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Life and Livelihoods in the 'Forbidden Kingdom', the Trans-Himalaya[1], Nepal

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Abstract

Rural livelihoods in Nepal are generally based on ecosystem resources. Despite a large number of studies on the Himalayan livelihoods, representation of the Trans-Himalaya, particularly Upper-Mustang, are rare. Such a scarcity could be associated with the fact that the place was isolated from the rest of the world and mainstream Nepali societies for a long time and also used to be known as 'forbidden kingdom.' This paper documents livelihood situation of Upper-Mustang in reference to the data collected in 66 households, in-depth interviews taken with 22 key informants, and focus group discussions conducted in 6 locations. Household livelihood system was studied with reference to five livelihood capitals, which were transformed into Livelihood Capital Index (LCI) at first and Livelihood Sustainability Index (LSI) later. Households in the Trans-Himalaya fulfill their livelihood requirement from multiple sources such as farming and livestock ranching together with small-scale enterprises, remittance and labouring. Overall status of livelihood capital is weak that cannot satisfy households' food and livelihood requirements. There exists inter-household variation in the status of livelihood capitals.

1. Trans-Himalaya is a northern frontier strip of Nepal that lies north of the Greater Himalaya and attached to Tibetan Plateau. Mustang and Manang is the biggest block of the Trans-Himalaya and in this paper, it refers only to Upper-Mustang, the study area.

The households with diversified livelihood options have relatively secured livelihood, although such security is relative to the households of Upper-Mustang. Considering the weak status of agro-livestock system, which is mostly associated with unfavorable geographic conditions and lack of agro-livestock service provision, the region has sound scope for tourism industries and production as well as marketing of medicinal and aromatic plants, and fruits. Therefore, there is a plenty of possibility of diversifying livelihoods, however, neither the communities are eager to do so nor the state policies are encouraging. Therefore, together with expansion and advancement of physical infrastructure, effective service delivery and provision for social welfare, government programs should be facilitative for optimum and sustainable utilization of ecosystem resources for the sustainability of household livelihood system.

Keywords: Livelihood capital, Sustainable livelihoods, Forbidden kingdom, Trans-Himalaya, Nepal

Introduction

A livelihood system of a household indicates its existing interaction with local environment.The availability of livelihood resources, shocks and stress, and coping strategies of individuals and households determine sustainability or vulnerability of livelihood system. This study sheds lights on livelihood situation of the Trans-Himalaya (Upper-Mustang), Nepal, the place from where studies in livelihood system are rare as the place remained as 'forbidden kingdom' for a long period of time. Livelihood perspective investigates a range of sectors and their interdependence onto social-ecological system. Hence, understanding household livelihood is an important component of rural studies since the findings provide feedback for poverty reduction policies and promote social-ecosystem-based livelihoods. The focus of this study is on status of livelihood capitals since recent publications such as Pandey and Bardsley (2015) discussed vulnerability context while Pandey (2016) presented the issue of food (in)security in the 'forbidden kingdom.'

The household livelihood is a concept that incorporates the interplay of many livelihood capitals, which vary across the space, time, and community. The heterogeneous Himalaya holds a range of social-ecological systems where a variety of livelihood sub-systems co-exist. Consequently, rural livelihood is a complex combination of varieties of resources and diverse interactions (Pun, Subedi, Pandey

& Pokhrel, 2009; Subedi, Subedi, Dawadi & Pandey 2007a; Subedi & Pandey, 2002).

Livelihood studies in Nepal is a not new attempt. Furer-Haimendorf's (1975) study on *Sherpas* of Khumbu region, North-eastern Nepal documented the practice of multiple livelihood options (agriculture, trade, mountaineering and animal herding together with migration to market centres). Bishop (1990) conducted research in Karnali region, North-western Nepal, and reported that people adopt a number of livelihood strategies such as intensive agriculture (despite unfavourable topography as area has only 1.13% of land suitable for farming) integrated with animal husbandry; home-industry (wool and herbal products); exploitation of the wild biota, and trade (control over important trade routes between the Ganges plain and Tibbet so their territory benefits), and seasonal out-migration for work. Ephrosine's study (1994) on *Rai* and *Sherpa* of Upper-Arun Valley found adoption of agriculture and animal husbandry, further supported by collection of forest food/herbs and working in trekking-tourism. Pandey (1998) found land use dynamics, intensification of use and rapid land use changes in Upper-Arun Valley whereas Subedi et al. (2007a) identified cereal crop-based subsistence agriculture, supplemented by remittances and off-season framing as livelihood options of the people in Mid-Western Nepal.

Despite considerable studies have been conducted on livelihood systems in Nepal, there is a unique spatial gap that Upper-Mustang is not covered. Therefore, this study intends to document livelihood-related picture of Upper-Mustang. In order to conduct research on the Trans-Himalayan livelihoods, next section develops a conceptual framework, which is followed by research methods. Section four of the paper elaborates the livelihood situation of the Trans-Himalaya and discusses results in relation to reviewed concepts and literature. Finally, the paper provides concluding statements together with some policy recommendations.

Conceptualizing Household Livelihoods

A livelihood is a way of gaining a living that can only be secured and sustained by utilization of multiple resources. It includes actions carried over a specific time by specific group of people to continue their lives. Since available resources as livelihood assets determine people living, its sustainability depends upon the interplay among livelihood capitals, structure and process, vulnerability context and coping and adaptive strategies.

The sustainability of livelihoods depends upon local, both formal and informal institutions (socio-cultural and politico-economic), the endowments, entitlements, and capabilities (Sen, 1989; Agrawal & Perrin, 2008; Leach et al., 1999; Ostrom, 1999). Poor regions tend to have less diverse and more restricted entitlements on livelihood resources, a lack of empowerment to cope with stress may challenge livelihood sustainability (Kelly & Adger, 1999). Similarly, Sen (1981) noted different food entitlement sources: own production, the income, gathering of wild food, community supports, assets, and migration. Since production and gathering-based entitlements are derived from ecosystem services so can be referred as environmental entitlements. However, fast growing trade-based entitlement and partly inheritance and transferred entitlements together with state or community support-based entitlements are also becoming alternative sets of food security mechanisms globally.

Scholars have contributed into conceptual and theoretical foundations of livelihood studies. The few to note are Sen (1985), Chambers (1986), Chambers and Conway (1991). A number of development and aid agencies such as UNDP, DFID, Oxfam International and Care International (Carney, Drinkwater, Rusinow, Neefjes, Wanmali & Singh, 1999; Sanderson, 1999; Scoones, 1998) have transformed theoretical components of livelihood system into a programmatic framework, which is known as Sustainable Livelihood Approach (SLA).

Sustainable Livelihood Approach

The World Commission on Environment and Development (WCED) in 1987 put forward the idea of Sustainable Livelihoods as a way of linking socioeconomic and ecological components in a cohesive policy structure (WCED, 1987). The United Nations Conference on Environment and Development in 1992 elaborated the concept by

incorporating it into Agenda 21, and advocating it as a tool for poverty eradication (UNCED, 1992). The SLA framework has the ability of integrating factors that allows policies to address development, sustainable resource management, and poverty eradication related issues simultaneously.The SLA seeks to understand the dynamic nature of livelihoods and the influences upon them and tries to build on the peoples' strengths and opportunities by emphasizing the importance of macro-micro linkages. Capra (2007, p.13) thinks sustainability as 'designed way of life' that includes the harmonic relationship of 'built' environment and socio-political and economic institutions, technology, with nature's ability to sustain life. Although the concept of sustainable livelihoods has been brought into development discourse in the late 1990s, it is not really a new concept for third world since 'livelihood in harmony with nature' has been practiced widely in indigenous communities throughout the world.

The sustainability of livelihood should be seen from wide perspective since it is a holistic approach to livelihood sustainability. The SLA expects interplay of assets, vulnerability context, coping/ adaptation strategies, and the structure and process of endogenous and exogenous factors creating sustainable livelihood outcomes (Figure 1). The SLA ignores conventional economistic approach of livelihoods by incorporating capability of using livelihood assets and activities to cope with and recover from stress and shocks and considers the vulnerability context as well as structure and process of policies. SLA also pays attention to the various factors and processes, which constrain or enhance poor people's ability to make a living in an economically, ecologically, or socially sustainable manner (Krantz 2001). Blaikie, Cannon, Davis & Winser (1994) also emphasize for the people's differential access to resources as a principle determinant of their livelihood sustainability.

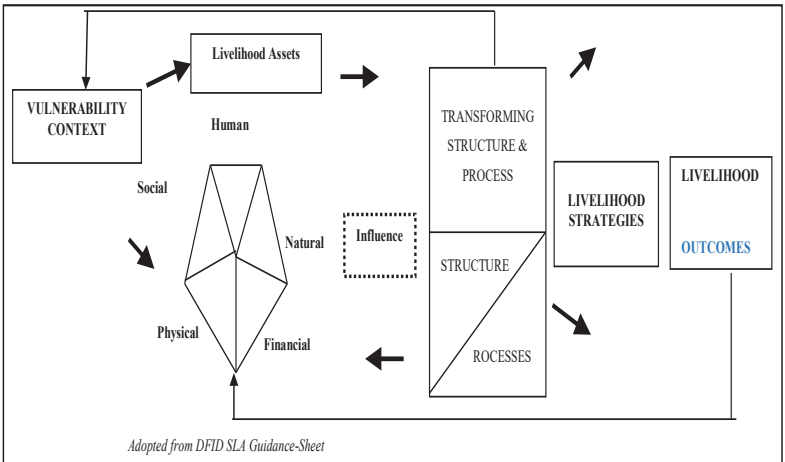


Figure 1: Sustainable Livelihoods Framework

Livelihood sustainability is an outcome of interplay of various livelihood capitals. Livelihood capitals are not exclusively separable, though often categorised into five types: human, social, natural, financial and physical (Chamber & Conway, 1991; Sanderson, 1999). Berkes and Folke (1994) labeled them into three groups: human, natural and cultural whereas Ostrom (1990) considered institutional capital in addition. There is a complex relationship among these capitals, which collectively produce a sustainable or vulnerable livelihood system.

Among the livelihood assets, human capital is the primary one. The social systems (also includes political institutions) contributes into innovation and technological development using human resources that further contributes for economic growth or generates financial capital (Adger, 2000). Osbahr, Twyman, Adger & Thomas (2008) demonstrated that agricultural initiatives, along with the reorganisation of social institutions and opportunities for communication, innovation and micro-credit facilitates were effective for livelihood restorations. Contrary to this, stresses and variability associated dependency in particular resource (Adger, 2000) increases the risk of livelihood insecurity. Auty (1997) argued that resource endowment and dependency of households explain some of the constraints on social capital development and the ultimate destiny of livelihood systems as well. Hence, diversified

livelihood options are significant for livelihood sustainability.

The vulnerability context in livelihood system can be defined as the conditions which constraints the opportunities of an individual, households, or community to benefit from available resources. The vulnerability context consists of long-term trends (climate, national politics and economic condition) as well as short-term sudden shocks (price hike, violence, sudden death of the bread winner) that affects people but people merely influence the vulnerability context in turn.

The structures and processes of the LFA are other components those determine the access of individuals or household to their assets. Structures are formal institutions such as government organizations, acts, bylaws, and regulation; whereas the processes are the rules of the game which are informally applied but has direct impact over the access to assets. Feedback loops in the SLA can be described as the outcomes of interplay of the components, which could be sustainable or vulnerable livelihood.

Although there are many components in SLA framework, this work focuses particularly on livelihood assets because recent works (Pandey & Bardsly, 2015) extensively elaborated the vulnerability context of the Trans-Himalaya and Pandey (2016) particularly focussed on food (in)security outcome in the same study groups. Since both of these works do not discuss livelihood resources of Upper-Mustang in details, this paper analyses livelihood capitals using following methods.

Research Methods[2]

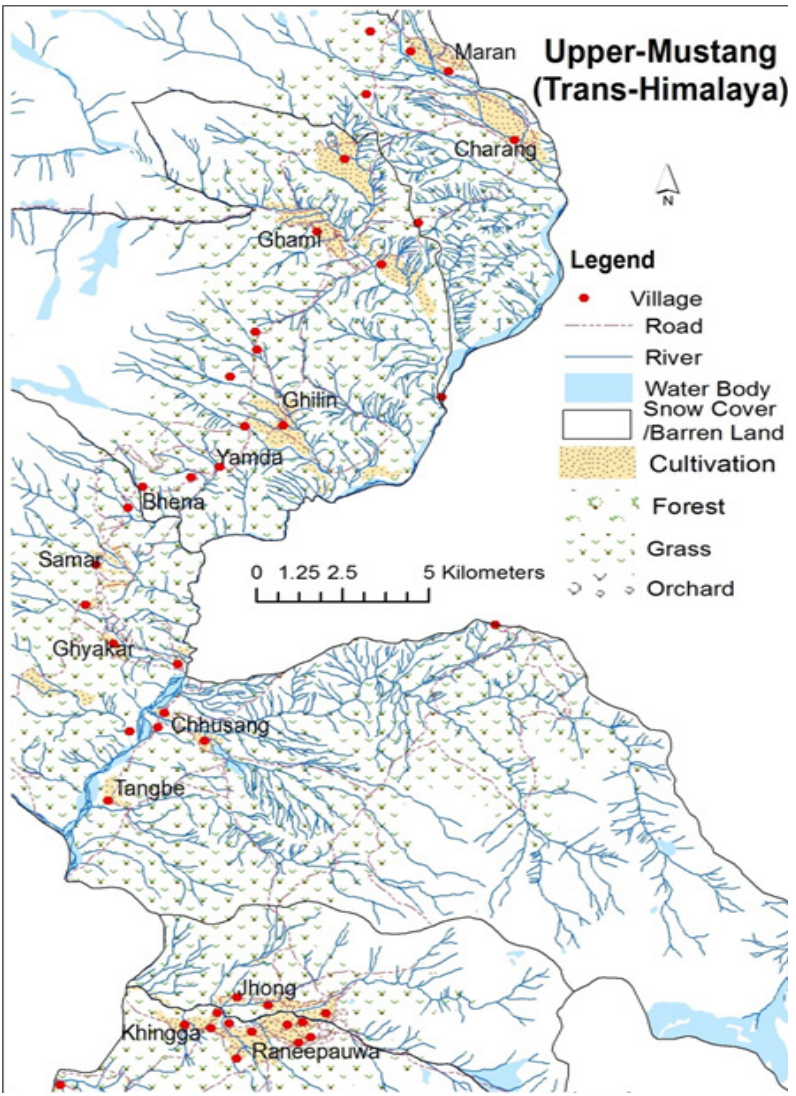
Location of the Study Area

The Upper-Kaligandaki Basin in the Central Himalaya, Nepal that is located in the Trans-Himalaya and also known as Upper-Mustang or as 'forbidden kingdom' is the site selected for this study (Figure 1). The site has human settlements located between the elevation of 3000 and 3900m.a.s.l..

The term 'Upper-Mustang' covers relatively larger part in the context of administrative division, however in this study, the settlements located above 3000 m.a.s.l. are considered. The area is mostly

2. Information provided in this section may overlap with published paper Pandey (2016) since the data used here are from the same project.

barren and rugged so cultivated farmland is limited; however, small fields are managed almost as fertile oases. Therefore, the place is called 'Mustang' that means 'fertile plain' in the *Mustangi* dialects. The region is sparsely populated so has 2456 (1294 females) people in 752 households with an average of 3.3 persons per household (Table 1).



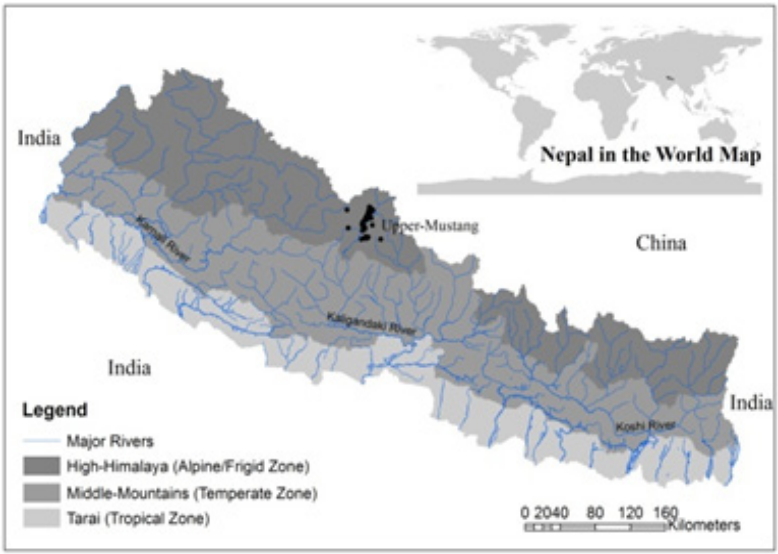


Figure 2: Location of Upper-Mustang in Nepal

Sample Size and Method of Data Collection

As the place is sparsely populated, a total sample size of 85, using representative sampling process, was calculated from the total households (N = 752) using confidence interval (e) = 0.10 (10% error), significance = 0.05 (95% confidence level), and estimated probability of success (p) = 50% values at first. Due to unfavourable weather conditions and inaccessibility during the field work, some of the settlements could not be accessed. In addition, respondents from some of the sampled households did not give consent for face-to-face interview. As a result, the actual sample size rested on 66 households. The households for face-to-face interviews were randomly selected while respondents from the sampled households were mostly the heads of households. Of the total, almost 30% of respondents were females. The questions included in the household interview schedule were related to social-demography and livelihood capitals, and coping strategies adopted during the period of food and livelihood insecurity.

Table 1: Demographic Characteristics of the Population in the Trans-Himalaya, Nepal *(Source: *CBS 2012; ** Field Survey, 2013).*

Variables	**Population Census 2011***	**Sample House-holds****
Number of House-holds	752	66
Total Population	2456	392
Male	1162	212
Female	1294	180
Sex Ratio (Number of male per 100 female)	89.8	117.8
Household Size	3.3	5.9
Dependency ratio	Na	39.5

Dependency ratio[3]

To complement the quantitative data collected at households, qualitative information from a total of 6 Focus Group Discussions (FGD), and 22 Key Informant Interviews (KII) was also collected. The qualitative information collected was compiled and used to support quantitative data during the analysis. Field work was conducted in June 2013 by the author and 2 enumerators for 12 days, graduated in social sciences and have few years of experience in conducting field research. This research obtained ethical clearance from the University of Adelaide, Australia.

3. Dependency ratio is defined as the ratio between economically active (working age population) mostly aged 15 to 59 years) and non-working population (aged below 15, and 60 and over) adopted by Central Bureau of Statistics, Nepal (CBS, 2012). Though, it has many limitations in terms of economic/livelihoods dependency. For an example, the remittance earners (retired and over 60 years of age) in many cases (retired military of British Gorkhas) may earn more than many of working age individuals and can bear the other dependent.

Method of Analysis

The livelihood resources have been analysed using descriptive statistics. In addition, each variable belonging to different livelihood capitals is transformed into indexed values at first using max-min method then Livelihood Capital Index (LCI) and Livelihood Sustainability Index (LSI) later. The mean of all the indexed-values of particular livelihood capitals is accepted as LCI for particular capital (human, social, natural, financial and physical) while mean of five LCIs is the LSI. The measurement is relative to the studied households therefore it provides only the picture of Upper-Mustang so the index-values are not much relevant to compare with the values of other places. The Livelihood Capital Index (LCI) calculation process includes:

Equations:

$$\text{Index } Hv_1h_1 = \frac{Hv_1h_1 - Hv_1h_n^{Min}}{Hv_1h_n^{Max} - Hv_1h_n^{Min}}$$

Here, index Hv_1h_1 refers to the actual indexed value of 'variable #1' belonging to the 'Human Capital' (e.g. strength of labour force) in 'household #1; $Hv_1h_n^{Max}$ is the maximum value of labour force and $Hv_1h_n^{Min}$ is the minimum value of the same among the surveyed households. Using the similar method, index values for all the applicable variables were obtained. Afterwards, the mean of the various variables associated with particular livelihood capital {human capital index = (labour force index + health index + education and skill index) / 3} was calculated. By applying the same method, index values for different livelihood capitals were obtained. Here, Social Capital Index included the support received and or obtainable at the time of crises from kinship, extended family members, and neighbour as well as having a membership in community organization; Natural Capital Index included ownership of land, type and area of land, cropping intensity, fallow farmland, availability of irrigation, source of water for domestic use, availability and collection of various forest products, and livestock

size kept by the household; Economic Capital Index included food sufficiency status, indebtedness, investment, and stock of money and convertibles. Finally, Physical Capital Index included various household possession such as houses, vehicles, and equipment. The values of each LCIs ranges between 0 and 1, higher value is denoting higher status of particular capital. The average of all five capitals is the LSI that also ranges between 0 and 1, higher value is referring to higher level of livelihood security. The data analysis was performed in the SPSS.

Results and Discussion

This paper is presenting livelihood system of the Trans-Himalaya in reference to five livelihood capitals namely human, social, natural, financial, and physical. Major components of these capitals are elaborated below.

Human Capitals

Human capital includes the quantity (labour force), quality (education, health, skills), and behaviour of the human population (Subedi, 1995). Among which, labour force, education and skills, and health of studied population are covered by this study and are described below.

Labour Force

Labour force data (Table 1) of Upper-Mustang show 5.9 persons per household, which is higher than the national average of 3.3 persons (CBS, 2012). The studied households have smaller share of female population (45.9%) that is 118 males per 100 females. However, the dependency ratio is 39.5% and is lower than that of the national average of 43% (CBS, 2012).

Age structure is an important component of labour force analysis particularly for agro-pastoralist activities of Upper-Mustang. Figure 2 shows 8.7% young children of below 5 years of age while the proportion of older children (5-14 years) is 9.9%. Notably higher proportion of youths, aged 15 and 29 years (31.4%), also indicate prevalence of youth bulge in the Trans-Himalaya that could be transformed into human capital by guiding them properly. In addition, almost one-fourth of the total is working population of

(30-44 years of age) and 15.6% is older adults belongs to 45 and 59 years of age. There are 10.1% senior citizens of 60 years of age or above. Except in the age groups of 45-59 and 60 and above in which female population outnumber males, all of the other age groups have higher number of males. The share of aged population is higher than the national figure of 8.14% (CBS, 2012) in the Trans-Himalaya, indicating higher need of social security and welfare support.

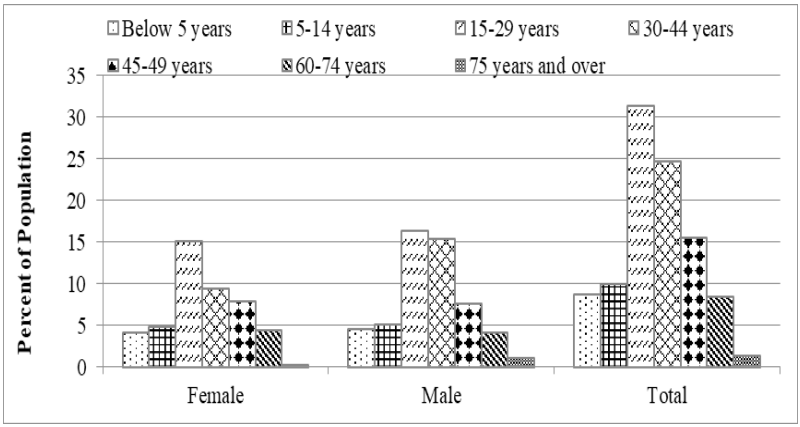


Figure 3: Age and Sex Composition of the Population in the Trans-Himalaya, Nepal *(Source: Field Survey 2013).*

It is identified that the population of the Trans-Himalaya is declining[4] and it is reflected in the age structure of population as well. The proportion of the young population is small and higher share of older children and elderly population is increasing the problems in day-to-day activities as the area has poor accessibility and lacks many basic services.

Educational Status

Literacy status of studied population shows 83% literate people (Figure 3) and it is higher than national average of 65.9% (CBS, 2012). However, the level of educational attainment is generally low, with the majority (58%) having received only primary education,

4. Altogether 27 districts including Manang, Mustang recorded negative population growth rate in last decade: 2001-2011, by up to -31.80% in Manang in last decade for example (CBS, 2012), and the decrease is continued from 1991 in Manang and Mustang (CBS, 2001; CBS, 2012).

followed by secondary (23%) and tertiary 2%. The proportions of female population are lower than that of males in every categories of educational attainment. Overall educational status of studied population is poor in terms of the requirement for white collar jobs.

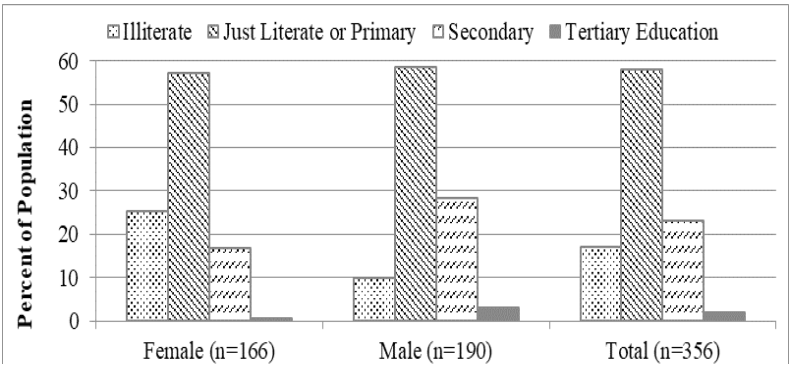


Figure 4: Literacy Status and Educational Attainment by Sex in the Trans-Himalaya, Nepal *(Source: Field Survey 2013).*

Health

Marx (1867) in his essay on 'working day' has interpreted health as a 'commodity' that can be transformed into economy. Health bears a significant role in earning livelihoods in labour intensive occupations (Pandey, 2008). The health status of sampled population shows 69 individuals (17.6%) out of total 392 people suffering from different health problems in the previous year of survey i.e. 2013. Among them, almost a half had flu related problems while 40.6% suffered from gastro intestine (diarrhoea, dysentery, worm infestation) problems. Gastro-intestinal problems are the major killer of humans in the developing world because of poor health and sanitation practice as well as poor quality of drinking water. It is common in the Trans-Himalaya as well despite area's cold climate. Furthermore, a total of 8.9% individuals in Upper-Mustang had chronic illness related to renal, cardio-vascular, respiratory, and neuron systems.

Human capital of Trans-Himalayan people is poor in general because of high dependency rate, low level of education, and prevalence of various health problems. During the focus group discussion, the participants generalised that having household member sick not only implicate into the sick him/her-self but also to other family members. Medical expense leads to financial burden on

the one hand and time for care giving reduces household income on the other.

Social Institutions and Social Capital

Social capital includes both tangible and non-tangible elements of the society that construct the social safety net (Adger, 2003; Pun et al., 2009; Subedi et al., 2007a; Tao & Wall, 2009). Therefore it is an important asset of livelihood systems. The social capital of the Trans-Himalaya is discussed in relation to extended family members, reciprocal relations and affiliation into Community-Based Organizations (CBOs).

Extended Family and Kin/Clan Networks

Links and attachments to extended families and kin/clan are valuable social assets of Nepali societies and cultures. Of the total, 45% households have reciprocal relations with their kin/clan who are living within neighbourhood or in adjoining villages. Other 25.5% respondents reported having satisfactory reciprocity despite the kin/clan are located in the cities or abroad. On the other hand 5.8% each do not have good reciprocal relations despite their kin/clan are located within the neighbourhood or at a day's travel distance. Furthermore, 17.4% households do not have satisfactory reciprocity with their kin/clan because they are living away, either in distant cities or abroad (Figure 4).

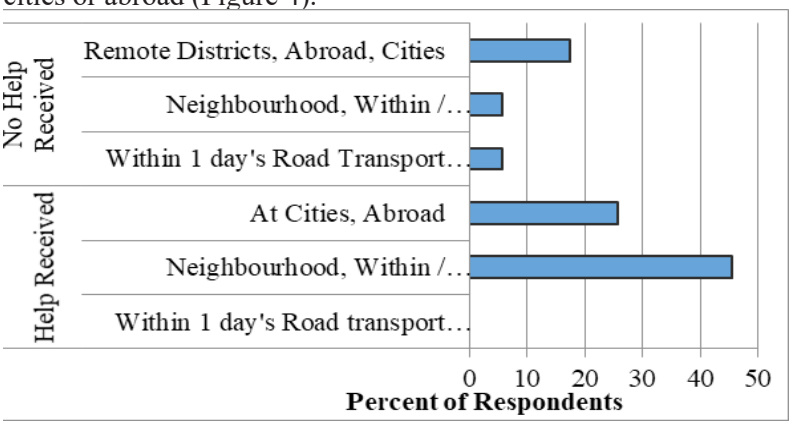


Figure 5: Distance to Extended Family and Kinfolk and the Status of Help Exchange in the Trans-Himalaya, Nepal *(Source: Field*

Survey 2013).

It is generally understood that physical distance and economic status of extended families kin/clan affect reciprocal relations. The people who have migrated out are those kinfolk who have relatively better economic status. Therefore the left-behind often expect support from the out-migrants. The respondents also reported the reception of help from the kinfolks who have moved away from the villages (mostly in the cities and abroad).

Neighbourhood Reciprocal Relations

The Trans-Himalayan, particularly the *Mustangi* culture is exceptionally good in reference to reciprocal relations. The example is that over 92.4% respondents reported having good reciprocal relations with their neighbours. Another 1.5% respondents reported that they receive support from neighbours only in the case of emergencies, while 6% households do not get any help.

Affiliation to Community-Based Organizations

Membership of Community-Based Organizations (CBOs) brings a sense of belonging among the members. Such membership advances the scope and broadens the horizon of social networks, and increase the probability of obtaining help in the times of crisis. Almost three fourths households of the Trans-Himalaya are affiliated to some sort of CBOs. However, the type of the CBOs they are affiliated is mostly the indigenous or traditional groups and affiliation in such groups is generally compulsory. A key informant elaborates that:

> … villages in Upper-Mustang have *Gau Mukhiya*, who used to collect revenue from the people and deposit to the government account in the past (this role is not assigned to *Mukhiya* at present since local council does the task). The *Mukhiyas* are powerful as they regulate social activities and traditional justice system in their jurisdiction. *Mukhiyas* usually resolve the disputes and informally govern the cluster (*gau*). *Mukhiya* is chosen by consensus among the villagers through a meeting. The fine (local revenue against various misconducts) collected from the villagers is utilized as village development fund. That fund is equally distributed to the households as borrowing until sum of money required for specific purpose is accumulated. The *Mukhiya,* in consensus with the villagers, specifies the crop calendar, specifically sowing and

> harvesting periods, just before such seasons arrive. As a result, households do not have freedom of sowing or harvesting crops whenever they desire….

The analysis of social capital above shows generally rich status in Upper-Mustang in terms of its quantity, but quality aspects are not evident. The available kinship and social networks and associated reciprocity are inadequate because many of the households who are economically strong live in the cities for the most of the time while poor living in the villages are always in scarcity so they cannot provide material help to each other, although that is crucial.

Natural Capital

Natural capital is a set of environmental resources that supplies goods and services for human and non-human life (Daily, 1997; Ekins, 2000). It is a primary source of livelihoods to rural people globally. Land, water, forest and pasture resources are contributing for the Trans-Himalayan livelihoods so they are discussed below.

Land Resource and Use

Inheritance practices in the country have given access to land to its 70.6% households (CBS, 2013) and almost all households of the Trans-Himalaya own some land. Notwithstanding proportion of studied households are the owner-cultivator so the tenancy arrangements are uncommon. Nevertheless, a few households (4.5%) have rented their land out while 7.6% have rented it in. However, these tenancy arrangements involve only a part of household's land. Lower level of practice of cross-tenancy in Upper-Mustang is associated with area's tradition of encouraging for owner-cultivation. A Key Informant from Jhong village stated that:

> … the *Mustangi* indigenous governance system does not support for changing land-tenure right (entitlement) in general. If particular household could not cultivate the farmland, the land will remain fallow and the user right of irrigation of the plot-owner is delisted for corresponding year/season …,

Despite there is a good access to land, the plot-sizes are generally small in the Trans-Himalaya. Mean sizes of entitled and owned lands are 0.7256ha and 0.6979ha, respectively, with standard deviations of 0.6812ha and 0.6931ha, respectively. The size of land

available to households is insufficient to secure the livelihoods from farm-based activities. It is particularly because the area consists only-one cropping season and has limited irrigation facilities. Highly rugged topography, high rate of erosion, and excessive level of suspended particles in irrigation water demand for higher level of efforts for farm-management and maintenance of irrigation infrastructure in Upper-Mustang. Overall outcome is that the farm-output is often inadequate to pay the production-cost.

Water Resource and Use

Water as a natural resource carries immeasurable importance for life system. Only surface runoff (streams) for irrigation, and natural springs and streams for domestic use are available sources of water in the Trans-Himalaya. Out of the total, 94% households use water channelled from nearby streams for irrigation. Similarly 95.5% households fetch water from public taps for domestic use. Since there is no other sources of water. However, there is no major change in the source of water in the last decade. Out of the total farmland, only about 60% is irrigated.

Use of Forest and Grazing Resources

Many researchers have noted that rural peasant households in mountain area draw a sizable portion of their livelihood resources from forest (Ephrosine, 1994; Subedi & Pandey, 2002). However, as Upper-Mustang is located at high altitude with semi-arid climate, quite a little natural forest (alpine needle-shrubs) exists there and has limited scope of collecting edible items from the forest. Yet, some households (41%) collect medicinal and aromatic herbs from the forest and pasture land, the excess amount from household consumption is sold in local market (hotels) and occasionally to hawkers to earn cash. Moreover, higher proportions of households rely on agricultural residues and on private forest as well as on community forest for fodder, forage, firewood and building materials. The proportion of households relying in community forests for firewood is 28.8%. Pasture resource for grazing animal is another natural resource that over two-thirds (69.2%) of households of Upper-Mustang are utilizing. The participants of the FGDs stated that small herds of livestock graze on nearby public pastures or

private land while households with large herd-size hire herdsmen who take the livestock to the alpine pastures.

Economic / Financial Capital

Financial capital includes stocks and flow of money, convertibles and precious metals, and livestock and household possessions. However, many households of Upper-Mustang did not report the possession of strong financial capital and it is discussed in relation to occupations of labour force, livestock and poultry kept in the households and other household possession as well as self-reported economic status of households.

Occupational Status of Population

The majority of households of Upper-Mustang have marginal[5] (52%) or small (45%) size of land holding and it contributes little to their livelihoods (Table 3) although they report 'farming' as their primary occupation. A total of 45.2% population of Upper-Mustang reported their engagement on crop-livestock activities. Of the total, 15.1% engaged in business/entrepreneurship while wage laboring is adopted by 12.2%. A few households reported having household member working abroad (5.9%) and sizable proportion of population do not do particular economic activity, however are students and they assist in household chores. The students and minors, 17.2% of the total population of Upper-Mustang, engage in household chores, which is a typical phenomenon in Nepal that makes it possible that other members of the household can work to earn livelihoods (Onta & Resurreccion, 2011; Subedi et al., 2007a). The assistance the students and minor provide makes a significant contribution to sustain agro-livestock-based livelihoods of the Trans-Himalaya.

5. Holding size categorization is based on NRB 1991: Marginal holders – households with holding of less than 0.5 hectare; Small – 0.5 to 2.0 hectare; Medium – 2.0-4.0 hectare; and Large – 4.0 hectare and larger.

Figure 6: Occupational Status of Population by type of Occupation and Ecological Zones *(Source: Field Survey 2013).*

Livestock and Poultry

Livestock is an integral part of livelihoods in farming households. Livestock also provides regular income together with contribution to household food security, supplying manure for better farm production, and also helps household earns cash through draught power. Selling livestock for cash is also a common coping strategy of rural poor whatever the source of livelihood stress is (Davies et al., 2008; Ellis, 2000; Subedi & Pandey, 2002; Subedi et al., 2007a). Considering the importance of livestock in household livelihoods, most households (83.3%) of the Trans-Himalaya are keeping cows, mountain goats, sheep, horses and mules, and Yaks/*Jhocpos*[6] (Figure 6). The horses and mules are the means of transportation so they earn cash to buy as well. Poultry, goats and sheep are the major sources of cash income[7]. Higher numbers of goats and /sheep substantially

6. *Jhocpo* is a cross-breed of cow and yak. Cows cannot adapt at high altitude, and yaks cannot adapt at lower altitude (even around the human settlements of Upper-Mustang, which are located up to 3900masl). *Jhocpoes are* well adapted to the altitude of human habitation so farmers prefer to keep *Jhocpoes*.

7. The local free range chicken meat costs more than NPR500/kg ($6) and the male goat (mutton) costs over US$8/kg. An adult mountain goat or male goat costs around NRP18000, equivalent to one month salary of junior-officer of government job.

increases economic status of households[8]. However, livestock is sensitive to extreme weather events of the Trans-Himalaya. Livestock is typically not insured so this form of wealth creation is not risk free as livestock death associated with extreme weather events and wildlife depredation are common, the FGD participants stated. Furthermore, there was a high level of consensus among the FGD participants that contribution of livestock to household livelihoods is continually eroding because of declined size of herds, almost abandoned *transhumance* practice, and reluctant youths in agro-livestock activities in Upper-Mustang.

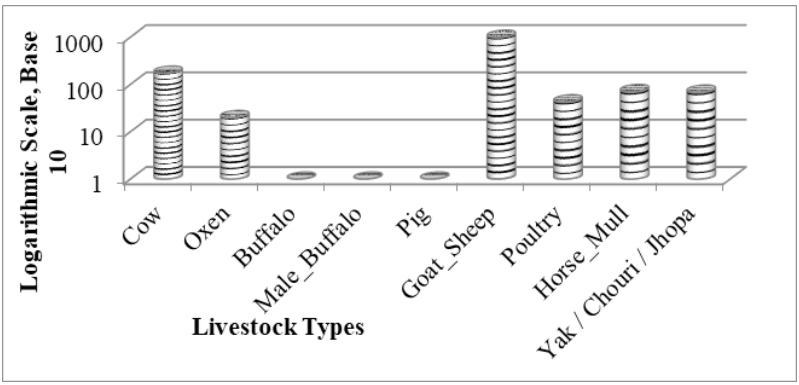


Figure 7: Number and Types of Livestock Kept by Households in the Trans-Himalaya, Nepal *(Source: Field Survey 2013).*

Household Possessions and Perceived Economic Status

Possession of household appliances and valuables can contribute significantly to household livelihood security by hiring them out, or strengthen social networks by swapping them among the households. The possessions and valuables the households of Upper-Mustang hold are categorised into 8 types[9]. Among them, alternative source of energy (solar) is installed in 51.5% of households although solar

8. Some of the households own over 250 mountain goats, an accumulation of about 3.75 million Nepali Rupees (US$37,500), which is quite big in the context of Nepali rural households.

9. Alternative energy (Bio Gas, Solar), means of information and entertainment (Radio, Television), means of communication (Telephone, Cell Phone), means of motorised transportation (Four Wheel Vehicle), means of non-motorised transportation (horse, mull), and valuable metals (gold).

energy is only to heat water using an inverse umbrella device. Radio or television as a means of information and entertainment is available to 62.1% households while over three-fourths (77.3%) households own cell phone for communication. Of the total, 18.2% households own motor vehicles since recently constructed rural roads in the Trans-Himalaya have increased the scope of transportation entrepreneurship. Additionally, motorcycles are becoming convenient private vehicles since area's poor access to public transportation has increased their scope. Consequently, 31.8% of households own motorcycles. Some of the respondents stated that horses, the traditional means of private transportation, have mostly been replaced by motorcycles. The participants of FGDs indicated that motorcycle, mobile, and money (3M) have diverted young generation from agro-livestock activities. The key informants also stated that as motorcyclists cannot drive the herds, the size of grazing-herds is decreased. A similar problem in Tibetan pastoralists' community is also reported by Yeh at al. (2014). Moreover, many farms in the Trans-Himalaya lack modern farm-equipment. Area's unfavorable terrain and limited cropping season might implicating onto households not possessing agricultural equipment. Furthermore, perceived economic status of studied households shows a predominance of middle-class (76%), followed by poor (18%) and upper-middleclass (3%) in the Trans-Himalaya. The households possess quite a little convertibles such as gold, making overall financial capital weak that cannot compensate the inadequacy of other livelihood assets. So far the discussion has focused on the capitals wholly in the private domain, following section considers physical capital of private and public domains that investigates if it can buffer other assets presented above.

Infrastructures and Physical Capital

Physical capital mostly denotes public utilities and infrastructureof public domains: roads and transportation, schools, water supply and sanitation provisions, health facilities, and other extension services such as agro-veterinary service centres and farm-product marketing mechanism together with private houses and residential arrangements. As public utilities and infrastructures are limited in the Trans-Himalaya, physical capital of private domain also briefly discussed here.

Physical Assets of Private Domain

Housing is more than a home-space or shelter since it provides social prestige and can be used as an economic space by running micro-enterprises. The dominant proportions of households (95.5%) of Upper-Mustang own a private house, which is more than the national average of 85.3% (CBS 2012). The rest of the households are living in rental arrangement. The dominant construction material of house-buildings is 'non-concrete' (57.6%), followed by mud-stone (37.9%) and concrete (4.5%). Similarly, most of the house-buildings (75.7%) are two-storeys, followed by three (15.2%), one (7.6%) and four storeys (1.5%). The houses in Upper-Mustang are structured in such a way that livestock is kept at ground floor and people live at first or second level. This practice makes upper levels relatively warmer. Furthermore, of the total households, 43.9% have modern, non-flush toilet while 31.8% have pit latrine and 6.2% have modern flush toilets. The importance of toilet facilities in the context of a livelihood security is that they reduce the risk of waterborne diseases, which in turn reduces medical expenses on the one hand and loss of working-day due to illness on the other. However, almost a fifth household lacks toilet in Upper-Mustang.

Physical Assets of Public Domain

Access to public services reduces with increase in distance from the state or regional capitals. The Trans-Himalaya is located at the remotest parts of Nepal therefore lacks most of the basic services (Table 2). Only primary schools are located within the accessible distance but access to secondary school is poor. Seasonal unpaved roads connect major villages although public transport is infrequent and unreliable. Local markets are accessible to most of the villages, giving farmers access to wholesale buyers for their excess production of fruit and vegetables. The price given by such middlemen to various farm products is generally low, according to the respondents. Fruits (apple) and livestock (mountain goats) are major marketable products of Upper-Mustang. The monetary transactions are carried out in cash because banks are not accessible.

The study area lacks facilities to respond crop and livestock

diseases. Sanitation and hygiene are also poor in general, consequently prevalence of water-borne diseases are reported by notable proportion of households. Furthermore, not having an effective emergency response mechanism and poor road transportation make it difficult to access health services. The hospitals are located at considerable distance from the villages and each of the villages only has a sub-health-post[10] run by an assistant health worker (para-medic). As inhibited in the Table 2, access to physical facilities and public services are notably poor in Upper-Mustang.

Table 2: Accessibility to Public Service and Service Centres in Various Locations of Trans-Himalaya, Nepal *(Source: Field Survey 2013).*

Types of service/ facility available	Major Settlements			
	Chhusang-3, Chhusang	Muktinath-4,5,6, Jharkot	Jhong	Ghami
Primary school	A	A	A	A
Secondary school	3	2.5	2.5	NA
All season Motorable road	NA	NA	NA	NA
Dry season Motorable Road	A	A	A	A
Safe shelter for emergency	NA	NA	NA	NA
Local market	A	A	A	A
Banking facility	2*	3	3	NA

10. Sub-health-post is the smallest health service structure under government health service mechanism that runs by semi-trained health professional and provide basic treatments of general health problems. The hierarchy structure is: sub-health-post (out-patient health service from assistant health worker) → health-post (out-patient service from health worker) → health centres (mostly out-patient service with few in-patient services, led by an MBBS Doctor (GP), district hospitals → regional hospitals → and the central hospitals.

Milk Dairy/collection	NA	NA	NA	NA
Agro-product collection centre	NA	NA	NA	NA
Agriculture /Veterinary service	NA	NA	NA	NA
Wizard/ traditional healer	A	A	A	A
Health Post	A	A	1	1*
Hospital	2*	3	3	NA

Note: A= Accessible within 30 minute walk, NA= Not Available within 1 hour walking, 'number' = total walking distance required to get the service, * Available after mentioned hours of public transport

Social Security System

The state can be a critical institution for livelihood security of its citizens by providing support during the period of crises (Barnett & Adger, 2007). Social protection helps poor people expand their assets, use the assets efficiently, adopt better strategies and enhance adaptive capacity (McCarthy et al. 2001). Nepal, however, lacks an effective social protection mechanism. The Government of Nepal provides minimum economic support to the needy individuals through unemployment benefits, soft loan and grants to obtain skills and training, loans to start entrepreneurships (especially for youths), social security pension (for elderly, single women and physically-challenged individuals, as well as to people of remote area). The Social Security Allowances commenced since 1994, initially through a provision of a universal flat pension of NRS 100 a month to the elderly (75 years of age and over). The allowance amount has gradually been increasing and since 2008, the age threshold was also reduced. It is 60 years for people of deprived communities and area such as elderly of *Dalits* communities and the citizens of Karnali Zone while it is 70 years to the elderly of other places and communities. No age threshold is imposed for single women, endangered races and the disabled. Disabled benefits, however, are limited to a certain number in each local council.

The status of physical capital in Upper-Mustang is found to be poor that cannot buffer the inadequacy of other assets of

private domain, although physical asset meant to do that. In such context households livelihoods of Upper-Mustang is at the risk of vulnerability.

Assessment of Livelihood Capitals and Livelihood Security

Livelihood assets of households has been discussed extensively above. The assets were assessed in an index-value relative to other households of the region. The mean indexed values of different livelihood capitals ('0' weakest to '1' strongest) show poor status of all assets and they are: Human = 0.333, Social = 0.501, Natural = 0.111, Financial = 0.604, and Physical = 0.352 (Figure 7). The Livelihood Sustainability Index (0 refers to the highly vulnerable and 1 refers to sustainable) for the Trans-Himalaya is 0.380 indicating the livelihoods at risk of vulnerability. The agro-based livelihoods of Nepali rural households experienced persistent change, and it is also true for the Trans-Himalaya as well since contribution of non-agro-based activities in households' livelihood is increasing while of agro-livestock is decreasing (Table 3). Furthermore, collection and marketing of medicinal and aromatic plants, which is one of the major strategies of ecosystem-based livelihoods also lacking in Upper-Mustang.

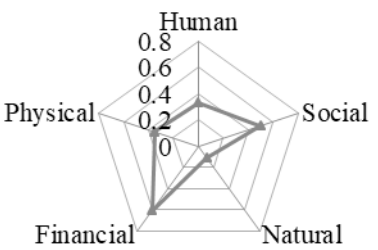


Figure 8: The Mean of Livelihood Capital Indices in the Trans-Himalaya, Nepal

There is inter-household variability in the status of different livelihood capitals (Figure 8) that shows households' variable ability to deal with stress and shocks and benefit from various opportunities. Admittedly, the studied communities are relatively rich in social capitals, there is highest level of variation (0.1464) in Social Capital Index (ranges from 0.050 to 0.800). Social capital alone is not to deal with livelihood requirement because many of the households lack minimum basic needs so they cannot help others materially. It shows that economic poverty makes households compromise mutual assistance within the neighbours. It is also because that the better-off households have already migrated to cities such as Jomsom, Pokhara or Kathmandu, such migration has made the situation worse should the left-behind required emergency support. The variation in index-value is the least for Human Capital Index (ranging from 0.209 to 0.528), indicates grossly poor human capital.

Physical Capital Index follow the human capital in terms of variation and the indexed-value ranges from 0.208 to 0.675. The public infrastructure that would compensate for the lack of private capital is also inadequate in Upper-Mustang. It is interesting to note that despite people of Upper-Mustang report themselves as agro-pastoralists, the status of natural capital is the weakest among the capitals. Most households have access only to a marginal size of land, lack of irrigation, limited growing season, small plot-size and high level of labour required to maintain farm-plots make farm output minimal. The livestock population has also sharply decreased and young people are not interested in agro-pastoralist activities. The overall outcome is that natural capital contributes the least in household livelihoods. Contrary to natural capital, financial capital is the strongest (with mean index value of 0.604). Relatively better Financial Capital Index in Upper-Mustang could be associated with the use of 'self-reported economic status of households' to calculate Financial Capital Index. It is observed that many respondents do not want themselves to be identified as poor, although they are poor in terms of fulfillment of basic needs. Higher contribution of financial resources and its growing share (Table 3) in household livelihoods show emergent importance of cash income in the Trans-Himalaya and miseries of ecosystem-based livelihoods.

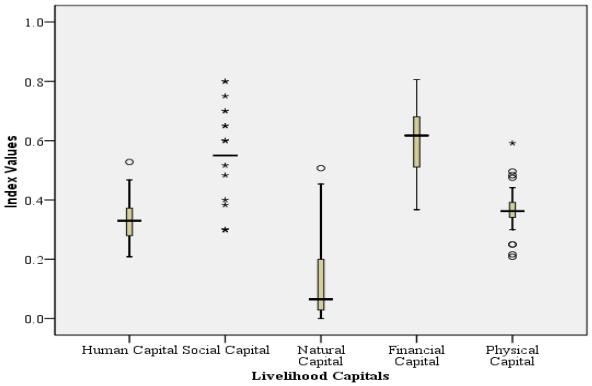


Figure 9: The Status of Livelihood Capital Indices across the Studied Households in the Trans-Himalaya, Nepal

Table 3: Proportions of Households with Changed Share of Livelihood Contribution of different Sectors in last Decade (2002-2012) in Upper-Mustang, Nepal (Source: Field Survey, 2013)

Changed Proportions	Agro Live-stock	Employ-ment	Business/ Enterpris-es	Remit-tance	Wage Labour
- >75%	0.00	0.00	0.00	0.00	0.00
- 50 and 75%	4.55	0.00	0.00	0.00	3.03
- 25 and 50%	7.58	1.52	1.52	0.00	4.55
- Up to 25%	16.67	0.00	1.52	1.52	3.03
+ Up to 25%	0.00	0.00	3.03	6.06	6.06
+ 25% and 50%	0.00	0.00	9.09	9.09	0.00
+ 50% and 75%	0.00	0.00	6.06	1.52	0.00
+ Over 75%	0.00	0.00	1.52	0.00	0.00

This study identified that none of the livelihood capital of Upper-Mustang is at the position of buffering the inadequacy of other capital. The outcome is detrimental so the household livelihoods is insecure. Earlier work (Pandey, 2016) highlighted moderate to severe level of food insecurity in Upper-Mustang. High level of exposure of climate sensitive social-ecosystem in Trans-Himalaya and poor adaptive capacity of communities often hit by extreme weather events have led the region towards social-ecological vulnerability (Pandey & Bardsley, 2015). Upper-Mustang has sound scope of integrated agriculture such as expansion of fruit farming and livestock ranching, and establishment of local agro-based micro-enterprises, however such options are not exploited at their fullest potential. In addition, tourism industries has brought changes into cultural landscape and traditional agro-livestock based economy of the area, but agro-tourism has not been introduced yet. The underlying challenge is that farmland abandonment has already become common in Upper-Mustang as in other parts of the Trans-Himalaya such as Manang (Chapagain, 2008; Vetås, 2007). Ultimate outcome is that the unique life and livelihood pattern of the 'forbidden kingdom' of Upper-Mustang is leading to a verge of collapse. Therefore policy interventions are urgent for restoration of agro-pastoralist activities of the region so the communities could be benefited from areas abundant ecological resources.

Livelihood sustainability in the mountain environment is particularly critical in Nepal. It is often associated with roughed mountain topography that has limited agricultural land, followed by harsh climatic condition, limited growing season, lack of irrigation and poor scope of agricultural mechanization as well as poor accessibility and lack of basic services (Adhikari, 2008; Bishop, 1990; Subedi & Pandey, 2002). Not much research work have assessed livelihood capitals and livelihood sustainability of the Himalaya using index-method, however. The use of index-based methods at household level is typically new as the method was first introduced by Pandey and Bardsley (2015) to assess social-ecological vulnerability to climate change. Finding of Aryal, Cockfield and Maraseni (2014), who calculated the index for spatial-clusters, are fairly comparable to the status of Upper-Mustang since Livelihood Sustainability Indices of Khumjung, Kalinchok Majhigaun in North-eastern Mountains in Nepal are 0.406, 0.382 and 0.417, respectively. These findings indicate that despite livelihood systems

of peasant households of mountain region of Nepal contains most of the components of the social-ecological system, overall food and livelihood security outcomes are grossly poor and it is particularly true in the case of Upper-Mustang.

Conclusions

Livelihood capitals of the Trans-Himalaya is discussed extensively. As found elsewhere in rural Nepal, the livelihood of the communities of Upper-Mustang is derived from five major capitals namely: human, social, natural, financial, and physical. Households mostly report their means of livelihoods as agriculturally-based despite its direct contribution is decreasing. Other major sectors contributing for household livelihoods are small scale enterprises, service, sale of labour, and remittances. However, contributions of different assets in household livelihood are variable.

The overall outcome of the interplay of livelihood capitals is found to be insufficient to generate new assets or strengthen existing ones in the Trans-Himalaya. The optimum utilisation of available labour force, development of sound social capital, community engagement in management of alpine pastures and fruit farms such as apple orchards are poorly utilized though their extensive utilization would support for livelihood security. Community-based hospitality business can also help to reduce internal inequalities across the households. Additionally, empowering young population in agro-pastoral actives, increasing cash income from supplementary occupations such as locally and agro-based micro-enterprises (fruit processing, collection and marketing of medicinal and aromatic plants, woolen-handicrafts) would support livelihoods at private scale while sound investment in both physical infrastructure and provision for strong social security mechanism by state are also important components of livelihood security in the Trans-Himalaya. At present, the Trans-Himalayan livelihoods are not sustainable since the LSI is 0.380 (only one-third of expected sustainability level). The livelihood can be made sustainable by strengthening peoples' ability to cope with and recover from stresses and pressures. Point to note that as Trans-Himalayan livelihood is at risk of vulnerability since adaptive wealth of households and overall health of social-ecological system are poor, the area-friendly policy responses is urgent. Furthermore, considering the area's remoteness and

marginality, strong social security mechanism, effective emergency responses, and promotion for local-food productions as well as appropriate level of subsidies in marketed food should incorporate into targeted policies for the Trans-Himalaya.

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