Chapter II

Study Area

Monika Bisht

ROLE OF NGOS IN THE FIELD OF ENVIRONMENTAL CONSERVATION AND DEVELOPMENT IN UTTARAKHAND: A CASE STUDY OF A DISTRICT ALMORA OF KUMAUN REGION
CHAPTER II

The Study Area

The present study is carried out in Almora which is a hill district of Kumaun region in the state of Uttarakhand. The chapter succinctly describes the geo-physical attributes such as geographical location and demography, climate and vegetation, rainfall etc. and the geographical peculiarities and related environmental issues in the State of Uttarakhand and the present study area.

The NGOs registered under the Societies Registration Act 1860 and working in the field of environmental conservation and development in the area constitutes the universe of the study. The profiling of the selected NGOs have been elaborately described in the chapter fourth of this research work.

For the present study, the members of the ‘Grassroots Communities’ of the rural hill areas of District Almora, where the selected NGOs are working, constitutes the ‘Unit of Investigation, or Enquiry’ for the study. Each of the Unit of Analysis for the study belongs to one of the following categories:

i. The **Official Staff and Field Workers of the registered NGOs** which are based in the study area, i.e. Almora District of Kumaun region of Uttarakhand and are engaged in the field of environmental conservation and development in the study area of the present study.

ii. The **Respondents from the Communities and Beneficiaries of the Environmental-based projects** implemented in the village sites where the respective NGOs have previously worked or currently working.

To obtain the list of the NGOs registered under the Societies Registration Act, 1860 and working in the field of environmental conservation and development in the study area, i.e. the Almora district of Kumaun region in Uttarakhand, the researcher visited the Office of Assistant Registrar of Firms, Society and Chits, Government of Uttarakhand located in Heera Nagar, Jail Road, Haldwani, and also the Treasury Office at Almora. In Uttarakhand, the registration and administration of societies under Societies Registration Act 1860, partnership firms under Partnership Act 1932 and
chits under Chits Act 1892 is done by Registrar of Firms, Societies and Chits Dehradun through its regional offices at Dehradun and Haldwani. Further, the Assistant Registrar Haldwani has territorial jurisdiction of Kumaun region consisting of Pithoragarh, Champawat, Bageshwar, Almora, Nainital and Udham Singh Nagar districts.

2.1. Description of the Universe and Justification

2.1.1. The Hill State of Uttarakhand

The 27\textsuperscript{th} state of the Republic of India, carved out of Himalayan and adjoining districts of Uttar Pradesh on 9\textsuperscript{th} November 2000, is situated in the northern part of the country. The state of Uttaranchal was officially renamed as Uttarakhand in January 2007. As per Hindu mythology and ancient literature, the name is derived from a Sanskrit word \textit{uttara} meaning north and \textit{khand} meaning part of a country. The land is renowned as Devbhumi (the Land of Gods) due to the presence of some of the Hindu's most spiritual and auspicious places of worship and pilgrimage in this state. The state shares its boundaries with the Tibet Autonomous region in the north, the country of Nepal in the east, the Indian state of Uttar Pradesh in the south, Haryana in the west and Himachal Pradesh in the northwest. The provisional capital of Uttarakhand ever since its creation is Dehradun which is proposed to be replaced by Gairsain owing to its geographic centrality. ¹

a. Geographical Location of Uttarakhand

Located in the Central Himalayan Zone, Uttarakhand occupies roughly 10 per cent of the Indian Himalayan mountain region. It extends between 77°34’ and 81°02’ E longitudes, and between 28°43’ to 31°27’ N latitudes. As the state lies in between the cold arid western region and warm pre-humid eastern region, it is affected equally by western disturbances and easterly air circulations and moderates the two climatic extremes and thus accounts for the rich diversity of flora and fauna of the state. The state is strikingly rich in natural beauty and has an old distinguished religious and spiritual heritage. ²

An area of 2088.6 km\textsuperscript{2} in Uttarakhand is occupied by the major glaciers at an altitude ranging from 3200 m to 7400 m. The peaks and glaciers of the Great Himalayan
ranges covers the northern parts of the state. The Ganges and the Yamuna, the two great river systems of the country, take their birth in the Gangotri and Yamunotri glaciers in Uttarakhand, respectively. ³

Uttarakhand is a part of the Western Himalayan physiographic division. Geographers divide the state into five transverse zones (Figure 2.1).⁴

i. The Terai: South of the Himalayan Frontal Fault.

ii. The Doons: Between the Main Boundary Fault (MBF) and the Shivalik (Outer Himalayan) range.

iii. The Middle Himalaya: Between the MBF and the Main Central Thrust (MCT) with ridges as high as about 3000 m.

iv. The Inner (or Great) Himalaya: The zone north of the MCT including the permanently snowclad peaks at heights ranging up to just under 8000 m.

The areas around the MCT and to the north of it fall in the earthquake Zone V, the most earthquake-prone zone in India while the rest of the state lies in Zone IV. Uttarakhand also witnesses landslides, flash-flooding and forest fires almost every year while the rain-shadow areas are prone to droughts. Forests themselves cannot prevent all these disasters from occurring, but their presence can at least attenuate the probability and intensity of occurrence of landslides, flash-floods and sheet erosion of the topsoil.⁵
The state is situated in the north western Himalayas, has about 5.3 million ha land mass spread over 13 districts with 93 percent of its area as hilly terrain and only seven per cent as plain area is inhabited with a human population of about only 10.12 million\textsuperscript{6}. 

\textit{Source: Chopra, Ravi. (2014).}
b. Climate and Vegetation of Uttarakhand

The state’s climate varies tremendously from the sub-tropical humid climate of the Terai region to the tundra-like climate of the Great Himalaya ridges. The variation is even more dramatic along the slopes of the mountain ranges. These variations give rise to tremendous biodiversity, particularly in the forest areas. The highest elevation is the home for glaciers, covered with ice and rocks, giving rise to several perennial rivers, streams. Between 3000-5000 meters are located montane grasslands and shrub lands, namely the western Himalayan alpine shrub and meadows. Below the tree-line grow the temperate coniferous and the western Himalayan subalpine coniferous forests. At 2600-3000 meters the forests transform to the temperate western Himalayan broadleaf forests. The broadleaf forests extend in the altitudinal zone of elevation from 1500 to 2600 meters. The Himalayan Subtropical pine forests thrive below the elevation of 1500 m. The lowlands along the Upper Gangetic Plains of Uttar Pradesh are covered mostly with deciduous forests and the drier Tarai-Duar Savanna and grasslands. This belt, locally known as Bhabhar, constitutes one of the most productive agricultural belts of the state. The forest area is about 3.5 million ha i.e. 65 per cent of the total land area while the cultivable land constitutes about 15 per cent of the total area.

c. Demography of Uttarakhand

The total population of Uttarakhand in 2011 was 10.09 million according to the 2011 Census. It is primarily a rural state with 69.8 per cent of the people living in 15,761 villages. The urban population is mostly settled in the southern Terai region and the Doon valley. More than 90 per cent of the people in the mountain districts live in rural areas. The Middle Himalaya region between the MCT and the MBF is the most densely populated Himalayan zone. The Great Himalaya region remains largely remote, sparsely populated and unspoiled. Mountain villages generally have a high proportion of women to men as compared to plain areas. This is due to high levels of out-migration of men in search of jobs and cash incomes. Over 51 per cent of the state’s working population is involved in agriculture even though the cultivable area is less than 15 per cent of the total geographical area. Poor to moderate soil fertility on the mountain slopes limits agricultural production. Groundwater irrigation and tube wells are largely restricted to
the southern plains. The state’s industrial production is also almost entirely limited to the southern districts.10

Table 2.1: A brief profile of Uttarakhand

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (in sq km)</td>
<td>53,485</td>
</tr>
<tr>
<td>Population (in 2011)</td>
<td>10,086,292</td>
</tr>
<tr>
<td>Rural Population (%)</td>
<td>69.77</td>
</tr>
<tr>
<td>Sex Ratio (F/1000M)</td>
<td>963</td>
</tr>
<tr>
<td>Density (per sq km)</td>
<td>189</td>
</tr>
<tr>
<td>SC Population (%)</td>
<td>15.17</td>
</tr>
<tr>
<td>ST Population (%)</td>
<td>2.56</td>
</tr>
<tr>
<td>% Designated Forest Area of Geographical Area</td>
<td>65.18</td>
</tr>
<tr>
<td>% Pasture Land of Geographical Area</td>
<td>3.72</td>
</tr>
<tr>
<td>% Net Sown Area</td>
<td>14.10</td>
</tr>
<tr>
<td>% Total Fallows</td>
<td>1.98</td>
</tr>
<tr>
<td>Rainfall (mm)</td>
<td>1550</td>
</tr>
</tbody>
</table>

Sources: Census of India 2011, and State of Forest Report 2011

2.1.2. Almora – a Typical Hill District of Uttarakhand

District Almora, located within the lesser Himalayas is the study area of the present research. Situated in the Kumaun region in the State of Uttarakhand, Almora is geographically a typical hill region. The landscape of this hill district comprises of mountain ridges, river valleys and upland which makes it an ideal location for human habitation. Over the years, the degree of human-environment interactions in this region has increased manifold but has depicted a negative trend which is accelerating the pace / rate of degradation in the quality of natural resources and hence deterioration of natural environment of the hilly region of the district.

Situated in the Central Himalayas, the district is named after the town of Almora and it holds a historical relevance owing to its importance as the capital of the great Chand Dynasty rulers who ruled from 953 A.D to the late 18th century. During the ruling period of the Chand rulers, the district acquired the seat of strongest hill power in 1563 A.D. These rulers had significantly contributed in the unification of the entire Kumauni land
and since then the limits of the Kingdom of Kumaun had extended over the entire tracts of districts of Almora and Nainital. During the reign of this dynasty several religious places and temples were erected due to the tremendously religious temperament of the rulers and these sites are still maintained as landmarks of rich cultural heritage of the region.\textsuperscript{11}

\textbf{a. Geographical Location of Almora}

The geographical limit of this study is district Almora of Kumaun region in the State of Uttarakhand in India. The study area i.e. the district of Almora in Kumaun region of the State of Uttarakhand extends between $28^\circ 59'$ and $30^\circ 49'$ north latitudes and between $70^\circ 2'$ and $81^\circ 31'$ east longitudes. The total geographical area of the district is about $3144 \text{ km}^2$ which comprises of eleven development blocks and only $35.68 \text{ km}^2$ is urban area. Almora district is surrounded by District Nainital to the south, Districts Pithoragarh and Bageshwar to the north, Chamoli and Pauri districts to its west and District Champawat to its east.\textsuperscript{12}

The elevation of Himalayan peaks in Almora ranges from 5090 to 7785 m amsl. The nearby hill stations of Kausani, Shikhar, Devidhura and Binsar provides splendid views of their scenic beauty. The landscape has three main features: the mountain ridges, the river valleys and the upland. The series of rivers and valleys gets separated from one another by the mountains and ridges. Kali, Saryu, Gori, Kosi and Ramganga are the major rivers flowing through the land.\textsuperscript{13}
b. Drainage of Almora

The district is drained by three distinct river systems, the Pindar in the north, the Ramganga in the west and the Kali in the east. The other rivers and streams of the district either join the main rivers or their tributaries. Pindar river rises from the Pindari Glaciers lying between the Nanda Kot and Nanda Devi mountains at an elevation of
3816 m above sea level, in the northern part of tahsil Almora. It runs southwards past Phurkia and Dugli to Dwali where it is joined by the Kaphari on the left bank. Kaphni a feeder of the Pindar, rises in the Kaphni Gal glacier and runs in a southerly direction. During the rains, the water of the united stream of rivers at confluence becomes milky colour. It is separated from the Pindar River by a ridge culminating in a peak. Other streams in the district are as following. 14

i. Sundardhunga – It is a considerable feeder of the Pindar which is formed by the union of the Maiktoli and Sukhram streams near the village of Sundardhunga in Patti Danpur Malla of tahsil Almora.

ii. Sorag – A small tributary of the Pindar rises from the Purli Dhar range and running southward joins the Pindar from the right near the village Sorag.

iii. Baur – An affluent of the Pindar is formed by the union of the Tatoni and Chakalbagar stream at Samdar in Patti Danpur Malla of tahsil Almora.

iv. Ramganga – It enters the district near Chuelara- sim in Patti Giwar Palla of tahsil Ranikhet and runs southward to the village of Punabagar where it is joined by the Bimoli Gadhera stream from the left.

v. Gagas – It rises in Patti Kairarau of tahsil Ranikhet to the west of the Bhatkot range near Dunagiri and runs due south through the tahsil.

vi. Kosi – It is also an important tributary of the Ramganga and is also known as Kosila or Kaushalya in Patti Katyur Bichla of tahsil Almora.

vii. Sual – A chief tributary of the Kosi, rises near the village of Bhaspar in Patti Lakhanpur Malla of tehsil Almora. Running westward it traverses the Patti and runs to Almora separating Pattis Lakhanpur Talla and Khas Parja on the north from Patti Uchyur on the south and runs to Chaunsali where it joins the Kosi.

viii. Kali – It rises in the Kalapani springs in district Pithoragarh, touches Almora district at its confluence with the Sarju to the north-east of the Kalimat hill, and runs southwards separating this district from Nepal.

ix. Sarju – A considerable affluent of the Kali rises on the southern slope of a ridge in Patti Danpur Malla of tahsil Almora. Running south-westward it is separated from the sources of the eastern Ramganga on the east and from those of the Kaphni on the west by spurs emanating from the mountainous mass which culminates in the Nandakot peak.
x. Ramganga Eastern – It is one of the considerable tributary of the Sarju, rises from a horseshoe-shaped depression on a ridge in Patti Danpur Bichla of tahsil Almora.

xi. Gomati – It is another important tributary of the Sarju rises on the northern border of district Almora near the Debra mountain and runs south-eastward through Patti Katayur Malla.

xii. Pungar – This river rises from a ridge on the eastern border of Patti Nakuri in tahsil Almora, it runs southwestward through the Patti as far as Hatsia where it forms a considerable stream.

There is one lake of importance in the district the Tarang Tal, situated in the eastern valley of Patti Giwar Walla. Surrounded on three sides by high mountains, it is a picturesque lake formed by a natural dam made by big boulders, below which a stream gushes out.\textsuperscript{15}

\textbf{c. Climate and Vegetation of Almora}

Vast variations in the climate and seasons, specific to location are exhibited depending upon the geographical distribution, topography, mountain ranges, altitude above sea level, mountain formations, their slopes and aspects as well as varying distances from snowbound areas. The mean monthly temperature of some of the major towns, such as Almora and Ranikhet, show a mild climate with temperatures ranging between 5° and 25° C that is suitable for a wide variety of agricultural and horticultural produces. However, a perusal of the annual rainfall data shows that District Almora receives on an average 1209 cm rain during a year. The minimum and maximum temperature is 5 °C and 28 °C, respectively.\textsuperscript{16}

Total area of the district is 3139.00 km\textsuperscript{2} out of which 1725.6 km\textsuperscript{2} is forest area, whereas, net sown area is 1073.11 km\textsuperscript{2} and 118.28 km\textsuperscript{2} is net irrigated area. Net sown area is cropped more than once, leaving scope for bringing more land under double cropping. This kind of land utilization denotes that there is much scope of improvement of agriculture by bringing more area under irrigation. Another aspect of economy boost for this region could be utilization of the permanent grazing lands for dairy development.\textsuperscript{17}
d. Demography of Almora

As per Census 2011, the total population of Almora district is 622,506 of which 291,081 are males and 331,425 females. Almora district ranks 6th in terms of population in the state of Uttarakhand. Population density (persons per square kilometres) of the district is 198 against 189 for the state. A population of about 560,192 inhabit the rural areas while the urban areas population is about 62,314. Sex ratio of the district is 1139, of which urban areas record 848 and rural areas 1177. Almora district ranks 1st in terms of sex ratio (1139) which is higher than state average (963 females per one thousand males). The district has registered a negative decadal population growth of -1.64 percent against state’s positive decadal growth of 18.81 percent. This is indicative of a correlation between population size and decadal growth. The search for better employment opportunities and better living conditions has resulted in huge outmigration of able-bodied persons and youths from the district. Another factor responsible is the practice of labour-intensive and subsistence type of agriculture in the district which suffers from very low productivity due to poverty and marginality of farmers, uneconomic landholdings overly dependent on monsoons for irrigation, low level of agricultural commercialization, lack of infrastructure and weak market orientation and greater susceptibility to natural calamities.

The literacy rate of the district is 80.47 of which that for females is 69.93, which is much lower than that for males i.e. 92.86 in the district. Almora district ranks 7th in literacy (80.47 per cent) and is little above the state average (78.82 per cent). Till the Census 2001, the district had only three tahsils – Bhikiyasain, Ranikhet and Almora. However, with the creation of six new tahsils from these tahsils the total number of tahsils has gone up nine in 2011 namely, Bhikiyasain, Chaukhutiya, Sult, Ranikhet, Dwarahat, Someshwar, Almora, Jainti and Bhanoli, which are further divided into eleven Development Blocks i.e. Bhikiyasain, Syaldey, Sult, Tarikhet, Chaukhutiya, Takula, Bhaisiya Chhana, Hawal Bagh, Lamgarha, Dhaula Devi and Dwarahat for developmental purposes. Almora district has 2289 villages including 39 forest villages out of which 2184 villages are inhabited and remaining 105 villages are uninhabited. The district has 1122 Gram Panchayats. Apart from this, 8 villages were also transferred from Bageshwar tehsil of district Bageshwar to Almora tehsil of the district during this decade. The district has four Statutory Towns and one Census Town. They
2.1.3. Geographical Peculiarities and Related Environmental Issues in the State and the Present Study Area

The agitations for a separate state of Uttarakhand had demanded a mountain state, but successive state governments have neglected Uttarakhand’s predominantly mountain character and adopted the conventional model of development followed in the rest of India. They have ignored the people-centred green development path hoped for during the statehood agitations.

Economic development after statehood has generated wealth in Uttarakhand. Industries and jobs have increased, but mainly in the plains. The chief beneficiaries of economic growth are in the towns and cities of the southern districts where production investments have concentrated. The neglect of Uttarakhand’s mountain character has doubly jeopardized its mountain communities. Agriculture is their main livelihood source, but agricultural income growth has been the slowest after statehood in 2000. Given its generally marginal farm lands, the SC community in the mountain areas is among the least benefitted. Sustainable regeneration of mountain agriculture deserves high priority in Uttarakhand’s development planning.

The faster growing economic sectors of the state economy have brought some growth to the mountain areas but have also seriously endangered ecological sustainability and livelihood security in the process. Uttarakhand’s government has pushed roads, dams, tunnels, bridges, mining and unsafe buildings even in the most fragile mountain regions. All these activities contributed to the aggravation of the destruction caused by the 2013 disaster floods.

The manufacturing subsector recorded the highest growth rate (414 per cent) between 2004 and 2013; but it also caused widespread pollution. In 2010, the Uttarakhand Environmental Protection and Pollution Control Board (UEPPCB) issued closure notices to 52 manufacturers for causing pollution. Later it cited 374 industrial units...
for environmental pollution in the state. These included manufacturing giants like Tata Motors, Hindustan Unilever, ITC, Hero Honda, Bajaj Auto and Nestlé among others.

24

The massive growth of tourism and commercial activity in Haridwar city has caused serious air pollution and concomitant problems due to particulates emission from motor vehicles. Construction of hotels, restaurants and commercial centres has expanded rapidly to cater to tourists in different parts of the state. This has led to large-scale illegal construction of hotels and buildings on river banks and river bed sand mining.

25

Paper and pulp industries, sugar mills, distilleries and other industries routinely discharge effluents directly into important tributaries of the Ganga like the Western Ramganga, Kosi and Dhela. In January 2010, the Central Pollution Control Board (CPCB) was compelled to direct the UEPPCB to monitor and curb such pollution.

26

According to data recently made available by the Government of Uttarakhand, it has identified an installed potential of 27,039 MW at 450 hydro-electric projects (HEPs) in Uttarakhand to meet the construction industry’s demand. HEPs cause a variety of environmental and social problems throughout their life cycles. They fragment rivers, alter their ecosystems and reduce riverine bio-diversities. There is significant deforestation in the pre-construction and construction phases when roads are built and colonies established for housing and offices.

27

Quarrying for construction materials, blasting for tunnels and muck disposal all cause air, water or noise pollution. Roads and tunnels often destabilize mountain slopes, endangering lives and livelihoods. Displacement of local populations and loss of access to local livelihood resources add to the environmental dimensions. Hence, dam building is a fiercely contested development activity in Uttarakhand. The Union Ministry of Environment and Forests (MoEF) estimates that almost 45,000 ha of forestland have been diverted to non-forest uses in Uttarakhand since 1980. About 40 per cent of this has been for road construction, HEPs and transmission lines. Two-thirds of the forest diversion has occurred after the formation of the state in 2000.

28

Environment is a basic dimension of mountains and therefore, an indispensable aspect of integrated development planning of mountain areas. Land, water resources
and forests are closely linked and interdependent elements of the environment. Development without degrading or adversely affecting limited environmental resources and the ecology of mountain areas is the only way to ensure environmentally sustainable development of the state. Eco-development, i.e. economic development is based on ecological principles.31

Barely 10 per cent of the net sown area in the mountain districts is irrigated. Highly variable weather in recent years has increased the vulnerability of agricultural production in the rain fed cultivation areas. Unless climate change impacts and disaster mitigation are built into development planning, weather-related disasters will affect mountain farmers and farm labourers the most. They could also erode economic growth in the near future.32

Agriculture (including forestry) is the mainstay of the economy of the state. Destruction and degradation of forests are taking a heavy toll of soil and water resources in the state. Both physical as well as biological treatments of degraded lands are essential for enhancing their productive potential. Thus, intensification of farming under integrated intensive holistic farming system and agro-forestry can augment productivity and enable long run sustainable farming in the state. Ecological or organic farming utilizes biological, cultural and natural inputs. It makes use of organic or farmyard manure, compost, crop rotation using legumes, vermin-culture, mechanical cultivation, bio-fertilizers, bio-pesticides and biological control to maintain soil productivity, supply plant nutrients and control insects, weeds, other pests and diseases. Integrated intensive holistic farming system brings together a host of farm and non-farm sub-systems. It encourages shift from monoculture farming towards adoption of inter-cropping or mixed cropping type of farming such as food grain-based, dairy-cum-poultry based, vegetable-based and horticulture-based farming to enhance farmers’ income substantially as well as ensure ecological sustainability.33

On the other hand agro-forestry works towards regenerating forest degraded area and culturable wasteland by growing plants, fodder and fuel. Planting of trees like Manipuri oak and deodar to evergreen grasses like teliya and nacha, rare medicinal herbs like salem panja, kuth, sameva or tagar, flowers like roses and lilies and climbers like barbate bean will help save forest and agriculture land in the state.34
Climate change has emerged as a critical issue in this disaster-prone state. Uncertainty of rain and snow appears to be increasing. Winter rains have almost disappeared and inner Himalayan peaks experience much less snowfall than earlier times. The frequency of extreme weather events seems to be increasing. For example, 2009 was a drought year in Uttarakhand but 2010 saw heavy rains and landslides in the Kumaun region during the monsoon season. In 2012, a cloudburst deluged the Assiganga valley wiping out three small HEPs. Hence, resilience against unpredictable weather and its consequences has to be built into development planning in Uttarakhand. Sustainable regeneration of mountain agriculture therefore deserves high priority in Uttarakhand’s development planning.35

The June 2013 disaster could be a harbinger of the onset of climate change (CC) in Uttarakhand. It is generally known that CC will manifest in increased variation in temperatures and precipitation. Growth and yields of crops, fruits and flora will be affected. In the Himalayan region it will impact springs’ discharges, cause glacier recession and thereby alter river flows. Climate change will escalate Uttarakhand’s existing vulnerabilities. There are indications that the daily temperature extremes are likely to intensify in the year 2030s and that intense rainy days are likely to increase.36

The geographical, ecological, agro-climatic and socio-cultural factors account for the peculiar problems and constraints in the development of hill areas of the state. Some of the problems that are specific to the hilly areas in Uttarakhand are: 37

- Environmental degradation caused by excessive denudation of forests and mining.
- Over dependence on agriculture and absence of a developed industrial sector.
- Lack of adequate infrastructure facilities
- Non-availability of alternative income and employment opportunities. Large scale outmigration of able bodied and educated youth.
- Heavy burden of work and drudgery of women and poverty.

Both land and water resources are limited in the state. The marginality, inaccessibility, fragility of the hilly terrain and the Himalayan microclimatic variability are the attributes of mountain farming system. The major constraints in agricultural development in the state:38
• Steep slopes and difficult undulating topography.
• Isolated fragmented holdings and absent landlordism.
• Poor socio-economic conditions of people, less risk taking capacity.
• Lack of adequate institutional finance.
• Agricultural operations executed by the womenfolk but decision making is done by the menfolk.
• Lack of trained manpower in the field of watershed management and agriculture.
• Migration of able bodied and educated people.
• Variations in microclimate and soils etc.
• Subsistence agriculture with limited crop diversification.
• Limited irrigation resources.
• Limited availability of improved seeds and other inputs. Non-availability of agricultural implements suitable for hilly terrain.
• Inadequate market arrangements for the produce and post-harvest facilities.
• Slow returns from orchards due to long gestation period.

Most land regeneration requires only basic water and soil conservation measures and some amount of plantation and protective work. Loss of forest has reduced the capacity of mountain slopes to absorb and infiltrate rain water leading to drying up of springs and consequent dwindling of water resources. The soil and water conservation forms the essential ingredients of a watershed management for optimum and sustained production with minimum occurrence of damages from natural hazards. Run-off harvesting, through contour bunding or ridges, flood water harvesting through level flooded terraces, check dams for aquifer recharge, surface dams and subsurfaced dams are available techniques for checking further denudation of soil and water resources through harvesting. Regeneration of water sources, particularly spring and seepages, by employing the concept of “spring sanctuary” is oft used. Bio-industrial watershed projects by using bio-gas processing industries form an integral part of watershed management. Watershed development programmes should dovetail the on-going production programmes in agriculture, horticulture and allied sectors to revive hill agriculture, to make it more productive and sustainable. Land facing any kind of degradation should be subjected to plant treatment with specific plant species. Large areas of land in the hills get afflicted with mass soil erosion and degradation
problems caused by landslides, mine-spoils and torrents. Rehabilitation of such highly
degraded lands through bio-engineering technology should be undertaken. The highly
degraded mine-spoil and landslide slopes need to be treated with small engineering
structures such as loose stone/gabion check dams, contour trenches, wattling,
geojute, etc. and planted with suitable vegetative species.\(^{39}\)

The socio-religious and cultural heritage of Uttarakhand has provided the rules of
sustainable natural resource utilization that enabled hill communities to survive
materially. For example, the intricate relationship between water and the faunal cover
was so well understood that a protected forest cover was maintained on the higher
reaches (the recharge zones of the natural springs) and local deities (devatas) were
often installed at such places. Special attention was paid to protect their sanctity and
keep them pollution free. The places where water was collected, i.e. naulas and
dharas, were considered auspicious. Many important rituals were associated with
these places and the cleanliness of these ritualistically important water harvesting
structures was a social responsibility. In order to protect the vulnerable locations from
landslides and other natural calamities, the indigenous people built traditional water
escape routes i.e. jungle guls to keep the pore water pressure within threshold limits.
Hence, water harvesting through recharge pits (chaals/khals) etc. and practices of
recharge zone management are not new to the people of hills.\(^{40}\)

Also the architecture of the traditional buildings is best suited to the physiographic
conditions of the hilly region. The commonly found four storied houses i.e. goth, chaak,
paan, chaj have been built incorporating the essentials of earthquake resistance.
Evolved through centuries of experimentation these socio-religious practices and
sanctions form a nature-man-spirit complex or the survival strategy of the people of
this land. Being time-tested, location specific, participatory and cost-effective these
traditional socio-cultural practices of resource management are more pertinent today
so also their scientific upgradation will help evolve a comprehensive strategy for
rejuvenating the economy and ecology of the region.\(^{41}\)

For the development of Uttarakhand, conservation of land, water and bio-diversity is
essential. Natural biodiversity of this region is exceptionally rich and is one of the most
important common property resources (CPRs). Biodiversity, ecological niches, and
human adaptation mechanisms inextricably linked with the mountain agriculture\(^{42}\) are
the positive attributes associated with the mountain areas. The natural ecosystems endowed with biodiversity are extremely resilient. Biodiversity also creates barriers against any natural calamity like drought and pest epidemics. Thus agro-ecosystems harbouring high degree of bio diversity are also resilient against any type of physical or biotic turbulence to the system. They are more stable than monocultures (monocropping), and therefore, gives farmers more security. Simple, less complex ecosystems and monocultures are extremely prone to various kinds of damaging agents whereas cultivation of many different varieties for different purposes such as productivity, drought resistance, taste, colour, nutritive value, rituals etc. injects sustainability in the agro-ecosystems and thus, enhance degree of security. However, rapid deforestation, unscientific management of natural resources and degrading land use practices has resulted in low productivity, depletion of floral/faunal bio-diversity and aggravation of ecological imbalance.

The Biodiversity Conservation Prioritization Project (BCPP), 1998 had emphasized that trade, unsustainable harvest without proper replenishment, loss of habitat and over exploitation are the major causes of loss of biodiversity especially of medicinal plants. Article 8(J) of the Convention of Biological Diversity (1992) emphasizes that it is relevant to respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles for the conservation and sustainable use of biological diversity. The unique indigenous knowledge, innovations and practices based on locally available bio-resources of the people of Uttarakhand have evolved in lieu of their incessant efforts to survive in difficult geo-physical climatic conditions of the region amplified in absence of adequate infrastructural facilities. Their traditional values of resource use, such as, subsistence values (food, clothing, housing, medicine, energy), socio-cultural values (ritual, spiritual, aesthetic, educational, psychological), economic-commercial values (agricultural, industrial, pharmaceutical, tourism), and traditional practices of resources use (agri-diversity, wild edibles, medicinal plants and ethno-medicine, forest and grasslands, ethno-veterinary, etc.) are tools of resource conservation. Exploring possibilities for their value addition and validation through appropriate science and technology inputs will augment income generating potential of bio-resources and provide greater impetus to conservation efforts on the part of people of the region.
For the constraints imposed by inaccessibility and fragility of the mountainous terrain, a region specific, integrated and highly diversified development approach is the prerequisite. It is neither lack of general awareness of the problems of the hill state nor the lack of sincere planning efforts of the central or state governments but inadequate or improper co-ordination between different plans or different stages of the programmes and multiplicity of plans or programmes for meeting the same goals, faulty criteria for the identification of beneficiaries in the programmes and emergence of dependency culture instead of self-reliance from the state assistance and subsidy for poverty relief and economic development, the absence of requisite activity specific infrastructure and services in the hills and failure to pay attention towards understanding inter-sectoral linkages in the planning and implementing process of the development plans and projects are the factors behind years of deep-seated discontent and economic backwardness of the region.\textsuperscript{46}
2.2. Research Methodology - Criteria for Selecting NGOs, and Research Design

2.2.1. Design of the Study and Tools and Techniques of Data Collection

The ‘research design’ is a detailed plan of how the goals of the research are to be achieved. It is the planning of an appropriate strategy, which considers what is to be observed, how it is to be observed, when and where it is to be observed, why it is to be observed, how to record or assimilate the observations, how to analyse or interpret the recorded observations, and how to generalise the findings, for conducting the research study.\(^47\)

a. Collection of Primary data

The primary data is the first-hand data, which is collected by the researcher for the first time. The data collected is original in nature and specific to the research problem that is currently being studied. \(^48\)

The questionnaire is a document that contains a set of questions and the answers are filled by respondent himself while an interview schedule is a set of structured questions and the answers are recorded by the interviewer himself. The questionnaires, which are usually sent by mail or delivered by hand, are employed for primary data collection when the respondents are scattered in a large geographical area. On the other hand the schedule is records the responses of the respondents who are located in a small area and thus can be personally contacted. The questionnaire is used when respondents are educated while the schedule can be used for both the illiterate and the educated respondents.\(^49\)

The researcher visited the offices and village project sites of the NGOs' for getting the first-hand experience of the work and nature of NGOs at the very grassroots, and collect the relevant information from the NGOs working in the study area. The researcher also developed a format of the questionnaire and the interview schedules for the collection of primary data. These tools of primary data collection have been developed as per requirements of the research and were redesigned during the course
of the survey to incorporate necessary changes when found inappropriate or lacking during the field work.

The researcher developed two sets of questionnaire and schedules to objectively study the working of the NGOS and their impact by collecting information from the stakeholders. On the one hand, one set of questionnaire or schedule was designed to evaluate the impact of the working of NGOs and the level of community participation in the environmental conservation and development through the intervention of NGOs’ environment based projects. On the other hand, the second set was developed to assess the role and effectiveness of the NGOs working as agencies for environmental conservation in the study area. The former was used to assimilate information from the respondents of the communities in the village sites where the selected NGOs had previously implemented or are currently running a project having positive impact environment. And the latter format was employed to record the experiences and achievements of the NGOs and their staff that are working towards environmental conservation in and development of the study area. The format of the set of questionnaires and interview schedules which were developed by the researcher for the present study are provided in the appendix to this thesis.

**Sampling Procedure: Non-Probability Purposive Sampling**

For conducting the present study, the researcher has selected the sample NGOs based upon the ‘Non-Probability Purposive Sampling’. Non-probability sampling techniques are the techniques which enable the researcher to select units from the given population that they are interested in studying.

The purposive sampling provides the researcher with strong theoretical reasons for the choice of their sample units based on their subjective judgements, academic literature and practice, i.e. the experience of the researcher and the evolutionary nature of the research process. Purposive sampling, which is also known as Judgement, Selective or Subjective, is a non-probability sampling method which is used primarily when only limited number of primary data sources are available due to the nature of research design and aims and objectives of the study. This cost-effective and time–effective sampling technique is very useful in reaching the targeted sample easily and quickly. 

*Chapter II* 67
b. Collection of Secondary data

The secondary data is the data which has already been collected during other studies and may also be statistically analysed. The secondary data is the second-hand data which is readily available from the other sources.51

c. Participatory Rural Appraisal

Participatory Rural Appraisal (PRA) is an alternative framework for data collection and analysis with the involvement of rural people. It is a process of participation with the villagers for indigenous knowledge-building exercises. It constitutes a set of principles, a process of communication and a menu of methods to learn from and with the villagers in order to investigate, analyse and evaluate constraints and opportunities for planning, implementing and monitoring of rural development programmes. It is a useful methodology of participatory nature that focuses on the rural people, their livelihoods and their inter-relationships with the socio-economic and ecological factors for collecting different kinds of data, identifying the affected groups, evoking and mobilizing the intended groups to enable their participation in decision-making.52

PRA is also known as Participatory Rapid / Rapid Rural Appraisal (PRRA/RRA) or Participatory Learning Method (PALM). Here the emphasis is both on ‘participatory’ and ‘rapid’, where rapid refers to the ‘pace’ of data collection and not the process of development or the implementation of plans.53

i. Objectives of PRA Methodology

PRA sessions can be conducted to serve different objectives in view or a mix of objectives. Some of the objectives are mentioned below:54

- For learning perceptions, experiences and capabilities of the rural people and thus securing greater and better involvement of villagers
- For collecting different kinds of data and generating relevant information for immediate and future use.
- For learning about earlier or on-going policies and programmes and their impacts in order to facilitate the process of framing new ones.
- For estimating trends and ascertaining conditions of the issues at hand
For validating or cross-checking data collected from other sources such as secondary.

For training of different categories of persons or groups involved, from the government, NGOs, banks, donor agencies, researchers, extension agents, scientists etc.

For further research on the use of PRA and improvements in its methodology.

PRA is a process of participation through rapport-building with the rural people. Its output and content would differ depending upon several factors such as which set of principles are applied, what methods are used, how the process is established and how the analysis progresses.55

ii. Principles of PRA

The guiding principles of PRA are the following:

1. Optimal ignorance,
2. Seeking diversity,
3. Offseting biases and triangulating, and
4. Listening and learning, learning rapidly and progressively and learning through participation.

The principle of optimal ignorance is applied to seek appropriate imprecision or avoiding not necessary precision. With the purpose of minimizing cost and time, it aims to know only what is worth knowing and sufficient enough to the purpose and leaving the rest or not finding out more.56

PRA is concerned with collecting different kinds of data and generating information regarding diverse rural events, different processes and factors, perceptions and experiences that lead to various relationships in rural communities. Thus, PRA sessions look for analysis of difference.

PRA is essentially a methodology to overcome biases of conventional methods of survey or questionnaire. It emphasizes on being flexible, not rushing, listening and not lecturing, probing and not speeding indifferently and also evoking and mobilizing participation of rural groups.57
The process of ‘triangulation’ is to check the reliability and validity of the data in different ways. In order to improve accuracy it involves conscious, non-random selection in different dimensions such as team composition, units of observation, PRA methods. The team must be composed in a manner to be inclusive of different perspectives and thus inter-disciplinary. For cross-checking the information or deeper probing, the units of observation can be changed from time to time. Different groups can be dealt with separately or in combination in order to collect/ consider viewpoints from varied angles. Secondary data and other sources of information can also be consulted. Different PRA methods in varied combination and sequences can be applied to collect, test and verify any piece of information such as semi-structured interviews supplemented by farm maps, livelihood analysis and flow charts.

Learning through participation of intended groups/individuals and listening to their experiences, their history and culture, their ideas, their priorities and preferences constitute an important part of PRA. The greater is the interaction and participation with the rural people, the greater is the learning achieved and information generated. These principles of PRA accounts for making the process of PRA sessions informal and flexible, its methods innovative and inter-active and the learning iterative and progressive, thus facilitating greater and better participation.

iii. PRA methods as complementary to Questionnaire Survey

The questionnaire based survey often faces the problem of communication barrier between the literate enumerator and the non-literate respondent which leads to data generation that is frequently inaccurate and misleading. PRA methods can complement the questionnaire survey by identifying the gaps in language, content and direction of questionnaires to be used in the survey. The visual techniques of PRA can help the non-literate respondents in answering questions which otherwise remain unanswered or ineffectively communicated. Informal interviews which are semi-structured can produce better results because of its flexibility and openness. Use of PRA techniques can enhance the language of questionnaire and the vocabulary used in survey by incorporating appropriate local words/terminology or appropriate clarification for words used in questionnaire. PRA sessions can also suggest the kind of questions, the importance of the questions and the number of questions to be included in order to generate appropriate information without affecting the accuracy of
response which generally declines due to the ‘fatigue’ factor. The more formal the questionnaire and the more length of the interview, the greater is the risk of fatigue setting in. The respondents may be reluctant to give direct response to some questions such as net income. Under such circumstances PRA techniques can assist in devising indirect or alternative means of approaching the same question on the spot and generating required important piece of information.

PRA also facilitate intensive study of the issue at hand or a general trend of any aspect of community life, and thus puts forth a more refined picture on the basis of analysis of difference provided by the study.

PRA survey gives the advantage of soliciting group views which helps in evaluating results obtained from individual respondents. Group interactions also help in conflict resolution within the group on controversial issues.

Thus, questionnaire survey can be combined with PRA-type inquiry for better results especially in terms of design efficiency, quality of data, time management, the depth of inquiry, trustworthiness and utility of data.59

2.2.2. Data Collection Methodologies Used in the Present Research

The present study is primarily theoretical, exploratory and descriptive in character; hence the nature of data utilized in this study is both ‘Primary’ and ‘Secondary’ and also based on ‘Participatory Rural Appraisal’. The objective of the descriptive study is to describe the observed events, phenomenon and situations precisely as they are while the exploratory nature of the study explores sources to address the limited knowledge of the researcher on the concerned topic of research. 60

The main reason for taking up ‘Non-Probability Purposive Sampling’ for this study is the fact that no two NGOs can ever be found to be similar. In this method, the minimum number of sampled units that meet the requirements of the study can be specified. Here, the researcher is not concerned with achieving objectivity in the selection of samples or having numbers that match the proportions in the population; instead, to enable the researcher to concentrate the relevant research on a limited group or a small sized group having similar characteristics by employing the method of non-
probability purposive sampling. To make generalizations from the sample units to the entire population under study is desirable but of secondary consideration.

In order to overcome the shortcomings of the questionnaire survey, the researcher has complemented the questionnaire survey with PRA technique of semi-structured interviews and group discussions with the respondents from the communities where the selected NGOs work. Semi-structured interviews are partly structured interviews conducted in an informal manner. The interview is initiated by the outsider with a few pre-set questions that are required to be open-ended. Further questioning and probing depends upon the answers received and the willingness of the respondents

The sources of secondary data for the present study mostly included books, journals, magazines, newspapers, published reports and the websites. For the collection of relevant data from secondary sources required for the present study the researcher had visited different libraries, the offices of the selected NGOs and the concerned government departments and offices which are located in the given study area. For library consolation the researcher had visited the Central Library of Kumaun University wherein the researcher had accessed the internet resources at the Central Library of Kumaun University for paid journals and other online publications (books, magazines, research papers etc.); consulted the Library of Political Science department at D.S.B Campus, Kumaun University for the books related to the present study and the Library at ATI (Administrative Training Institute), Nainital.

---

2 Ibid.
3 Ibid.
5 Ibid.
9 Ibid.

Ibid.


Ibid.

Ibid.

Ibid.

Ibid.

Ibid.

Ibid.

Ibid.


Ibid.

Ibid.


Ibid.


Ibid.

Ibid.


Ibid.

Ibid.


Ibid.

Ibid.

Ibid.

Ibid.


http://research-methodology.net/sampling-in-primary-data-collection/purposive-sampling/


http://research-methodology.net/sampling-in-primary-data-collection/purposive-sampling/


