Diversity, Complexity and Dynamics: Land Use Patterns in the Central Himalayas of Kumaon, Northern India

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Introduction

Natural resource use in high mountain areas is generally diverse as potentials, constraints and risks of agrarian practices are largely subjected to certain environmental conditions. The altitudinal zonation of climate and vegetation belts and the related ecological particularities stipulate vertical and seasonal mobility patterns to increase the availability and variety of natural resources. Consequently, land use systems have predominantly been interpreted in the context of local adaptation strategies within given spatial distribution and economic appraisal of natural resources. This proves especially true for peripheral mountain areas, where both land use and livelihood security primarily depend on subsistence farming, animal husbandry, and forest utilization (Bishop 1990, Stevens 1993, Uhlig 1995, Nüsser 1998). Even if off-farm income opportunities have increased in almost every part of the South Asian high mountain rim comprising the Hindu Kush, Karakorum and Himalayas, agro-pastoral land use still constitutes the economic backbone of mountain communities. Beyond common features of combined mountain agriculture (Ehlers & Kreutzmann 2000), regional agrarian practices vary between different sections of the high mountain belt of South Asia. Nonetheless, the analysis of regional land use cannot be reduced solely to aspects of adaptation to natural resource potentials and management strategies to mitigate the impacts of losses due to environmental hazards. A better understanding of land use change in both production patterns and livelihood strategies strongly depends on the integration of socioeconomic developments, cultural values, external influences, and the territorial dimensions of land tenure (Kreutzmann 2004). Especially in the context of common property regimes and community-based institutions, the interaction of local norms, formal and informal regulations, and external development interventions all must be taken into consideration. Although integrated approaches are often postulated, changing strategies of resource use are predominantly conceived as a one-way street in which local actors react more or less uniformly to external impulses and restrictions.

The purpose of this paper is to analyze the diversity, complexity and dynamics of land use patterns in Kumaon, the north-eastern portion of the Indian state Uttarakhand. Much like in adjacent high mountain regions, agrarian land use in this part of the Central Himalayas takes place within a context of combined mountain agriculture across different altitudinal belts. The multiple territorial rights of access and natural resource utilization mainly results from ethnic segregation, settlement processes and external impacts. Most notably since the onset of British colonial rule in South Asia, the Central Himalayas have served as an effective barrier to the territorial expansion of diverse emperors. Nevertheless, the control over the vast natural resources of the moun-

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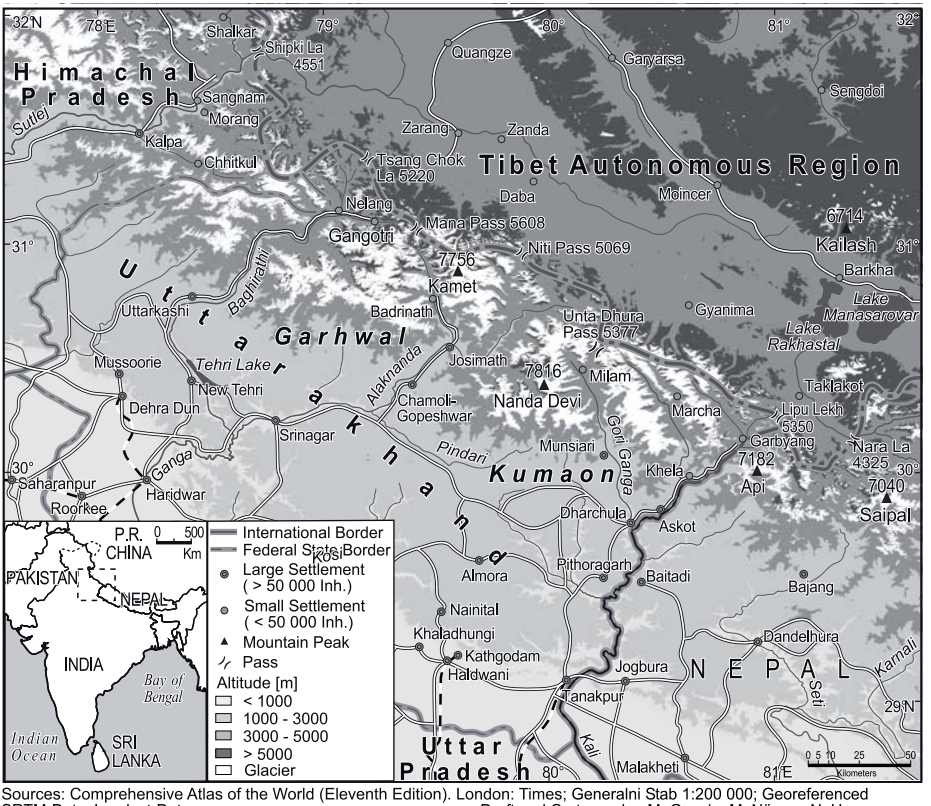

Sources: Comprehensive Atlas of the World (Eleventh Edition). London: Times; Generalni Stab 1:200 000; Georeferenced SRTM-Data; Landsat-Data

Draft and Cartography: M. Gerwin, M. Nüsser, N. Harm

Fig. 1 The Central Himalayas of Uttarakhand, Northern India

tain belt, first and foremost forests, have always been an important matter of interest for various state agencies. In the given regional context of Kumaon, the ethno-linguistic group of the Bhotiyas deserves particular attention. Apart from their agro-pastoral land use patterns, the Bhotiyas practiced trade with nomads of the Tibetan Plateau until the war between India and China in 1962 and the resulting sealing of the border. The traditional land use system of the Bhotiyas can be illustrated using the case of the Gori Valley, which originates in the Trans-Himalayas and crosses the main ridge of the Greater Himalayas over a distance of roughly 100 km. Prominent massifs like Nanda Devi (7816 m), Hardeol (7151 m) and Panchchuli (6913 m) frame the upper portions of this transversal valley.

It remains to be seen how land-use patterns and strategies of resource use of the Bhotiyas have changed during shifts in political power and subsequent socioeconomic restructuring of the region. Whether or not or to what extent new strategies of land use have arisen or the existing ones have been modified remain open questions.

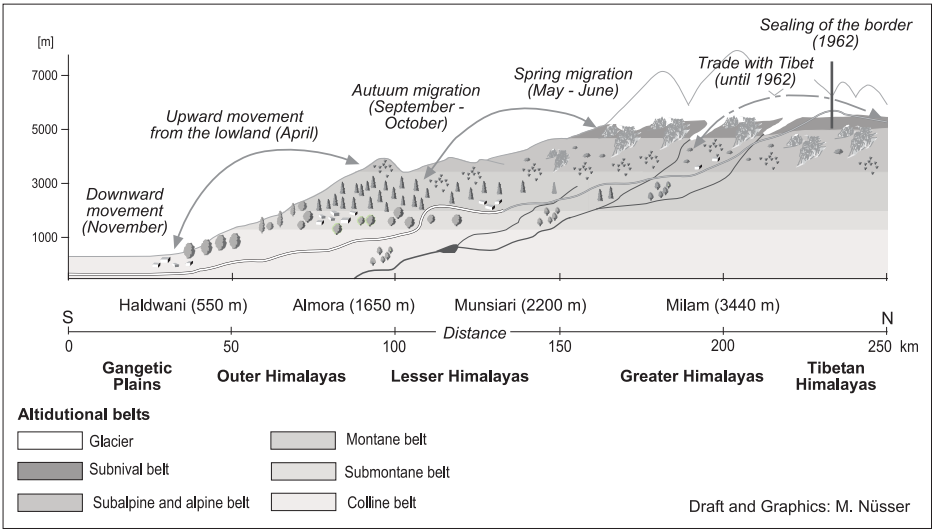

Fig. 2 Vertical Zonation and Traditional Mobility Patterns in Kumaon, Northern India

Environmental Zonation

The Kumaon and Garhwal Himalaya constitute the Indian federal state of Uttarakhand (fig. 1). Both regions span over several environmental zones with specific potentials and limitations regarding crop farming, forest and pasture use. The narrow belt of the Outer Himalayas arises from the northern parts of the Ganges Plains (*Terai*). Up to an altitude of approximately 1000 m this area is covered by tropical sub-humid Sal-forests (*Shorea robusta*), mostly reduced to steep slopes and almost exclusively protected as state-governed Reserved Forests. Without any visible disruption the range of the Lesser Himalayas, also known as *Himanchal*, follows in northern direction. This 70 to 100 km wide belt of mountains with an elevation of 1500 to 3000 m is dominated by *Pinus roxburghii*-forests. These conifers have been tapped for turpentine extraction since the early 20th century (Agrawal 2005). In the vicinity of settlements nearly the entire available land is terraced and cultivated for double cropping with rice, wheat, millet and different legumes.

The zone of the Greater Himalayas of Uttarakhand is about 30–50 km wide (Fig. 2). The scenery is dominated by glaciated mountain peaks, many of which exceed 6000 m and some 7000 m. The narrow transversal valleys are covered by montane forests and alpine grasslands, the former boasting a large variety of tree species. Evergreen oak forests, consisting of *Quercus semecarpifolia*, *Qu. dilatata* and *Qu. leucotrichophora*, alternate with areas dominated by conifers (*Abies spectabilis*, *Cupressus torulosa*) or deciduous trees, such as *Alnus nepalensis*, *Aesculus indica* or different species of maples (*Acer spp.*). The northernmost part of the transect is characterized by the Tibetan Himalayas. Located in the rain shadow of the main mountain range, the quantity of summer precipitation is rather low. During winter months however, the area is covered by thick and wet snow. Since the landforms have been shaped by glacial erosion processes, the valley

Photo 1 The transition zone between the montane and subalpine vegetation belts in the Gori Valley (M. Nüsser, October 2004)

bottoms are relatively wide and shallow. These localities are covered by alpine meadows and dwarf shrubs and are mainly used as pastures (photo 1).

Agro-Pastoral Resource Utilization and Trans-Himalayan Trade

The traditional system of agro-pastoral resource utilization of the Bhotiyas comprised pasturing, crop cultivation and forest use. Their seasonal transhumance linked all the aforementioned environmental zones to ensure an optimal use of all available fodder resources. Until the closure of the Indo-Tibetan border in 1962, they combined their agro-pastoral activities with Trans-Himalayan trade. Their winter migrations led them to the southern fringes of the mountain belt close to the Ganges Plain in search for valuable grazing grounds and trade markets (Hoon 1996). In this region, the towns of Ramnagar and Haldwani were already connected to the expanding railway system in the 1880s. During upward migration, the Bhotiyas drove their flocks to halting places (*Paraos*) in the montane belt in April and further up to the subalpine and alpine pastures between May and June. They returned to their halting places between September and October and reached the foothills again in November. This agro-pastoral migration cycle between summer and winter settlements was organized over a horizontal distance of roughly 200 km (fig. 2). Sheep and goats were the dominant animals for crossing the mountain passes to Tibetan trade markets during the summer months. Cattle and cross-breeds with yaks were suitable animals to deliver a sufficient amount of manure and to provide draught power (Traill 1832).

This system of agro-pastoral resource utilization is, however, subject to constant change, similar to other regions of the Central Himalayas. Summer migration to the *Bugyals*

Photo 2 Abandoned houses in Milam (3440 m), the uppermost settlement of the Gori Valley (M. Nüsser, October 2004)

for the purpose of high pasturing has reduced drastically. Apparently, due to the closure of markets for grain in Tibet, crop-farming in high altitude settlements is no longer profitable. During prosperous phases of trade crop-farming was conducted extensively and dominated by the growth of barley and buckwheat that were often irrigated due to the more arid conditions (Pant 1935). Presently, most of the buildings are abandoned and agricultural land is almost exclusively left fallow (photo 2).

The significant decrease in sheep and goats as well as the parallel increase of cattle (Traill 1832, *KBPF* 1947, Government of Uttaranchal 2003) indicate the transformation from transhumance towards sedentary agriculture. Nowadays cattle are the preferred species for agriculture in the middle sections of the High Himalayan valleys within the vicinity of the former trade depots. Since the montane forests often exhibit a herbaceous understorey, the forests also serve as important pastures for cattle, which is supplemented by stall-feeding during the winter months. This observation is reinforced by a considerable decline in the use of other transport animals, such as horses, ponies, and donkeys (*KBPF* 1947, Government of Uttaranchal 2003).

Downward migration to the lowlands and foothills is significantly reduced in present days. Only professional shepherds take remaining sheep and goats of the Bhotiyas down to these areas during the cold period. Due to legal regulations the shepherds are allowed to use one pasture for 10-15 days only. Contrarily, foreign livestock owners come to the valleys to graze their animals, mainly buffalos, between May and September.

Photo 3 Sacred birch forest above the village Martoli, Gori Valley (M. Nüsser, October 2004)

Socio-Cultural Landscapes

The mountain landscape of Kumaon and Garhwal is characterized by both its environmental and socio-cultural diversity (Ramakrishnan 2003). Since ancient times the region has been regarded as the abode of gods and deities. Examples of the sacredness of landscape elements include the source of the Ganges at the Gangotri Glacier, the Nanda Devi as the seat of a goddess or the important Hindu temple at Badrinath. The spiritual meaning of mountain peaks, rivers or forests strongly correlates with regulations of natural resource use. Numerous sacred forest groves (photo 3) exhibit restrictions on the utilization of trees as fuel wood, building material or animal fodder. Traditional pilgrim routes not only lead to shrines of Uttarakhand, but connect the Himalayan valleys with the Tibetan Plateau, especially with Mount Kailash, the sacred mountain of Hindus and Buddhists.

The contact zone between the Hindu-dominated Indian Himalayas and the Buddhist-orientated Tibetan Plateau is an area where various cultural influences merge. The Bhotiyas, who live in this transition zone in Kumaon, Garhwal and in the northwestern parts of Nepal, are widely described as brokers (Traill 1832, Hoon 1996). Their ecological knowledge and their ability to communicate in Tibetan languages are viewed as the main reasons for their monopoly in regional Trans-Himalayan trade (Srivastava 1966, Brown 1984). Whereas, nowadays they characterize themselves as Hindus, former scholars and early explorers regularly emphasized their Tibetan origin and the Buddhist influences on their cultural practices to distinguish them from the major local Hindu population in these mountain valleys, the so-called Paharis (e. g. Atkinson 1882). More recent research, however, alludes to the uncertainties of their geographical origin and, instead, emphasizes the heterogeneity within the group itself (Saklani 1998).

Development in a Contested Border Region: a Historical Perspective

A better understanding of regional land use patterns and development trajectories strongly depends on the integration of political processes and external influences in a historical perspective. Since the invasion of Kumaon and most parts of Garhwal by the Gorkhas in 1790, the area increasingly came to the fore of British strategic and economic interests (fig. 3). After the Gorkhas had been defeated by the British in 1815 and the first direct access to the Indo-Tibetan border was ensured (Gill 2000), the trade activities of the Bhotiya groups were reduced to the barter of locally needed products. Sugar, grain, and clothes from the Indian side were exchanged for salt, raw wool, animals, and borax from Tibet (Pant 1935, Joshi & Brown 1987). The more lucrative long distance trade of *pashmina* wool, a raw material for Kashmir shawls, was then exclusively conducted via Ladakh (Lamb 1986). After the invasion of Ladakh by the Dogras, the British colonial rulers initiated an eastward shift of trade to the effect that the routes monopolized by the Bhotiyas increased in significance (Rizvi 1999). Towards the end of the nineteenth century the reduction of taxes and transit duties by the British as well as the onset of mechanized wool production in the Indian plains pushed the Bhotiya's trade volume to its highest rate (Atkinson 1882, Sherring 1906). The summer settlements in the subalpine and alpine belts were prospering places during this period of time. From the 1920s on, however, trade patterns in general and wool-related trade in particular declined, the main cause being construction of roads connecting the existing railheads with the Lesser Himalayas. These infrastructural developments have been associated with increasing imports of cheaper wool products from Europe and (sea-)salt from the Indian lowlands (Walton 1910, Fürer-Haimendorf 1975). Additionally, due to the discovery of new natural deposits of borax in other parts of the world as

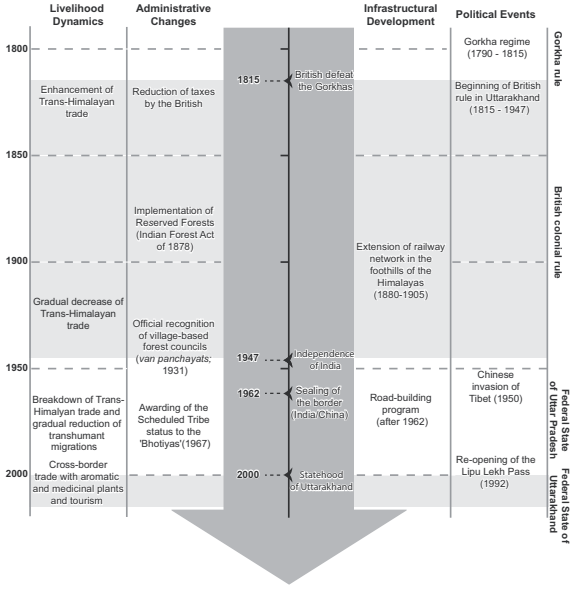

Fig. 3 Historical Events and Developments in Kumaon, Northern India

well as the availability of artificial substitutions of this mineral, the products traded and manufactured by the Bhotiyas became less competitive (Spengen 2000). The most important factor leading to a significant reduction and finally to the complete breakdown of Trans-Himalayan trade, however, was the Chinese invasion of Tibet in 1950 and the Indo-China war in 1962 (Srivastava 1966).

After the border war between India and China both nations continued to expand their presence in the contested border region. One of the crucial forms of intervention by the Government of India was a large road construction program, which has opened up the lower parts of most mountain valleys stretching towards Tibet for military purposes (Rawat & Sharma 1997). High altitude villages along the former routes were progressively abandoned as a result of the collapse of Trans-Himalayan trade and increased road accessibility of the main villages. The example of the village of Milam in the upper Gori Valley (fig. 1) exemplifies this development. Whereas a figure of 1,500 inhabitants was given for the early 19th century (Traill 1832) and 600 families were counted in the 1930s (Pant 1935), only 300 families were left in 1950 (Murray 1951) and the number was further reduced to only 18 families living in the village in 2004 (Nüsser 2006). The former winter settlement and trade depot of Munsiari gradually became the central municipality and administrative centre of the Gori Valley in the course of the 20th century. Infrastructural investments and funds allocated by the Indian Government, such as for the construction of school or the public administration, have further promoted this growing significance with numerous non-farm employments. The Bhotiyas no longer constitute the majority in the Gori Valley. Instead people who are administratively counted as Paharis have formed the majority of the population in more recent times (Government of India 2003). It is estimated that about three quarters of the Bhotiyas have re-settled in other areas of Uttarakhand or the Indian plains due to the changes in the valley (Pangtey, oral information). However, the shops at the market centre of Munsiari are almost exclusively in the hand of influential Bhotiya groups, who also dominate local politics. Quite clearly, these groups have been able to use their profits, prestige and education gained from trade and the associated dynamics of the borderland, but a further crucial point marks the awarding of the scheduled tribe status in 1967 for which the identification of distinguishing socio-cultural features is vital (Bergmann et al. 2008). It was this status that guarantees them access to employment in government service, admission to universities, and reserved seats in the legislative bodies.

Additionally, new income sources have been opened up including the rise of tourism enterprises. The support and expansion of tourism to generate income is one strategy of the newly formed government of the hill state of Uttarakhand. Since this state was carved out of the most populated Indian state of Uttar Pradesh in 2000, the appointed government promised to take the specificities of the mountain environments and its inhabitants seriously (Rangan 2004). Local inhabitants may apply for credits to set up tourism projects, and especially in and around Munsiari new enterprises, such as hotels, offices and homestay arrangements have been established. However, the allocating of funding and the realization of business are matters of local politics and numerous disputes arise on this topic within the area. It is also anticipated to revitalize activities in the upper part of the valley such as mountaineering and trekking, which in turn require new forms of infrastructural investment and the regulation of natural resources.

Politics of Natural Resource Regulation in Historical Dimension

Environmental regulations and resource protection in Kumaon have a long history and are deeply interwoven with changes in land use patterns. Colonial and postcolonial measures of resource control intermingle with local land use patterns and livelihoods. From the mid-nineteenth century onward, the main focus of British politics in Kumaon shifted from the motives of trade control and geopolitical influence towards the extraction of biological resources. During this period administrative structures were implemented and strengthened in order to increase taxes from agricultural land, forests and livestock (Atkinson 1882; Political Department 1895). Apart from demarcations of government land and village boundaries for revenue purposes, numerous restrictions were imposed on the use of forests and grasslands. These regulations started in the foothills and Lesser Himalayas, where sal and pine forests had been protected for the generation of railway sleepers (Agrawal 2005). These interventions directly interfered with the traditional transhumance patterns of the Bhotiyas. Examples include the assignment of certain market places, halting stages and winter habitations during the annual migration cycle (*Forest Department* 1905). After the British administration had extended its environmental interventions into the northern parts of Kumaon at the end of 19th century, most of the forest and grass areas were bordered either as Reserved Forests or as Civil Forests. In both cases strict rules were imposed on the local population and territorial rights of access and utilization were demarcated and assigned village-wise.

The constitution of *van panchayats* as village-based administrative bodies for the regulation of forest use in the year 1931 marks a milestone in the history of natural resource management in Kumaon, following massive protests of local groups against the repressive colonial interventions. These decentralized councils are awarded a certain amount of freedom regarding the implementation of local rules for grazing, fuel wood and leaf litter collection in the areas assigned to them. As a matter of fact, these institutions represent one of the oldest surviving examples of formally approved agreements between state authorities and local forest users (Agrawal & Ostrom 2001). Presently, there are around 12,500 of these councils in the entire Kumaon (Agrawal 2005). Although this system of resource control dates back to the time of colonial rule, most *van panchayats* were established after independence. More recently, the control over medicinal plant collection (photo 4) arises as a further challenge for these institutions.

The Uttar Pradesh Zamindari Abolition and Land Reforms Act of 1950, which was drafted with the intention of transferring agricultural land to the actual cultivator, is considered to be one of the far-reaching forms of government intervention in agrarian resource use (Rahul 1968, Government of Uttar Pradesh 1967). As a consequence of this land reform the Bhotiyas have almost completely lost their access to pastures and land in the foothills and the Lesser Himalayas and have therefore been forced to reduce their seasonal migrations (Nautiyal et al. 2003). The boundaries of the revenue villages were re-drawn and a new land and forest settlement has been carried out in the 1960s, also affecting the *van panchayat* areas (Government of Uttar Pradesh 1967). While the settlement act was designed to correct the colonial regulations, it was also influenced by local power relations. The result of this latest settlement, subsequent re-negotiations

Photo 4 Medicinal plant collection in the Ralam Valley (M. Nüsser, August 2005)

and re-allocations is a current patchwork of unequally sized village forests. In fact, even some villages are completely left out and are without any officially approved access to forests and grassland areas. The most striking example of size variations of village forests can be found in the alpine parts of the valley and the spatial arrangements around Munsiari in the Gori Valley. While some villages are almost completely abandoned in the upper portions, these resource user groups exhibit by far the largest *van panchayats* with vast alpine pastures. The area of the *van panchayat* of Milam for instance encompasses 35,081 ha of land. The areas around the former trade depot Munsiari by contrast are characterized by an intricately nested and interwoven mix of regulations. Here the *van panchayats* measures just 20–100 ha (Foundation for Ecological Security 2003).

In Munsiari people allude to an insufficient access to forest and grassland resources as one reason for the reduced number of livestock. Since some of the forest councils rely on paid guards or control their areas on a rotational base, people fall back on Reserved Forests that are situated nearby. In these forests resource control is often less strict or even non-existent. The limited access to the essential resources of mountain livelihood is also seen as one reason for the summer migrations to the upper valley zones by at least a fraction of the families. In these upper parts of the valley the access to grazing grounds is less restricted or people are members of a *van panchayat*. Forest products are regularly auctioned and not all persons are able to participate equally. Quite often non-farm income decides upon supply. In addition to the officially sanctioned rules, informal agreements exist. Beside ethnic affiliation and social position, customary rights permit access to forests and grasslands.

Conclusions

In spite of the various factors of transformation, the seasonally and spatially highly diversified 'combined mountain agriculture' still plays a vital role for a large number of households in Kumaon. Land use patterns and livelihood strategies shall be differentiated not only as for environmental issues, but according to such factors as ethnic and socio-cultural affiliation and territorial rights of resource access. A better understanding of the diversity, complexity, and dynamics of regional land use systems requires identifying and evaluating the historical dimension of human-environmental interaction. Changing land use structures and functions reflect the supra-regional political and socioeconomic developments. Land use change, however, has evolved rather slowly and gradually. For instance, with regard to common property regimes and community-based institutions colonial and postcolonial forms of intervention are clearly visible in present day land use patterns and mountain livelihoods.

The case of the Bhotiyas demonstrates their flexible response to changing political, economical and socio-cultural constellations in the borderlands of Kumaon. This includes the tangled relationship between strategies of agrarian subsistence production and non-agricultural employments. After the abandonment of the Trans-Himalayan trade, the upper valley sections have been transformed from transit corridors to new peripheries. This functional change has been reflected in reduced land use intensity accompanied by new income options such as collection and cultivation of medicinal and aromatic plants. The administrative and economic centres exhibit a heterogeneous mix of livelihoods, institutions and resource use strategies. New forms of income such as mountain tourism or shop-keeping have arisen, accompanied by combined mountain agriculture in the vicinity of the permanent settlements. The latest development of trade relations, however, is characterized by the re-opening of the Lipu Lekh Pass in the northeastern corner of Kumaon.

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