STORIED LANDSCAPES: A STUDY OF THE ECOLOGICAL NARRATIVES OF THE BHOTIYAS (TOLCHHAS, MARCHAS AND JADS) OF UTTARAKHAND

Master's Dissertation Thesis Submitted to
Saurashtra University Rajkot, Gujarat

For the Award of the Degree of

Masters of Science in Heritage, Conservation and Management

By

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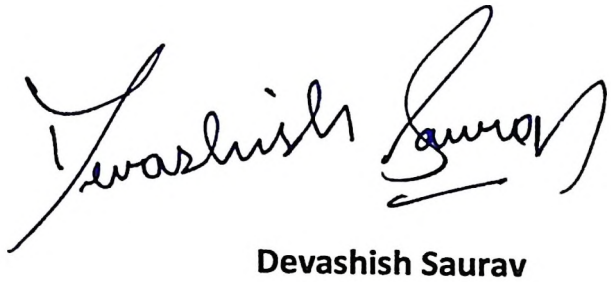
2021

DECLARATION

I,**Devashish Saurav,** hereby declare that the research work entitled **"Storied Landscapes: A Study of the Ecological Narratives of the Bhotiyas (Tolchhas, Marchas and Jads) of Uttarakhand",** carried out in partial fulfillment of M.Sc. (Heritage Conservation and Management) degree of Saurashtra University, Rajkot is an original work. This work was carried out under the supervision of Dr. Ruchi Badola, Scientist-G and co-supervision of Dr. Anju Baroth, Scientist-C, at the Wildlife Institute of India from January' 2021 to July' 2021. I hereby declare that this work has not been submitted in any form for any other degree or diploma at any university or other institutions.



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CERTIFICATE

This is to certify that Mr **DevashishSaurav** has carried out an original piece of research in partial fulfilment of Master's Degree in Wildlife Science of the Saurashtra University, Rajkot, Gujarat. The topic of his dissertation was **"Storied Landscapes: A Study of the Ecological Narratives of the Bhotiyas (Tolchhas, Marchas and Jads) of Uttarakhand"**. The study was carried out under our supervision from January to June. We hereby certify that this work has not been submitted for any degree to any university

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Acknowledgement

Throughout the writing of this dissertation I have received a great deal of support and assistance. I would first like to thank my supervisor, Dr. Ruchi Badola, Scientist G and Dr. Anju Baroth, Scientist C Wildlife Institute of India, I am grateful for the showers of compassion and support. Your insightful feedback pushed me to sharpen my thinking and brought my work to a higher level. I am indebted to Prof. Qamar Qureshi, Scientist-G and Dr. Vishnupriya Kolipakam, Scientist-C Wildlife Institute of India whose expertise was invaluable in formulating the research plan. Your trust motivated me and your ideas enlightened me in wisely moving on with the study.

I would like to acknowledge my colleagues from Wildlife Institute of India for their wonderful collaboration. I would particularly like to point out the contribution of Dr. Pariva Dobriyal, Deepika Dogra, Amanat Gill, Amrita Laha and Dr. Upma. I want to thank you for your patient support and for all of the guidance provided. Their support provided me a direction to carry out my study as per the plan.

I would also like to thank my friends Shruti, Abhishek and Arpit for their valuable feedbacks throughout my studies. You provided me with the tools that I needed to choose the right direction and successfully complete my dissertation, I am thankful to them for stimulating discussions as well as happy distractions to rest my mind outside of my research. I owe infinite thanks to my mother and sister (Nayancy) for their wise counsel, sympathetic ear and overwhelming benevolence. I indebted to my nieces Pihu and Pakhi whose smiles and words helped me in moving forward even under adverse situations.

This Work is dedicated to Janki Aunty and several other epitomes of women empowerment within the Bhotiya community. I am obliged for their love and support.

Chapter 1: Introduction

1.1 Abstract

Himalaya is still young and growing; the formation of Himalayan ranges is still going on. Vast terrain, unstable stretches, extreme climatic conditions and other potential hazards are major challenges for the inhabitants of the area. Humans have survived all such challenges since ages, it is a story of settlers' survival and sustainability. The story of survival narrates the suitability of the wise traditional practices and sustainable community based approach. This process follows the lessons learnt from trials and errors, cultural assimilation and devoted observations. This is reflected in socio-cultural spheres, technological understanding and institutional structure of local Bhotiya (Jads, Tolchha, Marcha) society.

It is important to understand the Himalayan settlers historically, the cultural practices of inhabitants help us in understanding the background, origin and nature of local traditions. Jads, Tolchhas and Marchas are such ethnic groups from Uttarakhand who evolved and settled in Himalayan region over a course of time. They follow different cultural traits, livelihood practices and hold different socio-political and religious affiliations. They inhabit the northern and upper ranges of Himalayas. The blend of Tibetan Buddhism and Hinduism is reflected from their culture and nomadic lifestyle. Since very old time the Middle Himalayan region of Garhwal and Kumaun have been under the influence of Hinduism. Puranas and Hindu epics mentions about the associations with the region in great detail. Along with the Indo-Tibetan trade which got disrupted post-1962 war, the practices of subsistent farming, animal husbandry etc. have passed on from one generation to another. The farming practices developed extensively with the arrival of migrants (most of them Rajputs) who fled from the plains in 14th century due to the Muslim

invasion. For coping up with the extreme climatic conditions they adopted the route of seasonal migration.

Settlers survived the hazards of hilly terrain like landslides, earthquakes and flash floods. They sustained in the region, because of rich natural resources and water availability. The hilly architecture, selection of residential areas, management of natural resources and local safeguarding techniques supported them in growing and evolving with time. Several traditions developed over generations as a cultural response to the daily challenges, it was thus successful in making a niche in the ecological diversity and lifestyle of the people.

Scholars from environmental science, humanities and social sciences are trying to establish, explore or experiment with ideal ways through which living beings engage with their surroundings. Vehement interactions with other living and non-living beings (both tangible and intangible elements) provide insight regarding accountabilities, relationships, involvement and understandings of an individual with the external world. It often reflects the source and direction of an individual's immersion and involvement with the material world. The work though focused on the Bhotiyas (Tolchhas, Marchas and Jads) of Uttarakhand, works along the field of multispecies studies (Dooren, Kirksey, and Munster, 2016). Exploring the various arenas of the species world, the research explores multiple dynamics associated with categorizing, classifying and combining the diverse ways of life that constitute the everyday chores of the Bhotiyas(Tolchhas, Marchas and Jads) world.

Bhotiyas have evolved in reaction to external stimuli. Being a borderland community living near India's dragon neighbour China, Bhotiyas (Tolchhas, Marchas and Jads) changed over time, giving rise to different modes and skills for survival. Paying attention to several human and non-human entities like the forest, rivers, traditional knowledge, festivals, etc.,

multiple forms of potential connections and understanding open up, representing that the Bhotiyas (Tolchhas, Marchas and Jads) have multiplied their forms and associations. Such changes or transformations or multiplications have characterized the present association of Bhotiyas (Tolchhas, Marchas and Jads) with the physical and non-physical world.

A plethora of arguments have been contested, inquired and followed in this work. The various modes of immersion, perceptions, imaginations, living realities, social customs, and folklores are explored during the fieldwork tenure. Engagement with the Bhotiyas (Tolchhas, Marchas and Jads) of Uttarkashi and Chamoli districts includes farmers, activists, artists, unclaimed hunters and forest dwellers; ground and guide the research. Such diverse interactions help in generating a dynamic form of ethological and ethnographic inquiry.

Along with the vibrant context of multispecies studies, the influence of state and forest laws on Bhotiyas (Tolchhas, Marchas and Jads) lifestyle is considered during the research. The work showcases ethics, epistemology, environment, culture and politics revolving around Bhotiyas (Tolchhas, Marchas and Jads).

1.2 Origin of the study

The colonial era emphasized the strength of science, but a linear approach to understanding nature has been under the scanner nowadays. Throughout the 19th century, the intricate relationship between people and nature has been missing in colonial discourses. Usually, researchers and scientists consider the dependence of people's upon nature solely in material terms, but the scope has broadened in academia, and people's perception of nature and interactions have become a meaningful way to understand the landscape holistically.

The scientific study of Indian environmental history began after India got independence in1947. But even in these historical accounts, humans were often ignored and treated separately from nature in writing. Ecological issues are less explored from the lens of human experiences. People's resistance to colonial laws and restrictions started getting recognition in later stages. Though, the tales of human resistance got due acknowledgement in scholarly works, newspapers, and magazines. But the everyday life, dependency, and perception of people are far beyond the mere tales of resistance. The renowned British historian E.P.Thompson in the 1970s, called for attention that needed to be given to folklore materials for a better social history. Indian historians were also reacting to this growing tide. In the 1990s, Ajay Skaria told a masterful account of forests and tribes in western India through folklore materials. So a zeal to unravel the truth of previously written documents and relook the way forward arose among scholars and academicians. Chronologically, several scholars became more sensitive towards the complex world of folklore and its interconnection with general ecology. The popular perception in ecological and environmental matters got worldwide recognition through conventions and international agreements as well. Several works have re-emphasized the requirement for understanding the relationship between humans and nature.

Undoubtedly folklore plays a remarkable role in relocating attitude towards ecology. Tales, ballads, songs, dances, and poetry, etc., illuminates' human and nature relations. People often claim that many of the scientific policies and ideas about nature conservation and management are drawn from folklore and myths. In the context of the present study, folklore throws light upon the understanding of ecology in the technological age. Such issues are more relevant in South and South-East Asia because of enormous pressure and consistent interaction with natural resources.

Following the method of looking at narratives through the lens of vernacular religion (Primiano, 1995), this study will attempt to make a niche in the "environmental humanities" field. The diverse understandings of the Bhotiyas about, and activities in, their surroundings are crucial factors in constructing a sense of and inhabiting a dynamic and complex more than human world. The conventional bifurcation between disciplines concerning "nature" and those examining "culture" has led to a linear science-oriented approach towards environmental dilemmas. The need for a conceptually sensitive and integrated approach towards environmental issues is getting recognition across social, ecological sciences and the humanities (Sorlin,2012). Hence, environmental humanities developed as a response to the requirement. It is an effort for enriching environmental research by relooking at the ontological exceptionality of humans with a conceptual vocabulary. It is essential to understand the various roles of the Bhotiyas in their surroundings. It can contribute to supporting and developing alternative solutions, approaches, and framings outside the dichotomized notion of environment and society that have gone through several forms of militarism, colonialism, extractivism, erasure, and globalism. Under the theme of environmental humanities, the present study draws inspiration from Asian religion and philosophy to overcome the nature/culture dualisms and create a society in "harmonious coexistence with nature" (Gorman et al., 2019). The growing willingness for engaging with the environment from the social sciences and humanities gave rise to environmental humanities (Rose et al., 2012). Earlier, both fields were centered around humans and excluded or sidelined the non-human world. Since 1960's environmental issues gained attention within several disciplines, it created remarkable research agendas in environmental philosophy, environmental history, sociology, environmental anthropology, post human geographies, ecocriticism, and political ecology. The present study will attempt to place the ecological issues of the region

(Chamoli and Uttarkashi district) within the Bhotiyas ways of being in the world. The study's core will be socio-cultural formation, the conceptualization of human agency, entangled relation between human and non-human worlds, and socio-environmental change.

Biodiversity loss, climate change, and several anthropogenic factors have drastically altered the contemporary world, so we need to rethink many ideas and concepts central to our aspirations and understandings (Chakrabarty, 2009). The Himalayan region faces all such threats and marginalization of communities like Bhotiyas due to ongoing political and economic reason, requiring rethinking and holistic research. It is possible by positioning the present study within the environmental humanities theme. Environmental historians are trying to highlight that the 'natural world' is not a virgin to the human influence; the interaction between nature and humans is consistently active rather than passive (Rose *et al.*, 2012). Eco-criticism has revealed that communities' poems, stories, and songs interact with climatological patterns and non-human landscapes. The present study will explore Bhotiyas eco-philosophical motivation behind the wider environment and thought relationship. Thus, it will situate the history of Bhotiyas within broader earth histories.

Several studies have already been done to understand the ethno-medicinal, culture-nature linkages, and folklore of Bhotiya. The present work will try to resituate Bhotiyas lifestyle and resituate non-human entities within the broader ethical and cultural domains. Thus, the study will follow central tasks for the 'ecological humanities' as identified by Val Plumwood (Plumwood, 2002). It will try to address the issues like several modes of ethical thought like eco-centrism or biocentrism, the moral status of non-humans, mindfulness of matter and eco-feminism.

1.3 Landscape, Humans and Belief System

The spiritual connections of humans are visible in their culture. Different people see and experience the world around them in different ways. Worlds and worldviews vary. These differences are reflected in the way people perceive things. For example, a human see a place where they live as a house, whereas a tiger sees a den. So what sort of elements constitutes a 'society' and what constitutes 'nature' should not be decided by anyone else;the description and experience of an individual should frame it. Hence, for social scientists, these shouldn't be the starting points rather it should be an outcome of negotiations between human and non-human entities.

Along with sacred groves, the human habitations of the landscape are equally important to understand the complexities attached to the landscape. Several scholars have started acknowledging the subjectivity of a given place. As Barbara Bender argues, ' landscape is time materialized' and 'Landscapes and time can never be "out there": they are always subjective' (Bender, 2002). People's engagement and understanding of the world around them creates landscapes, and they are in the continuous process of being shaped and reshaped. Landscapes impede action and provoke memory (Bender, 2002). Tim Ingold argues that landscape is not 'land', not 'nature' and not 'space' (Ingold, 1993). Landscape in itself is a world for those who inhabit its places, dwell there, and journey along the connecting paths; Ingold calls it 'dwelling perspective' (Ingold, 1993).

Changes in living ways, religious systems, beliefs, nature, and coexistence documented raise the socio-cultural and ecological dynamics. These documentations need not necessarily be done from written sources; folklore, place lore, day to day stories, archaeological findings, and every day practices also reflect the living realities and expectations. Stories reflect upon the

understanding of nature, intimate relationships, connections, coexistence, and people's anxieties. Such stories often express fear and supernatural associations with individuals. These stories also get transmitted from one generation to another. It is high time that we make sense of these narratives and experiences rather than just collecting material evidence. People also believe in spirits. This belief is not based upon speculation but is living experiences based upon sensory perceptions (Hufford, 1995). These distinctive experiences are deeply grounded in experiences and can be understood from the stories of people.

Humans have influenced the landscape in which they lived and vice-versa; this has resulted in various land-use changes regarding how the places are perceived. The landscape changes are promiscuous, crisscrossed by values and interests (Tilley and Cameron, 2017). All forms of living entities, not just humans, influence and get influenced by things around them (Kohn, 2013). With time, such changes impact the landscape because of the transitions in topography, distribution of species, and socio-cultural alterations. Population increase is directly proportional to agricultural land expansion, uncontrolled forest fires, massive timber extraction, and other socio-ecological changes (Behera *et al.*, 2016), which means that the delicate environmental balance is affected by habitat loss. Ultimately all these changes are combined responsible for the degradation of habitation and biodiversity loss, which then impacts human livelihood and plays a massive role in the ongoing climate change.

But all these induced changes also affect belief systems and understandings of how the landscape is constructed, storied, and narrated. Humans tell stories, and each individual and community are repositories of histories that influence the experiences and engagement with the ecology around them. Such stories change and morph and often reflect the attitudes and concerns of tellers. Stories also act as cohesive mediums that create meaning for people and are a means to

negotiate social realities. The mobile characteristics of stories also get recreated and influenced as they migrate and adapt to different contexts. Stories invest spaces with meaning that help people negotiate complex phenomena that occur around them. Insights from stories can give us a glimpse of transitions within a given society. It is essential to understand the relationship between humans and other biotas as it can provide us with an insight into the behavior motives and culture's worldview (Kohn, 2013).

1.4 Borderland and Dimensions

Anthropologists have studied social boundaries (Barth, 1969) and issues, but national boundaries have recently gained scholarly attention (Alvarez, 1995; Gupta & Ferguson, 1992; Sturgeon, 2004; Schendel, 2005). For understanding the cultural plights and paradoxes of 21st-century border regions are crucial (Wendl & Rösler, 1999: 1), it is essential to understand the "nature of the social" (Rumford, 2006). Perspectives from peripheries represent that the territorial restructuration and interactions are primarily based upon negotiations over socio-spatial setup and resources. Such negotiations are framed and influenced by state politics and by the livelihood patterns of the indigenous communities (Baud & Schendel, 1997; Anderson &O'dowd, 1999). Infrastructural and bureaucratic interventions help in augmenting and fostering influence at the periphery (Vandergeest & Peluso 1995, Walker 1999). These efforts often contest the borderland's aspiration, and it gives rise to webs of interwoven relations (Sturgon, 2004).

This holds true even for the border areas in the Central Himalayan Mountain and Tibet Autonomous Region under the People's Republic of China. Historically, this border acted as a

barrier in the territorial expansion of British colonial power and Chinese empires. Now, it has culminated in an intense border dispute between India and China. The dividing lines got sealed due to contemporary bull's nationalism and contestations post-1962 war. The fluid border and space for socio-cultural and economic exchange suddenly limited the passages or scope of interactions between the Lesser Himalayas and Tibetan Plateau communities. From the Indian claimed boundary, Bhotiyas were the central community interacting with Tibetans. This consistent interface resulted in hybrid practices of the Bhotiyas. The extensive trade network illustrates the kinds of exchange happening between the Bhotiyas and Tibetans. Livelihood strategies, traditions, and identities of border communities are active rather than passive. State authorities and other borderland agents constantly negotiate with indigenous people living in border areas; thus, they often act as a catalyst for transformation or change. Usually in mountainous border regions environment and natural resources are crucial. Natural resources are integral to their survival and existence; from fulfilling their daily needs to storing for harsh climatic conditions, natural resources are vital. Under the fragile ecosystem and fragile environmental conditions, people of borders survive using available resources.

1.5 Transhumance

Another vital attribute of the Bhotiya society is that they follow transhumant migration. They migrate seasonally. In a particular year, the Bhotiyas utilize several ecological belts. The selection of such belts is dependent upon the resources required and availability. Bhotiyas make a niche in these ecological belts as per the limitations and potentials of the forest, pasture and agriculture (Nüsser, 2006; Bergmann *et al.*, 2012: 179). The environmental zone of Bhabar (Outer Himalayas), have tropical Sal forest (*Shorearobusta*), which are found in northern edges

of the Terai (Gangetic plains). These forests act as pastures in winter at an altitude of 1000 m (approximately).

For humans' food security and well-being, biodiversity (either wild or domesticated, whether animal or plant, cultivated or naturally grown) is essential. It plays a crucial role in a country's development. Human beings represent a tiny part of biodiversity, but they exert enormous pressure on the environment and biodiversity. Due to drastic increase in human population, biodiversity is under threat, the destruction of habitats; deforestation, massive urbanization drive and occupation of wetlands are diminishing the variety of flora and driving out the wildlife. Unsustainable management of natural resources including forest, agriculture, fisheries escalates the process of destruction. Even today the major source of livelihood and food for the mountainous communities are natural biodiversity. But with growing population, ongoing pace of degradation and global demand, it seems difficult to continue this in long term. In this work, I attempt to analyze and explore the folkloric materials of Bhotiyas for understanding their approach towards variety of flora and fauna. It will thus help me in reaching to the core of their daily practices and traditions.

Another important element of the Bhotiyas lifestyle is the practice of transhumance. They have followed it since a long time, though the character and purpose of transhumance has changed. Transhumance practice enabled them in gathering rare herbs from different regions of Himalayas. They raise crops like sweet buckwheat (*F. tataricum*), buckwheat (*Fagopyrum esculentum*), potato, barley, vegetables etc. on agricultural lands in their summer villages. Over a period of time they have developed the capacity to utilize resources as per the availability and natural conditions. The tradition crop varieties produced at high-altitudes not only met their dietary requirements but was also traded with Tibet. This pastoral nomadism allowed them in

utilizing resources optimally, thus, they maintain a larger and highly productive livestock in comparison to sedentary peasants. However, in the last three decades, a sharp decline is observed in their customary lifestyle and transhumance. It is happening primarily due to the trade blockage from Tibet and government policies which include reservations (which designated them as schedule tribe). The trans-Himalayan trade with Tibet is guarded by Bhotiyas traders and they maintained a monopoly over the trade route. Large herds and flocks were required as goats and sheep transport merchandise. The flourishing trade and commerce got terminated with Sino-India war in 1962, the closed Indo-Tibetan border led to instant closure of economic activities. Thus, the transhumant way of raising goats and sheep, following the movement from winter to summer village and vice-versa has dwindled with time. The trade disruption also affected the professions intricately linked with trade. The disruption in wool industry and other occupations disturbed the subsistence level. The Bhotiya community was thus forced to look for alternative sources of livelihoods.

1.6 Folklores

Indian history and culture has a diverse legacy of folklores, even today it serves as a source to understand the multi-layered traditions and complex beliefs of the people. The knowledge about plant's diversity and wildlife gets passed on from one generation to another through these folklores. This knowledge helps them in ensuring and sustaining the crucial ecological systems. It also helps in preserving and perpetuating the traditional knowledge system through stories, popular sayings, legends, rites, rituals and superstitions. Even in our myths animals, reptiles, and birds have been extensively consulted.

Indian sub-continent has diverse ways of approaching and interacting with issues of ecology. Notions regarding environment has always varied from one culture to another. The environment consciousness either knowingly or unknowingly have directed people's behavior and attitude towards nature. Once R.R. Ruether pointed has out that "there is no ready-made ecological spirituality and ethic in past traditions" (1992, 206). Many scholars have mentioned and suggested that Asian religion potentially revolve around the local environments.

1.7 Objectives and Questions

The study will revolve around three analytical axes.

1. **To understand how Tolchha, Marcha, and Jad Bhotias conceptualize nature.**

The first objective is further sub-divided into two parts:

a) Folklore

- What are the different types of folklore?
- What are the ecological elements mentioned in their folklores?
- How do Bhotiyas (Tolchhas, Marchas, and Jads) perceive nature?

b) Traditional Knowledge

- Do scientists and forest departments recognize traditional knowledge for the management of resources?
- What is the relevance of traditional knowledge within the community?

2. **To assess the impact of infrastructural development and socio-cultural changes on the Bhotiyas (Tolchhas, Marchas, and Jads)**

- What are the significant changes in the socio-ecological and infrastructural set-up?
- How Bhotiyas perceive the changes occurring in their surroundings?

- How these changes affected their community lifestyle and belief system?

Chapters 2 : Literature Review

2.1 Indigenous and Multispecies world

A plethora of arguments has been put forward by scholars working in field of anthropology, social sciences, natural sciences and folkloristic in context of multispecies world. In an attempt to understand the multispecies worlds, scholars have dived deep into various fields or expertise. Critical and creative thinking of scholars have led us to construct, destroy and reconstruct several notions attached to the world we live in, it helped us in understanding the world in a better way.

Haraway's work on primates was one of the earliest example which sets this approach of understanding the world around us. Despret a Belgian philosopher, have also worked extensively on these themes. Despret provided critical readings of biological and ethological literatures.

The term "indigenous" is often connected with original, native or original inhabitant of the place. But if we understand it by lens of time this understanding of "indigenous" turns ambiguous. The evolutionary history reflects upon the stories of change with time in the flora, fauna and physical elements of the world. When looked through the perspective of time, the notion of being "indigenous" offers scope of political contestations while working on scientific agenda. Therefore, the use of term "indigenous" is quiet objectionable in countries like India, Indonesia and Malaysia. The preferred term in these regions are *Adivasi, Asli,* and *Orang,* it usually meant "first peoples". For a country as diverse as India this standpoint is very useful as it helps in avoiding the unnecessary emphasis on tribals as the indigenous resident. In case of India the debates revolving around the Aryans and Dravidians as the native inhabitants of India provokes

the political and nationalist sentiments. For South Americans, native organizations and associations persistently emphasizes on the term "indigenous" as a positive term for referring to the native people in international agreements and conferences. Post Indo-China war of 1962, Bhotiyas are often claimed as the indigenous inhabitants of the Himalayas lying on the Indian side, this arises more to claim authority and natural control over the region. The fragile border issues are bargained by both sides by claiming people as indigenous inhabitants of the area. Though such indigenous population are projected or considered as remote and backward minorities, they comprise of five hundred million people in Asia, Africa, Australia, America, Eurasia and the Pacific (Berger, 1990). But the word "indigenous" is not sufficient to describe such complex cultural groups. Nowadays, the term indigenous has got international attention, even the diverse tribal, native, traditional people and local people have claimed themselves to be indigenous. Such claims generally erupt when they struggle for their rights and raise demands. International bodies have started using the term "indigenous" extensively, for instance, the United Nations declared 1994-2004 as the "Decade of Indigenous People and "The Earth Charter" identifies the democracy, socioeconomic justice, peace and integrity while appreciating indigenous knowledge. Article 1 of the International Labour Organization's Convention considers people as "indigenous as per their descent from the population which inhabits the region or country to which they belong". While discussing any indigenous communities, the socio-political dimensions mentioned or discussed in these definitions must be taken into account. Philosophical and religious features prevalent in cultural lifestyle of communities are also a necessary prerequisite to understand their indigeneity.

Thus, the elements associated with cultures, languages, histories, homelands, traditions, sacred symbols and rituals are linked with the indigenous identity of community. These themes are inseparable from community's knowledge. It is woven into the fabrics of their existence.

From many generations the world's biodiversity has been handled by societies of hunters, traditional peoples, societies, fishermen, herders, and agriculturalists. The living resources of the earth have been utilized by the people with exceptions of open-ocean and species found in deep-sea. Even tropical forests like Amazon 'were not virgin environments but the last cycle of abandonment' by the traditional users (Gomez-Pompa and Kaus, 1990). Over millennia, the traditional systems of management and pre-scientific rules have been the ways by which communities managed their natural resources (Berkes and Farvar, 1989; Gadgil *et al.,* 1993). Due to this the Biodiversity has survived despite all external pressures. The term indigenous knowledge is broadly defined as the local knowledge which is unique to a particular society or culture, it can be used interchangeably as traditional knowledge as well. Through cultural transmissions the traditional knowledge gets transmitted to younger generations, it reflects the relationships between living beings and the environment (Berkes, 1993b). Traditional knowledge or traditional ecological knowledge is essential for socio-cultural and ecological values. Traditional knowledge contributes to the conservation of biodiversity. IUCN (1986) listed relevant points regarding Traditional Knowledge for Conservation (Berkes, 1993b):

- Traditional ecological knowledge offers ecological insights and based on biological knowledge;
- Potentially, Traditional knowledge holds scope for sustainable management of resources;
- While planning for development activities Traditional ecological knowledge is crucial;
- For conservation and environmental assessment, Traditional knowledge is used.

2.2 Traditional Knowledge

Scientific knowledge and Traditional knowledge holds a lot of similarities. Both of them are different ways to make sense of the world, both are derived from generalizations based on observations. Several parallel themes can be drawn from them, in many cases scientific approach matches with the approach of traditional resource management techniques (Gadgil and Berkes, 1991). However, indigenous understanding and knowledge occasionally differs from scientific knowledge in few aspects. For instance, indigenous knowledge is usually restricted to a particular geographical unit, they rely mainly on qualitative understanding, accumulate the facts at slower pace etc. Scholars have discussed the characteristics of indigenous knowledge in great detail, the correlation between traditional knowledge, cultural significance, and ecological benefits are also discussed extensively (Freeman and Carbyn, 1988; Johannes, 1981; McNeely and Pitt, 1985; Morauta *et al.,* 1982; Posey and Balee, 1989; Ruddle and Johannes, 1990; Tanner, 1979; Niarnir, 1990; Warren, 1991; Warren, 1992; Warren *et al.,* 1993; Berlin, 1992: Oldfield and Alcorn, 1991; Inglis, 1993). These studies are helpful in drawing generalizations, it seems that morally, spiritually and ethnically the indigenous knowledge has a larger social context. The relation between human and non-human entities plays a crucial role in it. In many of the regions it is found that the individual identity is not different from the surrounding social identity. Traditional knowledge is reflected in the beliefs and practices of the people. The regional ecosystems hold an important place in determination of traditional knowledge practices.

Western science and scholarship have usually excluded the element of sustainability from communities but this approach and mindset is challenged in context of Indigenous societies. The relevance and necessity of considering indigenous knowledge for sustainable management of

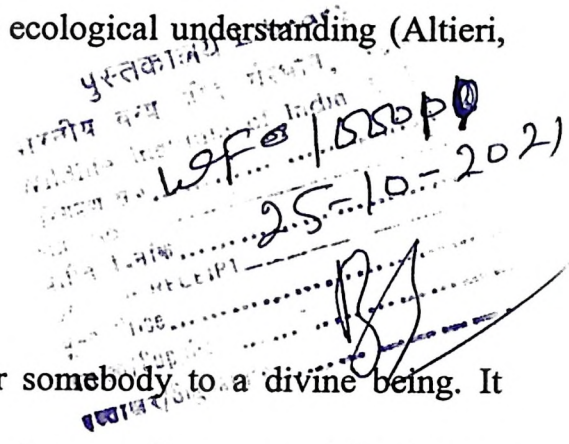
resources is getting recognition since last two decades. With the long-term view and environmental understanding is helping scientists all around the world in developing methods for conserving biodiversity. Though very little study has been done in this context, for instance, the role of traditional ecological knowledge in tropical forest for biodiversity conservation is studied by Oldfield and Alcom (1991). Majority of the discussions around traditional knowledge focus upon the reasons that drives loss of traditional knowledge. The decline in traditional knowledge is mainly due to changing technology, commercialization, loss of indigenous control over natural resources, population growth, changes in the regional set-up with urbanization and breaking down of traditional land tenures (Johannes, 1978; Berkes, 1985a; Rajasekaran *et al.,* 1991; Ruddle *et al., 1992*). It should be noted here that; all rural people cannot be called as conservator of biodiversity merely because of above mentioned reasons. But it is a fact that the practices based upon traditional knowledge, direct communities in harmonious survival with nature. Social organizations, religious views, resource availability and adaptive character of humans play a remarkable role in deriving such harmonious practices. Thus, humans can be categorized as a K-strategist species, as they can adapt to maintain their population not beyond the natural carrying capacity (MacArthur and Wilson, 1967, Gadgil, 1987), but it is rather debatable.

As mentioned above the historic continuity is essential for the continuation of Indigenous knowledge. Societies that have continued their traditional ways or lifestyle largely remained dependent upon the local natural resources. Such communities are termed as 'ecosystem people' (Dasmann, 1988), he opposed it from 'biosphere people' as they derive resources from far and transform them through industrial process or interventions. Ecosystem people are expected to have more stakes in local environment management, due to their well-being and consistent association with natural resources. It is also a part of their survival technique as the knowledge

regarding the terrain, biota, climate, water resources, forest types and grasslands is an advantage for them. This knowledge is used for obtaining instant medicine, food and other necessary things. Such practices and knowledge motivates conservation, it hinders the short term interests and offers a long-term perspective.

Sometimes, social prudence is implemented at grass-root level but they are not considered as 'rational' in the scientific world view. Such differences usually arise when belief in supernatural entities and social conventions are involved. Thus, the presence of social factors is obvious in mediating the restraints, environmental ethics and world views are also very important in this context. A plethora of arguments have been put forward by scholars, 'what people do about their ecology depends on what people think about themselves in relation to things around them. Human ecology is deeply conditioned by beliefs about our nature and destiny' (White, 1967). Conservation practices or thoughts are grounded in the interconnectedness between humans and nature. Humans are incorporated in wider spheres of flora, fauna and physical features. Humans usually respect such natural elements even though they cut down forest and disturb the natural habitat (Tanner, 1979). This respect is manifested through the cultural-natural linkages. Several practices followed by indigenous peoples contribute in managing the species diversity, creating heterogeneous habitat at landscape level and directing resource utilization. In most of the cases biodiversity conservation is not the primary objective but an indirect outcome of such practices. In all that we cannot ignore the possibility of conscious conservation (Ruddle *et al.*, 1992). For instance, the productivity of crop yield can be increased or enhanced by making use of the tempo-spatial opportunities, for example multiple cropping, shifting cultivation, integrating traditional methods and intercropping etc. These systems are highly sophisticated, thus we cannot call it 'primitive'

(Stocks, 1983). We cannot underestimate the knowledge and ecological understanding (Altieri, 1989).



2.3 Nature: Sacred or Profane

Sacralization includes the dedication of something or somebody to a divine being. It involves the transformation of space into a place of interaction between humans and the divine. Thus sacralization tends to be cumulative, and it involves creating sacred spaces. This space dedicated to holy develops a nodal point of communication and ensures the divine benevolence over the region, individual, or group (Caseau, 1999).

For this study, the vernacular religion approach is better suited. Vernacular religion is religion as it is lived, it involves the encounter, interpretation, understanding, and practice by human beings (Primiano, 1995). Leonard Norman Primiano mentioned that the religion of an individual is always vernacular because religion involves interpretation. The Vernacular religion method involves an interdisciplinary approach for studying individuals' religious lives, and it gives attention to the religious belief process. It also focuses upon the material and behavioral religious beliefs of individuals. These process priorities the bidirectional influence of individuals upon the environment and environment upon individuals. It also acknowledges factors like the natural environment, community affiliations, physical predispositions, tradition, religious institutions, education, and socio-economy as all of them influence individual belief.

Svetoslava Toncheva (2019) mentions that the various ways to connect with nature are justified from the claims that people exist in harmonic relations with nature and find ways to mediate it. She expressed that deep spiritual meaning is grounded in care for nature. This treats nature as a source of life and power, as divine, a mode for self-development. It is a connection

between the sacred world with a way to find the meaning of existence. Unconsciously people treat nature, and they interact with it on an everyday basis without realizing it consciously. From her studies, she even claims that when people pollute nature, they even pollute themselves. She analyzed alternative attitudes to nature, which originates from spiritual systems. The work explores various methods and models for living with nature and mentions the contribution of spiritual systems.

Mare Kõiva (2020) work suggests that to a smaller or greater extent, nature has been an essential aspect for most religions. Nature and its sacredness are used as a metaphor for religion. Natural sacred places are significant in vernacular religious practices. Sacralisation of nature as a whole is prominent in humanistic movements, though different religions used nature in various forms. One of the most crucial parts of any sacred place are the lores attached to it. Rituals are more stable than religious beliefs as later is closer to an individual's modification and personal variation (Firth, 2013). Several stories, sacred place narratives, nature objects, and motifs are like treasures that can be referred to as sacred (Kalda, 2011).

Ulinsa (2019) talks about the ecological elements present in the folklore of Buol community. It categorizes multicultural folklore into natural ecological element and cultural ecological element. The ecological elements of folklore contribute to the preservation of nature as a source of life. The ecological aspects of culture make folklore a part of tradition preservation and its relationship with faith and myth.

Marafa (2003), shows that nature conservation practice has a long history, and the expêrience goes beyond historical horizons. Historically, the forest transformation is defined by struggle and competition for using the resources. This struggle also shapes the cultural and geographical features. Culture and forests have always been intertwined. Forest landscapes are

strongly characterized and formed by management systems and cultural beliefs. Cultures are built materially and get shaped spiritually by the natural physical environment. Culture and nature are integral to the landscape, and cultural identity is closely associated with the natural environment (Bruun, 1995). Feng Shui beliefs in South China gave birth to several vegetation communities and natural landscapes (Marafa, 2003).

2.4 Folk and belief

Folklores of Edo tribe of Nigeria varies, but those relevant to nature mostly relate to water, animals, wild plants, human use of resources and land. Folklores are based on oral traditions so they even exhibit variations locally among the clan and villages members. However, the central theme of the folklore remains the same (Osemeoba, 1994).

In the present era of globalization, we need to acknowledge the role of communities and their contribution to the management of resources. The significant chunk of the world's biodiversity has been in the hands of societies of hunters, traditional people, herders, gatherers, agriculturalists, and fishers (Berkes *et al.*, 1994). Most of the earth's resources have been utilized extensively by people. Pre-scientific and traditional systems have been the primary ways through which societies have managed their natural resources (Berkes and Farvar, 1989; Gadgil *et al.*, 1993). Usually, the influence of humans on the natural system is considered and often portrayed as destructive. Still, this trend is changing rapidly ecologists and scientists have started appreciating the way traditionally people were using their resources without destroying them (Gadgil, 1998). Many studies have documented the traditional knowledge system (Ruddle and Johannes, 1985; McNeely and Pitt, 1985; Freeman and Carbyn, 1988). Several studies have

shown that community-based resources management worked due to the presence of appropriate and robust common property institutions (McCay and Acheson, 1987; Berkes, 1989). Studies from agro-ecosystems have reflected upon the ways, in which traditional people interacted and co-evolved with (Norgaard, 1984) their surroundings, communities have modified nature and have actively maintained it in a productive and diverse state. Based on these studies, my work will focus on the contemporary situations and perceptions of the Bhotiyas (Tolchhas, Marchas, and Jads) towards their traditional knowledge systems and beliefs.

Experience and perception of communities shape the way in which communities approach the utilization of their natural resources. Several traditional societies perceive physical and biological components of the environment and the human population as connected and linked in the web of relationships, and this is similar to the present-day ecosystem view. This view represents a holistic view that considers all the ecosystem components, human societies and their interactions (Gadgil, 1998). The interplay between place, people and the environment has multiple dimensions that are often ignored. The place is an emergent phenomenon that involves continuous interaction between the physical elements of place and humans, place location in wider socio-political and economic relations, and the individual's role (Staeheli, 2003). As per Harvey (1996) "places are constructed and experienced as material, ecological artifacts and intricate networks of social relations" (p. 316). Humans even carry place-based knowledge (Casey, 1997). Several scholars have suggested that argued that sense of place fosters related emotions, behavioural intentions and pro-environmental behaviour (Hungerford and Peyton 1986; Heimlich and Ardoin 2008; Monroe, Andrews, and Biedenweg 2007; Hungerford and Volk 1990). The rights of indigenous communities and their potential contribution to natural resources management, mostly forest, are now recognized worldwide. Agenda 21 of 1992, Rio

Earth Summit states that tribal and indigenous communities have an essential role in developing and managing the environment.

Unplanned and stringent policies have caused extensive hardships for the Bhotiyas. It led to a series of agitations and protests and degraded forest wealth (Maiti, 2009). It is inevitable as tribes are directly getting affected by these decisions. Such conflicts between the forest department and the Bhotiyas are not new. The pioneers of 'Chipko Movement' were Bhotiya women from Reni (Chamoli). From 26th to 27th March 1974, under Gaura Devi's leadership (president of Mahila Mangal Dal), several women and children clung to the trees of Reni forest. Gaura Devi leads the resistance to check the forest department and contractors for cutting down the trees. In the absence of men who went out to Joshimath, for collecting the compensation for the loss of their land during the Indo-China war of 1962, these women emerged as the movement champion. Several protests and processions followed that incident; ultimately the government bent down to the demand of Bhotiyas and stopped the cutting down of trees in Reni forest. This participation of women in the Chipko movement had major implications in changing the gender dynamics in the Garhwali socio-cultural set-up (Jain, 1984). Recognizing the role of veterans like Gaura Devi is essential as it is an integral part of Bhotiya identity and pride, but we need to acknowledge the role of nature in it.

In the Niti valley, the indigenous system for the distribution and regulation of natural resources is still prevalent. These practices are embedded in the rituals related to goddess Nanda Devi. The system works under an authority through a socio-religious institution and ensures all the stakeholders' participation. The selection of family facilitates it, and then responsibility is given to them to call meetings and distribute resources (Kainthola *et al.*, 2006). Though religious traditions usually don't talk directly about biodiversity, they add worldviews, environmental

ethics, and values that shape how societies interact with nature and biological diversity (Berkes, 2001). So we can say that the community's religion can be a part of the problem and the part of the solution. Religion holds the capacity to encode adaptive strategies for the management of resources and biodiversity use. It supplies an emotional belief system to put these strategies into practice. Eugene Anderson (1996), observe that traditional societies have successfully kept resources productive. Such societies have succeeded in following it through ritual or religious representation in resource management. For Anderson, the critical point is not a religion but symbols that help construct and maintain the sense of sacred.

Taking Bhotiyas (Tolchhas, Marchas and Jads) as an example, the study will explore various ways through which they interact with nature using folklore (as a tool). Folklore gets transmitted through one generation to another, so it provides a glimpse of changes that have occurred over time. Pramanik and Nandi (2019) argue that folklore plays a vital role in people's culture and life. The work talks about human experiences. It provides a clue about how people in ancient India maintained aquatic and terrestrial ecosystems, which are governed by folklore traditions. The work also claims that such practices ensure food security and stability. It discussed the folklores related to animals, fishes, plants, and their impact on resource conservation. There is also a common notion of tree worship, and it is based on the belief that trees also have souls like humans. They are thus treated as animate objects. Usually, both tribal and non-tribal people consider cutting down of trees as sin. In Bengal, people believe that a coconut tree's felling is equivalent to killing a Brahmin, and it is viewed as a sin (Pramanik and Nandi, 2003). Nagas of northeast India believe that prosperity will be lost, and several diseases will start affecting people if forests nearby the villages will be destroyed (Chanhkija and Kumar, 1996). Several plants and animal species used for medicinal, food, and other uses are protected

due to sacred groves. Despite the pressures of the modern world, sacred groves act as a haven for biodiversity to flourish. More than 15000 sacred groves are estimated in Kerala, and 40 are found through studies in Maharashtra (Pramanik, 2004). Many trees are not worshipped but still hold an important place in socio-cultural traditions. Oak (*Quercus)* species of Garhwal and Kumaon region of western Himalayas are critical for fuel wood and fodder. It serves various hill people's functions and is a crucial component of the mountain forest ecosystem by supporting biodiversity, conserving soil moisture, and improving soil fertility (Ramakrishna et al., 1994). Oaks are also the focal point of folk dance and music of the region; thus it is a part of the culture.

Similarly, Bamboo species are essential because of their property to conserve nitrogen, potassium, or phosphorus in the system. It is also used for various activities, including making utensils, thatching materials, and house construction. Animals worship is widespread in India, and it is a common practice throughout the subcontinent. The Puranas, stories, and legends identify the cow as sacred and connect it with the goddess Bhagabati. Puja, offered to goddess Bhagwati, is performed with several ceremonies associated with the cow (Roy, 2000; Pramanik and Nandi, 2003). The Hindus consider cow killing as a grave sin, ensuring constant food and nutrition security in the form of dairy products and domesticated biodiversity conservation. Deities in India are associated with animals as *'bahan'* (vehicles) that carry them. Many wild animals, such as lions, tigers, elephants, owl, peacock, swan, etc., have been adorned as vehicles of gods and widely worshipped. Many tribal societies don't hunt during the mating season as they consider it unethical and sinful. Several northeast Indian communities do not kill deer from March to May, as pregnant female deer are present in the herd (Gupta and Guha, 2002). Birhor tribe in India observes animal taboo while hunting and trapping monkeys (Bose, 1973). S.K. Chaudhuri's article on Folk Belief and Resource Conservation: Reflections from Arunachal

Pradesh mentions that the forest is the abode of numerous spirits and gods, both evil and benevolent in nature. Adis believe that trees like *Rotne*is the abode of evil spirits called *Epom*. Due to this Reason, they don't harm such trees. They even perform sacrificial rituals to appease the spirits if their considered habitat got destructed.

Chapters 3 : Study Area

3.1 Regional characteristics

Uttarakhand is a hill state in the northern part of India. Uttarakhand's total geographical area is 53,483 km^2, and the elevation ranges from 210 to 7817 m asl. It constitutes 1.63% of the country's total area. Geographically, Uttarakhand is located between 28° 43'N-31 ° 28' N latitude and 77° 34'E-81°03'E longitude (Bhandari *et al.*, 2016). Among the Indian Himalayan states, Uttarakhand accounts for the highest number of medicinal species of plants (Kala, 2005). The state accounts for about 27% of India's total angiosperm flora (Uniyal *et al.*, 2007). Out of 573 schedule tribes, more than 175 tribes inhabit the Indian Himalayan Region, and the region accounts for around 18.5% of the total Indian tribal population. The Central Himalayan region is inhabited by the 'Tharus', 'Buxas', 'Jaunsaries', 'Bhotiyas' and 'Rajis' (Samal *et al.*, 1998). The 'Bhotiyas' are of Mongoloid origin and follows transhumance migration. Bhotiyas inhabit the Central Himalayan region at high altitude in the border region of India-Tibet and India-Nepal. These areas are space of cultural assimilation and ethnic intermixing. Bhotiyas show close cultural affinity and racial similarity to the Tibetans. The eight major groups of Bhotiyas are scattered over eight river valleys known as Byans, Johar, Darma, Chaudans, Niti, Mana, Jadung and Nilang (Samal *et al.*, 2010). 'Bhotiyas' have used plants for multiple purposes and holds great faith in plants' traditional knowledge (Bhandari et al., 2016). In the absence of a modern healthcare facility, medicinal plants are used by them, and it is their cultural preference too. Since generations, they attained extensive knowledge of values and adverse effects of these plants. This knowledge gets passed on from one generation to another verbally, but due to changes in socio-cultural and economic practices, it is diminished. Loss of traditional knowledge

and loss of species both are irreversible (Joshi *et al.*, 2005). Hence, there is an urgent need to study the reasons for loss and causes of a shift towards other systems. Since centuries, 'Bhotiyas' have been living in the Himalayan and sub-Himalayan region; they survived and are surviving because of their dependence upon forests and forest products (Maiti, 2009). But it needs to be acknowledged that 'Bhotiyas' are not solely dependent upon forest they are now holding better position in public and private sectors, involved in small and large scale industries etc. Goat and Sheep rearing play a significant role in Uttarakhand's rural economy. Apart from agriculture and trade, the main occupation, particularly of Jad Bhotiyas is weaving of wool.

3.2 Area

The study was carried out in Dunda village of Uttarkashi, Ghingran and Chhinka Villages of Chamoli district at Uttarakhand. Dunda is the winter place of Jad Bhotiyas. They migrate here temporarily from Bagori village in Harshil. Ghingran is the winter place of Marcha Bhotiyas, they migrate here from Mana village. Chhinka is the summer place of Tolchhaa Bhotiyas, they migrate here from Niti valley in winters (Figure 3.1).

3.3 Bhotiyas

Our primary focus is on the Bhotiyas (Tolchhas, Marchas and Jads) of Uttarakhand. Before the 1962 Indo-China war they were primarily trans-Himalayan traders and resided in the mountains of Uttarakhand. The work also analyzes the nature-culture connections in the Bhotiyas (Tolchhas, Marchas and Jads) life. In light of shifting socio-cultural scenario, environmental conditions and state's intervention, the research discussed the mobile socio-spatial

constellations. The work is broadly framed around two axes of Bhotiyas (Tolchhas, Marchas and Jads) traditional knowledge and folklore. The table 3.1 below shows the Bhotiya communities and their district wise location.

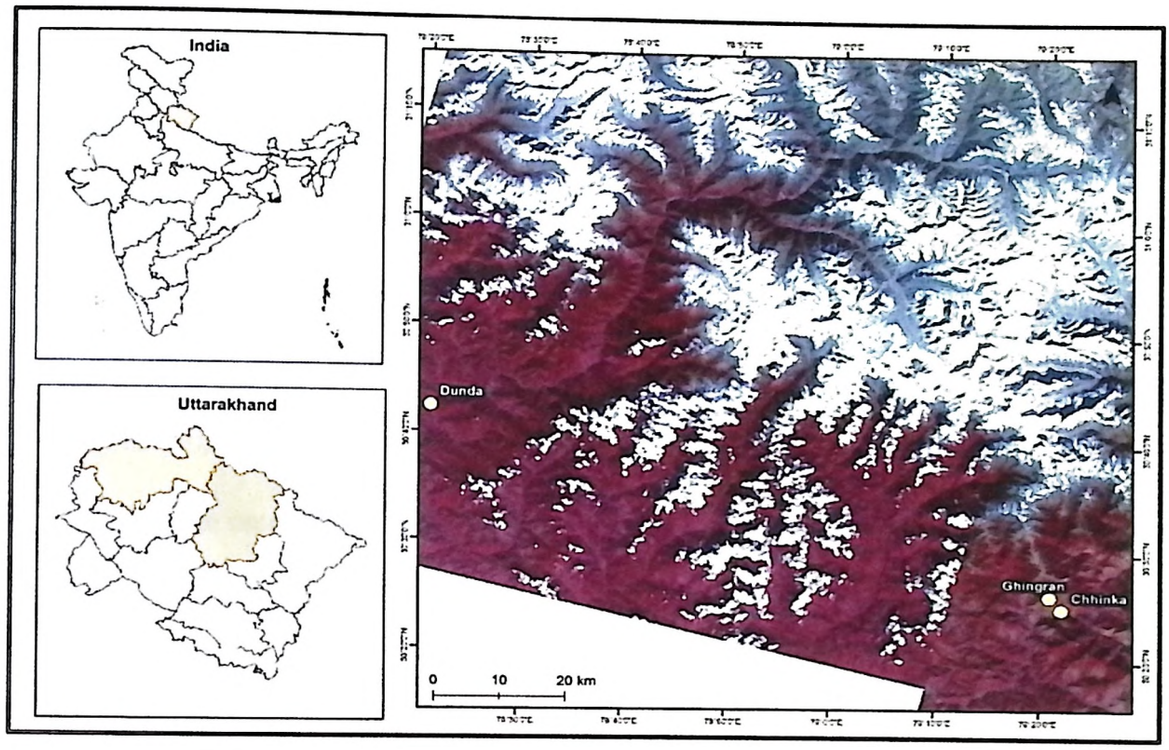


Figure 3.1 Map of the Study area

Table 3.1 District wise location of Bhotiya communities

Sr. No.	Valley	Community	District
1.	Nelang and Jadung	Jad	Uttarkashi
2.	Mana Valley	Marchha	Chamoli
3.	Niti Valley	Tolchha	Chamoli

4.	Johar	Johari	Pithoragarh
5.	Darma	Darmi	Pithoragarh
6.	Byans	Byansi	Pithoragarh
7.	Chandans	Chandansi	Pithoragarh

Charles Brown (1992) wrote an article titled 'What we call "Bhotiyas" are in reality not Bhotiyas', this article was quiet provocative. In literal sense the ethnonym 'Bhotiya' signifies or denotes the people living in region known as Bhot. The name 'Bhot' is a geographical term but it etymologically related to the Sanskrit word Bhotah, the term itself is derived from Tibetan Word Bod which means Tibet (Ramble 1993). According to this, the Bhotiyas are general term for Tibetans, however such categorization or description is highly contradictory and objectionable in context of Bhotiyas from Uttarakhand. The name 'Bhotiya' or 'Bhotia' or 'Bhootia' got in public domain in 18th and 19th century during British expansion towards Nepal and western Himalayas (Brown, 1987). British officers, travelers, and scholar's mentions regarding the trading groups living in trans-Himalayas at the northern edge of British Empire as 'Bhotiyas' (Traill 1992 [1832]; Atkinson 1973 [1882]; Sherring 1974 [1916]). This term remained disputed among scholars; it is a contentious issue till today. As many of the border communities like Jads, Marchas etc. connect more with their regional associations than to lie within the broader umbrella of Bhotiyas. However, for my work the term Bhotiya is retained for the reference because it is the constitutional Schedule Tribe designation for the informants of my work. The edges or the domestic geographical limits of Garhwal and Kumaon administrative divisions has been inhabited by the Bhotiyas since a long time. Uttarakhand was incorporated into Uttar Pradesh after India gained independence from British Raj in 1947. In the year 2000, after series

of political protests, the state of Uttarakhand was carved out as the 27th state of India. In the Chamoli and Uttarkashi districts of the Garhwal division resides the Jads, Tolchhas and Marchas. Johari and Rang community of Bhotiyas inhabits the Pithoragarh district. Grierson (1909) classified the indigenous languages spoken in this region as a subgroup of complex Himalayan languages belonging to Tibeto-Burman family. Bhotiyas (Tolchhas, Marchas and Jads) spoke different vernaculars, however, most of the Bhotiyas (Tolchhas, Marchas and Jads) consulted during fieldwork was comfortable and familiar with Hindi and Garhwali, few of them especially the elders also speak or understand Tibetan along with their mother tongue (Nawa, 2004). Now, with consistent interaction through tourism and connectivity the number of people speaking and understanding English has also got increased. As mentioned earlier, Bhotiyas (Tolchhas, Marchas and Jads) traded sugar, woolen products, grains and sugar in return for wool, salt, borax and animal's meat with Tibetans till 1962 as the borders were more fluid (Pant, 1935). The region was inaccessible without proper roads so sheep, yaks and goats were used particularly in summers to cross the mountains leading to Tibet. Yaks and sheep were also reared extensively by crossbreeding.

Generally, few other communities for instance "Kohlis" (constitutionally recognized as Schedule castes) are associate themselves with Bhotiyas. But in the social order, Bhotiyas consider them lower in hierarchy. Such communities perform the daily chores and agricultural works of the Bhotiyas household.

Chapters 4 : Materials and Methods

4.1 Sampling

Stratified random and opportunistic sampling was used to collect data in the three villages namely Dunda in Uttarkashi, Chhinka and Ghingran in Chamoli. A reconnaissance survey was conducted in all the three sites before actual sampling. It was observed that the sizes of the villages are small, thus, an attempt to cover all the village households was made. The attempt was not very successful as many of the houses were either vacant or none of the family members were present due to unavoidable circumstances of pandemic. As these communities are semi-nomadic in nature, and had already migrated to their high-altitude villages, few households were available for sampling. Thus, 68% of the Jad Bhotiya households from Dunda, 40% of the Marcha households from Ghingran and 24% of the Tolchha households from Chhinka were surveyed. For getting a representative sample, around a door to door approach was followed. To avoid the unintentional exclusion of few groups (e.g. Daily wage laborer or fuel wood collectors) who used to be out at that moment of time, residents were called upon at different times. Interview was conducted on alternate basis, for instance it starts with the interviewing a male of the household, then for the next household the female members were approached. Such formula was not consistent due to hesitations of family or unavailability of women members, in that case the male members were interviewed and vice-versa.

4.2 Methodological tools

Stratified random sampling and opportunist random sampling is used for the study.

Before the principal fieldwork, I conducted preliminary interviews (open-ended) which were associated with the research questions. While doing this I conducted open-ended interviews with individuals (18 individuals), key informants (9 individuals), and small group comprises of 3-6 person (5 interviews) from three villages (Bernard, 2011; Patton, 2015). It helped me in refining my open-ended questions. It also helped me in developing specific categories for the closed-ended questions. The final questionnaire (annexure 1) comprises of eight main sections: Agriculture, livestock and forests, economic relations, natural resource dependency, indigenous organization and education, folklore, management, traditional knowledge, and sense of the place. The agriculture and forest section includes questions regarding vegetation, food practices, animal rearing, identity and ownership. Such sub-sections aim at understanding the various forms of socio-cultural and economic attachments with elements of nature and landscape. The economic relation section focuses upon the livelihood practices. It offered a scope to the respondents to answer their economic activities through gender lens and current requirement. It also includes few close-ended questions to keep the context alive. The natural dependency section is crucial as it gave respondents an opportunity to inform about the interconnectedness of nature with humans. Close-ended questions were intentionally put for getting a direct answer from the respondents about their daily interaction with elements of their local environment. This section was designed to get a reflection about respondent's perception and potential role in management of natural resources. The section of indigenous organization and education comprises of open-ended questions. It basically focused on the community's ideas and perceptions. The next section is of folklore aims at recording and understanding the various aspects associated with folklores.

Under this section respondent will be provided with an opportunity to discuss their local, daily, famous, and bedtime stories. The other sections of management and sense of the place majorly aims at understanding the local perspectives and belief system. They comprise of open-ended questions with various horizons to move but the aim will be to trace the changing perceptions and practices. The sense of the place section also aimed to trace the adaptation and mitigation strategies. One common theme running throughout the questionnaire is the flexible character which gives the respondents an opportunity to explain the answers in their own world without restrictions and checks.

The questionnaire interviews were conducted between January to 15th March in Dunda, followed by interviews conducted in Ghingran from 18th March to 15th April and lastly at Chhinka from 16th April to 5th May. At Chhinka the major challenge was the rising COVID cases which made the people skeptic about an outsider and it was also the time when they have started migrating to their summer village at Niti.

I interviewed adults (i.e., people above 18 years) and elders. I also attempted to vary the age and gender of the respondents. It was done for ensuring the representativeness in the data. A two-person, comprising of a woman along with me, administered the interviews. A field assistant (woman), well-versed in local language of Jad Bhotiyas and Hindi was selected for carrying out interviews in Dunda village was selected. Whereas, one field assistant (male) were selected for administering interviews in Ghingran and Chhinka village. Though the field assistants were well versed in their local languages, customs, and traditions but the interviews were conducted in Hindi. However, the responses were noted down using pen and paper in English. I was noting down myself, while the task of asking questions was not fixed. Interviews were conducted within 45-55 minutes on an average.

Prior to initiating interview, the respondents were conveyed that no compensation will be provided for participation, and the participation will n voluntary in character. Before the beginning of interview, prior consent was requested from the respondents. For ensuring the anonymity and respecting their privacy names were not written or noted in the form. The interview was conducted carefully and use of terms like "climate change", "global warming" and "connection with nature" was intentionally avoided. During the preliminary fieldwork it was found that using such terms directs the respondents towards answering in a particular way which often distracts their thought process and experiences. As the lead member of my interview team I myself translated and transcribed the responses in English. Consistency and accuracy was ensured by confirming it with English and Hindi literature students.

4.3 Data Analysis

Both qualitative and quantitative strategies are used for analyzing the results of questionnaire, casual talks, focus group discussions and informal discussions. Quantitative analysis is conducted by calculating the summaries of categorical and numerical responses (as received from respondents). While quantifying the data, measures of age and gender was kept in mind. Even family size, income, social structure, and accessibility to resources were mentioned while quantifying the data. Graphs and charts are used to give a reflection of the data collected. Kruskal-Wallis test and chi-square tests are done to understand the variance in number of folklores and number of ethno medicinal plants per household in all three sites.

Chapters 5 : Results

Each village is taken as a separate unit, it is done as the villages majorly comprise of a particular Bhotiya community i.e. Jads, Tolchhas and Marchas. Jads, Tolchhas and Marchas are inhabitants of Dunda, Chhinka and Ghingran villages respectively. 150 interviews conducted in total; Dunda/Bagori (78 interviews), Ghingran/Mana (44 interviews) and Chhinka/Niti (28 interviews). The average age of interviewees varies in different villages. Interviewees are selected based upon their gender and age. Around 13 Interviewees from Chhinka/Niti, 17 interviewees from Ghingran/Mana and 32 interviewees from Dunda/Bagori were females.

Focus group discussions were also carried on in villages, the major theme was to understand the ethno-medicinal practices of the Bhotiya communities. In total 8 Focus group discussions were carried on in Dunda, in which 3 discussions revolved around Ethno-medicine. At Dunda the central theme of 3 discussions was their folklore and 2 discussions were primarily focused upon local perceptions regarding infrastructural development. At Ghingran, 5 Focus group discussions were organized. 2 discussions solely involved woman, rest of the 3 were neutral. 2 FGD's were focused on folklore, in which 1 was only participated by women. 2 FGD's were on their traditional knowledge system with focus upon Ethno-medicine, farming and forest Conservation. 1 discussion revolved around the perception of the community. On similar lines of Ghingran, 5 FGD's were organized in Chhinka as well. Along with interviews and FGD's, informal discussions, interviews and casual chats were also conducted. Though I haven't counted it, as it was a routine affair and depends upon respondents' comfort and availability. I also participated in community events; teas shop discussions, temple gatherings, festivals, evening talks and casual chats with the respondents. Such interactions were very insightful. The

information shared by the respondents were noted down later on or even got recorded (after taking permission).

At Dunda the average age of respondents was 49.41 years (39 above 50, 21 above 35 and 18 above 20 years old). At Ghingran the average age of the respondents was 39.91 years (20 above 50, 14 above 35 and 10 above 20 years old). At Chhinka the average age of the respondents was 41.67 years (16 above 50 years, 7 above 35 years and 5 above 20 years).

5.1 Festivals of the Bhotiyas

Bhotiyas commemorate several festivals in a calendar year and most of the celebrations are focused on nature in their surroundings and local deity worshipped in the communities. During these festivals they seek blessings from these deities and pray to nature for a productive year in term of agriculture and health (Table 5.2).

Table 5.1 Key festivals celebrated by bhotiyas

	Festival	Month of celebration
1	Losar	February
2	Navratri	March and October
3	Janmastami	August
4	Holi	March and October
5	Diwali	October
6	Dussehra	October
7	Pandav Puja	October
8	Kul Dev Puja	July
9	Hariyali	July

Figure 5.1 Jad Bhotiyas celebrating Losar.

5.2 Environment Perception

Around 24.83% of the respondents were more development oriented, they favored dam, road, and seeks monetary benefits over forest and rivers. Such respondents didn't have any spiritual or sacred connection with the natural elements like forest or rivers. Following that around 53.02% of the respondents were more devoted towards conserving natural ecosystem, they have stories that resembles their connection with nature. Such story reflects upon their childhood and livelihood activities spent in forest and along the rivers. 22.14% of the respondents were willing to conserve natural resources and hold deep attachment with them but with changing lifestyle and survival requirements they are unable to follow it completely, thus, they are attempting to balance their necessities and natural resources as shown below in Table 5.2.

Table 5.2 Perception of respondents towards nature and development

Perception	Elements	Percent of respondents
Development Oriented	Support Dam	24.83
	Support Road	
	Demands monetary benefits	
	Didn't consider nature as sacred	
Nature Oriented	Consider dam as threat	53.02
	Against deforestation	
	Consider nature as sacred	
	Share stories of Jungle life	
Want Balance	Share stories of Jungle but demands monetary benefits	22.14
	Involved in construction of dams, roads, and deforestation	
	Consider nature as sacred but not able to follow the tradition due to changed lifestyle	

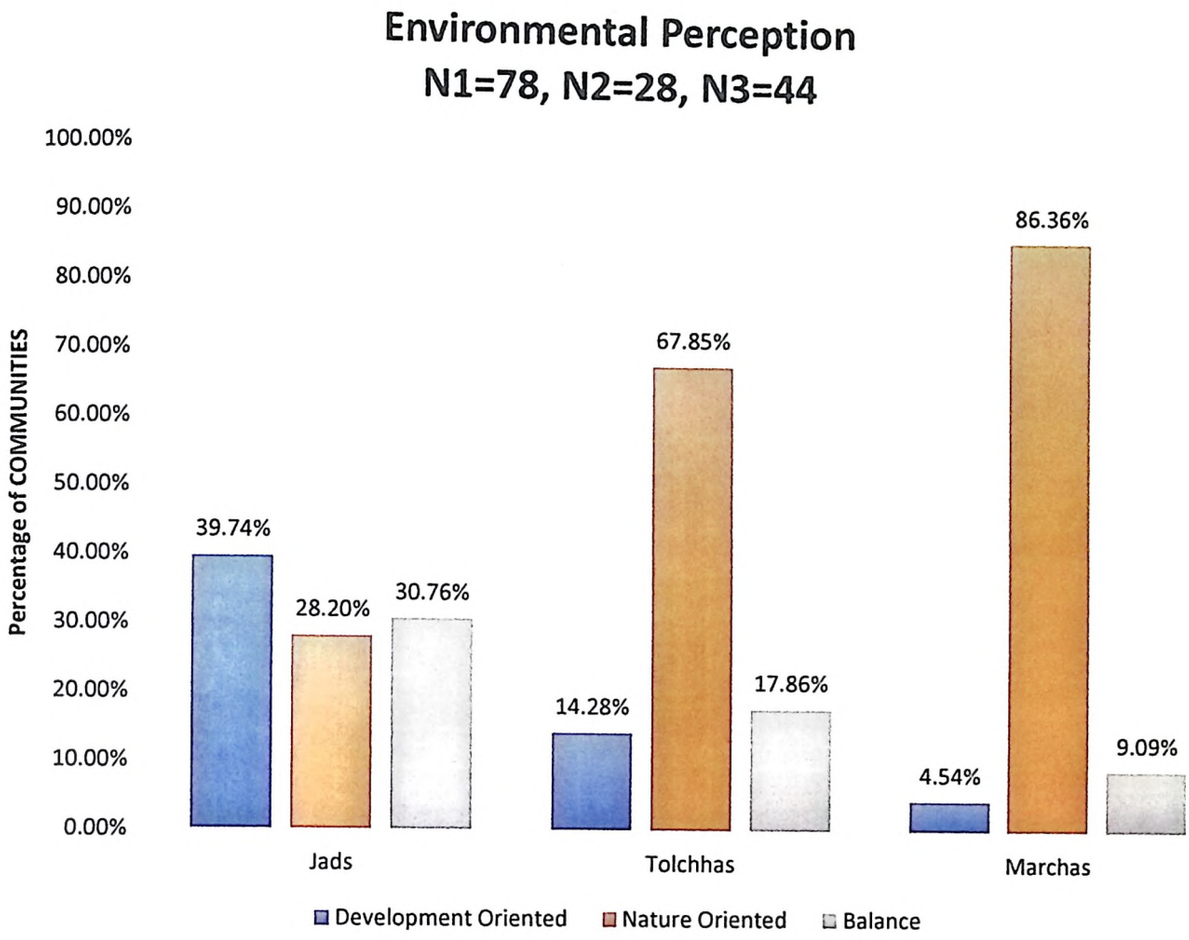


Figure 5.2 Quantification of Environmental Perception

The bar composition shown below represents the categorical (20-35 years, 35-50 years and above 50 years) age wise environmental perception of respondents from Dunda, Ghingran, and Chhinka villages.

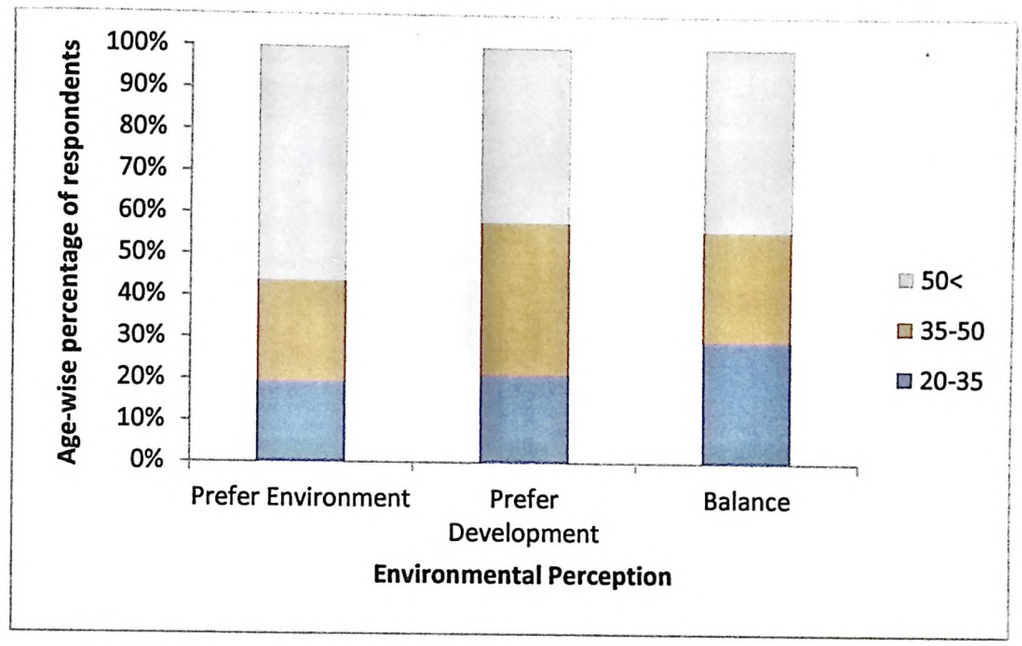


Figure 5.3 Bar composition representing categoricalage-wise respondents vs. environmental perception

Around 87% of the respondents consider Peepal tree (*Ficus religiosa*)sacred (not necessarily them worship it. Banyan tree *(Ficus benghalensis*) is considered to be sacred by 63% of the respondents. 59% of the respondents consider Padam tree (*Prunus cerasoides*) as sacred (most of the time use it for religious purpose). 48% of responses considers Mango tree (*Mangifera indica*) as sacred and they wish to have it close to their house. 92% of interviewees plant Tulsi (*Ocimum tenuiflorum*)plant in their house and consider it pure. 32% of responses consider Neem tree (*Azadirachta indica*) as purifier, they believe having a Neem tree ensures positive ambience. 68% of respondents considers Oak tree (*Quercus* leucotrichophora) very essential, majority of them use it as timber for construction of houses and furniture. 82% of respondents consider Deodar (*Cedrus deodara*) as pure and even use it for religious purposes (Table 5.3).

Table 5.3 Sacred flora of the Bhotiyas

Name of species	Percentage of respondents
Peepal (*Ficus religiosa*)	87%
Banyan *(Ficus benghalensis*)	63%
Padam (*Prunus cerasoides*)	59%
Mango (*Mangifera indica*)	48%
Tulsi (*Ocimum tenuiflorum*)	92%
Neem (*Azadirachta indica*)	32%
Oak (*Quercus* leucotrichophora)	68%
Deodar (*Cedrus deodara*)	82%

Figure 5.4 Bhotiyas praying to their Kul devi (Rengali mata)

It was found that wild species are not considered as bad omen within the Bhotiya communities. Though, stories and few beliefs consider Cats, Jackals, Owl and Crows are not considered to be a good sighting by 84% of the respondents. However, elephants, beer and snakes are considered as threat by 72% of respondents. Other than that, 77% of the respondents consider Snow leopard (Safed bagh), Tiger, Yaks (Chor gai), Ibex, and Monal as a sacred sighting. 43% of the consume Snowtrout as it is easily available (Table 5.4).

Table 5.4 Perception regarding fauna

Perception	Fauna	Percentage of respondents
Profane	Cats	84%
	Owls	
	Jackals	
	Crows	
Sacred	Snow Leopard	77%
	Tiger	
	Himalayan Monal	
	Ibex	
	Yaks	
Threat	Elephants	72%
	Snakes	
	Bear	
Consume	Snowtrout	43%

Figure 5.5 Bhotiya woman putting sacred grass which they grow in their home.

5.3 Traditional knowledge

For understanding the traditional knowledge and community's approach towards it their ethno-medicinal knowledge and traditional architecture is taken as an indicator.

Ethno-medicine

It was recorded that 21.33% of respondents know less than 5 species of ethno-medicinal plants. It was also found that 5-10 species of ethno-medicine are known or identified by 33.33% of respondents. Whereas, 44.67% respondents were able to identify and recognize more that 10 ethno-medicinal plant species (Table 5.5).

Table 5.5 Knowledge of ethno-medicines among respondents

Knowledge about ethno-medicine	Percent of respondents
Know <5 species of ethno-medicine	21.33
Know 5 to 10 species of ethno-medicine	33.33
Know >10 species of ethno-medicine	44.67

It was also observed that 39.33% of respondents were able to make ethno-medicine out of raw resources. However, 60.67% of respondents were unable to make any ethno-medicines out of extracted medicinal plants. This was done to understand the relevance of ethno-medicinal practices and knowledge (Table 5.6).

Table 5.6 Percentage of Bhotiya making ethno-medicines

	Percent of respondents
Make ethno-medicine	39.33
Do not make ethno-medicine	60.67

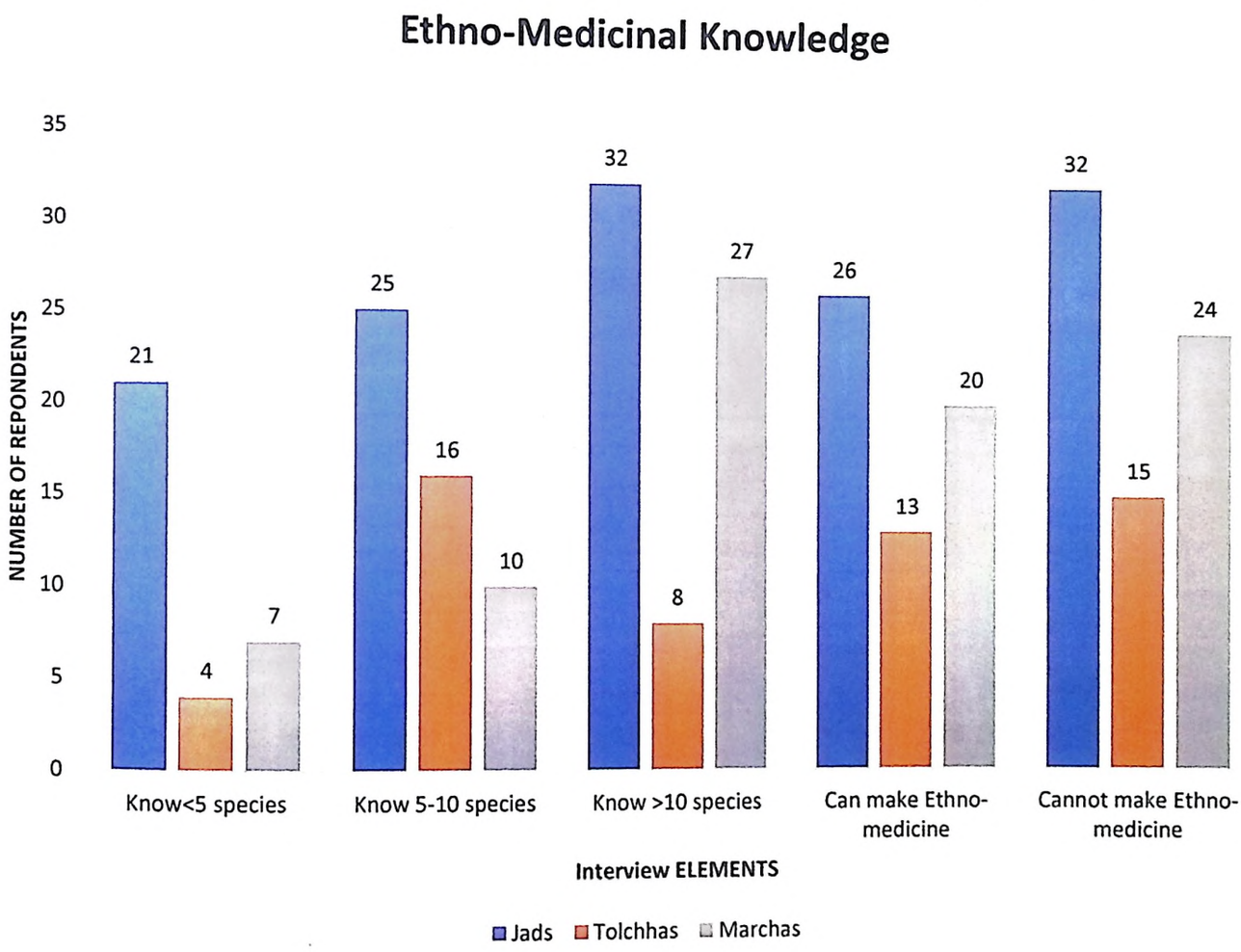


Figure 5.6 Ethno-medicinal knowledge of the respondents

It was observed that herbs are used in maximum (28 species). Climbers, shrubs and trees are used in lesser amount. Majority of the species are used for treating cough, wounds, chronic fever, diarrhea, joint-pain, skin diseases, headache and diabetes etc. For proper treatment of

diseases, the knowledge about the parts of plants to be used is very essential. Jads, Marchas, and Tolchhas possess a good knowledge about the parts of plants used. For majority of diseases roots (29.16%) are used, barks (4.16%), whole plants (22.91%), fruits and seeds (6.25%) are also used, along with other plant parts which include gum, flower, resin and stems. Gender also governed the use and knowledge of ethno-medicines (Figure 5.2). Such findings are also found in earlier works (Maikhuri *et al.,* 1998, 2000; Kiranjot *et al.,* 2007; Chauhan, 2014). Ratha *et al.,* (2015), Riaz and Bhandari (2015) discussed regarding the use of ethno-medicinal plants by communities in several parts of India. Himalayan inhabitants like Jads, Marchas, and Tolchhas have a strong belief and faith in the traditional healthcare system. It was also observed that Bhotiyas avoid collecting plants that are infected by insects, pests and diseases. One of the inhabitant from Bagori shared that *"plants affected by sunstroke, fire, floods, furious winds etc. are also not collected for extracting medicines".*

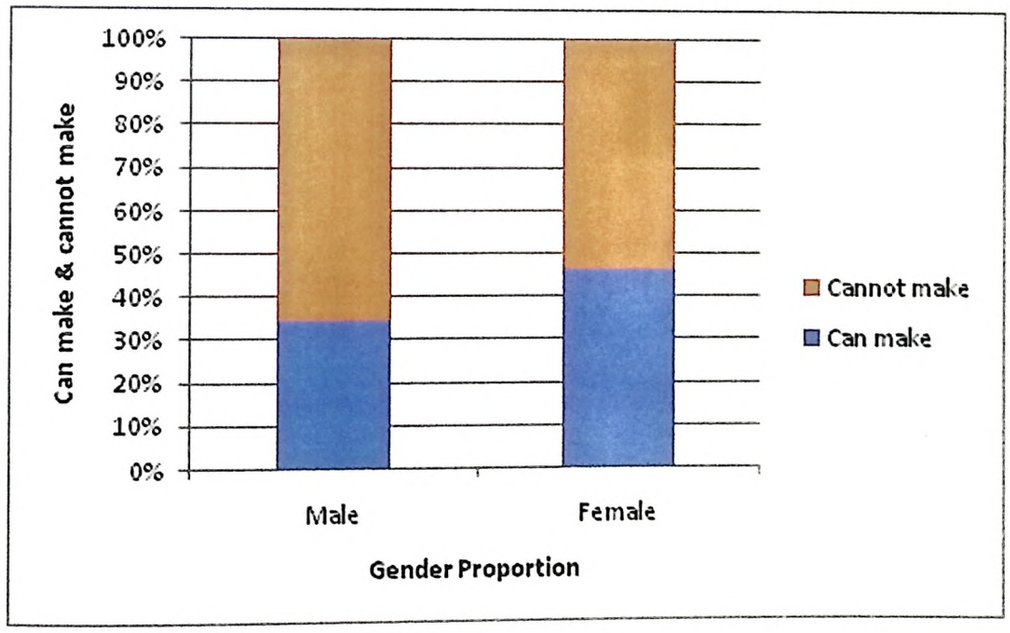


Figure 5.7 Gender and knowledge of ethno-medicine

Architecture

It was recorded from respondent's responses that 78% of the respondents prefer traditional architecture over 22% respondents who did not prefer traditional architecture for their houses. However, it was observed that majority of the houses are constructed with concrete using modern materials and objects. The response though reflects a sense of loss, which is due to the unavailability of resources and expertise required for construction of traditional houses. As represented through table 5.7.

Table 5.7 Preferance of traditional architecture

	Percent of respondents
Prefer traditional architecture	78
Do not prefer traditional architecture	22

5.4 Folklores

Six major categories of folklores were reported from responses of the respondents, they were categorized as leisure, moral, proverbs, spiritual, ecological and migration. Out of which 18.8% are stories, 18.8% are related to transhumance migration, 11.6% are sung during wedding rituals, and 10.1% is related to religious, leisure, conversation, ecological and proverbs each. The generated categories overlaps with each other, it is shown with the help of figure 5.5.

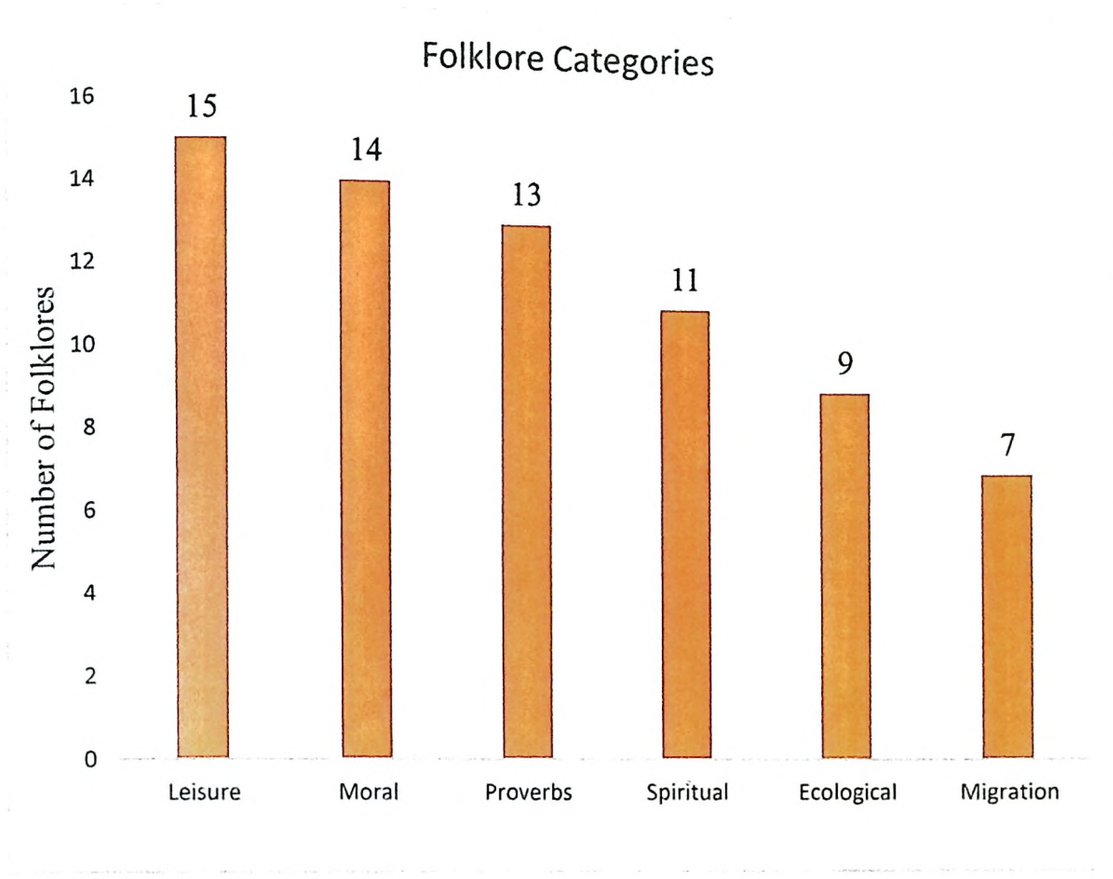


Figure 5.8 Categories of Folklores

After noting down the folklores manually the ecological elements mentioned in them were recorded. The appearance of ecological elements in folklore was numerically calculated. It was found that description/ mention of mountains, rivers, streams, grasslands, earth, wildlife, trees, rain, snow, fire, birds and trade route (passes) was found in the folklores. Such elements and their and their appearance is shown graphically with the help of figure 5.6.

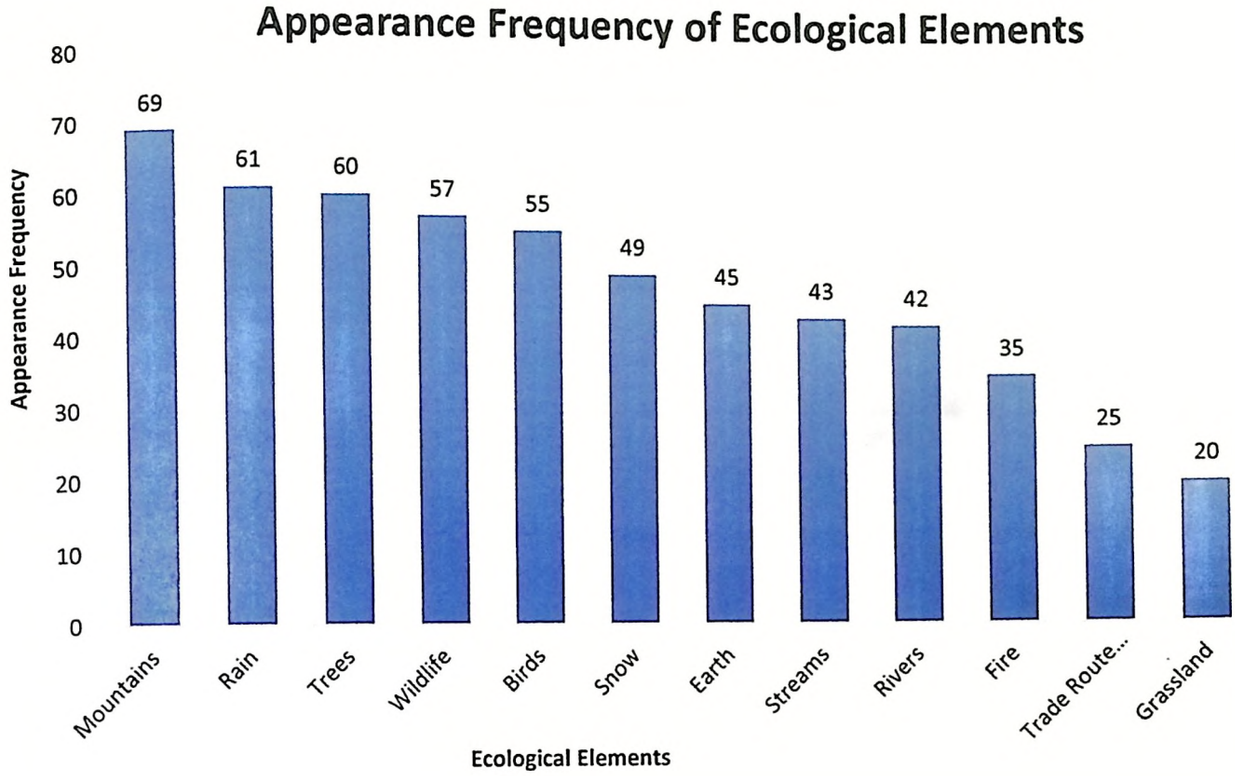


Figure 5.9 Appearance of ecological elements in folklores

To understand the relevance of folklores in contemporary society, knowledge of folklore is tested from the community. It was found from observation, markers and responses that 42% of the respondents can sing and understand the folklores. 39.3% of the respondents just know the lyrics but cannot sing or dictate the folklores. It was also found that 13.3% were aware about folklores and 5.3% did not have any idea about the meanings or recitation of the folklores. It is shown through the table below.

Table 5.8 Knowledge of folklores among respondents

Knowledge of folklores	Percent of respondents
Can sing and understand	42.00%
Know but cannot sing	39.30%
Aware about folklores	13.30%
Do not know	5.30%

It was observed that gender played an important role in shaping respondents awareness about the folklores. Women respondents were more aware about folklores and could recite more number of folklores (Figure 5.8). This can be credited to close knit societal relationships of women and their limited movements and exposure to outside communities. Men tend to go out more for education and work, hence were less aware about their traditional roots.

Figure 5.10 Rituals during Losar for prosperity of family and community.

There is no significant difference in the number of folklores known by respondents from Dunda, Ghingran and Chhinka villages.

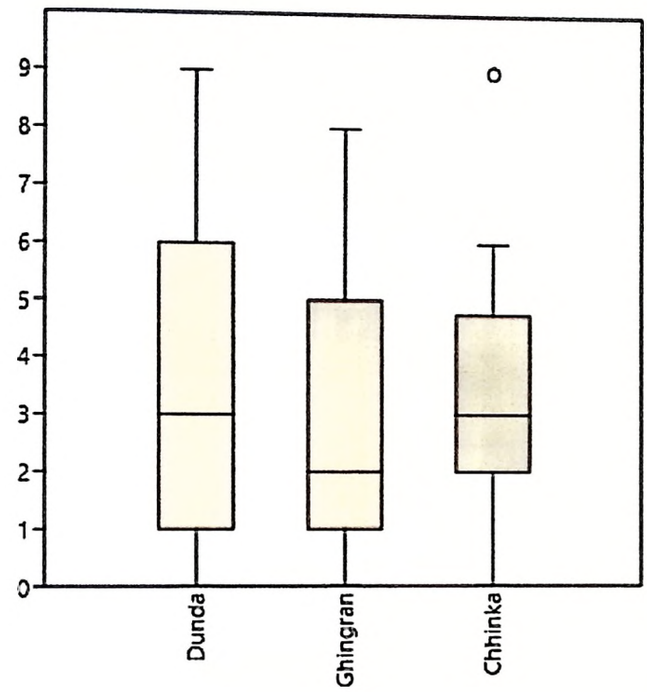


Figure 5.11 Kruskal- Wallis test for the number of folklores known by respondents

(Kruskal-Wallis $\chi2=1.543$; $p=0.45$) (Figure 5.8).

After performing chi-square test between various age groups and quantity of folklores known, it was found that there is a significant association in different age groups in the quantity of known folklores.

($\chi2 = 24.42$, **df**= 6, and **p value** = 0.0004.)

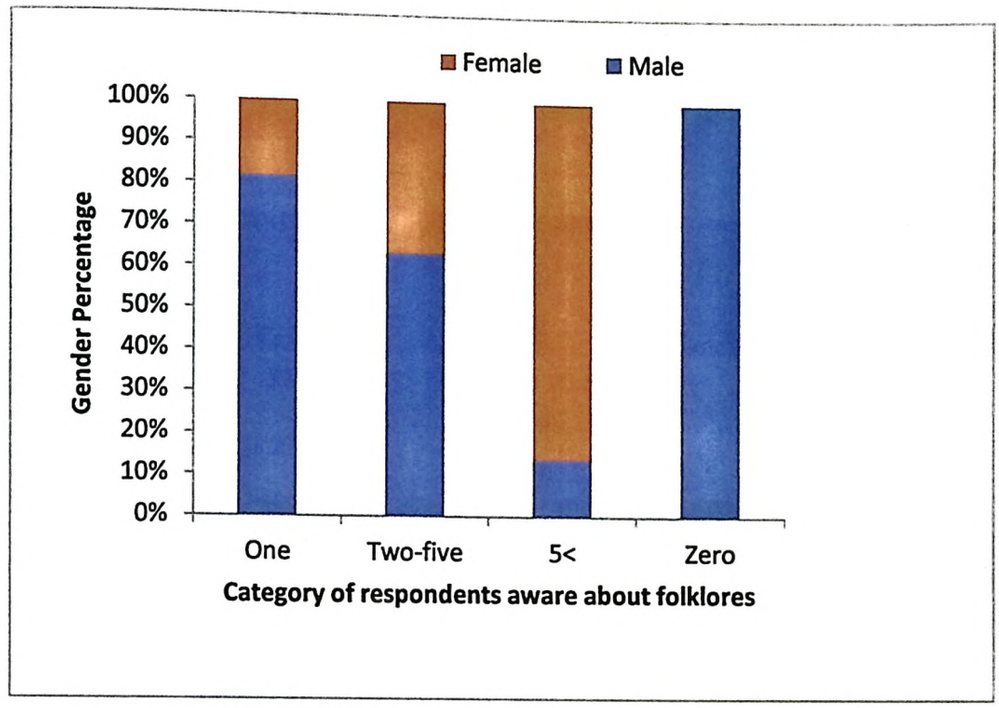


Figure 5.12 Number of folklores known to different genders

5.5 Impact of ongoing changes on lifestyle

To understand the impact of ongoing changes on lifestyle and culture food habits and festivals were taken as an indicator.

Way of celebrating festivals

Around 58.66% of respondents shared that the way of celebrating festival has changed. As per their responses, whole village didn't gather anymore for celebration, the spiritual connect and zeal is missing, celebration days and drinking alcohol have reduced. On the other hand, 41.33% of the respondent's experiences that food and attire is same, the ways of celebration haven't changed, fun, leisure and festive zeal hasn't changed and spiritual connect remained intact. So, they believe that the ways of celebrating festivals have remained same (Table 5.10). Community-wise perception is shown in fig.5.9.

Table 5.9 Ways of celebrating festivals

Way of celebrating festivals	Characteristics	Percent of respondents
Changed	The number of participants decreased.	58.66
	Less spirituality and zeal.	
	The days of celebration has reduced	
	Drinking 'Chang' has reduced.	
Remained Same	Food and attire is same.	41.33
	Ways of celebration hasn't changed	
	Festive zeal, leisure and fun is still the same.	
	Spiritual connect is continuing.	

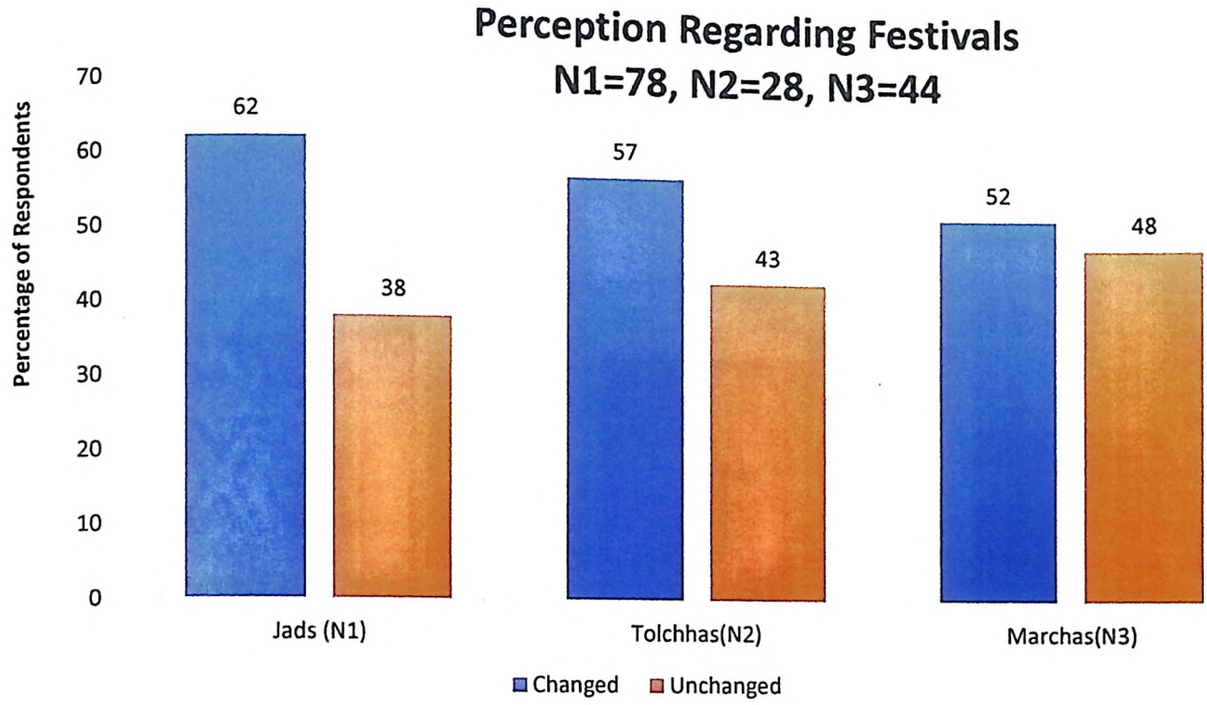


Figure 5.13 Community-wise perception regarding festivals

Food Habits

Food habits are changing, but it is gradual in process. Respondents have more variety of food to eat. But it was observed from the study that hunting is still carried on at certain places, during particular time of the year. Though, hunting as practice no more exists. But, owing to the nature of their life style and beliefs; occasionally people involve themselves in it. A sense of nostalgia regarding hunting was felt from observation and responses as few respondents still share their memories associated with hunting, their proportion is shown in fig. 5.10. The accessibility to wild meat has reduced drastically. In general, the cost of meat has increased and the number of sheep or other livestock has also reduced. Due to this the several people has left eating meat as they don't like the meat purchased from market. Women advocating vegetarianism are more in numbers as shown from figure 5.11.

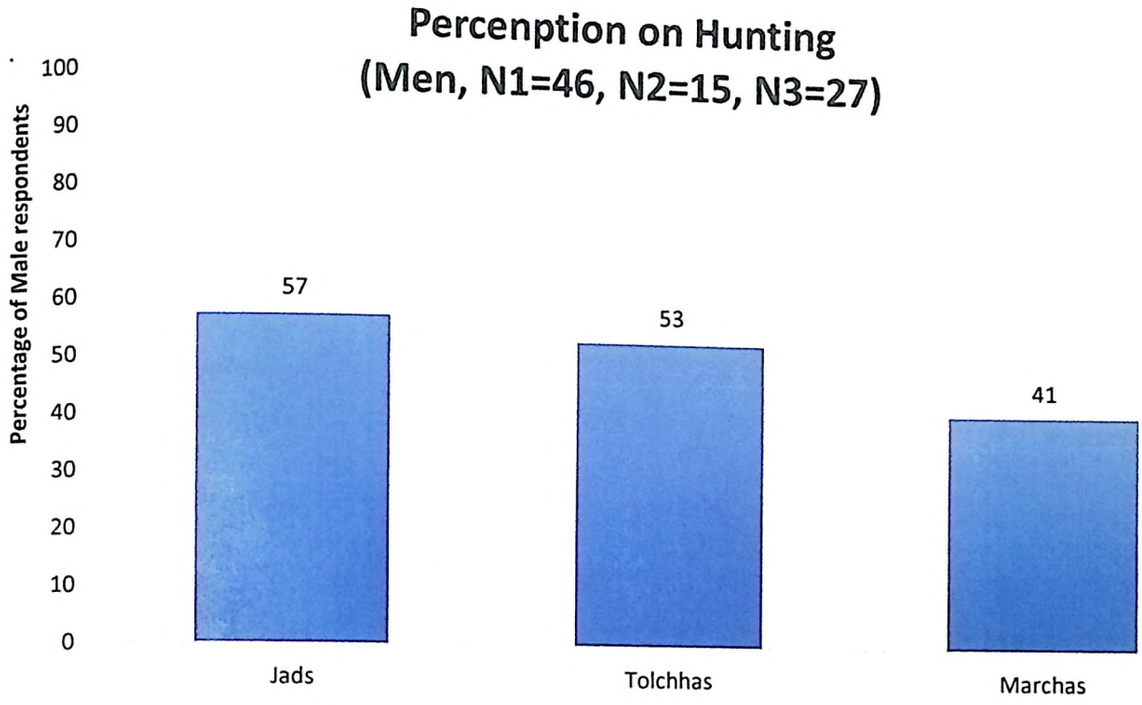


Figure 5.14 Proportion of respondents having memories of hunting

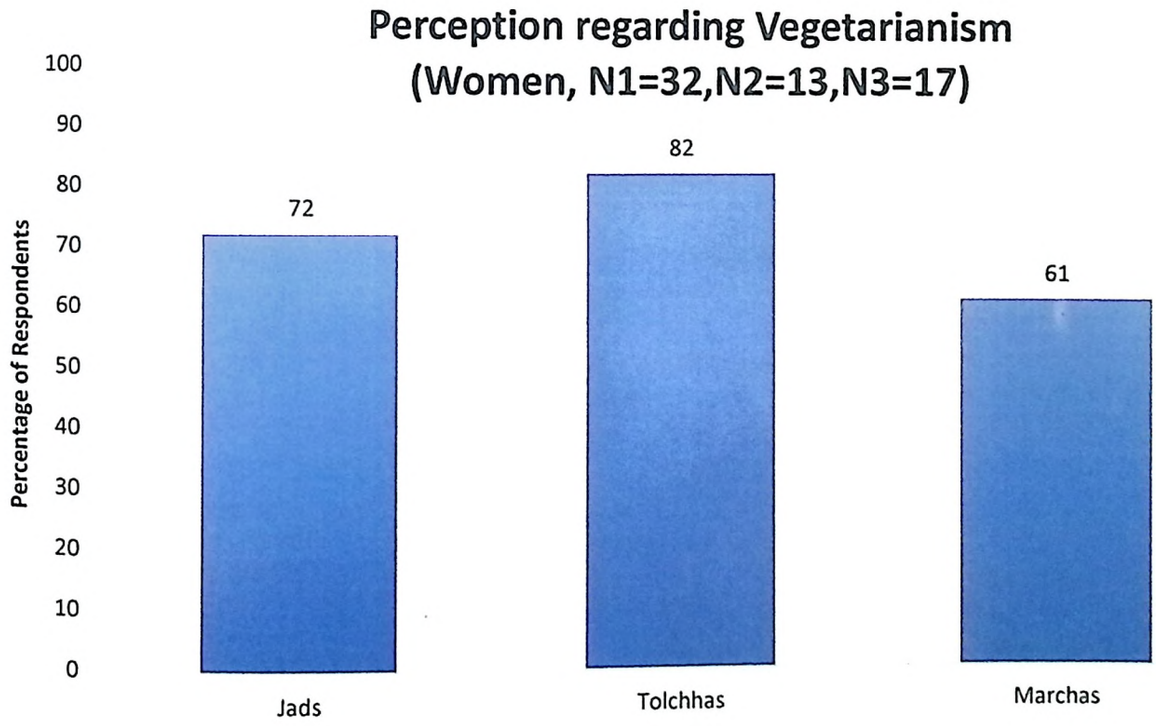


Figure 5.15 Women in favour of vegetarianism.

It was also found from the study that about 10% of the respondents consider that they get recognition in management of forest or involve them infrastructural activities. Mostly, they were respondents having higher education which includes Undergraduate and above.

Chapters 6 : Discussion

It was observed from the fieldwork that there is not a lot of difference between the perceptions of Jads, Tolchhas and Marchas. It may have been possible because of similar landscape and socio-cultural setting. The traditional occupation of livestock rearing and trade may have framed similar understanding regarding environment and their knowledge system.

The socio-cultural setting of the Bhotiyas (Jads, Tolchhas, and Marchas) is changing drastically; using food habits and festivals as indicators this transformation was studied. The food habits are changing gradually. This was found as a lot of people are turning towards vegetarianism; with restrictions upon extracting several species of plants and ban on hunting the eating habits have changed as well. As they live close to the border areas there are certain restrictions upon movement and the Nelong-Jadung area is inaccessible, thus, they have to change their food habits as well. After the Indo-China war of 1962, Bhotiyas were categorized in Schedule Tribe category of the Indian Constitution. This also resulted in a drive to accommodate them in the mainstream majoritarian ethos. Bhotiyas were inhabitants of politically sensitive zone, thus this drive was carried out extensively. Hence, the impact of Hinduism or plain culture also led Bhotiyas to change their food style. As they have moved away from their traditional occupation which was more livestock oriented, now they are fastly shifting away from it; so the intake of dairy products and meat in their diet has reduced. The accessibility to their area through motorable roads led to inflow of junk foods and markets; this is creating a change in food habits among youths.

Bhotiyas (Jads, Tolchhas and Marchas) did not have a separate and demarcated notion of sacredness for natural elements. This is possibly because they live with nature and they have evolved with it. With flora and fauna, Bhotiyas hold a strong association. For Jads, Tolchhas and

Marchas sighting a wild animal is a good omen though they consider elephants as a threat. This is possible because when they shift to grasslands for livestock grazing they face a threat from elephants. One of an elderly respondent from Dunda shared that "*When elephants come near them they used to climb Banyan tree and protect themselves*". This shows that they live closely with wild animals and the cases of conflicts are very low. It only happens when they are in grasslands while livestock grazing and forests.

The folklores of Bhotiyas (Jads, Tolchhas, and Marchas) are highly vibrant and includes a reflection of their lifestyle. It was observed that these folklores are fading away with time. It was felt that they women were more attached with the folklores. As a lot of people have shifted to the cities in search of better job opportunities (especially males); folklores involve women from all section of society. Singing folklores ensures sitting together and sharing their daily life. For women it is a gateway for leisure and relaxation whereas for males such folklores are essential while moving alone with livestock. Though, a lot of people have moved away from livestock and sold it. Gradually, with government support and subsidies women are getting involved with handicraft industries. Such places are lively and offer a scope to women for sharing their stories and sing songs.

Ethno-medicines are an important part of Bhotiya lifestyle. With restrictions under forest laws they are facing a lot of issues in collecting species and making medicine out of it. Though, they collect it in limited amount. Ethno-medicines are like first aid in case of any health issues. The younger generation lacks knowledge regarding ethno-medicinal species, the knowledge of elders is not getting passed on to younger generation. Generally, females are involved in collecting plants and males used to make it. This also reflects the sharing of labor and skills within the community. The benefits of reservation is visible upon the Bhotiya community, they

have reached to reputed posts and managing higher positions. Bhotiyas prefer traditional architecture over traditional but they live mostly in modern houses. This is mainly because the materials required to construct traditional houses are not easily available anymore.

It was observed that the educated people prefer to have dams and roads as the chances of getting jobs increases. Even the elder inhabitants didn't have a stark opinion against infrastructural works. Historically Bhotiyas have been involved in forest conservation, the Chipko movement is one such instance. But this movement was hijacked by other leaders and leading Bhotiya (Marcha) protagonist Gaura Devi and her agenda was sidelined. It is discussed in detail below. It was also observed that Bhotiyas (Jads, Tolchhas and Marchas) have their own way of understanding and surviving.

6.1 Contribution of traditional practices in dealing with natural hazards

Settlement and Architecture

Information gathered during fieldwork and from other sources suggests that initially Bhotiyas (Jads, Tolchhas, Marchas) resides in shelter houses made temporarily in Himalayan region. Such shelters were strategically located on trade routes and at grazing locations of sheep, goats and cattle. These houses are very light and made up primarily of grass, stones and timber, it was constructed because it matches the pastoral sedentary lifestyle. But with influx of people from plains, the setup changed due to the fusion of Hinduism from plains and local Bhotiya culture. The influence of advance technologies from Indo-Gangetic plains, developed agricultural practices, settled lifestyle is visible in the contemporary traditions of the Bhotiyas. Traditional knowledge system assimilated the cultural and technological differences. Slowly and gradually

the lighter house got replaced from elaborate buildings with precise techniques and resource use. Such advancements reflect the cultural response to external influence and transforming lifestyle. I made extensive observations of old buildings (which are more than 50 years old) and new buildings in Harsil (Uttarkashi), Ghingran and Chhinka (Chamoli) villages. It was found that old buildings are more resilient to natural hazards and suitable as per the climatic conditions. Few of the unique characteristics of the building construction and management are discussed below:

i. It was observed that modern buildings are majorly RCC or RBC building without any process of soil testing. However, the old men from villages informed that their used to be a process of soil testing before constructing any building earlier, slowly this tradition has faded away. But the term soil testing was not used, the land was analyzed to check whether it is suitable for construction or not. Earlier, it was an essential step before building construction. One elderly person from Ghingran village informed that "the land was examined and we usually consult a priest or wise man who informs us regarding good and bad things associated with land". With increase in population, continous exchange from plains and economic prosperity several inhabitants have shifted to modern techniques and designs of construction. It is not suitable for the harsh hilly terrain. After surveying the villages of Dunda, Ghingran, and Chhinka it was clear that modern house are less durable and old buildings are still standing at their places. It was also observed that the old buildings require less maintenance, the resources required to repair it is locally available. Whereas the modern houses have high maintenance cost. Due to this people have started shifting back to traditional modes of constructing buildings. They also believed that the impact of disasters like earthquakes and floods are less on traditional buildings. However, when asked regarding any such traditional way of

soil testing by priests or wise men in Dunda village gave a different result. In a focus group discussion with women of the village 'they claimed that such tradition doesn't exist, but now few people used to ask help of pundits for examining the land before starting any construction is started'. They said that the *Gaon Pradhan* (Village headperson) helps them in deciding a suitable place for any construction.

ii. It was also observed that the old buildings and houses have unique characteristic of insulation, it protects the residents from heat and freezing weather. Such houses have small windows and doors. Many of the houses have only one or two small windows. An elderly woman from Bagori (Uttarkashi), shared that "*small doors and windows were made to keep the house warmer, now with cemented houses the windows and doors bigger in size and it is difficult to tackle winters*". Another informant from Ghingran village told that "*in extensive snowfall small doors and windows are very helpful, it protects the house from cold, but the houses with bigger doors and windows become freezing cold during snowfall*". Another inhabitant from Ghingran told that "*now the winters are not that cold and we have access to electricity so we use heaters, earlier we don't have money to buy heaters so small doors and windows were a necessity*".

iii. During the fieldwork it was found that old houses used to be shorter in length with thick walls. It was constructed with traditional expertise to maintain the temperature within or inside the house. Thick wall and shorter length keeps the internal temperature higher in comparison to outside. Usually the family stays together in a small house with low ceilings and less surface area to retain the warmth. One of the informants from Chhinka village (Chamoli) shared that '*now no one wants to make such houses as they are comparatively congested and sometimes suffocating, now everyone has big families and*

money. Now, we sleep on wooden beds with blankets rather than on paddy or jute bags. It keeps us warm so we don't need shorter houses anymore'.

iv. Earlier timber was used extensively for constructing houses, temples and community buildings. As the timber is available easily, they were not required to pay anything for it. But now certain restrictions are imposed by the forest department on cutting down of trees for timber. An elderly woman having a timer house in Bagori (Uttarkashi) shared that "*the wooden houses are comparatively warmer, especially during winters. So people used to construct wooden houses*". Another informant shared that "*concrete houses are less effective in harsh winters; timber is available in abundance. This mountain, forests, and land it is our own, we have authority over it. Our ancestors have nurtured it from their blood and sweat. Concrete houses gets warm easily especially during summers, why we will live in it. We have timbers and we will construct wooden houses, as they are suitable as per the geographical locations, it is very successful in our place*". Geographically, timber houses have an advantage over the cemented buildings because of the resources available for construction and sustainability factor. Conventionally people also connect the timber and concrete houses with health, it reflects their health-consciousness and sensibility. One of the inhabitant of Chhinka village shared that "*timber houses ensure better health whereas concrete buildings are not good for health. Mud, clay and cattle dung used extensively in old houses, they are beneficial for health. Cemented houses have extreme characteristics as they get hotter in summers, absorb a lot of moisture during rainy season, and easily get colder in winters*".

v. It was found during fieldwork that the old traditional houses were usually two to four storied, having rectangular structure. The shape of the buildings areas designed such that

they provide extra strength to the buildings against natural hazards like earthquakes. The ground floor is constructed majorly for the cattle and it is locally called as 'got', 'byar', or 'obra'. However, this concept of a separate space for cattle and livestock is not very popular among the Bhotiyas. Possibly because their primary occupation is livestock rearing, so they live very closely with them. In Bagori an elderly woman named the floors "*the ground floor is 'obra', we usually keep our cattle. We make our kitchen on the first floor it has multiple benefits, in summers the ventilation helps to maintain temperature while cooking and in winters the heat melts the snow which gets deposited during snowfall*".

6.2 Agriculture

Earlier Bhotiyas tribe was primarily involved in Indo-Tibet trade and livestock rearing. Agriculture was a secondary activity; livelihood was majorly dependent on livestock. It determines the wealth of a family or individual. Jads, Marcha and Tolchhas usually follow farming practices that was temporary, gradually with shift towards a sedentary lifestyle the nature of agricultural practices also changed. It transformed from a mobile pastoral nomadic agriculture to intensive sedentary agriculture, similar to those practiced by people of plains. The cultural interchange, assimilation with the plains, loosening of traditional wisdom, and harsh climatic conditions supported such transformation. But the traditional knowledge and wisdom didn't get lost completely, it gets passed on and modified in the contemporary agricultural practices. It reflects the adaptive techniques of the Bhotiyas, several festivals, and religious ceremonies still give a glimpse of the traditional practices. Few important characteristics of the traditional agriculture are discussed below:

i. Terrace Farming

Inhabitants of the Himalayan region like Bhotiyas have evolved a unique practice of agriculture, it is suitable for the harsh climatic conditions and rugged terrains. During the fieldwork it was observed that Bhotiyas have transformed the extreme environmental oddities into their favor. The first step in this context is terracing the slope; it is adapted with a view to have a plain surface area for farming. Though it was observed that most of the farmers didn't know the reason for terracing, they just follow the traditions as transferred by their ancestors. This technique is the one of the most viable technique for cultivation in hilly terrains. A young man from Ghingran (Chamoli) informed that "*terracing helps in checking the soil erosion, it is a very effective measure. It is not impossible to level the entire mountain so people made slopes earlier, though people may have tried to slope the entire area*".

ii. Water Flow

Ensuring natural flow of water is essential in rainy season. The traditional water management system of the Bhotiyas aims to ensure natural flow and reduce water logging. It is evident that water logging instigates landslides; in rainy season water logging is very dangerous. In hilly terrains the Bhotiyas have learnt regarding the risky combination of water and soil. An inhabitant of Chhinka village (Chamoli) shared that "*we never bind our farms with ridges, because it may cause water logging thus leading to landslides*". It was found that the terraces are not constructed or demarcated in a regular pattern; it helps in smooth flow of the water. A farmer from Bagori explained that "*we*

never make terrace in a regular pattern or in a rigid way, irregular pattern helps in outflow of rain water. Potato is cultivated in the rainy season and it rots even with small amount of water logging". Thus, such water management system by Bhotiyas doesn't only helps in reducing the chances of hazard but also ensures better production of crops.

iii. Crop Rotation

Agricultural practices of the Bhotiyas are shaped by Himalayan terrain and harsh climatic conditions. It is reflected in the linkages that can be traced from Bhotiya culture and necessity to conserve the local biodiversity. At the core of the bhotiya agriculture is the alternate cultivation of pulses and twelve grains (locally known as barahnaja). It not only addresses the issue of regional food security but also helps in maintaining the genetic diversity of agriculture system. Such cropping patterns are sustainable as it provides ample time and space to the soil for maintaining its fertility. But in last two decades a shift is observed in the traditional cropping pattern which hampered the production of essential agricultural products like pulses. Several informants from Bagori, Ghingran and Chhinka villages held a common view that their ancestors used to grow the maximum crops that they require, but now they are dependent upon market for many items. An elderly woman from Ghingran informed that "*Rajma (Kidney bean), rice, green leafs, gehu (wheat), bajra (millet), bakra (goat meat), koni, cheena were a regular part of the diet. Now having such a meal is a luxury. We used to have all the things available at home and we work hard for it. Now, things have changed people work for money, once they have money they purchase everything. Money is more powerful now, when I was a kid we never crave for money as it is not required at all".* Another inhabitant of Ghingran

added to this conversation by sharing that "*earlier the variety of things we eat depends upon our activeness and hard work in fields. Now, it depends upon the source of money*". It is clear that the cropping pattern ensures the variety of food and it even contributes in maintain a proper diet but it is changing drastically. The production from fields has also deteriorated over a period of time due to less involvement of people in agricultural activities.

iv. Mixed Cropping

In all the three villages inhabited by Jads, Tolchhas, and Marchas participants mentioned that they practice mixed cropping on their land. Many of the supporting crops are grown together with the main crops. Buckwheat (*Fagopyrum esculentum*), amaranth (*Amaranthus oleracea*), finger millet, horse-gram(*Macrotylomauniflorum*), and Kidney bean (*Phaseolus vulgaris*) are grown are supportive crops.Pigeon pea (*Cajanuscajan*), blackgram (*V.mungo*), seasame (*Sesamumindicum*), several types of soyabean (*Glysinesoja, Glysine, Glysinemax*), tickweed, cow peas(*V.Unguiculata*), and perilla (*Perillafrutescens*)are other crops which are mixed. In-depth study of crops mixed and pattern followed, represents the deep association between natural diversity and traditional practices. Different areas of the farm are recognized, the unique qualities of the land piece or area is used to grow a certain type of crops. Bhotiyas adopted this pattern to enhance and optimize the productivity. In this system the main crop is usually grown with pulses and millets. The main crop is grown in the central part of the field with supporting crops along the sides. This not only helps in maintaining the fertility but also

the nutrient content of the soil is also retained. Supporting crops help in the nitrogen fixation of the soil.

v. Storage and conservation of seeds

Conserving and storing seeds are necessary to ensure the genetic diversity and production in the next season. The socio-religious customs of the natives have always paved the way to conservation of seeds. But for Bhotiyas conserving seeds is a bit new phenomenon, as observed after consulting the community members. In a farmland at Ghingran village an elderly man shared that "*earlier we don't use to conserve seed, we get seed in exchange of other products. It is a part of our trade*". But it cannot be said that conserving seed has been a totally new practice for the Bhotiyas. For agricultural continuity seed must have been conserved traditionally as well. It also contributes towards biodiversity conservation by maintaining the gene flow and productivity. Many farmers shared different practices for conserving seeds and storing grains. In a group discussion at a tea shop in Dunda, a JadBhotiya participant shared that "*though I have small patches of lands for cultivation at Bagori but it is very productive. The total produce is either consumed in a season or sold in the market so I don't need to store it for long time, thus, we don't have a specified method of storing grains. Though, my family stores few seeds of vegetables for planting it when the season comes. My wife sometimes uses a well-baked clay pot or rope woven containers that are plastered with mud or in glass vessels*". It was observed that the grains are usually stores in a wooden box which is approximately 5ft. in height. The box is made such that the bugs cannot enter it. Many farmers shared that they use to protect their produce from insects and bugs by using leaves and herbs. For instance Neem

(*Azadirachta indica*) leaves, and 'Dall' leaves are used to keep infections and bugs away from the stored grains. A participant of Ghingran village informed that "*Leaves are dried in sun or the fallen leaves are collected and kept in the grain box. The smell of these leaves keeps the bugs and infections away. But now with government subsidies and shops we use chemical tablets as well. They seem more effective but they are dangerous too. Leaves keep the ghun (woodworm) away*". It was observed that in few houses at Dunda, Bagori, Ghingran and Chhinka villages the storage of grains is done in a separate structure constructed outside the house. It is called as '*Kothar*'. Villagers shared that *Kothar*is contructed outside the house due to the risk of fire. Instant fire can potentially damage the produce of the entire season so it needs to be protected. An old man from Ghingran village shared that "*grains are produced with a lot of hardships. For poor people it is everything, earlier the houses are usually made from timber so the chances of fire is high. To ensure the safety of crops and food security the grains are stored outside. But now flammable elements like hey, timber, grass etc. is rarely used in construction, cemented buildings are less prone to fire so grains are stored inside the house*". Heat and smoke harm the grains so it is better to keep it outside the house. *Kothars*are designed in such a way that bugs and pests cannot enter it. The keys of *Kothar* are always given to the women. Another interesting practice is of storing potatoes. A pit is cleared and then grass is spread beneath it, after that potato are kept and covered with grass, at last it is covered by soil. The layer of grass protects the potatoes from rottening. Hence it was observed that local traditional knowledge helps in conserving the seeds and grains from external threats.

vi. Cultural and Religious influence on agriculture

The Jads, Tolchhas and Marchas of Uttarakhand have elaborate socio-cultural and religious practices associated with crops, productivity, seed conservation and agricultural lands in forms of festivals and deities. For instance, Losar and Navratri of JadBhotiyas start with worshiping nature, flowers and crops. People pray for productivity and agricultural prosperity. Local deities are worshipped and people seek blessings for better crop yield. JadBhotiya follow the Buddhist calendar which is according is seasonal cropping patter. Whereas the Tolchhas and Marchas follow the Vikram Samvat calendar which is specifically according to cultivation and harvesting pattern.

vii. Predictions

Due to continuous interaction with natural elements in the Himalayan region, Bhotiyas have developed a technique of predicting the climatic phenomenon. They were involved in trade with Tibet, due to this they used to travel in the rugged terrain of the Himalayas. The knowledge about weather phenomena helps them in survival and coping up with any potential threat. The participants suggested that earlier the predictions were hardly wrong and we easily predict the weather but now it is difficult. The precipitation pattern is changing and it is adversely affecting the crops. Though, the prediction technique is still functioning and farmers are dependent on it. The pattern of snow fall and melting has also changed and it is very difficult to predict. Thus, it is clear that the climate change is having a deep impact upon the Bhotiyas capabilities and understanding. It was observed that the disturbing ecological balance is forcing Bhotiyas to move beyond their traditional survival techniques.

6.3 Geography, Forest and Ethno Medicine

At various levels Bhotiyas has developed mechanisms to cope the geographical and climatic extremes of the Himalayan region. Due to continuous travel and trade, Bhotiyas are extensively exposed to the harsh realities of Himalayan climate and geography. While moving from one place to another Bhotiyas faced major challenges like mighty rivers, high peaks, glaciers, wild animals and dense forests. As they used to migrate from one place to another or transhumance, the problems associated with heavy rains, snowfall, avalanches, floods and earthquakes are quite regular. But under all such life problems, Bhotiyas have survived and grown over a period of time. Bhotiyas have successfully dealt with such challenges due to their experiences, traditional ecological knowledge and wisdom. These qualities get passed on from parents to offspring. Thus, such knowledge gets embedded in the lifestyle of communities. Traditional practices contribute in dealing with natural hazard unconsciously. Transmission of such knowledge happens through the stories and folklores of the communities. Few of the important elements related to this context is discussed below:

i. **Knowledge of routes and geography**

Bhotiyas are one of the oldest settlers of the Himalayan region, initially most of them were pastoral nomads, and they were involved in regional level barter trade. This trade was the lifeline for Bhotiyas as it fulfills the necessary survival products and cultural exchange. Earlier Bhotiyas live a completely mobile life which later on started getting more settled and comparatively sedentary. With their knowledge and understanding they used to cross dangerous valleys, mighty rivers, fragile glaciers, peaks and forests. Bhotiya ancestors were having deep knowledge regarding dynamic and static elements of

Himalayan geography. As they were involved in trade which was prone to loot and difficulties, they derived shortcuts and feasible routes for smooth travel. Bhotiya traders and their families still living in Bagori, Chhinka and Ghingran recognizes the hilly passes, routes to Tibet and other easy paths to travel safely with their livestock. Inhabitants of Bagori and Ghingran shared that their ancestors know a lot of shortcuts and identify each and every elements of the landscape which helps them in reaching distant places easily. They were trained by their ancestors who involve them in trade and livestock rearing, living in the lap of nature under the roof of sky, they not only learnt various survival techniques but also coevolved or grow with the nature. An elderly participant from Bagori shared that *"when my father was young he used to reach Rishikesh from Nelong along with their livestock in a shorter span of time. It was easier to travel through those routes but now with moterable roads it is difficult to travel with livestocks"*. Anotherwoman from Bagori who used to go for the NTFP collection informed that *"several routes where we travelled throughout our childhood had disappeared or disappearing without use. Now we need permission to go to Nelong, whenever I go to the forest I feel it is still the same but our trade routes are deserted. I can still see the steps that are used by sheep for going up on the peaks"*. With the 1962 war Bhotiyas of Nelong and Jadung valley were forced to leave their land and shift to Bagori they are not allowed to live over there anymore. For their annual deity worship they still go there but they require several permissions.

ii. Safe zones and hazard resilience

Apart from prediction and architecture Bhotiyas have developed strategies at local level to deal with their daily issues. For instance, in the local stream, spots are recognized by Bhotiyas where the flow of water is less and it is safe to bath and clean. It was observed that the water at such spots are comparatively clean to drink due to natural filtration by stones and surface area for heavy impurities of water to settle down. They have an elaborate understanding of the seasonal risks like landslides and floods. It helps in getting prepared for the potential hazard. Many of the participants informed about safe places present in the middle of the forest, they informed about caves and natural structures which protects them from cold and wildlife.

iii. Animal signs and unusual events

In a group discussion informants belonging to Marcha village from Ginghranshared that they have heard about their ancestors who anticipate the possibilities of hazardous events by reading animal signs, insects and bird signs. An elderly man from Bagori shared that "*in forest especially in the Terai grasslands the birds call help us in locating tigers or leopards. Initially, I was unable to understand it but my father helped me in understanding it'*. This clearly shows that not only scientists or forest department officials understand bird call and its indication, even the natives like Bhotiyas have used it for their survival since a long time. Unusual activities of birds and domestic animals points towards possibility of unusual events like earthquake. An old person from Bagori informed that "*snakes can hear the sesmic waves before us, when they came out from their holes, then something wrong is going to happen. Cattle cry, unusual noises and*

irregular activities of birds helps us in predicting the occurrence of deadly or sad events". However, many of the young Bhotiyas from Bagori doesn't know about any such practice, a group of children (from standard 6-8) from school said that they have heard about elders believing in it. But they neither understand such calls nor believe in it. A photographer from Ghingran shared that "*I don't believe in any such thing, most of the time I keep an eye on weather prediction on internet. When I see that there is a possibility of snow fall I go to the picturesque location of the Mana valley"*. Such stark difference in approach points towards the lack of cultural transmission and increasing accessibility of the Bhotiyas in era of globalization.

iv. Knowledge regarding local climate and other dynamics

Bhotiyas have been peculiar regarding their understanding of natural phenomenon; they hold their own understanding of the elements of the landscape. Their knowledge bank is filled with experiences and observations from direct interaction with nature. A man from JadBhotiya community of Bagori shared that "*we got disconnected from our family and community, once we enter the forest area. Only goats and sheep are our company, so we have a lot of time to observe nature and learn from it. It helps us in identifying the tree types and location, thus, we develop a relation with the jungle. I don't know the name and it is not found in Dunda but the moment I saw that herb; I can assure that a water body is nearby"*. Another elderly man from Chhinka informed that "*when we are in jungle, we assume a lot regarding various sounds coming from the jungle. Most of the time such assumptions transform into reality. Thus, we can indicate which places are dangerous in jungle and what precautions to take"*. Due to their constant requirement

Bhotiyas have developed such precise techniques to deal with any threat. There are several other techniques that Bhotiyas follow to mitigate the risk and improve their chance of survival. For instance, a Bhotiya shepherd from Ghingran informed that "*in rainy season we face the maximum risk as the weather is unpredictable and we used to be in jungle. But we know exactly when to move towards temporary cattle sheds present at higher altitudes or chhanies and reach a safe shelter for us and livestock*". Similarly, one old informant from Bagori said "*after looking at the rain we can predict that when the spring will reach its dangerous limit. After listening the sound of flowing water bodies during rainy season we can calculate the risk*". In a group discussion at Ghingran the participants belonging to Marcha shared that based on the position of cloud, they can easily calculate the timings of rain. They also agreed that most of the time predictions are correct. It was observed that local Bhotiyas have a lot of information regarding climate and weather, on the other hand those involved in government and private jobs lack such understanding. Such local knowledge can be helpful in disaster mitigation.

v. Forest Conservation

Forest is an indispensible part of the Himalayan landscape and Bhotiya lifestyle. Forest is a source of livelihood, fuel, medicines, fodder and several other eatables. It was observed that apart from direct benefits of forest, Bhotiyas acknowledge the indirect benefits from forest as well. Bhotiyas recognize that forest ensures stability of land, rainfall, protection from hazards, climate stability and continuation of biodiversity. All such factors are beneficial for the Bhotiyas life and stability. Bhotiyas have consciously protected the forest areas from a long time. Gaura Devi is one such protagonist of the Chipko

movement. She belongs to the Marcha community. Gaura Devi was an unsung warrior who not only protected the forest but also encouraged several other women from Marcha community to oppose the destruction of forest. Even before this several other Bhotiyas have contributed in conservation of forest. Trees are considered as sacred among Bhotiyas, though there are no restrictions over cutting down of trees. Trees around temples are considered as sacred among Jad Bhotiyas. Religion plays an important role in forest conservation. Especially, for Jad Bhotiyas as they follow both Buddhist ethics and Hindu spirituality. Thus, few of the trees like Peapal (*Ficus religiosa*), Banyan (*Ficus benghalensis*), Padam and Oak (*Quercus leucotrichophora*) etc. is considered sacred. Along with this Bhotiyas from Chhinka village said that even before the forest laws and restrictions, they prefer to use damaged trees or fallen trunks from the jungle rather than cutting down a new tree. In the past, Bhotiyas have faced several upheavals, thus they have developed effective methods or safety mechanisms to mitigate its affects. In an informal conversation, the Dunda village temple priest (who was not a Bhotiya) said that "*Jads never cut down the trees near temple or forest cover close to their houses. As the forest cover provides safety and support to their houses in case of excessive soil run-off or heavy rain*". An informant from Ghingran shared that "*we have grown and flourished in the forest. It is like our mother providing us so many things, even our livestock is alive because of their mercy. So, we cannot think of destroying it but as we also need timber for construction of houses etc. we have to cut down the trees*". It was observed that Bhotiyas care for the forest cover and understand its importance but the daily needs force them to extract the forest products.

Ethno-Medicine

Himalayan region is rich in biodiversity; several valuable species of medicinal herbs are found in this area. Bhotiyas have extensive and deep knowledge regarding the flora found in the region. This knowledge is very essential for them as they spent a considerable time in forest, floras found in such forests acts as medicine for them. For several health issues they use these ethno-medicines. This knowledge of local medicine is fading away at a fast pace. An informant from Ghingran said "*now we are not allowed to extract herbs, earlier we were free to do that without any restrictions. Now, hospitals and medical shops are accessible, the western medicine acts very fast and provide relief easily. Whereas our local medicine takes time to give positive results. Younger generation has so many things to do and earn, they don't want to waste time gathering herbs and making medicines*". However, the Bhotiyas from Bagori, Ghingran and Chhinka still use a lot of ethno-medicines. It is an important part of their daily life. Ethnic communities throughout the world have used medicinal plants for local health care, this knowledge is getting documented these days. Our results reflect strong consensus on uses of medicinal plants in Harshil, Niti and Mana valley. Informants were almost from all age group. It was observed that the knowledge regarding traditional medicinal plants is more among elders of the Jads, Tolchhas and Marchas society. Most of the informants informed that the learnt this knowledge and skill from their parents. They not only consume such medicines but also associate with them. It was also observed that medicinal plants have multiple uses in the rough Himalayan terrain. For example, *Bergenia ciliate* is one of the most widely used species for treatment of stones.

Most known medicinal plant was *Acontiumheterophyllum*, it was known to most of the informants belonging to all age group from Jad, Tolchha and Marcha community. As it was used

in fever and stomach ache so it was reported by 76 informants. The usage of this plant is high because it helps in treating very generic diseases which is common among inhabitants. *Berberis lyceum* is another popular species. It was reported to be used by 53 inhabitants, for the treatment of conjunctivitis. *Aconitum balfouriiwas* an uncommon plant species only 4 people have reported to know about it, all the 4 informants were from the Tolchha community living in the Niti Valley. It is quite unpopular but very important as it is used as antidote for scorpion sting and snake bites.

In past, the old folks and *Vaidyas* have used medicinal plants for treating their health and also for livelihoods. With forest laws and restrictions, the collection of medicinal plants is a major check on traditional practices. It is also reported that few of the species are facing threat of extinction or their habitat is changing, the fragile Himalayan ecosystem is facing major threats in different regions (Samal *et. al.,* 2010). One of the inhabitants from Ghingran shared that "*few of the plants that we used to eat directly as medicine in fever, stomach ache, skin rashes etc. are not found in our local areas anymore. Now, we have to travel a lot deep inside the forest to get it*". It was observed that the overexploitation, deforestation, poor regeneration, forest fire, climate change, habitat loss, land slide, timber extraction and over grazing were major threat to medicinal plants found in Himalayan ecosystem (Samal *et. al.*, 1998) where Jads, Tolchhas and Marchas reside. Therefore, it is the need of time to protect these valuable species from extinction and follow the path of sustainability.

The study indicates that the knowledge regarding medicinal plants in Harshil, Niti and Mana valley is still prevalent. It was evident from on-field observation that elders of the community hold maximum knowledge regarding the ethno-medicinal practices. It is interesting to note most of the youngsters don't know the local name of the species, this is more visual in the Jad Bhotiya

community. It was observed that even today medicinal plants are essential part of health and disease treatment among the Jad, Tolchha and Marcha community. If given proper attention with sustainable plan and inclusive approach, the involvement of natives and production of medicines may yield wonderful results. These practices are capable of generating constant income, claim identity, regional recognition, and sustainable management of natural resources. A holistic planning and policy framework may check the violent extraction of precious medicinal resources. Though several programs are going on, we need to come up with appropriate *in situ* and *ex situ* conservation plans for biodiversity and valuable medicinal plants. Wild population of such medicinal species requires attention and protection.

vi. Forest conservation and history

The Chipko movement has received global attention. The image of rural, poor women standing with their arms around trees to protect them from being cut down is a highly compelling and romantic one. In many ways, the reality fits with the image, and the Chipko movement is indeed a success story in a fight for securing women's rights through environment protection and forestry. But there are several other complicated implications as well. It is equally essential to understand the chronological development and context of the Chipko movement, which is still evolving.

A strong gender dimension is hidden in the global vision of sustainable development, as it highlights the necessity to identify women empowerment and gender equality at the core of development. Women and men have different traditional and formal rights over decisions and resources, so to address the issues of inequities, a gender-differentiated approach is required. Women's possession over environmental-related decisions is guided by her position in family,

community, and local politics. Strengthening women's participation and leadership in sustainability and environment crises is the need of time. When woman environment leaders like Gaura Devi argues "This forest is my '*maika*' (mother's home). Whenever I need something, I go and get it from there-- medicine, food, fuelwood, etc. I don't have to seek anyone's permission or pay money to get anything from there. How can they destroy my *maika?"* (taken from Pandit, 2017, p. 154), then it gave us a glimpse of close connection and pragmatism of people who live in the forested area. It is a way to meditate and interact with the non-human entities. Treating forest as '*maika*' makes the forest a part of the human world and represents the multispecies interaction at the level of emotions, economy and survival. A more than human and multispecies inquiry of Chipko movement will be useful, as it may upset the accepted notions of sociality.

Women played a decisive role in the Chipko movement. Owing to the ongoing hazards like landslides and their continuous interaction with nature unlike men (who usually migrate in search of jobs towards cities), it was easier for them to understand the nature's call and focus on maintaining the ecological balance of the area. However, the women mobilization for forest preservation came with conflicts regarding their position in society and decision-making. Ultimately, men seized the movement and transformed it into a socio-economic movement. Sadly, the contribution of women hasn't got the kind of acknowledgement that it deserves. A plethora of arguments has been put forward by scholars, and activists for Chipko movement. But the ambiguity regarding its origin continues. However, the well-known narrative is that on several occasions in the 1970s, women hugged trees for preventing it from being felled. It was followed by padayatra (marches) for informing other villagers about the movement. The movement is interpreted as "fusion" (Guha, 1989, p. 196) and as an "eco-feminist" movement (Shiva, 1988, p. 67) of a peasant movement and an 'ecological movement'. The spiritual and

material relationship of the movement with forest and peasants defending their values and lifestyle (followed by a chain of protest) gave a "legendary status" (Rangan, 1996, p. 214) to the historical events of the movement.

6.4 The hybridity of the religious sphere:

Some scholars refer hybridity to as syncretism. But I prefer the term hybridity over syncretism because several negative connotations have been attached to syncretism today. For a significant section of people, syncretism holds confusion, and it is an unclear path. Still, there is neither confusion nor denial of syncretic ethos in the context of people involved in the study, especially the Jad Bhotiyas. People live and combine different faiths; Buddhism and Hinduism complement the touch and connotations of indigenous religion by the Bhotiya people. Informants were not having problems blending and mixing other faiths as it carters to their spiritual, physical and socio-political needs. It is reflected in an anecdote that teaches that "plenty of wool doesn't spoil the sheep". The study observed that Bhotiyas historical legacy and experiences welcome pluralism. Bhotiyas were traditionally traders and lived an utterly mobile life. The negotiating character, adaptive ability and plural approach helped them survive the harsh ecosystem and adapt accordingly. Such eclectism generates a sense of peaceful cohabitation and tolerance towards diverse cultures. This approach is embraced in the Bhotiya worldview.

Chapters 7 Conclusion and Recommendations

Under this section, the focus is more upon concluding the crux, which was co-developed with respondents. It is essential to summarize the findings so that the research should not be left abrupt.

The objectives of the research are answered with the responses gathered during fieldwork. The information collected provides invaluable information about the Bhotiya lifestyle and wisdom. The conclusion is divided into six broader points, but they are intertwined and inseparable.

i. Coexistence with infrastructural development, identity building and transmission of traditional knowledge and spheres.

ii. For Bhotiyas living and non-living entities are connected. Though traditional lifestyle and experiences still frame their ontological setup, still infrastructure development and improved accessibility from plain areas are evident in their daily routine. The traditional ethno-medicinal knowledge, architectural setup, festivals and food habits all are undergoing significant changes. They are balancing between traditional knowledge systems and present-day requirements.

iii. The indigenous knowledge is under threat due to slow transmission and acceptance among the younger generations.

iv. Their folklores hold ecological elements which interact with them regularly, like-mountains, snow, rivers etc. The notion of sacred and profane towards wildlife is very overlapping; it reflects the impact of plains and their own understanding.

v. The livelihood pattern has changed in the last few decades; this facilitates a sedentary lifestyle. Thus several aspects of the pastoral systems are fading at an alarming rate. With constitutional provisions, the number of Bhotiyas getting involved in salaried jobs has increased drastically.

vi. Bhotiyas are peace-loving people, they follow a hybrid approach, and religious sentiments are very flexible and accommodating. Changing and evolving religious spheres are also framing their connections with elements of nature.

7.1 Recommendations

The study recommendations primarily revolve around the research question of how the Bhotiyas contributes towards a meaningful way of living and the ways in which they interact with ongoing changes. Essentially, the traditional knowledge system provides a sense of purpose, place and identify which helps in making connections with physical elements of nature and human-made world. The education, employment, culture, environment and health sector need to come under an umbrella to offer viable and sustainable solutions to Bhotiyas problems. Capacity building and incentivization are fundamental to the recommendations of the study.

The six priority wise recommendations from the research conducted are:

i. Incentives in form of monetary benefits are essential to continue the traditional knowledge system. For instance, the home stay scheme to support the traditional architecture.

ii. Incorporation of Bhotiya knowledge into the employment and education programs. Certain posts or services recruited for teaching and execution of traditional knowledge system will benefit the key knowledge holders and it will encourage others to learn it.

iii. Collaboration with elders for creating a sense of identity through traditional knowledge will help encourage Bhotiyas as custodians of their ancestor's legacy and history.

iv. Policies and framework to enhance the capacity development of the Bhotiyas. It will help them in identifying the gaps and locate the benefit spot from traditional knowledge systems.

v. Village wise succession and mentorship schemes, creation of opportunities for holding key position at village level on the merits and knowledge of traditional knowledge will help them in making sense of the infrastructure development by incorporating the traditional elements into it.

vi. Workshops, and training by forest department to aware Bhotiyas about endangered and scheduled species. It will facilitate grass root conservation and ownership at local level.

I observed that there is a lack of communication between government agencies, research institutions and Bhotiya community, which lead to policies that are unaware about and insensitive to their cultural, ethnic and developmental needs. If managed in a scientific and sustainable way the knowledge of Bhotiyas (Jads, Tolchhas and Marchas) may help in managing the natural resources. It is recommended governmental and non-governmental organizations, research institutions and civil society organizations should be involved to fill up the void and it will also help in decreasing the chances of contestations between forest department and Bhotiya community. Bhotiya women live in close knit groups and engage themselves in daily activities together. With ongoing projects, a lot of things are changing which brings about a change in their socio-cultural setup. At the heart of this study is the recognition that biophysical and socioeconomic conditions fundamentally constrain and can facilitate development pathways that they influence one another, and that social-ecological

conditions can vary within a given region. Although the study was carried out in small part of Himalaya, its results can be used as a base for future research work. Similar approach can be applied in other settings and could be useful in many ways for spatially heterogeneous social-ecological systems facing high levels of uncertainty and anthropogenic pressures. In-depth regional-scale analyses deserve much more attention by researchers than they currently receive though there is a need for global studies and policy initiatives. Integrated findings from various regional social-ecological case studies can guide regional, national, and supra-national policy more effectively. Moreover, engaging with people at local to regional scales may be our best chance to trigger behavioural and institutional changes that are the backbone of sustainable development.

Chapters 8 Reference

- Altieri, M.A. 1989. Rethinking Crop Genetic Resource Conservation: A View from the South, *Conservation Biology* 3: 77-79.
- Alvarez, R. R. 1995. The Mexican-US Border: The Making of an Anthropology of Borderlands. In: Annual Review of Anthropology 24: 447-470.
- Anderson EN. Ecologies of the Heart, Emotion, Belief and the Environment. Oxford: Oxford University Press; 1996.
- Anderson, J. & L. O'Dowd. 1999. Borders, Border Regions and Territoriality: Contradictory Meanings, Changing Significance. In: Regional Studies 33 (7): 593-604.
- Atkinson ET (1973 [1882]) The Himalayan gazetteer, vol III, part I. Natraj Publishers, Dehra Dun [originally published under the title 'The Himalayan districts of the north western provinces of India']
- Barth, F. 1969. 'Introduction.' In: F. Barth (ed.), Ethnic Groups and Boundaries: The Social Organisation of Culture Difference. London: George Allen and Unwin. Pp. 9-38.
- Baud, M. & W. van Schendel. 1997. Toward a Comparative History of Borderlands. In: Journal of World History 8 (2): 211-242.
- Behera, R.N., Nayak, D.K., Andersen, P. and Måren, I.E., 2016. From jhum to broom: Agricultural land-use change and food security implications on the Meghalaya Plateau, India. *Ambio*, *45*(1), pp.63-77.
- Bender, B., 2002. Time and landscape. *Current anthropology*, *43*(S4), pp.S103-S112.
- Bergmann C, Gerwin M, Nüsser M, Sax WS (2012) State policy and local performance: pasture use and pastoral practices in the Kumaon Himalaya. In: Kreutzmann H (ed)

Pastoral practices in High Asia: agency of 'development' effected by modernization, resettlement and transformation.Springer, Heidelberg, pp 175–194.

- Berkes F. Religious traditions and biodiversity. In Levin, S. A. (ed), Encyclopedia of Biodiversity. London: Academic Press; 2001:109–120
- Berkes, F. (1989). *Common property resources. Ecology and community-based sustainable development*. Belhaven press with the International Union for Conservation of nature and natural resources.
- Berkes, F. 1985a. The Common Property Resource Problem and the Creation of Limited Property Rights, *Human Ecology* 13: 187-208.
- Berkes, F. 1993b. Traditional Ecological Knowledge in Perspective. In Inglis, J.T. (ed.) *Traditional Ecological Knowledge, Concepts and Cases,* Canadian Museum of Naturel Intemational Development Research Centre, Ottawa.
- Berkes, F. and Farvar, M.T. 1989. Introduction and Overview, in Berkes, F. (ed.) *Common Property Resources,* Belhaven, London.
- Berkes, F., &Farvar, M. T. (1989). Common property resources—introduction and review. *Common-Property Resources: Ecology and Community Based Sustainable Development, ed. F. Berkes. Belhaven Press, London.*
- Berkes, F., Folke, C., &Gadgil, M. (1994). Traditional ecological knowledge, biodiversity, resilience and sustainability. In *Biodiversity conservation* (pp. 269-287). Springer, Dordrecht.
- Berlin, B. 1992. *Ethnobotanical Classification: Principles of Categorisation of Plants and Animals in Traditional Societies.*, Princeton University Press, Princeton.
- Bernard, H. R. (2011). *Research methods in anthropology* (5th ed.). Lanham: AltaMira.

- Bhandari, B. S., Riaz, T., Panwar, R., &Gusain, P. (2016). Indigenous traditional knowledge Of health care system Adopted By The Bhotiya tribe And other inhabitants In A Part Of Garhwal Himalaya. *World J. Pharm. Pharm. Sci*, *5*(12), 802-817.
- Bose, N.K., 1973. *Some indian tribes* (Vol. 51). New Delhi: National Book Trust, India; Delhi: distributors, Thomson Press (India).
- Brown CW (1987) Ecology, trade and former Bhotiya identity. In: Raha MK (ed) The Himalayan heritage. Gian Publishing House, New Delhi, pp 125–138.
- Brown CW (1992) What we call 'Bhotiyas' are in reality not Bhotiyas: perspectives of British colonial conceptions. In: Joshi MP, Fanger AC, Brown CW (eds) Himalaya: past and present, vol II. Shree Almora Book Depot, Almora, pp 147–172.
- Bruun, O. (1995). Fengshui and the Chinese perception of nature, in O. Bruun& A. Kalland (eds) Asian perceptions of nature: a critical approach, London: Curzon Press, 173–188.
- Caseau, B., 1999. Sacred landscapes. *Late Antiquity: A Guide to the Postclassical World*, pp.21-59.
- Casey, E. S. (1997). How to get from space to place in a fairly short stretch of time: Phenomenological prolegomena. In S. Feld & K. H. Basso (Eds.), Senses of place (pp. 13-52). Santa Fe, NM: School of American Research Press.
- Chakrabarty, D., 2009. The climate of history: Four theses. *Critical inquiry*, *35*(2), pp.197-222.
- Changkija, S. and Kumar, Y., 1996. Ethnobotanical folk practices and beliefs of the Ao Nagas in Nagaland, India. *Ethnobotany*, *8*, pp.26-30.

- Chauhan A. Ethno-medicine of Bhotia tribe in Mana village of Uttarakhand. International Journal of Sociology and Anthropology, 2014; 6(10): 296-304.
- Dasmann, R.F. 1988. Towards a Biosphere Consciousness. In Worster, D. (ed.) *The Ends of the Earth: Perspectives on Modern Environmental History,* Cambridge University Press, Cambridge: 277-288.
- Dollfus, Pascale. 1987. Lo-gsar, le nouvel an populaire au Ladakh. *L'Ethnographie*83: 63-96.
- Firth, R., 2013. *Religion: a humanist interpretation*. Routledge.
- Freeman, M. M., &Carbyn, L. N. (1988). *Traditional knowledge and renewable resource management in northern regions* (No. 23). Canadian Circumpolar Inst.
- Freeman, M.M.R. and Carbyn, L.N., (eds.) 1988. *Traditional Knowledge and Renewable Resource Management in Northern Regions,* Boreal Institute for Northern Studies, University of Alberta, Edmonton.
- Gadgil, M. (1998). Traditional resource management systems. *Lifestyle and Ecology*, 5-26.
- Gadgil, M. 1987. Diversity: Cultural and Biological, *Trends in Ecology and Evolution* 2: 269-373.
- Gadgil, M. and Berkes, F. 1991. Traditional Resource Management Systems, *Resource Management and Optimization* 18: 127-141.
- Gadgil, M., Berkes, F. and Folke, e. 1993. Indigenous Knowledge for Biodiversity Conservation, *Ambia*22: 151-156.
- Gadgil, M., Berkes, F., &Folke, C. (1993). Indigenous knowledge for biodiversity conservation. *Ambio*, 151-156.

- Gomez-Pompa, A and Kaus, A. 1990. Traditional Management of Tropical Forests in Mexico. In Anderson, AB.(ed.) *Alternatives to Deforestation,* Columbia University Press, New York: 45-64.
- Grierson GA (1909) Linguistic survey of India, vol III. Tibeto-Burman Family. Superintendent of Government Press, Calcutta.
- GUHA, R.: *The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya,* Berkeley: University of California Press, 1989.
- Gupta, A. & J. Ferguson. 1992. Beyond 'Culture': Space, Identity, and the Politics of Difference. In: Cultural Anthropology 7 (1): 6-23.
- Gupta, A. and Guha, K., 2002. Tradition and conservation in Northeastern India: an ethical analysis. *Eubios Journal of Asian and International Bioethics*, *12*(1), pp.15-18.
- Harvey, D. (1996). Justice, nature & the geography of difference. Cambridge, UK: Blackwell Publishers.
- Heimlich, J.E., and N.M. Ardoin. 2008. Understanding behavior to understand behavior change: A literature review. Environmental Education Research 14, no. 3: 215–37.
- Hufford, D.J., 1995. Beings without bodies: An experience-centered theory of the belief in spirits. *Out of the Ordinary: Folklore and the Supernatural*, pp.11-45.
- Hungerford, H.R., and R.B. Peyton. 1986. Procedures for developing an environmental education curriculum: A discussion guide for UNESCO training seminars on environmental education, Environmental education series; 22. Paris: UNESCO
- Hungerford, H.R., and T.L. Volk. 1990. Changing learner behavior through environmental education. Journal of Environmental Education 21, no. 3: 8–21.

- Inglis, J.T. (ed.) 1993. *Traditional Ecological Knowledge: Concepts and Cases.* Canadian Museum of NaturelIntemational Development Research Centre, Ottawa.
- Ingold, T., 1993. The temporality of the landscape. *World archaeology*, *25*(2), pp.152-174.
- International Union for the Conservation of Nature (mCN), 1986. Tradition, Conservation and Development. *Occasional Newsletter of the Commission of Ecology's Working Group on Traditional Ecological Knowledge,* 4, Gland.
- Jain, Shobhita. "Women and people's ecological movement: a case study of women's role in the Chipko Movement in Uttar Pradesh." *Economic and Political Weekly* (1984): 1788-1794.
- Johannes, R.E. 1978. Traditional Marine Conservation Methods in Oceania and their Demise, *Annual Reviews of Ecology and Systematics* 9: 349-364.
- Johannes, R.E. 1981. Words of the Lagoon, Fishing and Marine Lore in the Palau District ofMicronesia, University of California Press, Berkeley.
- Joshi P & Dhawan V. Swertia chirayita - an overview. Current Science, 2005; 89: 635-640.
- Julian Berger, *The Gaia Atlas of First Peoples* (London: Gaia Books, 1990), and R. H. Barnes, Andrew Gray, and Benedict Kingsbury, eds. *IndigenousPeoples of Asia* (Ann Arbor, Mich.: Association for Asian Studies Monographs,1995), monograph no. 48
- Kainthola, S. D., Rana, D. S., Nandan, S., Pratibha, N., Swagata, K., & Negi, B. S. (2006). Community rights and livelihoods in the Nanda Devi Biosphere Reserve. *Community rights and livelihoods in the Nanda Devi Biosphere Reserve.*

- Kala CP. Indigenous uses, population density and conservation of threatened medicinal plants in the protected areas of the Indian Himalaya. Conservation Biology, 2005; 19: 368-378.
- Kalda, M., 2011. *Folk tales about hidden treasures: getting actions into stories* (Doctoral dissertation).
- Kiranjot S, Jasjeet K, Gurvinder K &Kunwarjeet P. Prevention and cure of digestive disorders through the use of medicinal plants. J. Hum. Ecol., 2007; 21(2): 113-116.
- Kohn, E., 2013. *How forests think: Toward an anthropology beyond the human*. Univ of California Press.
- Kõiva, M., Jonuks, T., Kalda, M., Kuperjanov, A. and Hiiemäe, R., 2020. MARKING OF SACRED PLACES. *TRAMES: A Journal of the Humanities & Social Sciences*, *24*(2).
- MacArthur, R.H. and Wilson, O.E. 1967. *The Theory of Island Biogeography,* Princeton University Press, Princeton, NJ
- Maikhuri RK, Nautiyal KS, Rao KS & Saxena KG. Role of medicinal plants in the traditional health care system: a case study from Nanda Devi Biosphere Reserve. Current Science, 1998; 75: 152-157.
- Maikhuri RK, Nautiyal S, Rao KS & Saxena KG. Indigenous knowldege of medicinal plants and wild edibles among three tribal subcommunities of Central Himalayas, India. Indigenous Knowledge and Development Monitor, 2000; 8(2): 7-13.
- Maiti, S., 2009. Question of Rights: A Case Study of the Bhotia of Uttarakhand (India). *Anthropology in Action*, *16*(3), pp.55-66.
- Marafa, L. (2003). Integrating natural and cultural heritage: the advantage of feng shui landscape resources. *International Journal of Heritage Studies*, *9*(4), 307-323.

- McCay, B. J., & Acheson, J. M. (1987). Human Ecology of the Commons: Introduction to the Question of the Commons. *University f Arizoa Press, Tueson.*
- McNeely, J. A., & Pitt, D. C. (Eds.). (1985). *Culture and conservation: the human dimension in environmental planning.* IUCN.
- McNeely, lA and Pitt, D. (eds.) 1985. *Culture and Conservation,* Croom Helm, Dublin.
- Monroe, M.C., E. Andrews, and K. Biedenweg. 2007. A framework for environmental education strategies. Applied Environmental Education and Communication 6, no. 3–4: 205–16.
- Morauta, L., Pernetta, J. and Heaney, W. (eds.) 1982. *Traditional Conservation in Papua New Guinea: Implications for Today,* Institute for Applied Social and Economic Research, Port Moresby.
- Nawa K (2004) Language situation and 'mother tongue' in Byans, far western Nepal. Stud Nepali Hist Soc 9(2):261–291
- Niamir, M. 1990. Herders' Decision-Making in Natural Resources Management in Arid and Semi-Arid Africa, *Community Forestry Note No.4.* FAO, Rome.
- Norgaard, R. B. (1984). Traditional agricultural knowledge: past performance, future prospects, and institutional implications. *American Journal of Agricultural Economics*, *66*(5), 874-878.
- Nüsser M (2006) Ressourcennutzung und nachhaltigeEntwicklungimKumaon-Himalaya (Indien). GeogrRundsch 58(10):14–22.
- O'Gorman, E., Van Dooren, T., Münster, U., Adamson, J., Mauch, C., Sörlin, S., Armiero, M., Lindström, K., Houston, D., Pádua, J.A. and Rigby, K., 2019. Teaching the

environmental humanities: international perspectives and practices. *Environmental Humanities*, *11*(2), pp.427-460.

- Oidfielll, M.L. anll Alcorn, J.B. (cds.) 1991. *Biodiversity: Culture, Conservation and Ecodevelopment,* Westview, Boulder.
- Osemeobo, G.J., 1994. The role of folklore in environmental conservation: evidence from Edo state, Nigeria. *The International Journal of Sustainable Development & World Ecology*, *1*(1), pp.48-55.
- Pandit, M.K., 2017. *Life in the Himalaya*. Harvard University Press.
- Pant SD (1935) The social economy of the Himalayas. Based on a survey in the Kumaon Himalayas. George Allen and Unwin, London.
- Patton, M. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (4th ed.). Thousand Oaks, CA: Sage.
- Plumwood, V., 2002. *Environmental culture: The ecological crisis of reason*. Psychology Press.
- Posey, D.A. and Balee, W. (eds.) 1989. Resource Management in Amazonia: Indigenous andFolk Strategies, *Advances in Economic Botany 7.*
- Pramanik, S. K. and Nandi, N. C. 2003. Folklore and Biodiversity conservation in South Bengal. Folklore Res. J., 12: 112-123.
- Pramanik, S.K. and Nandi, N.C., FOLKLORE AND BIODIVERSITY CONSERVATION CONCERN: AN INDIAN PERSECTIVE OF FOOD SECURITY.
- Pramanik, S.K., 2004. Role of Sacred Groves in Biodiversity Conservation. SEBA Newsletter, Vol. 1 No. 1

- Primiano, L.N., 1995. Vernacular religion and the search for method in religious folklife. *Western Folklore*, *54*(1), pp.37-56.
- Rajasekaran, B., Warren, D.M. and Babu, S.C. 1991. Indigenous Natural Resource Management Systems for Sustainable Agricultural Development - a Global Perspective, *Journal of International Development* 3: 387-401.
- Ramakrishnan, P.S., Purohit, A.N., Saxena, K.G. and Rao, K.S., 1994. Himalayan environment and sustainable development. *Diamond Jubilee Publication, Indian National Science Academy, New Delhi, India.*
- Ramble C (1993) The name Bhotey. Himalayan 6(5):17.
- RANGAN, H.: "From Chipko to Uttaranchal: Development, Environment and Social Protest in the Garhwal Himalayas, India"; in: PEET, R./WATTS, M.J. (eds.): *Liberation Ecologies: Environment, Development, Social Movements*, London and New York: Routledge, 1996, pp. 205-226.
- Ratha KK, Joshi GC, Rungsung W &Hazra J. Use pattern of high altitude medicinal plants by Bhotiya tribe of Niti valley, Uttarakhand. World Journal of Pharmacy and Pharmaceutical Sciences, 2015; 4(6): 1042-1061.
- Riaz T & Bhandari BS. Ethno-medicinal plants used by the Gujjar-Bakerwal tribe and local inhabitants of District Rajouri of Jammu and Kashmir State. Global J. Res. Med. Plants and Indigen. Med., 2015; 4(9): 182-192.
- Rigal, Jean-Pierre. 1985. Le nouvel an à Chilling. *In* P. Kaplanian (ed.) *Ladakh Himalaya occidental: ethnologie, écologie*. Pau: Université de Pau.

- Rose, D.B., van Dooren, T., Chrulew, M., Cooke, S., Kearnes, M. and O'Gorman, E., 2012. Thinking through the environment, unsettling the humanities. *Environmental Humanities*, *1*(1), pp.1-5.
- Roy, S. N. 2000. Some animals and their worship. In : R. M.. Sarkar (ed). Through the Vistas of Life and Lore. PunthiPustak. Calcutta.
- Ruddle, K. and Johannes, RE. (eds.) 1990. *Traditional Marine Resource Management in the Pacific Basin: An Anthology,* UNESCOIROSTSEA, Jakarta.
- Ruddle, K., & Johannes, R. E. (Eds.). (1985). *The Traditional knowledge and management of coastal systems in Asia and the Pacific: papers presented at a Unesco-ROSTSEA regional seminar held at the Unesco Regional Office for Science and Technology for Southeast Asia, 5-9 December, 1983*. United Nations Educational, Scientific, and Cultural Organization, Regional Office for Science and Technology for Southeast Asia.
- Ruddle, K., Hviding, E. and Johannes, RE. 1992. Marine Resources Management in the Context of Customary Tenure, *Marine Resource Economics* 7: 249-273.
- Ruether, R.R., Gaia and God: An Ecofeminist Theology of Earth Healing, San Francisco, 1992.
- Rumford, C. 2006. Introduction. Theorizing Borders. In: European Journal of Social Theory 9 (2): 155-169.
- Samal PK, Dhyani PP & Dollo M. Indigenous medicinal practices of Bhotia tribal community in Indian Central Himalaya. International Journal of Traditional Knowledge, 2010; 9(1): 140-144. 19.

- Samal PK, Dhyani PP & Dollo M. Indigenous medicinal practices of Bhotia tribal community in Indian Central Himalaya. International Journal of Traditional Knowledge, 2010; 9(1): 140-144.
- Samal PK, Rawat DS, Farooquee NA, Pant R, Pant P, Topal YS, Satyal GS & Parihar DS. Tribal Development: Problems and prospects, In: Research for Mountain Development: Some Initiatives & Accomplishments, by GB Pant Institute of Himalaya Environment & Development, GyanodayaPrakashan, Nainital, 1998; 165-194.
- Samal PK, Rawat DS, Farooquee NA, Pant R, Pant P, Topal YS, Satyal GS & Parihar DS. Tribal Development: Problems and prospects, In: Research for Mountain Development: Some Initiatives & Accomplishments, by GB Pant Institute of Himalaya Environment & Development, GyanodayaPrakashan, Nainital, 1998; 165-194.
- Schendel, W. van 2005. The Bengal Borderland. Beyond State and Nation in South Asia. London: Anthem Press.
- Sherring CA (1974 [1916]) Western Tibet and the British borderland. The sacred country of Hindus and Buddhists. With an account of the government, religion and customs of its peoples. Cosmo Publications, Delhi.
- SHIVA, V.: *Staying Alive: Women, Ecology, and Survival in India*, New Delhi: Kali for Women, 1988.
- Sörlin, S., 2012. Environmental humanities: Why should biologists interested in the environment take the humanities seriously?. *BioScience*, *62*(9), pp.788-789.
- Staeheli, L. (2003). Place. In J. Agnew, K. Mitchell, & G. Toal (Eds.), A companion guide to political geography (pp. 158-170). Oxford, UK: Basil Blackwell.

- Stocks, A. 1983. Candoshi and Cocamila Swiddens in Eastern Peru, *Human Ecology I I: 69*-84.
- Sturgeon, J. C. 2004. Border Practices, Boundaries, and the Control of Resource Access: A Case Study from China, Thailand and Burma. In: Development and Change 35 (3): 463-484.
- Tanner, A. 1979. *Bringing Home Animals,* Hurst, London.
- Tilley, C. and Cameron-Daum, K., 2017. The anthropology of landscape: Materiality, embodiment, contestation and emotion. *Anthropology of Landscape: The Extraordinary in the Ordinary*, pp.1-22.
- Toncheva, S., 2019. Redefining human-nature dichotomy: the voice of spiritual-ecological movements in enviromentality debate. *Antropologija/Anthropology. Journal for Sociocultural Anthropology*, *6*, pp.57-73.
- Traill GW (1992 [1832]) Statistical report on the Bhotiyamehals of Kumaon. In: Joshi MP, Fanger AC, Brown CW (eds) Himalaya: past and present, vol II. Shree Almora Book Depot, Almora, pp 99–154.
- Ulinsa, U., 2019. ECOLOGICAL TYPES OF MULTICULTURAL FOLKLORE IN BUOL. In *Proceeding of The International Conference on Literature* (Vol. 1, No. 1, pp. 499-506).
- Uniyal BP, Sharma JR, Chaudhery U & Singh DK. Flowering plants of Uttarakhand, India, Bishen Singh Mahendra Pal Singh, Dehradun: 2007.
- Van Dooren, T., Kirksey, E. and Münster, U., 2016. Multispecies Studies: Cultivating Arts of Attentiveness. Environmental Humanities, 8(1), pp.1-23.

- Vandergeest, P. & N. L. Peluso. 1995. Territorialization and State Power in Thailand. In: Theory and Society 24 (3): 385-426.
- Walker, A. 1999. The Legend of the Golden Boat: Regulation, Trade and Traders in the Borderlands of Laos, Thailand and Burma. Richmond: Curzon Press.
- Warren, D.M. 1991. *Using Indigenous Knowledge in Agricultural Development,* World Bank Discussion Paper 127. World Bank, Washington DC.
- Warren, D.M. 1992. Indigenous Knowledge, Biodiversity Conservation and Development, Keynote Paper Presented at the International Conference on Conservation of Biodiversity in Africa, Nairobi.
- Warren, D.M., Brokensha, D. and Slikkerveer, LJ. (eds.) 1993. *Indigenous Knowledge Systems: The Cultural Dimension of Development,* Kegan Paul, London.
- Wendl, T. & M. Rösler. 1999. Introduction. Frontiers and Borderlands. The Rise and Relevance of an Anthropological Research Genre. In: Rösler, M. & T. Wendl (eds.), Frontiers and Borderlands: Anthropological Perspectives. Frankfurt am Main: Peter Lang. Pp. 1-27.

Annexure 1. Questionnaire.

Questionnaire no. **Socio-ecological assessment** **Date:**

1. **Altitude**
2. **GPS location**
3. **Gram Sabha:**
   Revenue village
4. **Tok:**
5. **Community:** **population:**

Respondent (Joint/Nuclear family)	Age	*Marital Status	Education/Training	**Reason for discontinuity	Occupation/ source of income	Traditional Occupation

*Unmarried [1] married [2] remarried [3] cohabit [4] divorced [5] abandoned [6] widowed [7] never married [8]

**Distance of the school from home [1] Failure in examination [2] lack of interest [3] health problems [4] could not pay fees/poverty [5] marriage [6] take care of elders [7] to earn a living [8] lack of awareness [9] no school in those days [10]

Agriculture, livestock and forest

Vegetation

- What tree or other plant species you value the most?
- What is the local name of these species?
- What kind of values is attached to it (Spiritual/Economic/Leisure)?
- How you deal with (Spiritual/Economic/Leisure) issues if the trees are not available nearby (Transhumance migration)?
- Do you worship any tree as god or goddess?
- Any good/bad omen attached with the trees?
- Which tree you consider as pious?
- Which plants you prefer to grow near your house?
- Which plants you don't prefer to grow near your house?
- Any taboo attached with that plant?
- Any tree or part of tree used in rituals (Wedding/funeral/child birth/festivals)?

- What plants are used as medicine for humans or animals?
- Where did knowledge of these medicinal plants come from?

Food practices

- Which season you find most comfortable for your survival?
- Are you a vegetarian/non-vegetarian?
- If vegetarian, why don't you eat meat (Spiritual/availability)?
- If non-vegetarian, what are the varieties of meat you eat?
- How do you procure food in winter/summer?
- How you store your food in winter/summer/rainy season?
- Does your food pattern vary in summer/winter (In case of transhumance migration)?
- Do you also keep fast?
- In which season your fasting days are more?
- What is the reason behind keeping fast?
- What is your traditional food?
- Any particular dish you offer to your god?
- Do you also offer something to gods after your harvest?
- What are your views on alcohol drinking?
- How you ferment alcohol?
- Do you like your own fermented alcohol or the one purchased from market?
- Do you use alcohol for any religious purpose?
- Any festival in which you consume alcohol?
- In which season you consume more alcohol?
- Any particular dish you consider as auspicious?
- Any traditional way of cooking?
- Do you also have community cooking?
- If yes, when you do community cooking?
- Any particular cook or community known or called for cooking?
- Any song or story attached with community cooking?
- Any ritual you perform before community cooking?
- Which Utensil type (Metallic/non-metallic) you use for cooking?
- What are the crops you cultivate?
- Which are traditional cultivation practices?
- Any modification in cultivation practice with increased availability or knowledge?
- What cultivation methods were introduced by outsiders?
- Which implements you use for cultivation?

Animals

- What animals are raised?
- For what are these animals used?

- What are they fed?
- Is commercial feed used? Are feeds planted?
- How you use to keep your livestock traditionally?
- Any song sung by herdsman?
- How is animal waste used?
- Are you using animal waste in any ritual?
- Do you worship any animal?
- Do you have any taboo attached with any animal?
- How you used to protect your livestock from wild animals?
- Which animal you are most afraid of?
- Any local phrase attached with any animals?
- Which animal you consider as wise/dangerous/dumb/fast/slow?
- Any folk song attached with animals?
- Did your ancestors share stories attached with animals?
- If yes, what are the stories?
- Are your deities associated with any animal?
- What are those animals?
- Any good/bad omens attached with animals?

Identity and Ownership

- Any song or story related to the origin of community?
- What are the moral values that your elders have taught you?
- What are your personal views about such values?
- What are your views (Pride/protection/memories/inheritance) regarding the place where you are living in?
- How you associate yourself with other members of the community?
- How you associate yourself with the surrounding place (environment as provider)?
- Do you have any bonding (Emotional/economic/daily visit) with the surrounding?
- How different is your lifestyle from your ancestors?
- Do you consider your present lifestyle, better than your ancestors?
- How you imagine your ideal life should be (with family/community, in village/city)?
- Which element of nature (trees/river etc.) you use regularly?
- How you interact with elements of nature?
- What are the common resources of the community?
- What are the things that connect you with resources?
- Any story or song attached with these resources?

Economic relations

Principal occupation in the household:

Livelihood	Tick if applicable
Farming on own Land	
Sharecropping /Farming Leased land	
Animal Husbandry	
Pisciculture	
Skilled Wage Worker	
Unskilled Wage Worker	
Salaried Employment in Government	
Salaried Employment – Private Sector	
Weaving	
Other Artisan(mention)	
Other Trade & Business (mention)	

- What are your ancestors livelihood occupations?
- Agriculture
    - Do you grow any crops? YES [1] NO [2]
    - If yes, what crops do you grow? Please list season wise
    - Any change in crop pattern?
    - If yes, why?
    - Traditional methods used in cultivation
    - Do you use modern equipments/ fertilizers/ chemicals for cultivation: YES [1] NO [2]
    - If yes, did it impact the yield: Increase [1] decrease [2]
    - If no, are you dependent upon traditional methods of cultivation
    - Do traditional system helps in: Crop selection [1] weather determination [2] harvesting [3] better yield [4]
    - Do you have a community set-up or organization, which looks after cultivation: YES[1] NO[2]
    - If yes, perception about that institution/organization: Positive [1] Negative [2] Neutral [3]
    - Representation and role of women in such organizations

- Are the required products locally sourced or purchased?
- Where do you sell your produce?
- What do you buy and sell?
- Who do you buy from or sell to?
- Who in the family (men, women, children, elderly) buys and sells?
- Are there stores in the village? Who manages them? What do they sell? What information do the storekeepers provide to customers about the goods they sell?
- Where do people buy seed? medicine? tools?
- How do you find out how to use these?
- How do you find out the right prices?
- Do people borrow money? from whom? what for? how is this arranged?

Natural Resource Dependency (Partly to understand the traditional knowledge and also for the objective related to recognition by forest dept.)

How you make use of mountains, forests, and rivers nearby in daily life?

Do natural surrounding helps you in meeting your daily needs?

- How does the forest help the members of this village?

  a. Provides firewood and wood for furniture and equipment
  b. Protects the local watersheds, rivers and streams
  c. Reduces soil erosion
  d. Protects bio-diversity and wildlife habitat
  e. Provides NTFP
  f. Reduces pollution / provides clean air / improves air circulation
  g. Place for recreation
  h. Social identity
  i. Other(_____)

- Have there been any changes in the following conditions of the forest and your relation within the last 10 years? increased/decreased/same

  - The distance of forest from the village
  - The size of trees in the forest
  - The number of species found in the forest
  - Amount of timber collected for sale
  - Amount of timber collected for household use
  - Amount of NTFP collected for sale
  - Amount of NTFP collected for consumption

- Is there a forest user group in your village? 1) Yes 2) No
- Which year was it established?
- Are you a member of the FUG? 1)Yes 2) No
- If no, why you are not a member?

  i. Your ethnic/religious group not part of FUG
  ii. Do not have time
  iii. Do not depend on forest products
  iv. FUG is politicized
  v. FUG is non-functional
  vi. High membership fees

- If yes, why did you become a member?

  i. Every villager is a member by default

ii. Financial benefits to members
iii. All villagers were becoming members
iv. Restore forest for ecological functions
v. Restore forest for more forest products
vi. Non-members restricted access to forest

- What are your responsibilities as a member?

i. Attend FUG meetings
ii. Scheduled group patrolling
iii. Labor in forest thinning, harvesting
iv. Labor in nursery and planting
v. Meeting forest Dept. officials

- What changes do you think have followed the establishment of FUG in the village?

i. Forest regeneration with ecological benefits
ii. Increase in important forest products
iii. Decreased illegal logging
iv. Helped building cooperation among villagers
v. Easy to control grazing in forest
vi. No change

- Has your income from forests increased over the last 10 years? 1)Yes 2)No
- What factors contribute most to the increase?

i. Traders come to village often
ii. Greater availability of products
iii. Value-addition through local cooperatives
iv. Govt/ NGO assistance in marketing
v. Forest employment through FD

- What factors contribute most to the decrease?

i. No market for forest products
ii. Lesser availability of products
iii. Local cooperatives are dysfunctional
iv. No Govt/ NGO assistance in marketing
v. Fall in jobs provided by the FD

Name of the item	Use of item (Fuel, fodder, food, construction,	Who mainly collect this item (head of	Is there any other member who accompanies	How frequently is (s)he accompanie	How many days is the item collected	How many months is the item	How much is collected in a 'typical'	Time taken (in minutes) on a 'typical' trip each season - (for	What other products are collected on such a

	for sale, medicinal, ritual)	household, other adult males, spouse of household head, other adult female, sons, daughters, hired labor)	?	d? (Mostly, some of the time, occasional)	in a 'typical' month in this season?	collected in this season?	trip each season?	'round trip' travel and collection separately)	'typical trip?

Indigenous organizations and education

- Are there any organizations or associations of people in the village?
- Who belongs to these?
- What do they do?
- Where do the organizations meet?
- When? Who attends? Who speaks?
- What is discussed? How are decisions made?
- How do members find out about the organizations' decisions and activities?
- How do non-member find out?
- How do children learn how to farm? sell produce? other skills?
- Who teaches them? How are they taught?
- What does the mother teach a child?
- Are there apprenticeship arrangements for learning skills or professions?
- For which subjects? Who can become an apprentice?
- Who teaches? How long are apprenticeships?
- What are the arrangements?
- How do people record important information (such as land titles, farm boundaries, local laws, genealogies)?
- Who keeps these records? How are they used?

Folklore

- **Festivals celebrated (season wise)**
    - Reason to celebrate according to them: inherited custom [1] religious reason [2] fun [3] belief [4]
    - Did ways of celebration changed: YES [1] NO [2]
    - If yes, how it has changed?

- What is the reason behind change?
- Are they happy with the changing ways: YES [1] NO [2]
- Any particular theme or area where the festival is celebrated

- Any story related with that area Stories from other areas
- How long you are familiar with these stories?
- Do you associate with them?
- Any stories relates to spirits or non-human entities
- Place based stories Songs that you sing while harvesting
- Songs associated with festivals
- Songs for childbirth or marriages
- Any other form of songs or stories
- Any belief associated with any particular area in surrounding?
- Do you have any taboos or omens associated with natural elements?
- Do you believe in any natural spirits?
- Anything or any story or song that your elders always repeat related to natural resources?
- Do you have any system of bali or animal sacrifice?

- What do people do for entertainment?
- What types of performing arts are practiced in the village?
- What types of drama? plays? puppet shows?
- On what occasions? On what topics? Who performs? Who determines the script?
- Are there village festivals or holidays?
- What happens on these occasions?
- How are they organized?
- Who attends? Who is involved?
- Does anybody tell stories? recite proverbs? sing gongs? dance?
- What are these stories/proverbs/songs/dances about?
- What do they mean?
- Any story that has came down to you from your grandparents?
- Any song that you sing regularly?
- Any songs related to deities?
- How your grandparents used to describe the surrounding around them during their childhood, to you?
- What have you learned from them about their childhood, adolescence, schooling, marriage, work, religion, political activity, recreation?
- Any event or memory or any other story attached with any character?

Management

- How do you interact with their environment (e.g., agriculture, hunting, collecting, etc.)?

- Are there any mechanisms to control or regulate this interaction (e.g., beliefs, taboos, community rules, etc.)?
- Are you aware of changes in their environment or differences between different areas?
- Are plant and animal populations increasing or decreasing?
    - If so. are overall numbers changing?
    - Is any particular species disappearing or increasing in number?
    - If so, which ones?
    - How fast?
    - How do people know whether the numbers of a species are changing?
- What do you think are the causes for such changes (over exploitation, disease, habitat degradation and destruction, displacement by non-native species, etc.)?
- What do you perceive as the main threats to their environment (e.g., conversion, pollution, exotics? Do these differ for different areas?
- What do you do if they notice changes in their environment?
- What. measures do you take to safeguards or conserve species or the environment?
- Are the traditional management systems, more effective?

Traditional Knowledge (TK)

- How you preserve your food?
- Which species of plants you use as medicine?
- How you are dealing with extreme cold winters?
- How you deal with bad eyes or vibes?
- Any particular area of forest or tree part you use in summers?
- Any particular area of forest or tree part you use in winters?
- Do you teach your children about such knowledge?
- Do you think these are better ways of living or modern ways are better?
- What are your beliefs concerning the environment (local definitions)?
- What else do you know about their environment, climate, etc.
- What animal and plant species do you know and differentiate?
- Do any species have a cultural value (religious value, mythical connotation, etc.)?
- Which species are detrimental to the community (e.g., mosquitoes, rats, poisonous plants, etc.)?

- **Nature of TK:**
    - Secret and confidential?
    - Sacred?
    - Individual or community held?
    - Orally transmitted?
    - Document and systematized in some form (traditionally or otherwise)?
    - Subject to customary restrictions for use or disclosure?
    - Any other important characteristics?

- **Content or expression of traditional knowledge:**
  - Technical knowledge or know-how?
  - Embodied in a tangible product?
  - Related to traditional cultural expressions?
  - Are there any other significant issues regarding its content or form of expression?
- **How widely is the TK used or disseminated?**
  - Known by a community: individual or leader or elder/ the community as a whole/ a group/ other social actors?
  - Disclosed to:
    – The general public (publicly or widely available)?
    – Individuals who do not belong to the community (such as researchers or students)?
  - Is TK commercialized or traded in some form (whether as know-how or in a tangible expression)? Locally, regionally or internationally?
  - Any other issues in relation to use and dissemination?
- **Role and rights of the different stakeholders:**
  - Who leads the process?
  - Which role will each actor play?
  - Who will write down, film, record, translate and compile TK?
  - To whom will the intellectual property rights that arise belong?
  - What rights will indigenous peoples and local communities retain?
  - Any other issues in relation to different stakeholders?

- <u>Wild plants collected in forest and around Farmland</u>

Questions	**Above 45 years old (Males)**	**Below 20 years old (Boys)**	**Above 45 years old (Females)**	**Below 18 years old (Girls)**
Species				
Habitat				
Since How many years, you know this plant?				
Are you using this plant?				
How frequently you use it?				
Purpose of use				
Part used				

Ongoing changes:

a) Is erosion happening in TK? [YES/NO]

b) What are the drivers/reasons?
c) How the changes are happening in the traditional knowledge?
d) Are you comfortable with the ongoing changes?

Sense of the place

- Where do people meet in the village?
- For what reasons?
- Who meets in these places?
- What do they talk about?
- Where do women meet?
- What do they talk about?
- Where do young people meet? older men? farmers? traders?
- Who is regarded as the best source of gossip in the village?
- What do you usually talk about at the water sources? in the fields? at the shop? in their homes? when visiting friends?
- What the subjects you are most interested in?
- What are you not interested in talking about?
- Any taboo related with talking about a particular object, character etc.?
- Do you travel?
- How do you go from place to place?
- Where do you go? Whom you visit and talk to?
- Why do you travel?
- Do outsiders visit the village?
- What types of information do they bring with them?
- Do you think this information is useful? credible? applicable locally?

Annexure 2. Flora used in ethno-medicinal practices of bhotiya

Botanical Name	Family	Vernacular Name	Use	Community
Pinus roxburghii	Pinaceae	Kulain, Hin: Chir	• Oleoresin used as crack cream, • saw-dust with honey used in asthma and bronchitis.	Jads, Marcha, Tolchha.
Thalictrum foliolosum	Ranunculaceae	Mamiri	• Roots used in Ophthalmia, • Fever and colic.	Jads, Marcha, Tolchha.
Berberis aristata	Berberidaceae	Kingore	• Juice from bark of stem and roots known as 'Rasaut' dropped in Ophthalmia, • Roots-infusion given in fever.	Jads, Marcha, Tolchha.
Berberis lyceum	Berberidaceae	Kingore	• Bark and stem or roots yields 'Rasaut' used in eye treatments, • Barks and roots orally taken to relieve jaundice.	Jads, Marcha, Tolchha.
Tinospora cordifolia	Menispermaceae	Giloei	• Stem and leaves juice used in general debility and urinary troubles, • Leaves extract regarded as an emetic.	Jads, Marcha, Tolchha.
Celtis australis	Ulmaceae	Kharik	• Bark paste applied on bones, • Pimples, contusions and joint pains.	Jads, Marcha, Tolchha.
Cannabis sativa	Cannabaceae	Bhang, Bhangla	• Leaves and flowers used as an intoxicating agent and narcotic.	Jads, Marcha, Tolchha.
Ficus palmata	Moraceae	Bedu, Anjir	• Fruits used in	Jads, Marcha,

			digestive disorders.	Tolchha.
Urtica dioica	Urticaceae	Kandali, Bichhu-Ghas	• Young branches or twinges as green vegetables especially in the winters, • Supposed to be a hot-diet for winters, • Used in sciatica, rheumatism.	Jads, Marcha, Tolchha.
Quercus oblongata	Fagaceae	Banj	• Gum of the tree medicinally used for digestive disorders	Jads, Marcha, Tolchha.
Stellaria media	Caryophyllaceae	Badyalu, Safed Fulki	• Plant paste applied on burns, boils and wounds.	Jads, Marcha, Tolchha.
Rumex nepalensis	Polygonaceae	Almoru, Pahari Palak	• Leaves infusion given in dysmenorrhoea and stomach-ache	Jads, Marcha, Tolchha.
Paeonia emodi	Paeoniaceae	Chandrian, Udsalap	• Roots and petals infusion given in whooping cough, intestinal spasms and diarrhoea.	Jads, Marcha, Tolchha.
Malva verticillata	Malvaceae	Suchali, Sochli	• Roots used in whooping cough, leaves decoction stimulates vomiting.	Jads, Marcha, Tolchha.
Viola biflora	Violaceae	Vanafsa	• Plants used to relieve bronchitis, cold and cough.	Jads, Marcha, Tolchha.
Trichosanthes tricuspidata	Cucurbitaceae	Indrian, Ilaru	• Roots juice used as an emetic, roots and fruits commonly used to relieve bronchitis, asthma, diabetes.	Jads, Marcha, Tolchha.
Lyonia ovalifolia	Ericaceae	Aiyaar, anyar	• Seeds paste applied on wounds and boils.	Jads, Marcha, Tolchha.
Rhododendron arboreum	Ericaceae	Burans	• Flowers and barks used in digestive and respiratory disorders.	Jads, Marcha, Tolchha.
Bergenia ciliate	Saxifragaceae	Silpara, Silphori	• Rhizomatous parts used as tonic, febrifuge and in	Jads, Marcha, Tolchha.

			digestive disorders.	
Prunus persica	Rosaceae	Aaru	• Leaves and bark infusion used to relieve cough and cold.	Jads, Marcha, Tolchha.
Prunus armeniaca	Rosaceae	Chulu, Khubani	• Seed-oil used in fever and piles.	Jads, Marcha, Tolchha.
Pyrus pashia	Rosaceae	Melu, mole	• Ripe fruits used in digestive disorders.	Jads, Marcha, Tolchha.
Rubus biflorus	Rosaceae	Hinsar	• Roots-decoction given in diarrhea.	Jads, Marcha, Tolchha.
Rubus nepalensis	Rosaceae	Gangoor	• Root paste externally applied on burns and scalds.	Jads, Marcha, Tolchha.
Mimosa himalayana	Mimosaceae	Kingrei, Shia-Kanta	• Leaves used in cough, bronchitis and urinary complaints.	Jads, Marcha, Tolchha.
Desmodium elegans	Fabaceae	Chamlai, Sambar	• Root-infusion smelled in epilepsy, • Roots also used as carminative.	Jads, Marcha, Tolchha.
Indigofera cassioides	Fabaceae	Saknya	• Leaf-powder taken in malarial fever.	Jads, Marcha, Tolchha.
Ampelocissus rugosa	Vitaceae	Bel-chapru, Chipari	• Paste of leaves and branches applied in bone fracture.	Jads, Marcha, Tolchha.
Zanthoxylum armatum	Rutaceae	Timroo, Timbar	• Leaves and fruits chewed for mouth wash and tooth care, • Also, soup made from seed epicarp with salt is taken against gastric problems, common cold and cough.	Jads, Marcha, Tolchha.
Oxalis corniculata	Oxalidaceae	Chalmori, Bhilmori, Khatibuti	• Leaf juice dropped in cataract and conjunctivitis.	Jads, Marcha, Tolchha.
Swertia alata	Gentianaceae	Chiratta	• Plant extract used as a tonic.	Jads, Marcha, Tolchha.
Solanum nigrum L	Solanaceae	Givein, Makoi.	• Fruits useful in diarrhoea, fever and eye treatment.	Jads, Marcha, Tolchha.

			• Plant extract used in piles and dysentery.	
Datura stramonium	Solanaceae	Dhatura.	• Seeds medicinal as toxicant.	Jads, Marcha, Tolchha.
Swertia ciliata	Gentianaceae	Safed Chireta	• Plant extract given in treatment of malaria.	Jads, Marcha, Tolchha.
Ajuga bracteosa	Lamiaceae	Neelkanthi	• Extract of leaves used in malarial fever, • Plant extract used as a tonic, astringent and febrifuge.	Jads, Marcha, Tolchha.
Callicarpa macrophylla	Verbenaceae	Bhirmoli	• Heat treated leaves used externally in rheumatic pain.	Jads, Marcha, Tolchha.
Cuscuta europaea	Cuscutaceae	Akashmatri, Amarbel	• Plant extract used in skin diseases.	Jads, Marcha, Tolchha.
Origanum vulgare	Lamiaceae	Van- Tulsi	• Extract of plant used in bronchitis, colic and diarrhea.	Jads, Marcha, Tolchha.
Mentha longifolia	Lamiaceae	Pudina	• Leaves used in indigestion and vomiting.	Jads, Marcha, Tolchha.
Corallodiscusl anuginosus	Gesneriaceae	Shila-Puspha, Tungla	• Leaves used against kidney stones.	Jads, Marcha, Tolchha.
Verbascum Thapsus	Scruphulariacea e	Akulbir	• Extract of plants taken in bronchitis and asthma, seeds used as narcotic.	Jads, Marcha, Tolchha.
Valerianajata mansi	Valerianaceae	Sumaya	• Roots used as an aphrodisiac and in mental disorders.	Jads, Marcha, Tolchha.
Anaphalisadn at	Asteraceae	Bugla, Agela	• leaves and heads paste applied on cuts, wounds and boils.	Jads, Marcha, Tolchha.
Artemisia roxburghiana	Asteraceae	Kunjaa	• Plant extract used as an antipyretic, tonic, • Also rubbed on skin allergy.	Jads, Marcha, Tolchha.
Galinsoga parviflora	Asteraceae	Marchya-ghas	• Plant used as an antidote of nettle stings.	Jads, Marcha, Tolchha.
Cynodondacty	Poaceae	Dubla, doob	• Roots taken in fever	Jads, Marcha,

lon			and in internal injury.	Tolchha.
Imperatacylindrical	Poaceae	Sirau, Siru	• Roots used as tonic, • Woolly hairs of the inflorescence used for staunching the wounds and for stuffing purposes.	Jads, Marcha, Tolchha.
Siegesbeckiaorientalis	Asteraceae	Liskura, gobariya	• Decoction of plant with rice water taken in diarrhoea and bowl complaints.	Jads, Marcha, Tolchha.

Annexure 3: Folk songs of bhotiyas

Prayer to Goddess Bhagwati by Jad bhotiyas

Mashi chering Chugna, yang-yang jhali maulam
(If I will not die, I will come to meet you again)

2) Varang Khimdi Jimbo, pakdam lambi kathin
(We all pray together for the blessings of Paldan lami or Bhagwati mata)

3) Paldan Lamu kheno, namgar rog-rog jamson
(Paldan lamu, please bless us so that all of us present here today can come to meet you next year as well)

4) Mi la che si tedhi, Nor la yang chi tesh
(May we have long life and our wealth should increase)

5) Paldan lami kheno, mausam tabuk dop-sho
(Paldan lamu, please listen to our prayer and bless us)

6) Karsi karbu kheno, karshi karbo penna marahi dangya bolin
(If the quality of extracted ghee will be good, then we will offer you green on shape of Shiva linga)

7) Mi la baazar Mango, cho la kazi mango
(Neither we nor our animals should fall sick)

8) Mi ta nor zombo, paldan lami khemo
(We pray to Paldan lamu so that our wealth should not reduce any bit)

9) Guna tema ar do, Gunbo duche tem-tem
(Grains should be there between the space of stairs and doors)

10) Long chu chang la chana, sinba dula men do
(We should have grains doesn't matter the amount of Chang we drink)

Song on the landscape and life in the village

1)Thonbo - Thonbo Ganga, Mau - Mau Panga
(High high mountains, low low fields)

2)Serbo meru menok
(Colourful flowers)

3)Bowr na sumala, rindiya bala dauja, Rongpa Dunda ro Chang ma
(From Bagori village to Rindiya and then the stay is at Dunda after few days)

4)Dunda na mals, chan mu chan mu, chom ja Rongpa galang ga la rimsha
(We have to go down from Dunda but kids are feeling sleepy, so they are holding the tail of cow and walking)

5)Rishikesh na ya la, chan mu, yinmu, chooja Rongpa, Dalong Katai maida
(Coming up from Rishikesh, we are walking day and night, we have no time to sit. As the plains of Rishikesh is not safe so we walk continously and we have no time to sleep)

6)Hasad la pang ma, swan da la Ram leela, Bhadon da la paltag ja.
(In july we are marrying each other, in August we are doing Ram leela and in September we are taking out wool from sheep's)