Chapter II
Physical environment and Transhumance in the Study area

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Chapter 2

Physical environment and Transhumance in the Study area

2.1 Introduction:

The Himalayas are geo-dynamically unstable, ecologically sensitive and economically underdeveloped. The rapid increase in population during the recent years, the demand for food, fuel, fodder and grazing-land has increased considerably, putting increased biotic stress on the critical environmental components, like land, water and forests. Consequently, the human transformation process of biophysical components has brought about drastic changes in the resource-use practices and land use pattern of the region. As a result, the Himalayan mountains are on the verge of a major ecological crisis threatening the collapse of the very life support systems. The impact of unscientific and irrational resource development processes and the resultant deteriorating environmental conditions are not confined to the region itself but also adversely affect the environment and economy of the hilly people. Thus, an old ethnic practice of resource use in terms of grazing is operating at an alarming rate. This practice of seasonal migration from low land to highland in search of fodder is called “Transhumance”. The phenomenon of transhumance has been found detrimental to the Himalayan environments because more and more families are increasingly practicing it. Thus, a micro level approach has been attempted in a part of middle Himalayan region in which transhumance is typically being practiced since earlier times.
2.1.1 Location:

The present study deals with assessment of transhumant phenomena felt in Liddar valley, which forms the southeastern part of the Kashmir and forms the part of middle Himalaya. It is situated between $34^\circ 00' 00''$ N to $34^\circ 15' 35''$ N and $75^\circ 06' 00''$E to $75^\circ 32' 29''$ E as shown in fig 2.1. Total area of the catchment is 627 km$^2$ (62,700 Hectares).

The area gradually rises in elevation from south (1600 mts to North 5223 mts). The Liddar valley is girdled by lofty ridges. The interior of the northern part of the Liddar valley has concentration of high mountain ridges making its actual area far far more than the apparent area and this anomaly gives rise to the alpine and sub alpine grazing grounds. Almost all the aspects are represented due to combined action of glaciers and rivers. Owing to its wide altitudinal gradient and varied edapho-climatic and physiographic features, the region harbors wide array of habitats including fresh water lakes, wetlands, springs, ponds, swamps, marshes, streams, canals, flood plains, terraced table lands, wastelands, montane slopes, rocky outcrops, permanent glaciers etc.

Liddar valley is selected a study site because very limited studies on the above aspect have been carried out. Further, its importance for ecosystem diversity and sensitive response to environmental changes makes it a place of concern.
Fig 2.1: Map showing location of study area.
2.1.2 Geology:

The geology of the study area is dominated by the upper Paleozoic and Triassic rocks. The Triassic rocks are surrounded by Palaeozoics and are overlain by Pleistocene and recent sediments. Upper Paleozoic rocks (Agglomeratic slates and Panjal traps) occur towards marginal areas as shown in Fig (2.2). The brief description of main two formations is given under following paragraphs.

a) Panjal formations:

Areas of sedimentation of Fenestella shales and great centre of vulcanicity with an enormous outpouring of lavas. The estimated thickness of these lavas is between 1500 m to 2000 m with an addition of 1500 m, occurring as Agglomeratic slates. The panjal volcanic formation is well exposed in the higher reaches of Pir Panjal hills bordering the valley hence the name. The typical Panjal volcanics is a dark grey rock comprising tuffs with fragments of glassy matter. On weathering, it disintegrates and crumbles rapidly taking a brownier tint. The trap is widely exposed in North and South of Pahalgam, near Tar Sar, Lidderwat, Aru, Chandanwari.

b) Triastics:

This is the most extensively developed and widespread formation in Liddar Valley. These carbonate rocks are mainly comprised of limestone with inter-beaded shales, sandy shales, arenaceous limestones and quartzites. The limestone is rich in calcium carbonate while as dolomite is composed of calcium and magnesium carbonates. Triassic limestone stands out in bold relief against the dark colored slate and basic rocks of Panjal formations. The Triassics of the valley have been grouped into the following three divisions:-

<table>
<thead>
<tr>
<th>Division</th>
<th>Litho Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Upper Triassic</td>
<td>Bluish grey to Dark grey massive limestone</td>
</tr>
<tr>
<td>2. Middle Triassic</td>
<td>Sandy shales with Calcareous layers and dolomatic bandsand quartzites</td>
</tr>
<tr>
<td>3. Lower Triassic</td>
<td>Shales and Nodular Limestone bands</td>
</tr>
</tbody>
</table>
The upper triassics are well exposed in north east and west of Pahalgam, Channdanwari. The middle triassics are exposed in Pahalgam. The lower triassics are exposed in the lower altitudes of the valley.

2.1.3 Altitude:

The vertical and horizontal complexity of the landscape leads to a high degree of spatial heterogeneity. The area’s varied land forms, particularly in relation to altitude, slope, aspect, and past management practices, have created a landscape characterized by a rich diversity of ecosystems, habitats, and floral and faunal species. A distinctive feature of the landscape is the marked altitudinal gradient from 2112 to 5,223 meters. The landscape includes varied temperate forests, sub-alpine, and alpine pastures. The combination of these biotopes is a key resource for the grazing and transhumant livestock farming.
Fig. 2.3: Digital Elevation Model of the Study area

a) Microstratigraphic study:

Microstratigraphic study has been commonly carried out to understand relationship among slope, soils, vegetation cover, etc. Here in present study similar attempt has been made on the basis of field observations along the tract of transhumance (Fig 2.4). One more component is added here i.e latitudinal position as shown in (Fig 2.12). The degree of latitude increases from Jammu (32°0’0”N) to Pahalgam (34°15’ 35” N). Cursory observations suggest that there are about six types of biotopes along the route these are:

1). Subtropical thorn steppe with Acacia, Carissa and Zizyphys forest.
2). Forest of Pinus roxburghii.
3). Forest of Cedrus deodar and Pinus griffithii.
4). Kashmir Scrub.
5). Western Himalayan temperate coniferous forest with Abies spectabilis and Picea smithana.
6). Moist alpine scrub and meadows.
Fig 2.4: The individual biotopes observed

2.1.4 Climate:

The valley differs considerably from that of outer Himalayas, due to alteration in climate and soil. The Pir Panjal acts as a formidable barrier to the monsoon winds. The little rain experienced in the valley in summer months is due to the precipitation of winds that escape in through the Jhelum George.

The Study region has Sub-Mediterranean climate with nearly 80% of its annual rainfall concentrated in winter and spring months as shown in Fig. (2.5). Mountain terrain complexity exerts an important influence on the local weather processes.

The temperature and precipitation change after every hundred meters of altitude. There are large seasonal variations in the mean maximum and minimum temperatures and precipitation by which winter and summer seasons are bifurcated (Fig 2.6). The long winters receive maximum precipitation with maximum temperature ranging between 20°C and 20°C. Similarly, minimum temperature fluctuates between -10°C and +15°C. The summer season commences from June and terminates in October.
The mean monthly maximum temperature ranges between $5^\circ$C and $30^\circ$C. The period from June to September records the highest temperature range between $25^\circ$C to $30^\circ$C, which favors the germination and growth of alpine and sub-alpine grasses and movement of transhumants to the area for grazing. Due to this fact, huge grazing pressures are placed on the region by pastoralists practicing short distance and long distance transhumance.

![Mean monthly rainfall (1998-2008)](image)

Fig. (2.5) Source: Indian Meteriological Department

![Mean monthly temperature (1998-2008)](image)

Fig. (2.6) Source: Indian Meteriological Department
2.1.5 Natural resources:

Balance between availability of natural resources, as water and fodders are indispensable to pastoralists who mostly depend on them, particularly for fuel, fodder and water. Their dependence on natural resources is institutionalized through a variety of social and cultural mechanism such as religion, folklore and traditions.

a) Water:

The study area is blessed with an adequate number of glaciers and streams. These streams supply water into a network of channels (Fig 2.7). Furthermore, the whole tract is dotted with an appreciable number of springs supplying drinking water to the adjoining habitations. The availability of water is a limiting factor for the distribution of transhumant camps on higher altitudes and becomes a driving force for migration to winter pastures. When the channels on higher altitudes dry up, pastoralists have to migrate to winter pastures where they find adequate water for them and for their livestock.

Fig 2.7: Map showing drainage pattern
b) **Vegetation:**

The forests of the study area are predominantly coniferous with sprinkling of broad-leaved species. The conifers of the economic essence are Deodar (*Cedrus deodara*), Kail (*Pinus wallichiana*), Fir (*Abies pindrow*) and Spruce (*Picea smithiana*). Associations of Yew (*Taxus buccata*) and Junipers (*Juniperus recurva*) are met with locally. The distribution pattern of conifers conforms to the altitudnal zonation. The climate, aspect, slope, geology and soil exercise their influence as well. Fir comes as a principal species higher up and extends to the alpine zone above where it gives way to Rhododendrons, Brich, Junipers and high-level willows. Walnut (*Juglans regia*), Horse Chestnut (*Aesculus indica*), Maples (*Acer caesium*), Ash (*Fraxinus excelsior*), Pohu (*Parrotiopsis jacquemontiana*) constitute the main broad-leaved species found along the moist depressions and drainage elements. The broad-leaved trees of the area are a best alternative for the fodder, which have been under a great deal of pressure along the migration routes of transhumants.

Still higher, the alpine pastures with their entire luxuriant flora appear. These grasslands generally develop on relatively steep slopes at elevations where the climate is too cold and severe for tree growth. These vast grassy tract of alpine meadows above Fir zone are mainly utilized for summer grazing (June-September) by large herds of sheep, goats, and horses. Time of snowmelt determines growth initiation in early season. Alpine scrub consisting of Junipers (*Juniperus recurva*), High-level Rhododendron (*Rhododendron campanulatum*), Willows and Betula (*Betula utilis*) replace Fir. These meadows locally called as ‘Marg’s’, sustain a rich variety of alpine flora consisting of the species of Potentilla, Primula, Corydalis, Caltha, Gentiana, Aconite, Jurennia, Androcase, Anemone, Agrostis, Dactylis etc. These pasture lands are the sustenance sources for the flocks of Gujjar and Bakarwal, grazing there for summer months. However, the edapho-climatic setting of these pasturelands makes them fragile and susceptible to the anthropogenic pressures like grazing.

The present rate of deterioration and depletion of resources due to grazing and continued misuse and in-discriminate cutting has resulted into proliferation of noxious and poisonous weeds. The denudation has also been caused by the nomadic activities on the specified routes of transhumance, besides causing widespread damage to the area outside their recognized routes. The socio-economic issue involved in this process of degradation is one of the measure concerns as it has larger dimension to live stock
industry as well as to its other linkages. This fact has gained the interest of conservation biologists all over the globe and has been attempted in the present study.

c) **Biomass Resource:**

Upper ranges of the study area are noteworthy for their large, lush green meadows. The grazing is available for a maximum of six months per year. Consequently, pattern of transhumance is developed to utilize the biomass resources of the area in its vegetative season. The productive potential of these pastures is 60-100 kgs/hectare. However, various authors have mentioned the biomass availability of pastures in Kashmir ranging from one ton/ hectare to 20 tons/ hectare but only 50% of the production becomes actually available to the grazing animals.

Thus, grazing areas of the State can sustain less than 20% of the migratory livestock for half the time of a year. The big gap in the availability and requirement of green fodder has resulted in unlimited and unrestricted grazing in forestland. The excessive utilization of forests and pasture lands beyond their carrying capacity, not only affect the ecology of the area but also decreases the natural regeneration of dominant species. This is among the most important cause of degradation of the forests. The effects of which are discussed in proceeding chapters.

Thus, on the recommendations of the anti erosion committee, the control of fluctuating grazing has been transferred to the forest department and is being regulated under the Jammu and Kashmir Kahcharai Act, (1954). However, the grazing rules prevalent in the state are liberal enough and open to indiscriminate grazing and there is no bar regarding the number of cattle grazing in the demarcated forests and the distance they come from. Wildlife and Fisheries departments are tasked with wildlands management to safeguard the ecological balance of the region.

2.1.6 **Protected areas:**

The area lies adjacent to the famous ‘Dachigam National park’ and the ‘Overa Sanctury’. The Fauna and avifauna found in the tract are much similar to Dachigam National Park and therefore remains stocked by rich wildlife. Majority of the wild animals found in the belt are herbivorous and are highly disturbed during the grazing periods by transhumants. Thus, are protected strictly under the
provisions of J&K Wildlife (Protection) Act, 1978. The black bears, the flying squirrels, monkeys, Jeys and parrots form a major component of natural fauna. Thus, forest compartments numbering 46-AC, 47-AC, 48-AC, 49-AC, 50-AC, etc (Co 39-L to 46-L) are included in Aru-overa protected area. The forests shall be managed to safeguard the wildlife resources of the tract by significantly protecting all the life therein from anthropogenic pressures.

![Map showing administrative compartments of the study area.](image)

**Fig 2.8.** Map showing administrative compartments of the study area.

### 2.1.7 Socioeconomic set up:

The adjoining areas of study area contain a rich mix of people, languages and cultures. Major portion of population are settled and most practice transhumance in the valley areas. Per capita incomes vary spatially, ranging from Rs 4000- 15,000 per annum. Agricultural and livestock production provide the main sources of livelihood. The average landholding per household rarely exceeds one hectare, with the most widely sown crop being maize, followed by potato and beans. Goats, sheep and cattle are kept by villagers for the production of dairy products like meat, wool and skins. A transhumant cycle is followed by local livestock being herded to high mountain pastures for grazing during the summer months and being stall fed during the winters. An appreciable number of persons among settled population are concerned with
tourism, while a least number of persons are holding the government jobs because of less literacy rate. This is one more strong reason that there is a huge pressure of both long distance transhumant livestock as well as the from the local livestock herds on the pasture resources of the area.

2.1.8 Importance of the area:

The tree cover and undulating topography of the area reflects aesthetic importance and has all the potentialities to emerge further magnificently on the world tourism map. For the purpose, the recreational facilities are enhanced for the natural appeal of the area. Recreational parks are established throughout the tract at suitable high lands viz. Baisaran, Arav etc. Observation towers and lookout points are constructed on prominent ridges, plateaus and hill tops so as to provide for a commanding view of the panoramic landscape and fascinating flower bedecked grassy meadows around. Other facilities in the form of hutments and camping grounds are provided. Thus, the area has been found to be an important tourist place which is evidenced by the facts as shown in Fig 2.9.

However, the main emphasis would be laid on the conservation and maintenance of the vegetal cover by ensuring promotion of natural regeneration, yet the artificial restocking and rehabilitation of denuded patches will never be lost sight of. Thus, the present study has been attempted in this area.

(Fig 2.9) Source: Digest of Forest Statistics 2005
2.1.9 Grazing as Subsistence Resource:

Toponomy certifies the human presence in this area ever since the middle ages, as well as its continuity up to the present times. Shepherding has preserved a tradition and a specific toponomy of exquisite scientific and touristic value, which are still insufficiently known and popularized. The old appellatives (Dandbare, Gur lupun, Sasket, Gabe dalve, Gurkhum, Girwar, Gohermarag) appeared as a result of pastoral activities and they have been passed from generation to generation. The landscape of the area shows following features:

1. Great extension of alpine and sub alpine meadow surfaces.
2. High density of Glaciers and alpine springs, which make the region suitable for grazing on the precipitous slopes.
3. An upper tree line of Spruce Fir forest at an altitude of 3000 mts.

Livestock in is a major instrument for employment, particularly rural self-employment, thus traditional activity of shepherding has increased (Fig 2.10) in the area last twenty years. The sheepfolds (Teer Woad) have always played an important part in the mountain economy. They are usually built near a source of water and in the vicinity of forest, where the wood for fire and construction has been readily available (Lawrence, 2006). However, they are placed in alpine and subalpine meadows in case of higher altitudes.

![Incidence of grazing in the forests of J&K](image)

Fig 2.10. Source: Digest of Forest Statistics 2005
2.2 Pastoralism in Liddar Valley:

Pastoral systems are strongly associated with the presence of grasslands on one hand and human occupancies on the other. It is observed in the study of social contribution of biomass resources in Gujarat (Katoch et al., 1991) that if population is meager it is directly proportional to size of population as availability of ample biomass resources. In the case of high size of population the consumption of biomass resources are directly proportional to resource availability, say area under grassland in the study region.

The most common categorization of pastoralism is by the degree of movement, from highly nomadic through transhumant to agropastoral mode and all the three enterprises are adaptation to different ecological situations. The present chapter deals with these aspects of the study area and its interaction with phenomenal transhumance.

2.2.1 Transhumance:

Transhumance is the regular movement of herds between fixed points to exploit seasonal availability of pastures. It is an ancient and relatively static subsistence activity (Cole, 1975).

In mountainous regions such as Switzerland, Bosnia, North Africa, Kyrgyzstan and the Andes, this is a vertical movement usually between established points and the routes are very ancient. Similarly, extensive grazing by transhumant and pastoral stock rearing is very common throughout the Himalayas and is the occupation of major portion of population. Gujjar and Bakarwal of Jammu and Kashmir are classic examples. Gujjars keep cattle while Bakarwal keep goat and sheep under such system (Rao and Casimir, 1982). They built phenomenon of reciprocity, which tied nomadic grazing to sedentary cultivation (Chakarwarti, 1998). Transhumance in the region is environmentally and economically important as a source of livelihood for herders. They may be called as opportunistic pastoralists depending on fallow pasture resources which varies from year to year as concluded by Blench, (2001). They migrate from the south of the Pir Panjal to the Alpine pastures of the greater Himalayan Ranges in the North and reverse trend is observed in winter.
The economy of the transhumants is dependant on the availability and rate of utilization of natural pastures. Because of the climatic constraints, these pastures are seasonal in their usage. During winter, when the higher Himalayan ranges are covered with snow, the pasturage is available only on the Shiwalik Ranges in the south, which has mild winters. As summer approaches, the pastures in the Shiwaliks dry up. At the same time the Snow and glaciers of middle Himalaya begin to thaw, resulting into the growth of luxurious and nutritious grasses and forbs. Consequently, the Gujjars and Bakarwal move back and forth from the lower Himalayas to the pastures in the upper Himalayan region. In their movements, they follow well defined tracts locally known as Rasto from winter pastures to summer pastures. In this process they drive their large flocks through snow clad gorges, over the ridges, steep slopes, spurs, streams, and rivers. They have developed annual set schedule of activities, and seasonal migration along with halts and departures round the year.

2.2.2 Transhumants:

There are different types of pastural resources as mentioned above. Similarly, different groups of people engage different types of activities. The liddar valley has shown three types of transhumants traditionally called as Gujjar, Bakarwal and Pohol. Following lines are devoted to highlight their general characteristic features.

2.2.2.1 Gujjar:

Gujjar constitute about 20% of the state population. The population of Gujjar has been certainly less than settled population. However, cattle population and the business dependant on Gujjar is carried out by them. It is in this sense this tribe contribute significantly in the economy of Liddar valley. They are transhumant agro-pastoralist and have regular encampments or stable villages with permanent houses Dera (Household or Homestead). They often practice subsistence level agriculture at one or the other destinations in summer and grow little out of their less fertile and sloppy lands and have adopted cattle and sheep rearing as their primary profession. They trade their animals and animal products in town markets. There is low margin of surplus because of low level of
technology, little occupational specialization, high participation of women in the economy and highly flexible residence. As all follow the same mode of production, there is little variation in economic level and behavior from one household to another. Short distance migrations are exercised in summers when the grass and other fodder as well as the water becomes scare in the lower regions, the Gujjar take their herds to high altitude pastures where grass is regenerated after snow (Kohler, 1992; Saraswati, 1995).

Nomadic Gujjar, who practice long distance migrations, spent winters in the sub tropical regions of Jammu, Punjab and lower districts of Uttar Pradesh (Cunningham, 1871, Manku, 1986). Migration proceeds between predetermined sites along traditionally set routes and according to more or less fixed timetable. The outward and inward journeys take about 15 to 20 days each. The buffaloes start migrating on their own when the weather gets hot in the month of March to April or when it becomes cold in the month of September. At the times if Gujjars are not ready to move, they have to physically stop the herds and if not disturbed, they can reach their destinations even on their own. The buffaloes forage mainly on leaf fodder during the winter months and on the rich grass of the Himalayan pastureland during summers (Walton 1989, Negi, 1998). During the days of fodder scarcity Gujjars lop off branches from selected fodder trees making sure that enough nodal branches and leaves are left so that tree may regenerate during the remaining period of the year. They lop the branches just before the time of leaf fall of the particular species and in this way they ensure that the tree gets the full benefit of its foliage for growth. However, the overexploitation of trees like Betula utilis has been reached to the maximum and these sensitive trees have reached near to the to the extinction.
2.2.2.2 Bakerwal:

The Bakerwal, a pure transhumant ethnic group in the western Himalaya, practice sheep and goat husbandry and utilize various biotopes of the different altitudes. Their winter pasturelands lie mainly in the Shawaliks at about 500-1000 m between Kathua and Jammu in the south east and south in Reasi and Punch in the Northwest, respectively, where they spend 5 months (early November to mid–April). In April, they leave their winter quarters in small groups and head for their summer pastures to reach the Kashmir valley by early July (Casimir and Rao, 1985; Khatana, 1992; Rao and Casimir 1982, 1983, 1985a, 1985b). The Bakarwal migrate northward from their winter regions over the Pir Panjal Range; most routes skirt the Kashmir basin periphery. The routes of transhumance are ancestral and change with the political and seasonal influences. The Bakarwal migration pattern reflects “Constricted Oscillatory Nomadism” (Johnson, 1969). On their migration the Bakerwal use mules and horses as pack animals and spend some five months each year migrating (Kango and Dhar, 1981). The individual Bakerwal families spend the summer in montane and alpine pastures (Late June to Late August) between 3,000 and 4,500 m to the North – northeast and northwest of Kashmir basin. Each camping unit moves individually, and since the terrain is hilly to mountainous throughout the year, Bakrwal camps are as a rule dispersed even in alpine scrub which forms the uppermost limit of vegetation and put a huge pressure on these ecosystems.

In summer the majority live in white canvas tents, sometimes these tents are used in winters as well, but huts made of branches and reeds are more common and those with land often have rough houses.

In late August, the herds are brought down from the alpine to the lower pastures and the migration back to winter quarter starts (Rao and Casimir, 1983). Surplus animals are sold, mainly to butchers, in the Kashmir Valley. Before they arrive in the winter area, around mid-November, pastures have to be found where they can browse. These are either Government forests or fallow lands leased out to them by local peasants. Increasingly, some Bakrwal have acquired land where they grow mainly maize and wheat. They have encroached progressively and often built
rough houses for themselves on this dry forestland. The vast majority of these landholdings are in their respective winter areas. Local Gojar tenants, poor bakrwal relatives or servants carry on cultivation in summer in their absence. This has created the problem of shifting cultivation and loss of forest cover, which has given birth, to the problem of erosion.

2.2.2.3 Pohal:

Pohol is different type of group from the rest of the two tribes mentioned above. The present study has identified these people as transhumants because of three reasons. Firstly, in spite of being settlers they live in outskirts of their own village. Secondly, they are landless labors and hence in search of work related to agriculture. It is very difficult for them to get the employment in agricultural fields as agriculture in the valley is of subsistence level. They have only opportunity to keep livestock. Thirdly, they are the lowest in the economic strata in the region. Therefore, this group of people has been engaged in transhumance since long. They are supporting the traditional transhumants that carry livestock with them for a very long distance. Thus, Pohol have been specialised in short distance transhumance. They carry local livestock both cattle and sheep to pastures in summer season and bring them back to the villages in winter season. In summer season, they take care of the livestock mainly owned by villagers and them selves on the basis of grass resources in the vicinity of the village.

The local pastoralists skillfully distribute their time and the composition of their herds between the different pastures such that they can support two vital components of herding: lambing in the cool climate and shearing in the low country near villages. Additionally, proximity to villages ensures adequate labour to help with the shearing. As in most Indian villages, access to the commons plays a critical role in the survival strategies of the poor. Each village sends its combined livestock herd to graze with two or three shepherds. A herd from a particular village will adopt a fixed route with a specified number of nights spent at places along the way. The route is detailed with as many as 10-12 stops and is planned to optimally use the combination of grasses and other herbs available in different
pastures along the way. This involves knowing and exploiting the life cycle of different plants and their nutritional values.

Over the couple of decades, the village commons have been encroached for the construction of houses and for increase in cultivable land and simultaneously placed the pressure on the alpine grasslands.

2.2.3 Routes of Transhumance:

Sub alpine and alpine pastures of Kashmir are approachable through well-defined migratory routes established by the ancestors of the nomadic Gujjar and Bakarwal centuries ago. The dates of migration and grazing in a particular pasture are fixed in advance and migration takes place according to seasons. These management methods are being practiced since time immemorial and are a testimony to the traditional systems of forage and livestock management. These routes have been altered by sociopolitical influences, insisting the transhumants to adopt the mechanical locomotives as a means of transport putting a huge pressure on the migration routes within the valley.
Fig 2.11. Map showing the major grazing routes in the state of Jammu and Kashmir
Résumé

It is quite understood that the study region has its own unique resource-man interaction. This kind of interaction has a special feature like transhumance, which may be considered as apt for the given topographical and ecological situation. The availability of seasonal resources in different parts of the valley are aptly utilized by transhumance. However, the population of both settlers and transhumants has been increased more than carrying capacity of the region. This has shown negative impact on the environment in the past. It is proposed to understand and discuss such impacts in the following chapters.