in Kathmandu is either for commercial or for household

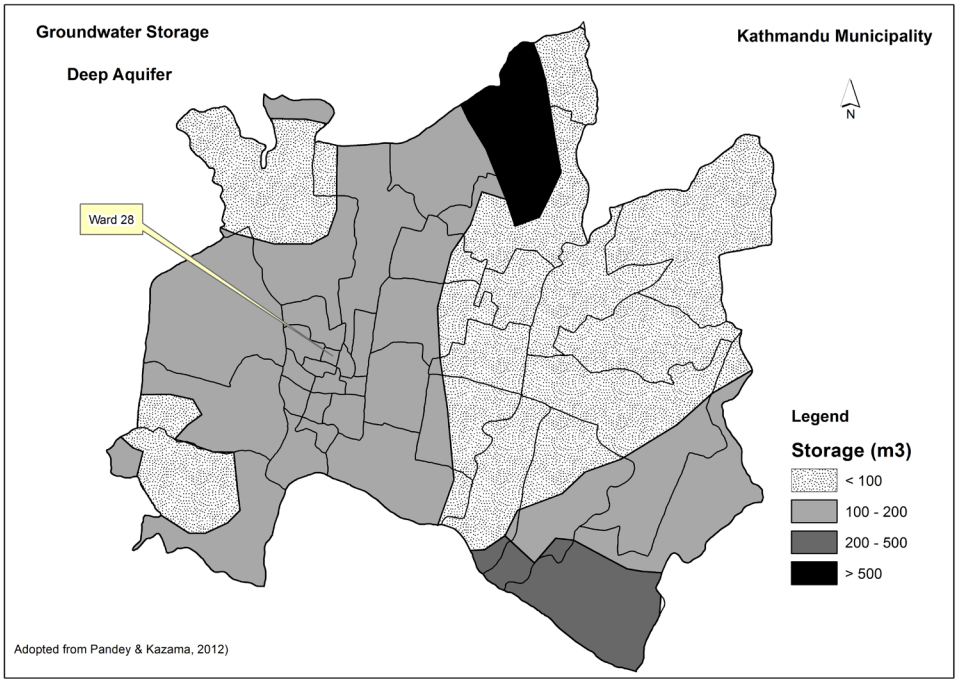

Figure 2. Ground water storage volume – deep aquifer

purpose. Commercial use includes use by hotels/restaurants, industries and private water supply companies. However, in ward no. 28 most of the ground water use is for household purpose. The traditional urban housing layout of Kathmandu city is characterized by an arrangement of residential courtyards with public well located at the center. In ward 28 also, there are 68 public courtyards. Among them, public tube wells or dug wells existed in 49 courtyards. According to ward official and field survey, it is estimated that more than fifty percent (51.05%) people use these public water source.

It is found that in ward number 28, dependence on public water source is higher than in urban Kathmandu in general. About 32% of water consumed within urban Kathmandu originates from non-government sources such as public well, stone spout and private well (Sada et al., 2013). Beside Surface water from Bagmati and Manohara rivers water supply authority was using 89 deep tubewells, 14 dug wells,

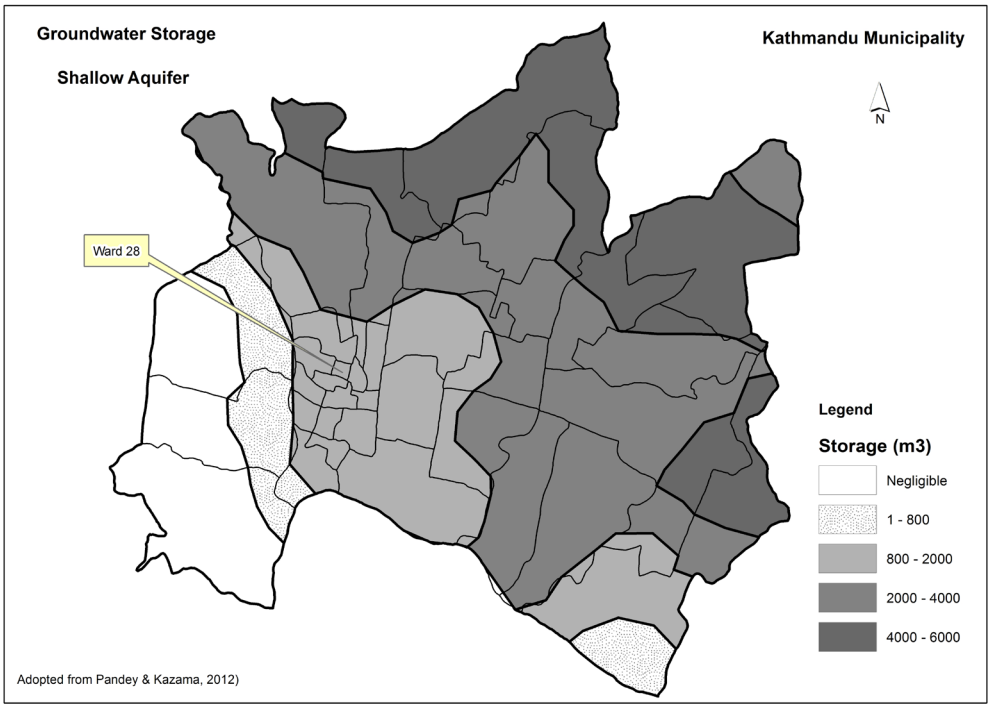

Figure 3. Ground water storage volume – swallow aquifer

and 22 Service Reservoirs for supply of drinking water in Kathmandu Valley (SAPI, 2004). It is also estimated that more than 90% of the water supplied by tankers was extracted from groundwater resources mostly from the peri-urban areas (Shrestha, 2011). Though, nearly half of water supply in wet season and up to 70 percent during dry season comes from groundwater (ICIMOD, 2007), the distribution system is developed without considering resource distribution over space and time which has resulted annual extraction exceeding recharge leading to depletion in groundwater levels (Pandey et al; 2012). Inequitable distribution of water across ward number 28 is also evident which has forced over extraction of ground water. It is found that anthropogenic factors such as over-exploitation of ground water are major drivers that exert pressures on groundwater environment which has lowered the groundwater levels and raised concerns on risks of land subsidence in area with high compressible clay and silt layers (Pandey et al., 2010).

From public resource use to privatization of public resource

In study area, it was reported that during 2005 there were 68 public wells, but during field survey in 2015, only 49 existed (Table 1). Among 49 tubewells, only 13 were functioning, 6 were already abandoned and 23 have dried out and 7 new were added within period of 2010 -2015. Those public wells were dried out when private wells and deep wells were constructed in the surrounding houses.People has started digging private wells inside their houses when new house is constructed. It is found that total of 55 new deep tube wells were constructed within recent five years (till March, 2015) and all of them are functioning. It is estimated that 80% new building construction started with the digging of deep wells inside the building within the study area (Field survey, 2015). In the courtyards where public well dried up, most of the people has dug deep wells up to 25 meter depth inside their houses. This on the other hand caused drying up of some of remaining public wells.Such extraction has an immediate consequence of drying out or low flow volume of dug wells, hand pumps, and traditional stone spouts (Shrestha, 2009). However in 7 courtyards new public tube wells were also constructed and maintained by the community.

Table 1. Distribution of public well by status

SNo	Status	Number
1	Abandoned	6
2	Functioning	13
3	Dried out	23
4	New	7
5	Total	49

Traditional culture in the study area was social arrangement regulating the preservation, maintenance, and consumption of ground water and so was along urban Kathmandu (Kansakar, 2011). However, the traditional culture of using public well i.e. culture of sharing and optimizing common natural resource is gradually fading due to scarcity of water resource. It is found that sharing of water from public well has become conditional in most of the courtyards having public well. The user should be of the same courtyard and should not exceed certain quantity i.e. not more than 3 buckets of 10-15ltr capacity. Though people residing in the same courtyard are allowed to use water whereas people outside the courtyard are allowed to use the resource only if they pay for it. In some areas even the tube wells are locked.This has created conflicts among people residing in the house facing towards courtyard and whose house doesn't. The locals who

cannot afford to pay and reside in courtyard without public well are affected most in the study area. The traditional social setting and relation among locals have thus changed. Location of public well is depicted in the Figure 4 and courtyard having private deep wells are depicted in Figure 5.

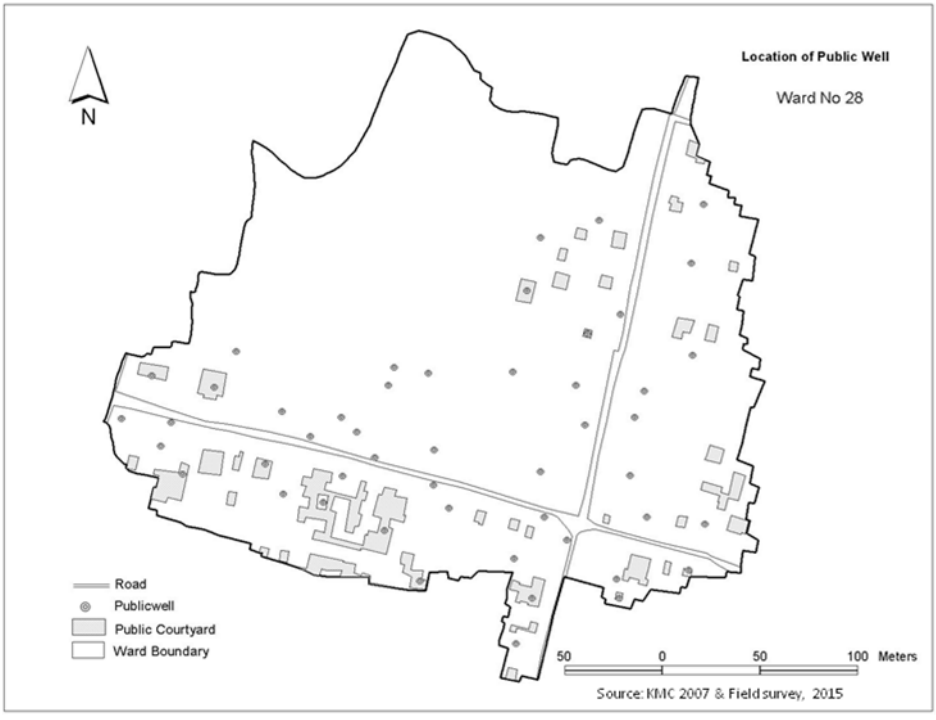

Figure 4. Location of public wells

It is also found that water is used from public well for the construction purpose, but once the construction is complete maintenance of public well is neglected because deep tube-well constructed inside houses fulfills the household water need. The social relation of sharing and cooperation between lower income people and people who have constructed new deep tube well inside houses in the same courtyard has deteriorated due to such tendency. However, in some courtyards community maintained wells are functioning well and no private well is constructed inside houses. Deep Boring for commercial purpose in three places within a ward is found which were constructed during the periods of 2013-2015. Water is sold per liter basis by these vendors in two different modes, namely, providing piped supply delivered to the house and from the deep boring source itself. The study on vulnerability and capacity assessment of

different wards of Kathmandu valley also concluded that in ward number 28, supply of drinking water by the government institution is short and people have to depend upon existing spring, private well and deep tubewell boring but these are not systematic and hygienic (NRCS, 2015). The community lacks safe drinking water and turbid water supply during rainy season are major problems. In case of any disaster, water sources and distribution pipes are at high physical risk aggravating the water distribution problem.

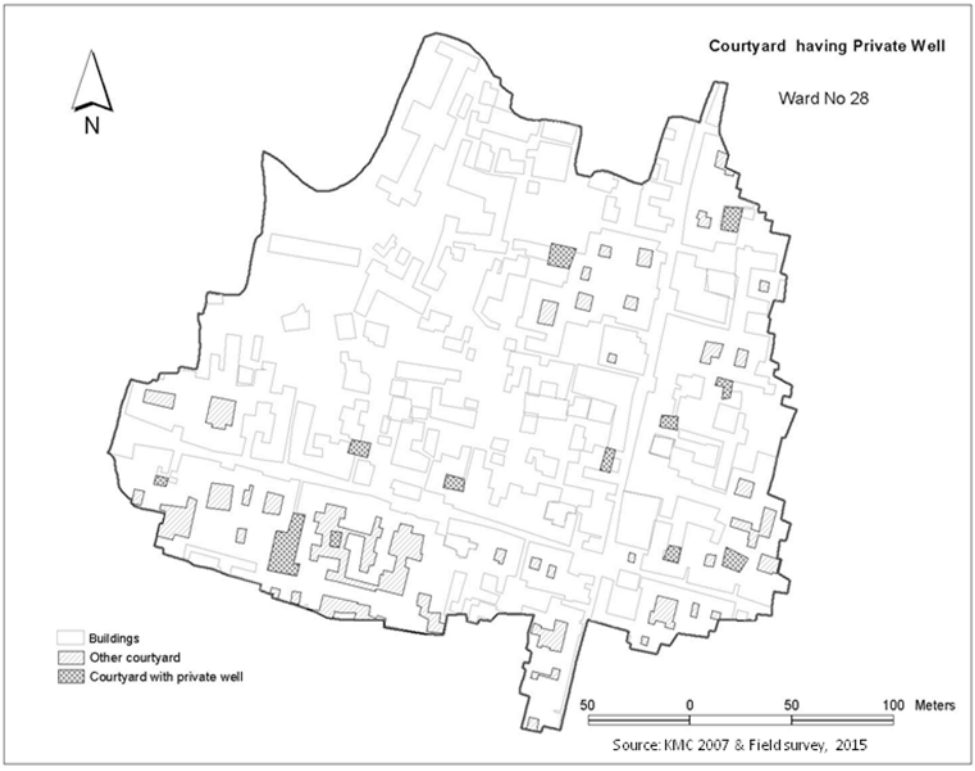

Figure 5. Courtyard having private wells

Cooperation versus Competition and open access to common pool resource has been major line of argument in literatures regarding use of common pool resources (Ostrem, 2008). Studies suggest that the proper solution of the over-exploitation of common resources, is to internalize its costs by making the public resources private (Runge, 1985) because with the private property, an individual will rationally manage resources. It is also assumed that markets are always best means of allocating public resources because competition leads to appropriate management (Vernon, 1988). However, in the study area, water extraction for commercial purpose (i.e supply to houses

for household purpose) is increasing gradually, competition rather than cooperation in groundwater extraction is perceptible. There is competition rather than cooperation in groundwater extraction from both shallow and deep wells which is increasing for private household use by individual household in the study area though for commercial use by hotels and other service providers (hospitals etc) and for public supply by Government institutions is not found within the study area.

Many scholars and public officials have relied upon the conventional analysis to justify the need for centralized control of all common-pool resources (Sick, 2008). The Government's National Water Supply and Sanitation Sector Policy of 1998 supports the involvement of the private sector in the operation and management of water supply and sanitation services in Kathmandu Valley towns and the establishment of a regulatory agency for economic regulation of service providers. Legislation for the creation of the regulatory agency do not exist yet. Similarly, though water-related laws and regulations do exist, specific policy and institutional arrangement for sustainable utilization and management of groundwater resources do not exist to date in the urban Kathmandu. Because there is no institutional mechanism and legal requirement for groundwater extraction, every new construction is starting with deeper dug well and deep tube well construction with decreasing water level and drying out of older wells during dry season in the study area.

Though over-extraction of groundwater is a major problem in the urban Kathmandu, potentials of water resource availability is not void. Estimation of ground water storage and potential recharge area for the Kathmandu valley based on GIS analysis show potential to store water in the empty space in between current and assumed upper limit of the groundwater level. If the groundwater reserve is used at the same rate as in 2001 (i.e., 21.56 Million m^3/year), the reserve would be emptied in less than 100 years. On the other hand, if the shallow aquifer could be managed properly (by regulation of groundwater development as well as augmentation of recharge), it has potential to meet most of the water demand in the valley (Pandey et al., 2010). Similarly, it is also estimated that approximately 1.2 billion m^3 per year (i.e. 3353 mld) of rainwater falls in the 640 sq.km of valley area. It is estimated that if only 10% of the Kathmandu Valley area was to be used for rainwater harvesting, 128 million m^3 peryear could be recharged (Shretha, 2009). This in turn will solve water shortage problem of household water demand of the sudy area and secondly, increasing the recharge potential of the ground water storage in the valley as well as in the study area. Together with conjunctive management of surface and groundwater sources including direct and indirect recharge

and rainwater harvesting the problem of water shortage could be managed (Dixit & Upadhaya, 2005).

Role of institutions

Extraction of ground water at institutional level through swallow and deep aquifer was promoted during 1970s with the expansion of number of municipalities in the country, though more than 20% urban population still relied on traditional stone spouts for household water supply (Shrestha et al., 2012). Though traditional stone spouts are regarded as heritage and managed by Kathmandu Metropolitan City, no authority is found responsible for management of ground water in the study area.

There is no specific policy for ground water use and no rules and regulations for construction and digging public and private wells. Public wells can be constructed in any public places with consent of municipal ward offices.No registration or permit is required for construction of private well and use of groundwater for household use. However, registration of community user group at District Water Resource Committee is required for surface water use from the source by community which is not prevalent in the study area. This trend of registration of water user group for surface water source use is more common in rural areas of the valley.

Within urban areas including ward number 28 of Kathmandu, different government agencies are operating in water sector. Nepal Water Supply Cooperation (NWSC) is responsible for piped water supply whereas for construction and repair permission should be taken from Metropolitan City Office and Department of Roads. Department of Water Supply and Sewerage (DWSS)is responsible for overall ground water management but it doesn't operate inside urban area.This has created confusion for people who want to go through legal procedure for ground water use. Because no single agency is responsible for ground water management in the study area including other urban areas, people has started constructing bore holes and selling water using private water tanker. This has resulted drying up of many nearby public well on which low income and poor people are dependent. These people are deprived of using water because in one hand they cannot afford to construct private well and on the other are not able to purchase water hence, they have to spend much of their time in search for drinking water. This has resulted deprivation of using common pool resource by poorer social group increasing the social divide.

Conclusion

Distribution of resource i.e. resource location, availability for use, affordability by local people and presence of regulatory authority exhibit a variety of responses to resource extraction. The increasing number of groundwater extraction, uncontrolled and unregulated use for private and to extent commercial use in the study area has contested the use of common pool resource and existing social setting. It is hence, essential to limit groundwater extraction by exploring the possibilities of augmenting groundwater supplies by implementing alternatives and institutional arrangements. This will also restore the traditional social setting of cooperation and relationships of common pool resource and user as basic resource and social good.

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Park-people interaction - Its impact on livelihood and adaptive measures: A case study of Shivapur VDC, Bardiya District, Nepal

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This paper deals with the concept of theoretical and conceptual framework in a research with park-people interaction of Bardiya National Park (BNP) with specific reference to Shivapur Village Development Committee (VDC) of Bardiya district. The local people enter the park illegally and exploit the park resources like fodder, firewood, thatch, etc. They also try to kill wildlife either for food as traditional profession or for money. They frequently encounter with wildlife and get injured; sometimes they are killed. Similarly, wildlife cross the park boundary and destroy the crops and kill the livestock. Villagers also get their shelters and sheds damaged by them. BNP, therefore, has introduced various programmes to keep the conservation intact without disturbing the livelihood of Buffer Zone people. Several efforts, such as construction of Trench, Machan etc. have been made to address the issues associated with park people conflicts. In addition, endowment funds, such as Rahat Kosh, Apatkalin Kosh and Chetipurti Kosh have been established to provide and compensate to the human casualty and property (mainly building) damage.The Park-People interaction is the reality and the need is felt from both sides. Despite ups (harmony) and downs (conflicts) and despite differential use of resources by localities, the interface continues and is likely to continue so long as both these entities exist there. The need is to realize each-others limitations and strengthen their mutual understanding and the benefits.

Keywords: Interaction; impact; conservation; wild animal; buffer zone; national park

Introduction

Human-nature relationship is not a new concept. Since long, human beings have interacted with nature to utilize natural resources for their basic needs. In the long run, population growth has caused excessive use of natural products resulting deforestation (Gurung, 1989).This has been mainly in response to the ever more apparent extent and severity of global environmental problems, which prompted various international agencies and national governments to search for a rational approach to the conservation of the natural ecosystem. The World Conservation Strategy (WCS) proposes an approach for the establishment of various representative coverage of the earth's wild species and major ecosystems. Resource conservation, as defined by the WCS, "is to maintain essential ecological processes and life support systems; preserve genetic diversity; and ensure the sustainable utilization of species and ecosystems" (Nepal & Weber, 1993). As a result of this philosophy, many protected areas have been established.

The Yellowstone National Park, in the United States created in 1872 was the first National Park ever established in the modern world (Shafer, 1990). National Parks in the developing countries, particularly in Asia, were established in the beginning of the second quarter of this century (Mishra, 1991). In Nepal, to prevent the increasing rate of deforestation and to protect unique flora and fauna of this ecological belt, at first Chitawan National Park was established in 1973 (Upreti, 1991), after the declaration of the National Park and Wildlife Conservation Act, 1973 (2029 B.S.). Wildlife conservation has been successful from the viewpoint of habitats of several threatened species (Mishra, Wemmer, Smith &Wegge, 1992). Active conservation of habitats has increased wildlife population within protected areas which started causing damage outside the park.The people living in and around such National Parks have interacted with them in multifarious ways. Some of them have built an ecological relationship with the park, whereas in certain other cases, the existence of National Parks has been questioned because of the growing conflict over land use rights and practices. The relation between park and people is imbalanced when the park animals damage and disturb the adjacent settlement. Damage of the agricultural crops, human harassment, injuries and death, livestock depredation are the common causes of this imbalanced relationship (Jnawali, 1989). Conflicts arise not only out of ecological malpractice but are also the reactions and social interventions from the outside (Jefferies, 1982; Weber, 1991).

For the first time, the Third World Congress on National Parks held in Bali, Indonesia in October 1982 focused its attention on the relationship between protected

areas and human needs and stressed the relevance of integrating protected areas with other major development issues (Mishra, 1991).This was reiterated during the Fourth World Congress on National Parks and Protected Areas held in Caracas, Venezuela, which called for innovative programmes of integrated planning and cooperative management at the bio-regional level that will support the roles of protected areas and directly involve the local residents and resource users (IV World Congress, 1992). According to the concept of park-people friendly environment, the periphery area of the park was declared as Buffer Zone minimizing the destruction caused by wildlife on human, shelter and crops. In Nepal, it was implemented in 1996 and in the same year it was provisioned in Bardiya National Park (BNP) which covers Shivapur VDC. This VDC lies in the Buffer Zone Area of BNP. This paper discusses park people interaction, its impact on livelihood and adaptive measures.

Methods and materials

In this research both qualitative and quantitative methods and techniques were applied to fulfill the research objectives. Focus Group Discussion, household survey using structural and semi- structural questionnaires, in-depth interviews, key-informant interviews and observation are the methods employed to generate primary data. Altogether, 105 households from Shivapur, VDC of Buffer Zone were selected randomly for interview. After the completion of household survey a total of five key informants were consulted to supplement the gaps of information. Selection of individuals for the interview was based on specific criteria such as gender, household and economic status. For the secondary information, a number of published and unpublished research documents, reports and theses and project reports on National Park and Buffer Zone were consulted. Descriptive Statistics was adopted. Besides these descriptive statistics, tables, bars, and maps are used to illustrate the findings.

Study area

The study area (Shivapur VDC) is located in Bardiya district which lies in western Tarai of Mid-Western Development Region of Nepal (Figure 1). Shivapur VDC is located between 81° 16’ 30” to 81° 19’ 24” East longitude and 28°28’ 02” to 28° 31’ 03” North latitude. The total area of Shivapur VDC is 1415.11 hectares. According to 2011 Census, the total number of population in the study area is 7706 in which 3578 are males and 4128 are females. This area, the Tarai flatland, consists mostly of fine alluvial soil and loam whereas the riverine floodplain contains coarse sand and fresh deposits of alluvial soil, silt and gravel (Upreti, 1994).

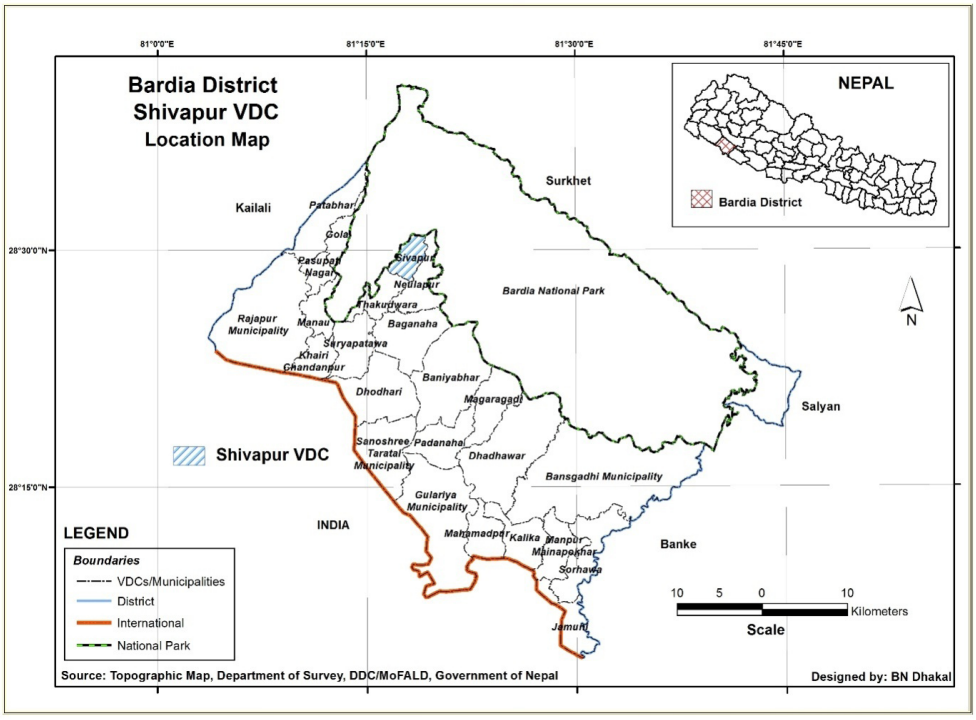


Figure 1. Location map

Three distinct seasons can be noticed in this area. These include: Spring from February to Mid-June, the monsoon season from Mid-June to late September, and the hot and dry season from late September to February. The mean monthly maximum temperature ranged from 17.4 ˚C in January to 38.5 ˚C in April and the mean monthly minimum temperature ranged from 9.7 ˚C in January to 25.6 ˚C in July. The maximum rainfall recorded at Chisapani- the nearest market of Shivapur was 864.6 mm. in 2010 (Paudyal, 2016).

Results and discussion

Park-people interaction

Park and people have coexisted for long and their co-existence is tied up in a special form of relationship considered as interface. This relationship or interface unfolds into several types of interactions and activities. Most of these interactions and activities are mutually benefiting although not all of theses activities benefit equally to both the parties. Buffer Zone people of Bardiya National Park have utilized various resources

like grass, fodder, timber, firewood, thatch, medicinal herbs and many others from the park and have adopted livelihood options accordingly for their living. On the other hand, wild animals from the park enter the villages to fulfill their hunger and ruin the crops. Residents of the Buffer Zone also disturb the natural course of action of wild animals in the park (BNP annual report, 2067/68). Despite these ups and downs in the relationships both parties have adjusted or adapted their living in and around the park areas.

Impact of the park

The people of study area (Buffer Zone) are victims of a host of problems raised by National Park. It has created two types of- direct and indirect-impacts on the life of VDC people. These impacts are given in detail in the following subsequent topics.

Human casualty and harassment

Encounter with wild animals around the park are common. Incidents of being knocked down by wild animals such as elephants, rhinoceros, leopards and wild boars are often discussed by the villagers. Each year, villagers of Shivapur VDC unfortunately lose their lives due to attack of elephant and rhinos in Shivapur VDC. According to Annual Report of Bardiya National Park (2010/11), one of the villagers from Shivapur in 2006 A.D was attacked by an elephant who was seriously injured. Similarly, in the year 2009 A.D. one fellow from the same VDC died due to elephant attack. Similarly, in the year 2010/11 four villagers were killed by the attack of wild animals in the Buffer Zone. Three of them were killed by elephants and one by the rhino. Among them one victim was from Shivapur. In Bardiya National Park, the number of elephants and rhinoceroses has increased from 60 to 80 and 15 to 24 respectively in five years.

Local harassment is another problem. In the evening it is risky to come out of houses because the elephants, rhinos, wild boars and other animals are freely visiting the fields nearby. Chasing them away may be dangerous and one often hears about someone being mauled, killed, or eaten away by the carnivores. Therefore, people move in groups to chase the wild beasts away.

Crop damage

Household Survey and Group Discussion in the study area entail that the main animals for damaging the crops are elephants, rhinos and *chitals*. On the other hand, other many

animals like wild boar, porcupines, rabbits and monkeys with birds are also responsible to destroy the crops in Shivapur. Paddy and wheat ready to harvest are destroyed by elephants and rhinos whereas *chitals* damage lentil and mustard. Likewise, vegetable grown fields are completely destroyed by wild boar, porcupines and rabbits. Monkeys, on the other hand, destroy maize including fruits and vegetables. The villagers are unwilling to grow wheat and maize because of such animals. The production of major crops and proportion damages by wild animals is given in the Table 1.

Table 1. Crop damage by wild animals

Crops Type	Number of Households	Production (in quintal)	Average Per Household	Crop Damage (in quintal)	Crop Damage (in percent)
Paddy	104	1800	17.30	1213	67.4
Wheat	90	950	10.56	855	90.0
Mustard	103	300	2.91	180	60.0
Maize	30	50	1.67	40	80.0
Vegetable	50	30	0.60	19	64.3

Source: Field Survey, 2011

Table 1 shows the amount and types of crop production by household and the destruction caused by wild animals in a year. The highest number of household i.e. 104 and 103 grow paddy and mustard respectively and the production of each is 1800 and 300 quintals respectively. Of the total production about 67.4 percent paddy and 60 percent mustard is damaged by the park animals. Among the above mentioned crops, the destruction of wheat is more than that of other crops. Above 90 percent production is ruined by the animals. Only 30 households grow maize as maize is the most favorite food for animals and it is largely destroyed by wild animals. About 80 percent of the total production of maize is destroyed by them. The percent of damage of crops by type is shown in Figure 2.

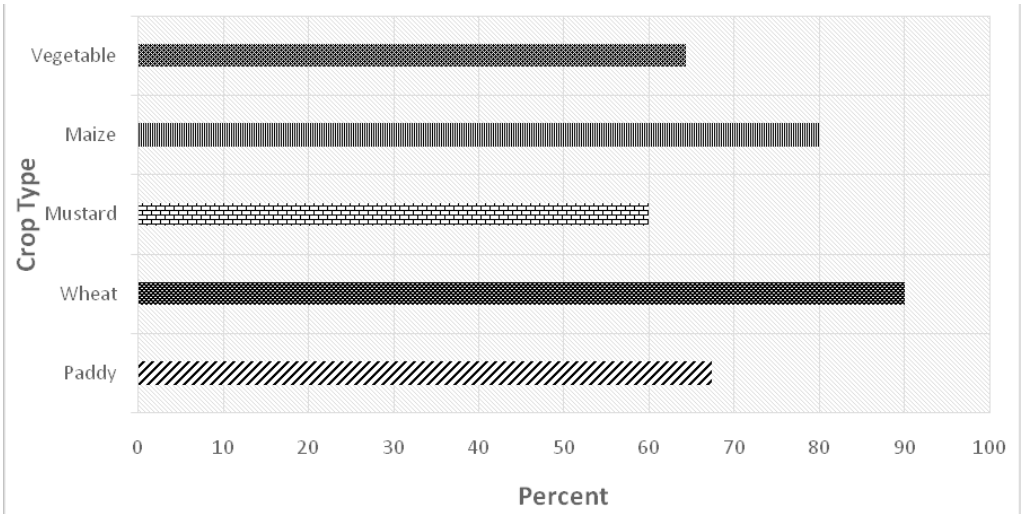


Figure 2. Crop damage (in percent)

Livestock depredation

Most of the farmers keep their own livestock. Cattle are an essential part of the Nepali agriculture system whose manure is used in the farms and he buffaloes and oxen are used for ploughing and transportation. Along with the problem of crop damage, livestock depredation is a severe problem in the study area. Livestock killing by carnivores has become a subject of discussion among villagers. About 10 percent villagers even expressed their feeling that hunting wild animals should be permitted in view of the loss incurred, which sometimes has cost them their income of a whole year or even more.

Domestic animals are restricted for grazing in National Park area so people take their animals for grazing to the open fields around their locality. Here mostly carnivorous wild animals like tigers, leopards and jackals make an encounter with domestic animals. Table 2 shows the number of animals encountered by wild animals on domestic animals in last five years in the study area.

Table 2. Number of livestock depredation by wild animals

Type of Livestock	Number	Number of Depredation	Percent
Cows	151	6	3.69
Oxen	122	4	3.28
Goats/Sheep	463	51	11.01
Pigs	78	6	7.69
Chickens	826	16	1.93
Total	1640	83	5.06

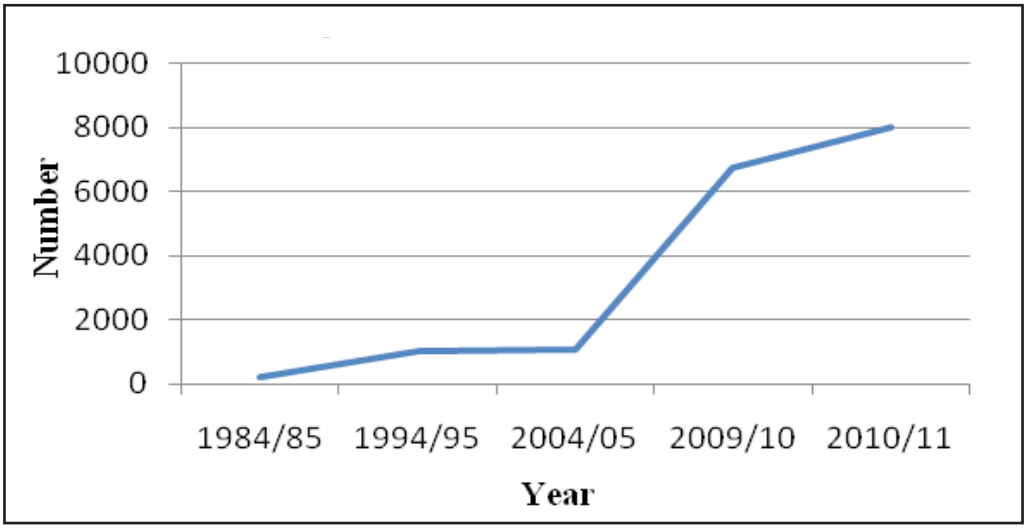
Source: Field Survey, 2011

Of the total 144 animals, 83 are killed among cows, oxen, goats, sheep and chickens. The depredation of goats/sheep by wild animals is higher than that of other animals. Of the total 463, about 51 goats/sheep are killed which occupies 11.01 percent of the total killing. Similarly, the killing of pigs come in the second position i.e. about 7.69 percent are killed by park animals. In total 5.06 percent of livestock are killed by these animals.

Tourism

The number of tourist visiting BNP has increased from only 212 in 1984/85 to 8025 in 2010/11 (Figure 3). As a tourist spot of Nepal, tourism is gaining momentum in ThakurdwaraVDC in BNP every year. Shivapur is the adjacent VDC of Thakurdwara, the people of Shivapur are gaining its benefit on their social life after the establishment of the park which has brought about a great change in their culture, language, even in daily activities. For instance, the teenagers, after their schools, join a job in the hotels or lodges in Thakurdwara which has helped to improve their livelihoods.More than 200 villagers are engaged in tourism. While some of them are badly encouraged to take smoke and use hashish. After all they help their family throwing their earning from tourism. The prices of essential items have gone up due to the increased flow of tourists here. So, National Park has both positive and negative impact on their livelihood.

Figure 3. Number of tourist



Human impact on the national park

Human impact has long-term consequences on the ecosystem of Bardiya National Park. Before the establishment of the National Park, there was some kind of positive interaction between the local people living in close proximity to the forests, because they utilized the land and resources there. Forest is the home of wildlife and resources, so the forest is used by both human beings and wild animals. When there is utilization of the same resources by two kinds of individuals, there is interaction and competition between them. While entering the forest to fulfill their requirements, people usually damage and destroy the habitat of wildlife and these animals do not tolerate human interference. These animals also cause economic losses through their raids into the farm lands and villages. People sometimes kill the wild animals and harm the miscellaneous forest products. The park once was utilized as common place for commercial forestry by the local people. So, clearing of forest land for agriculture, grazing of livestock, lopping of trees, burning of grasses, and collection of thatch have all contributed to the formation of the present environment of the park. Of the major impacts in the study area is the illegal exploitation of park resources by villagers living adjacent to the park. According to the information obtained, the human impacts to park listed by the local people are as follows:

Hunting and poaching

Indiscriminate poaching of wild animals such as sambar (*Cervusduvauceli*), bluebull (*Baselaphustragocamelus*) and sloth bear (*Melursusursinus*) has reduced the size of their population. Poaching of endangered species such as tigers (*Patheratigris*) and leopards (P*antheraparadus*) by poisoning are frequently suspected to occur in the park. Cases of rhinoceros (*Rhinoceros unicornis*) and tiger poaching have also been recorded in Bardiya National Park (Upreti, 1994). According to annual Report of Bardiya National Park 2067/68, 57 illegal activities like hunting, poaching, wood thefts etc. have occurred during the year. Of the total such activities, 17 are related to hunting and poaching and one of which happened in Shivapur. Due to the fright of concerned security personnel of National Park, people seemed unwilling to provide the actual data on hunting and poaching during household survey. However, group discussion showed that some animals such as deer, rabbits, porcupines, bluebulls are killed during crop raiding.

Firewood and other forest products

The important resources required to make a living possible for the households in the Park neighborhood are a steady supply of firewood, construction and repair materials for their thatched house,timber for agricultural implements and other forest products. The main five items the local people extract from the Parks either legally and illegally are firewood, timber, thatch/grass and Babio. They also extract wild edibles such as mushrooms, roots and Siplicanas vegetables occasionally. The main park products used by households are shown in Table 3.

Table 3. Park products used by households

Item	Consumption per household per year	Collection from BNP per household per year	Percent of collection from NBP in total consumption
Firewood (kg)	3600	3400	95.00
Timber (m^3)	500	300	60.00
Grass (kg)	3000	2600	86.66
Babio (kg)	300	300	100

Source: Field Survey, 2011

As shown in Table 3 about 95 percent firewood requirement is fulfilled from the National Park. Rest 5 percent of the fuel wood needs are made from resources such as utilization of agricultural refuses, dung cake, bio-gas and trees planted on private land. Similarly, the National Park fulfills 60 percent timber needs of the household. About 73.3 percent households in the study area use thatch as roof materials which are extracted from the park (Paudyal, 2016).

Grazing/ encroachment

Livestock husbandry plays a valuable role in the farmer's economy. Nepalese farmers keep large numbers of domestic animals especially for the production of manure, food products. Cows provide milk, butter and other milk products. Other livestock such as buffalo and goat/sheep contribute as an important source of meat for dietary protein.

According to household survey, 95 percent farmers selectively stall-feed their livestock. Those animals which are not stall-fed are generally let loose in the morning and driven to nearby grazing grounds including forest, community lands, and agriculture fields during fallowing, and floodplains. Although illegal, some of these livestock are taken to the adjoining park land on almost regular basis. Even those which were stall-fed are generally taken to the nearby watering place. Green fodder, grass or leaves, are brought home for the stall-fed animals. Fodder is harvested from various sources depending upon the season, including nearby community forest, floodplains and farmer's own land. Although illegal, about 86.66 percent fodder is harvested from the park forests. The population of livestock captured is relatively high during the dry months of the year when people take their livestock inside the park for grazing when there is lack of the grass outside the park.

Forest fire

Forest fire is a desirable tool for management provided that it is scientifically used. It can be used to improve the quality of the natural habitats of animals and provide nutritional food to those animals. In Bardiya National Park and elsewhere, grasslands are set on fire illegally by villagers while collecting reeds during the grass-cutting season. It does help new grass and plants to grow but it also destroys plants and animals species. According to Tikaram Adhikari- the park warden, Bardiya National Park sets fire on grass once a year after the collection of reeds and thatch so that new shoots can grow easily.

Adaptive measures

To keep the wild animals at bay, villagers have applied a number of traditional techniques which were observed during the field survey. Some measures used in the study area are applied in collaboration with National Park by the villagers. National Park has invested some amount of money and rest of amount needed for it is spent by the villagers to construct the various items but for some, the community itself has funded. By the joint investment of National Park and community, barbed fence, machan and trench are constructed. For the construction of such things National Park provides technical support and essential materials, e.g. timber, wire. While community provides labour free of cost. For the protection of crops, the villagers become active. They individually use different techniques for this purpose. Scare crow, ringing bell, translocation and

killing are some of individual adoptive measures. The people have used the following techniques which are shown in Table 4.

Table 4. Measures adopted by people

Techniques	Units	Benefitted households	
		Number	Percent
Barbed Wire (km)	10	105	100
Machan (number)	12	98	93.3
Trench (number)	10	99	94.3
Scar Crow (number)	50	102	97.1
Ringing Bell (number)	2	5	4.8

Source: Field Survey, 2011

By the joint investment of National Park and Buffer Zone community barbed wire, machan and trench have been constructed. While observing these things in study area, cent percent sampled households are benefitted by Barbed Wire facility. Machan, one of the methods of protecting crops, has facilitated 93.3 percent households. About 94.3 percent households are involved in construction of trench in Shivapur. The more common techniques used by the villagers are scare crow, and ringing bell. Ringing bell, a new technique among other techniques, has been more popular in chasing the beasts. About 4.8 percent households in study area use this technique. The number and length of each technique is given in Table 4 in detail.

Although various techniques have been used by the villagers with joint venture of BNP to stop animal from entering the villages but these techniques have not completely worked. In other words, no technique is hundred percent effective to confine animals inside the park.

Conclusion

Park people interaction includes both positive and negative interface between the both aspects. People living adjacent to or around Bardiya National Park try to exploit the natural resource flora and fauna for their livelihood.On the other hand, Park stops people from doing such indiscriminate consumption of natural products. As a result, more interaction occurs between park and local people. For inhabitants of Shivapur

VDC forest products are taken for granted to them. When park authorities ban them from their traditional rights of using goods from the park they show their strong reaction and illegally enter the park.

On the other hand, the people have been the victims of a host of problems raised by Park since it has affected the people mainly in two ways that are characterized as direct and indirect impacts. The main impacts are human casualty, house and cattle-shed damage, crop damage, livestock depredation, incidences of spotted rule violations, local harassment and transition in socio-cultural rituals. There is no one way impact of Park to local people but these people have also affected the Park with their malpractice. The local people kill wild animals indiscriminately. Their illegal activities of hunting and killing have reduced the numbers of endangered animals like tigers and rhinos. People very often enter the park illegally for collecting firewood, thatch and forest products. They also set fire illegally in the forest due to which many innocent wildlife and plants get burnt.

The people of the study area have applied various techniques for avoiding the entrance and attack of wild animals so that human casualty and crop damage can completely be stopped. Barbed fence, machan, trench, scare crow and ringing bell are the techniques applied by the local people. For the very purpose, Park has assisted people financially or by providing essential materials from the park.On the whole, both the people of the study area and the Park authorities have struggled simultaneously for better livelihood and wildlife conservation respectively without disturbing each other as far as possible. Keeping the Conservation Areas intact without compromising the customary livelihood of the people in the vicinity has become an important issue of managing such areas.

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Obituary for a Cartographer – Indra Narayan Manandhar, 1941 – 2011

Indra Narayan Manandhar was born on September 7, 1941 in Jhochhen Layakusa, Kathmandu, Nepal. He died on June 26, 2011 in Kathmandu at the age of 70. He did Master's Degree in Geography from Tribhuvan University, Nepal in 1968 and M.Sc. in applied geomorphological surveys from International Institute for Aerospace Survey & Earth Science, The Netherlands in 1987. He joined Central Department of Geography, Tribhuvan University in 1973 as an Assistant Lecturer and promoted to Associate Professor in 1988. He had served the Central Department of Geography as a Head of the Department from 2003-2004. He had also served the Department of Geography, University of Bergen, Norway as the Visiting Professor (April-June, 1998).

An academic

Late Manandhar was one of the energetic and delightful geographers and professors at the Central Department of Geography, TU, Kirtipur, Kathmandu, Nepal with over 31 years of teaching and research experience. He was retired in 2004. He had more than 10 publications including articles in journals, books and newspaper articles. He had substantial contribution to prepare *Mechi Dekhi Mahakali* (District Gazetteer book of Nepal in four volume published by the Department of Information and Publication, Ministry of Communication, Government of Nepal in 1973). He had attended and contributed several national and international level seminars and conferences. He had

served as Editor for *the Himalayan Review*, the Journal of Nepal Geographical Society (1968-1974). He had completed more than 12 research projects.

A skillful cartographer

As a cartographer, he was involved in preparing and publishing maps such as Kathmandu City (1975), National Fertility (1981), Geomorphological map of the Hoya Hoya De Malaga, Spain (1984), and Election Profile (2000). He had organized and co-ordinated training programs on Desktop Cartography (1995-1996) in the Department.

An adventurous excursionist

Late Manandhar was an adventurous excursionist. He had organized excursion tours for the students of the Department almost every year and travelled extensively different parts of Nepal.

The Central Department of Geography has lost a prominent geographer who was highly committed for the development of geography education and research. The noteworthy memories of sincerity, frankness and friendliness he has left for us are unforgettable to follow. The department family members (CDG) extend their deepest condolence to his family.

Obituary for a Political Geographer – Mangal Siddhi Manandhar, 1941 – 2016

Mangal Siddhi Manandhar was born on May 11, 1941 in Jhochhen Layakusa, Kathmandu, Nepal. He died on July 1, 2016 at the age of 75. He did his first Master's degree in Geography from Tribhuvan University, Nepal in 1964 and also from the University of Kansas, Lawrence, the USA in 1969. He also did PhD from the University of Oklahoma, USA in 1973. He was honored by "*Mahendra Bidhya Bhusan*" for his Geography Master's degree in 1964 and for PhD in 1974, and Educational Medal in 1986. He joined the Central Department of Geography (CDG), Tribhuvan University (TU) in 1973 as a Lecturer and promoted to Professor in 1980. Late Prof. Manandhar had multi-dimensional personality.

A competent academic

Late Prof. Manandhar with over 35 years of teaching and research experience was one of the energetic, ebullient and delightful geographers at the CDG, TU. He had more than 40 publications including articles in journals, books and newspapers. In addition, he had written more than 12 mimeographs. He had contributed papers in several national and international level seminars and conferences. He had served as chief editor for *the Himalayan Review*, the Journal of Nepal Geographical Society (1975-1985) and editor of the CDG's Geographical Journal of Nepal (1979-1999). He also served as Member Secretary of the Nepal Social Science Research Council since 1981. He was the member of TU Senate, the apex body of Tribhuvan University, which is responsible to direct and

approve academic programs for TU. During his tenure in the CDG, he had led more than 36 research projects in different fields – environment, land use, settlement and market towns, hazard mapping, etc.

A receptive academic administrator

Late Prof. Manandhar had served as the Head of the Central Department of Geography, TU from 1987 to 1999. During his headship of the CDG, late Prof. Manandhar introduced recently emerging concepts, methods, and tools in the curricula of geography in higher education. He had introduced courses such as Geographic Information System (GIS) and Remote Sensing (RS) and other courses like mountain geography and applied geomorphology in the master's level curricula. With the support of National Planning Commission, Government of Nepal and UNEP-GRID, Bangkok/International Centre for Integrated Mountain Development (ICIMOD), the GIS/RS laboratory with well-equipped facilities had been set up in the CDG under his headship. He had been successful to generate financial resources for CDG through carrying out research and training activities. A series of training programs on GIS and RS for academics, academicians, policy makers, planners, technicians, and administrators working in the universities, government, non-government, and private organizations were organized during his CDG's headship. He had also tried to develop and strengthen relationships with different INGOs, NGOs, GOs and foreign universities for collaborative works.

A benevolent planner and decision maker

Late Prof. Manandhar had served the National Planning Commission of Nepal as Vice-Chairperson twice:once in 1994-95 and then again during April-October 1997. He had led the group involved in formulating the concept paper of the Ninth Plan for the country. Under his leadership as the Vice-Chairperson of the National Planning Commission he was instrumental to introduce some of the benevolent programs such as i) old-age allowances; ii) *Aphno Gaun AphaiBanau* (Let's Build Own Village by Ourself); and iii) capacity building of local bodies by making provision of lump sum financial grant to each Village Development Committee and local participatory approach across the country.

A bold academic and political leader

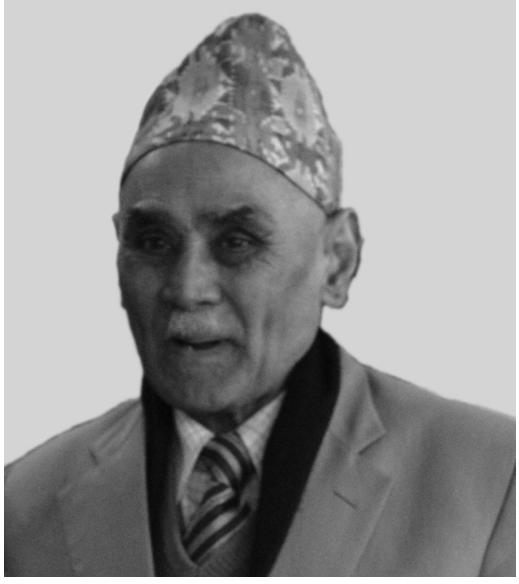
Late Prof. Manandhar had a quality of abled leadership. During his college time, he became General Secretary of the Student Union of Tri-Chandra College (1961-1962)

and also Executive Member of the Student Union of the Kirtipur Central Campus, TU from 1962 to1964. He served as the President of International Club of Oklahoma University, USA in 1970. He also became the President of Teachers' Association of Kirtipur Campus during 1981–1983 and Nepal University Teachers' Association during 1983–1985.

At the end of 1999, he got to be elected as the parliamentary member from Kathmandu-5 constituency representing the CPN (UML) party. He served as the Minister of Education and Sport in the transitional government formed during the years 2005-06 upon ending of historical people revolution.

The Central Department of Geography has indeed lost Prof. Mangal Siddhi Manandhar, a prominent geographer who was highly committed to the development, and strengthening of geography education and research. The noteworthy memories of sincerity, frankness and friendliness he has left for us are unforgettable to follow. The department family members (CDG) extend their deepest condolence to his family.

Obituary for an Agricultural Geographer – Soorya Lal Amatya, 1936 – 2017



Soorya Lal Amatya was born on March 3, 1936 at Kupandol, Lalitpur, Nepal. He died on February 4, 2017 at the age of 81. He did Master's Degree in Geography from M.S. University of Baroda, India in 1959 and also from University of Hawai, USA in 1964. He did his PhD from Banaras Hindu University, India in 1974. After his Master's degree from University of Baroda, he joined government of Nepal as section officer at the Ministry of Economic Planning for two years. In 1961, he joined Central Department of Geography, Tribhuvan University in 1961 as a Lecturer and promoted to Professor in 1980. Late Prof. Amatya had multi-dimensional personality.

A decent academic

Late Prof. Amatya was one of the active and ebullient geographers and professors at the Central Department of Geography, TU, Kirtipur, Kathmandu, Nepal with over 37 years of teaching and research experience. He had more than 18 publications including articles in journals, books and newspaper articles with major focus on cash crops, urban and rural development, and decentralization. He attended and contributed several national level and international level seminars and conferences. He also served as Chief Editor of *the Himalayan Review*, the Journal of Nepal Geographical Society (1968-1974). He had more than 12 research projects.

A veteran academic administrator

He had long experience of academic administration. He briefly served as Acting Head of Geography Instruction Committee, TU, Kirtipur (1971-1972). He had worked as Campus Chief, Kirtipur Campus, Tribhuvan University (1974-1975), National Programme Officer, UNICEF, Kathmandu (1976-1978), Deputy Director, Research Centre for Nepal and Asian Studies (CNAS), Tribhuvan University (1978-79), and Executive Director, Research Centre for Economic Development and Administration (CEDA), Tribhuvan University (1990-1993). After his retirement as Professor, he was appointed as Rector of Tribhuvan University in 2007 and served there for four years.

A voluntary intellectual

He was the president of many professional societies – Tribhuvan University Himalayan Club (since 1978), East-West Centre Association, Nepal Chapter (1988), Nepal Geographical Society (1974-1981), Nepal Council of World Affairs (1975-1977 and 1979-1981), Public Administration Association of Nepal. He was the Board Member of US Education Foundation, Nepal (1980-1982) and member of National Development Council, Government of Nepal (1992).

The Central Department of Geography has lost a prominent geographer who was very active in various fields of education, administration and research. The noteworthy memories of sincerity, frankness and friendliness he has left for us are unforgettable to follow. The department family members (CDG) extend their deepest condolence to his family.