

GENERAL INTRODUCTION

1.1 General Background

Nepal is a wonderland with limitless beauty embosomed in the world's mightiest mountain chains the Himalayas, stretching from tropical plains to stupendous snow heights. Owing to this diverse geography and wide range of altitudinal and climatic zones, she has magnificent, rich and varied biological resources. Along with the diversified floral and faunal resources, she also endows an array of ethnic groups rich in tradition, culture and indigenous knowledge system. The indigenous knowledge present in people from time immemorial has helped in the sustainable utilization of biological resources for various purposes like food, medicine, clothing, dyes, construction, etc. The indigenous knowledge for the utilization of plants and animal's part as medicine has been the only way to save life in the rural area of Nepal where modern health facilities is still out of reach. Still about 80-90% people living in rural area of Nepal depend directly or indirectly on the formal and informal system of traditional medicines for healthcare (Bhattarai, 1992). So, use of traditional medicine in remote areas of Nepal is a necessity than a luxury.

In Nepal, the use of plant's and animal's parts as medicine is widespread. In rural areas of Nepal, medicinal knowledge and practices are passed down entirely through the oral, traditional and personal experiences, keeping alive the rich traditional health care system like Ayurveda, Amchi, Homeopathy associating with Unani, and Naturopathy. "Medicinal Plants of Nepal", a book published by the Department of Medicinal plants in two volumes (HMGN, 1970, 1984) accounted 571 species from Nepal. Malla and Shakya (1984-1985) compiled a list of 630 species of medicinal plants from Nepal, out of these 510 species are indigenous i.e. they occur in wild and 120 species are either exotic or naturalized or cultivated since long. However, approximately 1000 species of medicinal and aromatic plants have been estimated to occur in Nepal (Chaudhary, 1998). These plants occur throughout the country from tropical forest to alpine meadows. The work of Malla and Shakya revealed the presence of maximum number of medicinal plant species, 540 (i.e. 85%) in central Nepal. The numbers from Western and Eastern regions are 424 (67.3%) and 512 (81.27%); respectively. Recently 1403 species have been reported which represents about 20% of the total estimated flowering plants of Nepal (Tiwari, 1999).

The varied geo-topography of Nepal harbors diverse ecosystem that bears a long historical attachment of native societies as their cultural identities. With distinct language, religion, customs, folklore culture, knowledge, ancient territory, 59 indigenous nationalities are legally recognized. Among them 10 are designated as endangered ethnic nationalities. Indigenous peoples are contributing their own cultural wisdom on restoration, conservation

and wise use of biodiversity, natural resources, and traditional knowledge associated with their life from millennia as biodiversity and natural resources are valuable sources for foods, medicines, vitamins, minerals, threads, building materials and rituals, intrinsic, spiritual, customs, religious and cultural significances of the society. Among them, the use of animal and plant parts as medicine in the traditional healing practices is popular because of their effectiveness and easy availability and also associated with traditional beliefs, customs, religions and popularity of specific cures. But, this kind of traditional healing systems differs among different ethnic communities due to geographical, cultural, religious and social differences. In the alpine and sub-alpine region, the traditional practice is highly influenced by Tibetan medicine because of common type of culture, religion, language and ethnicity in Tibet and the northern region of Nepal and the healers are known as Amchis. While in the temperate region, the task is performed by Shamans (Traditional healer) known as Dhami-Jhankri, Guni-Ojha, or Janne in general and in tropical region by healers known as Garuwa, Bharra and Gurau (Rajbhandari, 2001).

This vast and varied knowledge present in the indigenous ethnic groups regarding the use of plants and animals part for traditional medication is still unexplored in many ethnic communities and places. This knowledge of indigenous community is of profound value which if not documented and analyzed in time will be extinct. So, the protection and revival of this enriched traditional health practices present in the indigenous ethnic communities should be preserved and protected as they can be used as an alternative means of costly allopathic medicine as a sustainable and cheap health care system. So, the present research work is an effort to document such knowledge in Lapcha ethnic community of Fikkal VDC of Ilam district.

Lapcha, one of the 10 endangered indigenous ethnic communities of Nepal love to call themselves Rong which means "the son of the showy peak" (Tamsang, 1983) are concentrated in Ilam district of Eastern Nepal. They remain scattered as minority groups in other districts of Nepal as well. The population of the Lapcha community comprises 0.02% of Nepal's total population (CBS, 2003). Though the chronology and history of Lapchas are obscure, but still the folk tale, myths, imagination has tried to highlight on that.

1.2 Traditional medicine

Traditional medicine consists of those beliefs and practices relating to diseases which are products of indigenous cultural development and are not explicitly derived from the conceptual framework of the modern medicine (Mishra *et al.*, 2006).

The WHO Traditional Medicine strategy paper 2002-2005 explains that traditional, complementary and alternative medicine attracts the full spectrum of reactions, ranging from uncritical enthusiasm to uninformed skepticism. Yet the use of traditional medicine remains widespread in developing countries. In many parts of the world, policy-makers, health professionals and the public are whistling with the questions about the safety, effectiveness,

quality, availability, preservation, and further development of this type of health care. Meanwhile, in many developed countries, complementary and traditional medicine is becoming more and more popular.

Nepal being the stronghold of indigenous ethnic groups still practises a lot of traditional medicine system which are passed from generation to generation on which majority of people has a strong belief. Traditional medical wisdom and practices are prevalent in the community and are totally dependent on locally available medicinal herbs, animal parts, the use of which depends on traditional technology, folklore, customs, and religious beliefs of the ethnic society.

1.3 Indigenous Knowledge System

The rich biological and social diversity of Nepal are integrally linked in a relationship between the livelihood of the Indigenous Nationalities and their surrounding ecosystems and natural resources. Biodiversity is an important part of the sustainable livelihoods of the Nepalese nationalities due to this socio-economic and cultural importance as many species have religious values and are the source of food, fibre, shelter and medicine (Parajuli, 1999). Stemming from this relationship is the biodiversity knowledge and skills of Indigenous peoples and the wisdom related to its conservation that is known as Indigenous knowledge. Indigenous knowledge is crucial to the survival and subsistence of Nepal's Indigenous Nationalities as it provides a basis for food security, human and animal health, education and natural resource management (Subba *et. al.*, 2002)

Perhaps there is no other country in the world where one can find such a tremendous amount of biological and socio-cultural diversity in as small a space as Nepal. The different Indigenous Nationalities have their own mother tongues, folk cultures, beliefs and practices, dances and music, arts and artists, tools, games, foods, clothing and housing, fairs and festivals, life cycle rituals, and traditional healing practices (Bhattachan, 2000).

As Indigenous knowledge is transmitted orally, it is vulnerable to rapid change especially where people are displaced or when young people acquire different lifestyles and values from those of their ancestors. Nepal is currently under a period of rapid changing due to globalization and political conflict cum instability. The loss of indigenous knowledge cannot be recovered and will eventually lead to unsustainable natural resource uses and practices then along with it will go the cultural diversity it supports. The documentation of indigenous knowledge is therefore of crucial importance for the conservation of both the cultural and biological diversity in Nepal. Other advantages to indigenous knowledge documentation include.

- opportunity to equitable sharing of benefits from the use of biological resources and knowledge;
- preserving genetic variety is pointless unless the indigenous knowledge that supported the traditional farming systems is also preserved.

- development efforts that ignore local circumstances, technologies and systems of knowledge have wasted enormous amounts of time and resources (Grenier, 1998);
- increased protection of the intellectual property of indigenous nationalities from exploitation including pharmaceutical companies and other multi national companies; and
- adoption of modern technological practices with indigenous knowledge to advance people's quality of life, but ensures this standard for generations to come.

1.4 Justification:

Nepal has 59 legally recognized ethnic communities, Lapcha being one of the endangered ethnic community inhabits mainly in the eastern hilly region of Ilam district. As they are residing close to the natural environment, they have rich knowledge, skills and techniques on the traditional utilization of natural resources for various purposes like traditional medicine, food, clothing and housing etc. However, Lapcha people being shy and elusive in nature don't come in contact with outside world which puts their rich traditional and indigenous knowledge in the risk of extinction. It is, therefore, important that before the oral folklore about the use of plant and animal is lost forever, it must be preserved and properly documented since such knowledge bear prospects for many valuable discoveries. Thus, the present study is an initiation for the documentation of indigenous knowledge regarding the use of animals and plants, particularly for medicinal significance in the Lapcha community which can be of great use for present and future generations.

1.5 Objectives

- To provide the general information and ethnography about the Lapchas
- To explore and document the pristine indigenous knowledge system found in the Lapcha.
- To document the animals and their parts having the medicinal values used by the Lapcha.
- To document the medicinal plants and their medicinal values used by the Lapcha.

1.6 Limitations

- The present research work has been conducted for the partial fulfillment of the Masters Degree in Zoology at T.U., Kathmandu, Nepal. So, the time has been one of the most important limiting factors of the present study since it was accomplished within one academic year, and thus the comprehensive study was not possible.
- The researcher has no professional experience on social researches hence; the work might have been suffered from some methodological limitations.
- Lapcha people being shy and elusive in nature were quite reluctant in sharing their knowledge because of their cultural beliefs and practices. So the details of the required information on ethnomedicine couldn't be generated.
- The present study has been focused on the Lapcha community inhabiting the Fikkal VDC, Ilam. So, the outcome from this study area may not be generalized to other area of Nepal.



LITERATURE REVIEW

With the growing popularity of the indigenous knowledge present in the ethnic and indigenous nationalities in Nepal and world, a lot of researches and studies have been carried out. Most of the work includes the documentation of the traditional medicine prepared by using the plant and animal species present in their vicinity. However, works are mainly concentrated in recording ethomedical uses of plants and less work has been done on animals. A brief review of such relevant literature is presented here.

Manandhar (1990) carried out his study on Danuwars of Siwalik Hills and recorded 60 different plant species which have been used in their traditional medicinal system for the treatment of common diseases. Manandhar (1990) carried out an ethnobiological research on the traditional medicine practiced among Chepang, Magar, Tamang and Hayu community from different villages of Chitwan district. He documented 74 medicinal plant species that have been used for treating 24 diseases by the locals. Manandhar (1991) researched on the Tamangs of midlands and recorded 952 different plant species having medicinal value used for curing common diseases and disorders. Sapkota (1994) conducted a research on the indigenous medicinal plants and practices of local people of Palpa district and documented 48 plant species belonging to 38 families. Among them 15 were tree species, 22 shrubs species and 11 herb species used for treating 39 different diseases. Rijal (1994) researched on the ethnobotany of Padampur VDC and surroundings of north east forest of Chitwan National Park. He has recorded 185 plant species of medicinal values used on treating 126 different diseases. He also recorded the indigenous knowledge of the local people regarding the use of plants for medicine, fuel wood, fodder, handicrafts, ceremonial and cultural use.

Manandhar (1995) carried out his study on different medicinal plants used by the people in ten different villages of Jajarkot district. He reported 60 different plant species used for treating 25 different types of diseases. Chhetry (1996) studied on ethnobotany of the Limbus of Panchther and documented 162 species of plants with their medicinal and economic values. Dhakal (1997) studied on the ethnobiology of Kumals of Taranagar VDC of Gorkha District and reported 58 plant species used in the traditional medicinal practices for curing different disease like fever, cough and cold, headache, dysentery, cuts etc. They also use 12 animal species for various medicinal utility. Among the animals, 5 species were mammals, 3 species of birds; 3 species of fishes and 1 species of invertebrates.

Thapa (1998) studied the traditional uses of plants in Shivapuri Watershed and Wildlife Reserve area. He documented 113 plant species. Out of 113 plant species, 44 families, 57 genera and 57 species belongs to plants having medicinal values followed by 33

families 43 genera and 49 species of edible plants and 6 family, 7 genera and 7 species of both medicinal and edible value. Adhikari (1998) studied about the use of plant resources by the tribal people in and around Koshi Tappu Wildlife Reserve and documented 65 species of various plants with multiple uses 61 plant species form the total had medicinal value, followed by 31 species of fodder, 12 species of wild edible, 3 species of poisonous plants which have been used in treating cough, cold, cut, burnt, dysentery, diarrhoea etc. Basnet (1998) carried out his study on the utilization, trade and management of medicinal plants in Sindhuli district and documented 102 medicinal plant species in which highest numbers of plant species (42) were used to treat gastrointestinal diseases followed by ENT (13), urinogenital (10). He found *Acorus calamus* with highest use value with broad spectrum uses for more than 5 diseases. Kaundinya (1998) studied the ethnobiology of Kumals of Chirtungdhara VDC of Palpa district and documented 47 animals and 195 plants species. He reported 3 animals and 29 plants species have been used by them in folk medicine. Tamang (1998) carried out a study on the ethnobiology of Tamangs of Gorshang VDC of Nuwakot district and documented 183 plant species and 13 animal species used by the indigenous Tamangs of the study area for various purposes. Among the data reported plant and animal species, 44 plant species and 11 animal species have been used folk medicine.

Nepal (1999) conducted a study on the ethnobotany of the Rai and the Sherpa communities of the Makalu - Barun Conservation Area (MBCA) and recorded 142 plant species representing 119 genera and 87 families. Of there 128 species belonged to dicotyledons, 12 species of monocotyledons and 7 species of cryptogamic plants consisting 60 species of medicinal plants, 74 species of fodder plants, 22 species of wild edible plants and 46 species for miscellaneous purposes were documented. Ghimire *et. al.* (1999) studied the ecology of some high altitudinal medicinal and aromatic plants in the Gyasumdo valley of Manang district and found that these plants have supported the livelihood of local people as traditional healing substances and important commodities for export. They also revealed that human disturbances is attributing as a major factor influencing the population of medicinal plants. Upadhyaya (1999) carried out the ethnobiological study of the Botes (Majhi) in Chhamdighat, Bamgha and Juhang VDCs of Gulmi District and documented the various uses of 214 plant species and 58 animal species. He reported that 16 animals and 42 plants species have been used by the Botes in the traditional medicine for curing different ailments like rheumatism, cough and cold, dysentery, cuts and wounds, fracture etc. Ghimire (1999) carried out a study on the status, use, sale and conservation of medicinal and aromatic plants in Nepal's Himalaya. He reported 223 plant species having medicinal utility and involved in trade from all the development regions of Nepal.

Thapa (2000) conducted a ethnobotanical study of Danuwar Tribe in Lalitpur district and documented 24 plant species used in medicines in different forms for treating different diseases followed by 16 plant species used as fodder, 22 species of wild edible plants, 14 species of timber plants for household construction and 15 species are found being used for miscellaneous purposes such as agricultural implements, religious materials etc. Ghimire *et.*

al. (2000) carried out a study on plant resources used and impact of human around Royal Bardia National Park and documented 189 species of plants used by the Tharu people. The study revealed that 93 plant species (49.20%) belonging to 81 genera was used in medicinal purposes treating 45 different diseases and ailments, followed by animal food fodder (63 species), food and food additives (56 species), fuel (39 species), timber and ornamental uses (each 28 species) and others. Dangol of (2000) carried out the ethnobiological study of the Hayu community of Ramechap District and documented 22 plant and 21 animal species used for various medicinal purposes. Ghimire (2000) studied the ethnobiology of Danuwars of Deuvumi Baluwa VDC of Kavrepalnchowk District and reported uses of 7 animal species belonging to 2 mammals, 2 aves, 1 amphibian, 1 mollusca and 1 arthropods having medicinal value. Similarly, 37 species of medicinal plants used in traditional medicine was reported. Kafle (2000) carried out an ethnobiological study of Tharu of Gardi VDC of Chitwan district. He documented 205 plant and 60 animal species used in various purposes. Among the total, he reported 36 plant and 11 animal species were used for the medicinal purposes for treating different common diseases. Manandhar (2000) carried out a study on ethnobiology of Chepangs of Makawanpur district and reported the indigenous use of 354 plant and 127 animal species among which 121 plant and 33 animal species were used by local healers for the home remedy.

Karki (2001) conducted a study to document the indigenous knowledge and utilization of plant resources by the Chepang community of Dhusa VDC of Dhading district and reported the use of 55 plant species used in treating 34 different ailments. Thapa (2001) on her study documented the traditional uses of plants by Tharu community around royal Shuklaphanta Wildlife reserve. She reported a total of 135 plant species (60 species of tree, 22 species of shrubs, 46 species of herbs and 14 species of climber) belonging to 117 genera and 63 families,. Among the total, 109 plant species were used for curing 36 types of disease and disorders. The highest number of plants (20 species) was used for body pain followed by blisters (15 species), skin diseases and cut and wounds (13 species), fever (8 species) and swelling (6 species). Parajuli (2001) conducted study on medicinal plants used in cuts and wounds in Kaski district and their antibacterial activities and documented 39 plant species being used to treat "Cuts and wounds". Among the 39 plant species, 29 different medicinal plants were screened for their antibacterial activities against four strains of bacteria and found 11 plant species were able to produce zone of inhibition with all test bacteria and 7 plant species didn't show zone of inhibition with any test bacteria. Karki (2001) reported 75 species of medicinal plants belonging to 45 families and 68 genera used by the people of Ugrachandi and Tukucha VDC of Kavrepalanchowk District using their traditional knowledge. These different plant species were used for curing 51 diseases. Nakarmi (2001) conducted study on medicinal plants used by Lama community of Ichangu VDC in Kathmandu district and reported the use of 50 different plant species for curing different diseases and disorders like appetite, internal fever, typhoid, eye trouble, jaundice etc. Phytochemical screening of 8 plant

species was carried out and phytochemicals like carbohydrate, starch, flavonoid, reducing sugar, polyhydroxy compound, quinone, tannin, and saponin were determined.

Ghimire and Thomas (2002) recorded 529 species of medicinal plant species from Shey-Phoksundo National Park of Dolpa. They reported that about 94.4% of the total medicinal plants recorded have been used in traditional medicine by the Amchis for curing more than 50 ailments. Gautam (2002) conducted a study of medicinal plants used by Tharu people to treat respiratory complaints in Nawalparasi district and their antibacterial activities. She recorded 33 plant species used for curing respiratory diseases and were screened for their antibacterial activities. In this study 13 plant species were found able to produce zone of inhibition with all the test bacteria but 2 plants species didn't show any zone of inhibition with test bacteria. Gurung (2002) has carried out her study in Chitre VDC (Parbat) and Bhadaure/Tamagi VDC (Kaski) where different ethnic groups like Gurung, Kami, Sarki, pariayar, Chhetri, Bhujel etc. inhabits. She reported that these people have been practicing traditional medicine since time immemorial and has documented 83 medicinal plants species belonging to 51 families and 77 genera used by them for curing 52 ailments. Rokaya (2002) conducted a study on ethnoecology of medicinal plants in Dho-Tarap Area in Buffer Zone of Shey-Phoksundo National park of Dolpa district. He recorded 274 plant species belonging to 63 families and 172 genera having medicinal values. Out of total medicinal plant species, 195 have been documented as medicinal plants used for one or more diseases in Nepal, but 79 plant species have been documented as new medicinal plants for Nepal. In addition to medicinal use, 23 plant species have food value, 10 plant species have incense value. They were reported for the treatment of 64 different disease/disorders. A total of eight plant species used in local health care were endemic mostly to western Nepal, ten plant species as new records to Nepal, flora and one species *Gentiana species (Gentiana Skyeii)* is probably new species to science. Dangol (2002) documented the ethnobotanical knowledge of the Kumal community of Chitwan district. She recorded 27 wild plant species belonging to 54 different families used for various purposes. Out of 97 plant species, 66 species of medicinal value, 41 species of food and food additives, 10 species of religious value and others were used.

Balami (2003) studied the ethnoecology of medicinal and aromatic plants of Kharpa community forest of Pharping Kathmandu and recorded 119 plant species used in curing 35 different diseases, like diabetes, epilepsy fever, rheumatism; jaundice etc. Gurung (2003) reported the use of 32 medicinal plants species belonging to 25 families from the Tinjure area of Tehrathum district. Oli (2003) has investigated the use of medicinal plants among the Limbu community of Tapethok VDC, Taplejung and documented 40 medicinal plant species along with their parts used, way of medication and administration and dosage. Rai (2003) conducted a study on the medicinal plants of Tethrathum district and recorded a total of 105 vascular plants used in treating different diseases along with the detailed description of parts used, way of medication and administration and dosage. Panthi and Choudhary (2003) studied the ethnomedicinal plant resources of Arghakhanchi district and listed 101 plants species used to 56 different diseases and disorders. Devkota and Karmacharya (2003) reported the

traditional use of 101 medicinal plant species used for treating 70 different ailments by the people of Gwallek VDC of Baitadi District. Karki (2003) has presented a paper aiming the certification and marketing of medicinal and aromatic plants (MAPs) of South Asia. In a huge market of about US\$42 to 60 billion the regions share is negligible. So, he has focused on the certification system to ensure technical, institutional and financial compliances that will include production of high quality and authentic planting materials, maintaining ecological integrity and financial transparency and practicing ethically sound business practices.

Sigdel (2004) studied on the NTFPs of two community forest of Makanwanpur district and documented a total of 224 different plants species out of which 107 plants species (47.76%) were used in medicinal purposes for treating, common diseases and ailments. Dhakal (2004) carried out an study on ethnobiology of Magars of Thimure VDC in Palpa district and listed 43 medicinal plant species and 10 animal species used in treating different diseases and ailments like fracture, bronchitis, fever, cough, cold, asthma, toothache etc. among the local people. Koirala (2004) documented 180 plant species and 59 animal species used by the Musahars of Bachhauli VDC of Chitwan district, and reported 30 plant and animal species having folk medicinal utility for them. Koirala (2004) studied the ethnobiology of the Satars of Korubari VDC of Jhapa district and documented 34 plant species and 9 animal species have been used in the medicinal purposes. Rai *et. al.* (2004) carried out the study in Thumpathar VDC of Sindhupalchok district and documentation of 42 plant species belonging to 34 families for curing 45 different diseases along with doses and method of use has been made. Panta and Panta (2004) carried out a study on the Indigenous knowledge on the use of medicinal plants by the ethnic group comprising Dhami, Lohar, Tamata, Rawat, Damai and Bohara of Bhagawati VDC of Darchula district and reported the use of 78 medicinal species for the remedy of 9 different types of diseases and ailments. Thakur (2004) studied the therapeutic use of urine in early Indian medicine and reported the use of urine of 15 different animals both wild and domesticated to cure different diseases like worms, dropy, anaemia, loss of appetite, TB, poison etc. Ghimire *et. al.* (2004) researched on the Heterogeneity in Ethnoecological knowledge and management of medicinal plants in the Himalayas of Nepal and assessed variation in knowledge relating to the diversity of medicinal plant species, their distribution, medicinal uses, biological traits, ecology and management within and between two culturally different social groups living in villages located in the Shey-Phoksundo National park and its buffer zone. Heterogeneity in levels of knowledge and in practices both within and between these groups corresponds to differences in level of specializations in relation to medicinal plants, to socio-cultural and institutional contexts and to extra-local factors that govern people's activities.

Kunwar and Adhikari (2005) conducted a research of the ethnomedicine of Dolpa district and accounted 58 medicinal plant species used by the local people. Greater numbers of species were found to be used in fever (17 species) and diarrhoea and dysentery (17 species). Shrestha (2005) reported the medicinal uses of 50 plant species to cure different diseases by the Newar community of Tokha area. Ghimire *et. al.* (2005) conducted a research on

conservation of Himalayan medicinal plants and studied the harvesting patterns and ecology of two threatened species *Nardostachys grandiflora* DC and *Neopicrorhiza scrophulariiflora* (Pennell) Hong in Shey-Phoksundo National Park and in its buffer zone. They studied the harvesting approaches of two major user groups, Amchi (traditional healers) and commercial collectors and found recruitment and survival rates were higher in *N. scrophulariiflora* than *N. grandiflora* the latter species more vulnerable to harvesting than former. Pandey (2006) carried out a study on the use of medicinal plants in Traditional Tibetan Therapy System in Upper Mustang and documented 93 species of medicinal plants belonging to 74 genera spread over 35 families used by Amchis to cure different diseases. Bhattarai *et. al.* (2006) documented 91 ethnomedicinal plant species belonging to 40 families, 73 genera used in treating 93 ailments along with mode of preparation, dose and administration of medicine by the local people of Manang district.

Joshi and Joshi (2007) carried out a study on ethnomedicinal plants used against skin diseases in some villages of Kali Gandaki, Bagmati and Tadi Likhu Watersheds of Nepal and enumerated the traditional uses of 73 plant species belonging to 62 genera representing 47 families for treating skin diseases. Kala (2007) conducted a study on locals preferences of ethnobotanical species in Indian Himalaya of Uttarkhand and found 32 plant species of medicinal plants, 16 species of horticulture, 22 species of fodder plant, and 20 timber yielding plant species were selected as the most preferred. Ibara *et. al.* (2007) studied the presumed anti-ulcer Congolese medicinal plants and documented twenty one medicinal plants used in the traditional treatment of gastro duodenal ulcers. Joshi (2008) studied *Swertia L.* (Gentianaceae) in Nepal and revealed its use for treating different diseases in various forms like infusion, decoction, paste and juice. It was found that 9 different species were used commonly. Koche *et. al.* (2008) carried out a research on Ethnomedicine of Nagzira Wild Life Sanctuary and found 28 plant species used in traditional medicine belonging to 22 families used for treating different ailments by the tribal and local people of the Nagzira W.L. Sanctuary and nearby area. Reddy (2008) studied the use of various bio-fencing plants in the control of Human diseases by the Lambada tribe Inhabiting Nalgonda, district, Andhra Pradesh, India and documented 16 biofencing plants used to control various diseases and ailments Ramana (2008) conducted a study on ethnomedicinal and ethnoveterinary plants from Beath, Adilabad, Andhara Pradesh, India and reported the use of 57 plant species to cure different diseases and ailment of humans and livestock. Thapa (2008) studied the Medico-ethnobiological knowledge of the Magars of Salija VDC, Parbat district and reported the use of 85 medicinal plant species belonging to 52 families and 80 genera and 18 animal species belonging to 13 order and 13 families for medicinal purposes in traditional health care system. The reported plant and animal species were used for the treatment of 49 and 19 different diseases/ailments; respectively.



STUDY AREA

3.1 Location

Ilam district also known as the 'queen of hills' lies in the Mechi Zone at eastern boundary of Nepal touching the Darjeeling district of India in the east, Morang and Dhankuta districts in the west, Panchthar district in the North and Jhapa district in the south. It lies within 26°40' to 27°8' latitude and 87°40' to 88°10' longitude having the area of 1,703 sq. km. It lies at the altitudinal range of 600-3700 m from the sea level. The district headquarter of Ilam is Ilam bazaar.

Fikkal is one the 48 VDCs of Ilam District which is located at an altitude of 1500m above sea level, with an area of 27 sq.km. The VDC boundary of Fikkal VDC is Shri Antu on the east, Kanyam on south east, Pashupatinagar on north east, Gorkhe on north, Pachakanya on west and Naya Bazar on North West. Along with the Lapcha community, different other ethnic/caste groups also inhabit the area like Limbu, Rai, Tamang, Brahmin, Chhetri, Newar etc. However, a fairly large population of Lapcha resides in this VDC, so the study is focused on this village development committee.

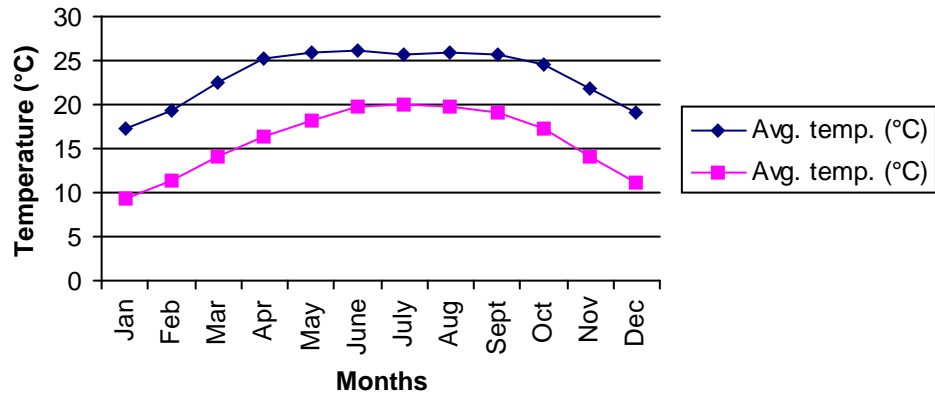
3.2 Demography

The population of the Lapcha community is 3,660 i.e. 0.02% of Nepal's population (CBS,2003).The Lapcha community is spread over 15 VDCs of the Ilam district, which accounts for 2520 of the population (CBS,2002). Later a study carried out during March 2004 with assistance from the Rong Sejum Thi (an organization established for welfare and upliftment of Lapcha people, in Nepali called as 'Lapcha Utthan Manch') found the population of Lapcha community in Ilam district to be 2589 (male: 1373, and Female: 1216). It accounts 499 households. Among the total 2589 population, male and female consist of 53 and 47 percent; respectively. The smallest population found in the Laxmipur VDC is 10 whereas the largest population exists in Fikkal VDC i.e. 368. Among total households 499, only two households have been residing in the Laxmipur VDC and Fikkal VDC has 71 households of Lapcha community (Roy, 2004).

3.3 Climate

The climate of Fikkal VDC is sub-temperate where the temperature varies from 8.1°C to 27.5°C. The weather station at Ilam Tea State, Ilam shows that mean monthly maximum temperature vary from 17.21°C to 26.24°C while mean monthly minimum temperature vary from 9.3°C to 19.93°C (Ilam Tea State Weather station 1998-2007; Fig. 1). The average annual rainfall during last 10 years is 1667.04mm. The mean monthly rainfall was found to be maximum for the month July i.e 426.14mm (Ilam Tea Estate Weather station, Ilam 1998-2007; Fig. 2).

Mean Monthly max. and min. Temperature of Ilam Tea Estate



[Fig. 2: Mean Monthly max. and min. Temperature of Ilam Tea Estate Ilam (1998-2007)]

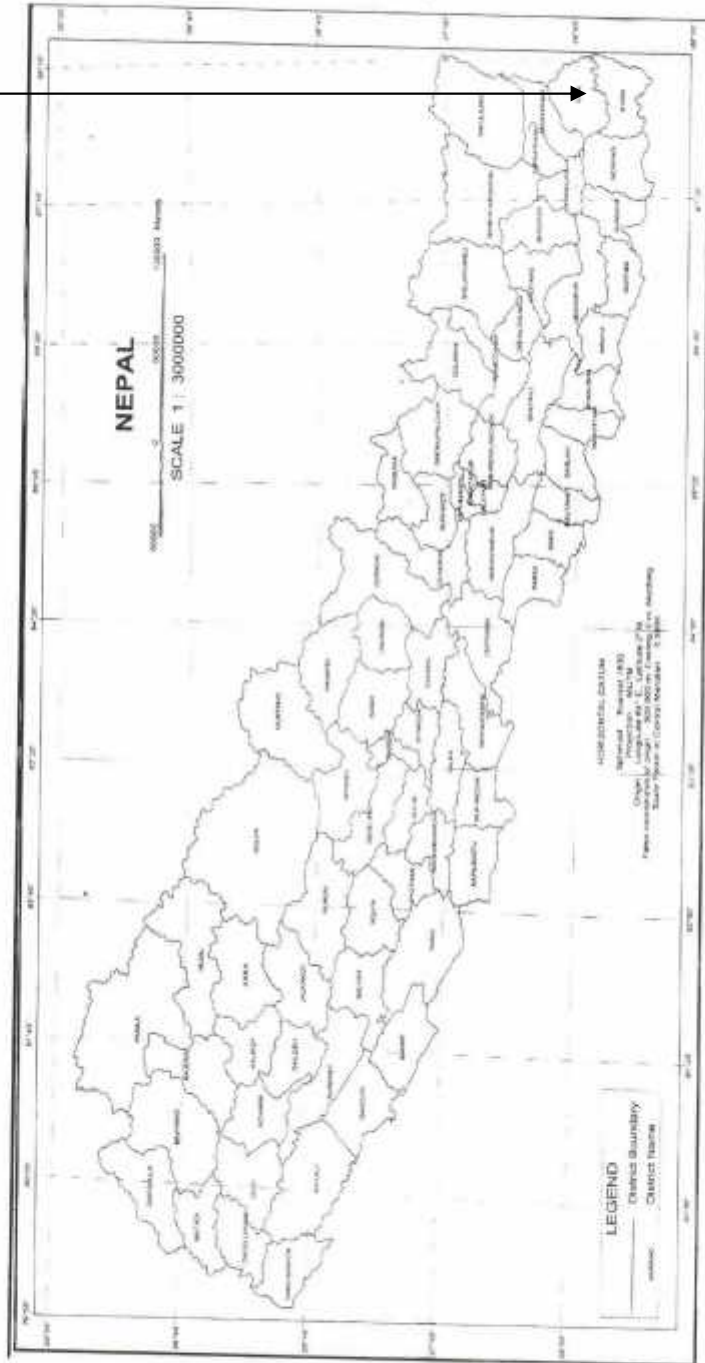
Mean Monthly rainfall of Ilam Tea Estate



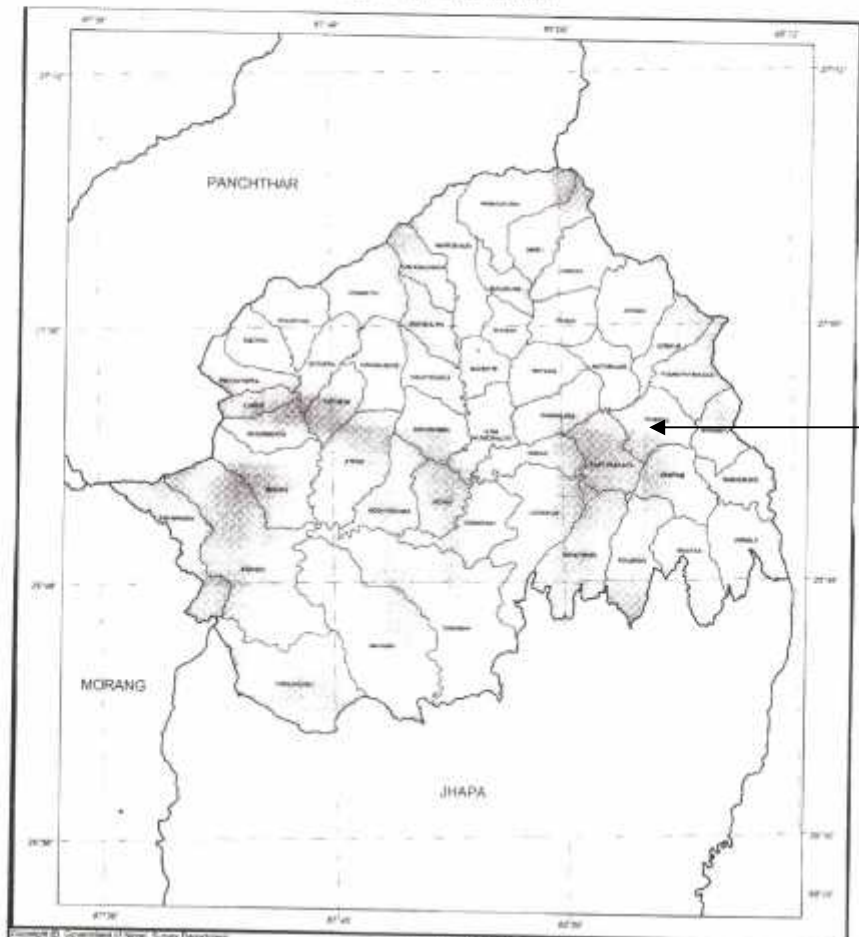
[Fig. 2: Mean Monthly rainfall of Ilam Tea Estate Ilam (1998-2007)]

Map 1: Map of Nepal

Ilam
District



Map 2: Map of Lam District



Fikkal
V.D.C

SCALE 1 : 400000

LEGEND

- District Boundary
- VDC Boundary
- MORANG District Name
- VDC Name

HORIZONTAL DATUM

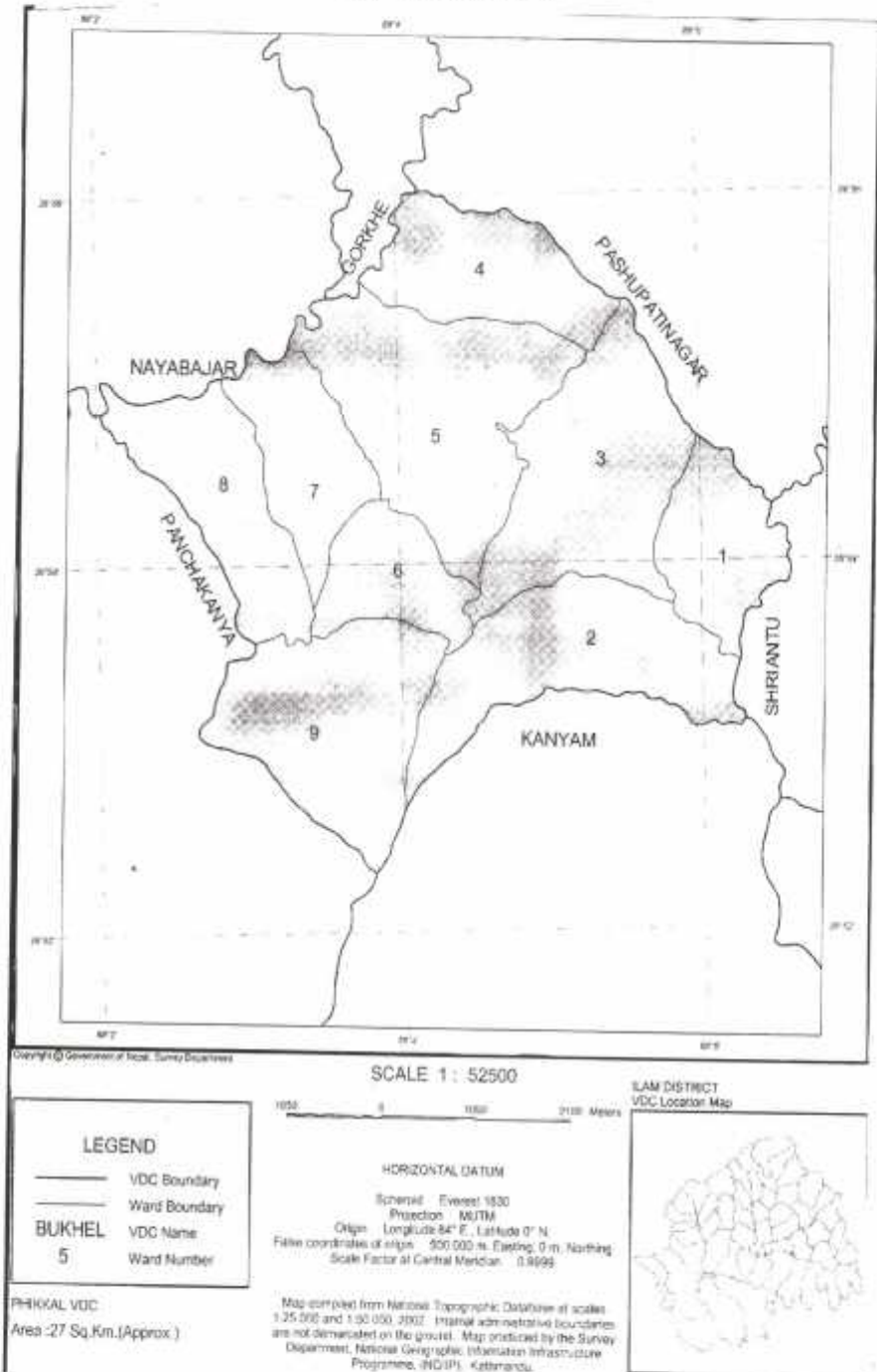
Spheroid - Everest 1830
Projection - M/UTM
Origin - Longitude 84° E, Latitude 0° N
False coordinates of origin - 500 000 M Easting, 0 M Northing
Scale Factor at Central Meridian - 0.9997

DISTRICT : LAM
Area : 1703 Sq.Km.(Approx.)

Map compiled from National Topographic Database at scales 1:25 000 and 1:50 000. Internal administrative boundaries are not represented on the ground. Map produced by the Survey Department, National Geographic Information Infrastructure Programme, (NGIIP), Kathmandu, 2003

LOCATION MAP

Map 2: Map of Fikkal VDC



METHODOLOGY

4.1 Rationale of the Site selection

Fikkal VDC of Ilam district was the study site that has been selected for the present work. Since, the present research work was focused on the investigation and documentation of ethno-medicinal knowledge of plant and animal species among the Lapcha community, this VDC was chosen for the study as this area has the highest percentage of Lapcha's inhabitants who still highly depend on traditional healing practices.

4.2 Nature and Sources of Data

To fulfill the objectives of this research work, two kinds of data were used. Primary data were collected from the field visit and the secondary data were collected from the relevant textbooks, research paper, journals and publications.

4.3 Primary Data Collection

4.3.1 Group Interviews:

Unstructured interview with small groups that comprised youth, women, and local elderly people along with members of Rong Sejum Thi was conducted to generate information's on various subjects like, culture, traditions, religiousness festivals, use of traditional medicine, indigenous knowledge present in the community etc. That has supported to fulfill the intended objectives of present study.

4.3.2 Interview with Key-Informants:

Key-Informants for traditional medicinal practices are the local healers like Dhami, Jhankri, Boonthing/Mun, Yaba/Yama. A number of questions about traditional healing practices, plants and animals used as medicine for different diseases were asked which were of immense help to complete this research work.

4.3.3 Field visit and observation:

The study area was personally visited in September, 2006 for 10 days and in May, 2007 for a week and observed in order to understand physical and cultural settings. The actual condition of medicinal animals and plants, preparation of herbal medicine were observed directly and recorded.

4.3.4 Sample collection and Identification:

Samples of different animals and plants both known and unknown were collected from the field visit. The collected samples were identified with standard literatures and with the help of experts (here) in Kathmandu. The plants and animal species were taxonomically classified into division, order, family, genera and species.



RESULTS

5.1 Ethnography of Lapcha

Ethnography is the descriptive study of a particular human society or the process of making such study which describes the way of life and finds out untold facts and realities. It is a significant part of ethnobiology.

Lapchas are the indigenous nationalities of Nepal who are concentrated in the eastern hilly region of Nepal mainly the Ilam district. Lapchas are one of the 10 endangered ethnic groups of Nepal according to "National Foundation for Development of Indigenous Nationalities Act, 2058 (2002 AD)". Their population comprises 0.02% of the total population of Nepal (CBS, 2003). They are mostly found in Ilam district of Eastern Nepal and Fikkal VDC has the largest population of Lapchas among 15 VDCs of Ilam where Lapchas reside (Roy, 2004).

5.1.1 Origin:

The Lapchas who call themselves Rong which means "The son of the snowy peak" are populously living in the Ilam district in Nepal. Though the chronology and history of Lapchas are obscure, but still the folktale, myths has tried to highlight on that.

The Lapchas who claim to be the son of snowy peak first and foremost primogenitors; Fodongthing and Nacongnyo were created by God from the pure, virgin snows of Kingroomaonboo choos' i.e. Mt. Kanchanjunga's pinnacle and spread all over the fairy land of Mayal Lyang that lies on the lap of Mt. Kanchanjunga (Tamsang, 1983).

5.1.2 Physical features:

The Lapcha have Mongoloid physical features. They have average height, flattened nose, minimum body and facial hair, slit eyes. The colour of skin is fair.

5.1.3 Language:

The Lapcha people have their own mother tongue known as Rong language. The Rong language consists of 10 vowels known as Aakap-ming and 28 consonant sounds known as Aamu-ming.

64% of the total population can speak Rong language fluently, but 36% cannot. Generally young generation represents this group. Likewise, 99% cannot read and write the language. Hence, to preserve the Lapcha's culture, the ritual promotion of Lapcha language is a must (Roy, 2004).

5.1.4 Dress and Ornament:

The Lapcha people have their own kind of unique dress and ornament. The dresses which the female Lapchas wear are as follows:

- a. **Dambun-** It is black in colour about 4 m long which looks like Bakhu. They were this form top to bottom by wrapping on body.
- b. **Tago-** It is the blouse which they wear inside 'Dambun.'
- c. **Namrik** - It is the patuka (waist band).
- d. **Thyak Tak-** It is the scrap which they put on head.
- e. **Takmilthak-** It is the necklace.

The dresses which the male Lapchas wear are as follows:

- a. **Dampra-** It is the outer garment which they were from top to bottom. It is striped and wore from right shoulder wrapping on body.
- b. **Togo** - It is the shirt that male wears.
- c. **Namrik** - It is the waist belt.
- d. **Tapiop-** It is bag of Lapcha male.
- e. **Tagip-** It is the cap which is round in shape with a red ball on the top which makes it attractive.

The ornaments of Lapcha are Khachung (of ear), Kau (of neck), Takbil Gayer (of hand) etc.

However, the dress mentioned above need special skill to prepare which the Lapcha people of Ilam are lacking and import the dress form Sikkim, India. So, they put on these dresses only in special function and occasion.

5.1.5 Family Type:

Lapcha people prefer to stay in nuclear family rather than in joint family usually, they convert their family since as nuclear after they get married from the parent family, which is easy to manage. However joint family also exists in small proportion.

5.1.6 Economy:

The Lapcha's economy is based on agriculture as they are traditionally farmers. They mainly grow cash crops like Amerisho, Allainchi (Cardomom) Aduwa (Ginger), Tea, Potato, Chilli etc and food crops like millet, maize, rarely rice and nowadays vegetables. Selling these agricultural products, they generate the income. They also rear cattle's like cow, buffalo, horse, goat, hen, and pig for different purposes like milk, meat, transportation, etc. Besides this, very few people are engaged in other occupation like driver, foreign employment, services, business and teacher to generate income.

5.1.7 Education:

These are 16 schools in the Fikkal VDC with 91 Lapcha students among them 52 students were boys and 39 students were girls. The number of private schools was more than government schools. There were 9 primary schools, 2 lower secondary schools, 4 secondary schools and 1 higher secondary schools. In the Lapcha community the number of students with higher education in the study area is very less, only one student has completed Masters Degree,

six students have passed Bachelors Degree and fifteen students have passed Higher Secondary level.

Table 1: List of Schools and Lapcha Student in Fikkal VDC

S.N.	Name of the School	Location	Status	Level	No. of boys	No. of girls	Total students
1.	New Word English School	Ward No. - 5	Private	Lower Secondary	4	1	5
2.	Harra Whalle Academy	Ward No. - 3	Private	Primary	1	1	2
3.	Sai Jyoti English School	Ward No. - 2	Private	Secondary	-	2	2
4.	Everland International Boarding School.	Ward No. - 3	Private	Secondary	1	1	2
5.	Shri Panchakanya Awashiya Vidya mandir	Ward No. - 6	Private	Secondary	1	1	2
6.	Shri Krishna Primary School	Ward No. - 3	Private	primary	-	-	-
7.	Shri Rastriya Primary School	Ward No. - 7	Government	Primary	4	2	6
8.	Bishnu Jyoti Primary School	Ward No. - 3	Private	Secondary	2	1	3
9.	Adarsha Lower Secondary School	Ward No. - 1	Government	Lower Secondary	9	6	15
10.	Shri Malun Primary School	Ward No. - 2	Private	Primary	2	-	2
11.	Rastriya Primary School	Ward No. - 5	Government	Primary	4	5	9
12.	Pandam Primary School	Ward No. - 4	Private	Primary	-	-	-
13.	Buddhanilkantha Primary School	Ward No. - 5	Private	Primary	-	-	-
14.	Sunrise English Boarding School	Ward No. - 6	Private	Primary	-	-	-
15.	Modern English Boarding School	Ward No. - 8	Private	Primary	-	-	-
16.	Fikkal Higher Secondary School	Ward No. - 6	Government	Higher Secondary	24	19	43
	Total				52	39	91

5.1.8 **Septs (Thar)**

Each and every ethnic community has different kinds of septs. Likewise, Lapchas also have different kinds of septs. Mainly, Lapchas have been divided into 15 major clans. Their successive generations scattered in different places and several other clans were formed after them. Now, there are about 40 clans or septs in Lapcha community (Tshering, 1971). But, in Ilam district of Nepal 35 clans of Lapcha community reside (Jefferey, Shanti & Juddha, 2000). The lists of different clans of Lapcha in Ilam are:

A den moo	Gurutashi moo	Nam chu moo
Bar fong moo	Imi moo	Nam tyo moo
Bar myak moo	Ko to moo	Pe the moo
Den Tsop moo	Lak som moo	Pidong moo
Fun Fing moo	Lang Dam moo	Po gona moo
Gamsa moo	Ling Dam moo	Rong ong moo
Gar moo	Loho moo	Sadna moo
Gorokh moo	Ma lam moo	Sagri moo
Guling moo	Morong moo	Sandiang moo
Soom moo	Sang sa moo	Sumek moo
Tali jiang moo	Sa fong moo	Tak nil moo
The ge moo	Yang yu moo	

5.1.9 **Religions and Festivals:**

The ancient religions of Lapcha are Boongthingism and Munism (Tamsang, 1983). The main religion of the Lapcha community in Ilam is Buddhism.

The main festivals in Lapcha community are Namwhan or Namsung or Namyal (New Year), Sakyu Ramphat (a festival celebrate to mark the yield of crops generally during the month of December) and the Lungazee(a festival celebrated to prevent the natural disaster,epidemic etc by offering worship to different God and Godesses). They celebrate these festivals with great enthusiasm and happiness and lot of feasting is also done. Along with these festivals they also celebrate Buddha Jayanti, Dashain, and Tihar, etc.

5.1.10 Life Cycle Rites

5.1.10.1 Birth Rites

After the confirmation of pregnancy, offerings of two hen and cock are made along with prayers to God for the good health of child and mother and safe delivery, which are sacrificed after the child's birth by Boongthing. The birth pollution for daughter is observed for 3 days and for son it is observed for 5 days. The last day of the pollution period is set for Name-giving ceremony or Navran. Navran is done by either LamaGuru or Boongthing. They calculate the time of birth, date and day and give the name to child. Feast is arranged to celebrate the occasion where all the relatives and neighbours are fed.

5.1.10.2 Marriage System:

In Lapcha language marriage is called Bri. Generally in this community there is a system of arranged marriage. Marriage in the same clan is prohibited. Until the mid 20th century a boy had to sit at girl's house working for 1 year to marry the girl, but nowadays this system is rare.

In case of 'arranged marriage', a group of elderly people from boys side called as 'Jerfukup' in Lapcha language with a basket of wine or four bottle of local liquors go to girls uncle or maternal uncle house to ask for her instead of going to her home directly. The number of times the boys side should visit girl's house depends on girl's side. But within one or two visit they know whether the girl's side is ready for marriage or not. For the first time when they reach the girls side house, they put two bottle of liquors in front of girls side and begin asking for girls hand in a very literary tone and language. Generally this kind of talk starts in the evening. After the girl's side agrees then the boy's side will give another two bottles of liquor to girl's side and return and convey the message to boy's side. Again, the second time 'Jerfukup' go to the girls side for final consentment and if they agree, fix the date of marriage and the gifts (Rith) to be given.

The gifts (Rith) is taken to girl's house a day before marriage which consists of 'Jharke thal, 'Jharke Lota' (brass plate & glass), one copper coin, khada (a small piece of cloth wrapped around neck) and other materials according to demand like ornaments, liquor, wine, he-goat, buffalo, pig or ox. To pay tribute to mother, father and other elders Lapchas traditional dresses, liquor and money are given as gifts. If the boy's side is unable to meet the demand, they are given traditional punishment like keeping them outside the home, late feeding etc.

After the gifts (Rith) is accepted, 'chifat' (marriage) is done by Boongthing. New bride and bridegroom along with their friends are kept together. Head of Ox or Buffalos or Pig with bucket of wine and two/two bottles liquor are kept in front of them from both sides. It is called 'Myok Panol' or 'Nyom Panol' in Lapcha language. After that by taking the names of all Gods and Goddesses, the new couple is blessed with good wishes and greetings. Amid the blessings, Boongthing declares the marriage between them and put garland of 'Totala'

flower and 'Khada' in their neck. After that the couple interchanges their wine and drink. During the marriage, the girl is taken out of her clan and put into the clan of boy. Then the night passes in introduction between girl's side and boy's side with new couple and they put tika of butter. Next morning again the boy's sides keep two bottles liquor and five rupees and ask for girl and then take her to his home. Again, the 'Chifat' is done in boy's house like in the girl's house. After that Boongthing gives blessing by putting tika of butter and 'Totala' flower.

After 3 days of marriage, bride is taken to her house along with 'Jerfukup'. Exchange of greetings takes place by keeping liquors between the girl's side and boy's side. In this way, in short duration the long ritual of marriage in Lapcha community is completed.

5.1.10.3 Death Rites:

In Lapcha community Boongthing or any elderly people declares the death and says the dead person has no relation with living people.

Through the death rites are conducted in two ways by reading Thagronamathar or by Buddhist Lama way though there are many similarities in them. The main difference is the religious book that is read.

After the death of a person, the dead body is cleaned by luke warm water containing a coin, 'Titepati' and 'Kandong' (Kanten Nyom in Lapcha language). Then the dead body is kept in sitting position with joined hands. If the dead person is woman, her hair is tied in opposite direction. The dead body is kept in bamboo raft and carried by four persons to the cremation hill. In front of 'Malami' (funeral procession) a person carries a sword or Khukuri with burning incense stick and some fruits and foods to offer to the dead body. They take the funeral procession by playing their traditional musical instruments. After reaching the cremation hill, the dead body is either buried or burnt. The fire to the dead body is given by son-in-law instead of son like in other communities by revolving around the pyre three times. The Lapcha community, they don't forbid to eat oil, salt and purify the death pollution in 3 days for first time and in 7 weeks for second time and after one year finally by the help of Lama offering prayer and reading religious book for the eternal peace of the departed soul.

5.2 Medical Ethnobiology

In Greek 'Ethnos' means people or race and Biology (Greek: bios-life and logos-discourse) is the study of living beings. It is the science that deals about the relationship between humans, animals, plants including the ecosystem. Therefore, Medical Ethnobiology explains the use of animals and plants (whole or part) as medicine. It is mainly divided into two parts: Medico-ethnozoology and Medico-ethnobotany.

5.2.1 Medico-ethnozoology:

Lapcha community of Fikkal VDC have been using a number of animal species both wild and domesticated in their traditional healing system as medicines to cure several diseases. Findings of this research disclosed that altogether 19 animal species both wild and domesticated, belonging to 10 order 13 families have been used for the treatment of 21 different diseases/ailments.

The list of animal species used in the folk medicine by the local Lapcha people of the study area is show below:

Table 2: List of Animals used for Folk Medicine by the local Lapchas of Fikkal VDC, Ilam.

S.No.	Order	Family	Latin name	Nepali name/Local name	Habit
1.	Artiodactyla	Bovidae	<i>Bubalus bubalus</i>	Bhaisi/Mahi	Domesticated
2.	Artiodactyla	Bovidae	<i>Bos indicus</i>	Gai/Bikh	Domesticated
3.	Artiodactyla	Bovidae	<i>Capra hiscus</i>	Bakhra/Saar	Domesticated
4.	Artiodactyle	Cervidae	<i>Axis axis</i>	Harin	Wild
5.	Artiodactyla	Suidae	<i>Sus species.</i>	Sugur/Mona	Domesticated
6.	Carnivora	Canidae	<i>Canis familiar</i>	Kukur/Ku-jeu	Domesticated
7.	Caraivaora	Canidae	<i>Canis aureus</i>	Syal/Siwal	Wild
8.	Carnivora	Felidae	<i>Panthera tigris</i>	Baagh/Suthong	Wild
9.	Perissodactyle	Equidae	<i>Equus coballus</i>	Ghoda/Ona	Domesticated
10.	Probacidea	Elephantiadae	<i>Elephus maximus</i>	Hatti/Thang-mu	Wild
11.	Rodeatia	Hystricidae	<i>Hystrix brachyura</i>	Dhumsi/Sathim	Wild
12.	Galliformes	Phasinidae	<i>Gallus gallus domesticus</i>	Kukhura/Hik	Domesticated
13.	–	–	–	Sarpa/Bu	Wild
14.	Anura	Ranidae	<i>Rana tigrina</i>	Manpaha/Talok	Wild

15.	-	-	-	Macha/Ngu	Wild
16.	Decapoda	Palaemonidae	<i>Palaemon malcolmsonii</i>	Jhinge macha/Aarang-li	Wild
17.	Hymenoptera	Apidae	<i>Apis cerana</i>	Ghar mauri/Hu	Domesticated
18.	Hymenoptera	Apidae	<i>Apis dorsata</i>	Putka/Ei	Wild
19.	Stylomatophora	Helicidae	<i>Anadenus species.</i>	Chiplekira/Tok-nol	Wild

5.2.1.1 Diversity of Animal Species:

Among the total 19 animal species used in the traditional medicine by local Lapcha people of Fikkal VDC, 11 species were Mammals, 1 species of Aves, 1 Reptilia, 1 Amphibian, 1 Fish, and 4 species were invertebrates. Similarly based on habit, 8 species were domesticated and rest 11 species were wild.

5.2.1.2 Diseases/Ailments Treated:

The recorded 19 animal species from the research site have been found to be used for the treatment of 21 different diseases or ailments by local people in their traditional healing practices.

The list of diseases along with the animal species is shown in the table below:

Table 3: List of Diseases/Ailments with the Animal Species Used.

S.No.	Name of diseases/ailments	Name of animals used
1.	Rheumatism (Baath)	- <i>Canis aureus</i> (Jackal)
2.	Pungent smell from body (Thangne Biram)	- <i>Equus coballus</i> (Horse)
3.	Burnt wound (Aagole Poleko)	- <i>Gallus gallus domesticus</i> . (Rooster), Fish
4.	Eczema below eye (Aakhamuni Ko khatira)	- <i>Gallus gallus domesticus</i> (Rooster)
5.	Baaghe (Wound) -	<i>Panthera tigris</i> (Tiger)
6.	Cough (Khoki) -	<i>Apis cerana</i> (Bee)
7.	Tuberculosis (Chhayarog) -	<i>Canis aureus</i> (Jackal)
8.	Eczema inside body (Sarir bhitra ko ghau khatira)	- <i>Elephus maximus</i> (Elephant)
9.	Dysentery (Mashi)	- <i>Rana tigrina</i> (Manpaha) <i>Axis axis</i> (Deer)

10.	Snake bite (Sarpala Tokeko)	- <i>Apis dorsata</i> (Putka)
11.	Vomit and fatigue (Banta ra Kamjori)	- <i>Apis dorsata</i> (Putka)
12.	Cut wound (Kate ko ghau)	- <i>Anadenus species</i> , Snake.
13.	Bone fracture (Haddi bhachiyeko)	- <i>Anadenus species</i> (Slug)
14.	Boils (Pilo)	- <i>Bus indicus</i>
15.	Piles (Harsa)	- <i>Rana tigrina</i> (Manpaha)
16.	Body back pain (Jhui ra Dhad dukhero)	<i>Bus indicus</i> (cow), <i>Apis cerana</i> (Bee, Ghar Mauri), <i>Gallus gallus domesticus</i> (Rooster).
17.	Asthama (Dam)	- <i>Sus species</i> (Pig), <i>Bubalus bubalus</i> (Buffalo), <i>Capro hiscus</i> (Goat), <i>Hystrix brachyura</i> (Porcupine)
18.	Dog bite (Kukurle tokeko)	- <i>Canis familiar</i> (Dog)
19.	Mushroom poisoning (Chyau ko Bikh)	- <i>Axis axis</i> (deer)
20.	Thorn Pricks (Kanda Paseko)	- <i>Paleomon malcolmsonii</i> (Prawn)
21.	Ring worm (Dadh)	- <i>Anadeus sp.</i> (Slug)

5.2.1.3 Animal organs used:

Generally different parts or organs were used as medicine by the Lapcha people of study area in their traditional healing practice. The mostly used organs or parts have been found to be meat, egg, bone and blood. Along with these organs, other parts used were stomach, brain, teeth, skin, bile, saliva, foetus, fat, milk, mandibles and sometimes whole body of an organism was used.

5.2.1.4 Routes of Administration:

Medical administration included oral absorption which is internal medication and poultice which are external medication. Most of the medication were administrated orally (13 remedies) followed by poultice/applying (7 remedies).

5.2.1.5 Detailed Study of Animal Species:

The animals used in the traditional medicine by local Lapchas of the study area are described on the basis of information collected during field visit. The detailed descriptions are given in alphabetical order of family of the animal species:

1. Apidae

Apis cerana 'Ghar mauri'

Type - Insect

Product used - Honey

Form of medication - Raw, diluted drug'

Medicinal uses-

(a) Honey mixed with *Zingiber officinale* (Aduwa) juice is used for cough.

Dose: 1-2 teaspoon for 2-3 times a day.

(b) Powdered 10-15 gm, each of *Astilbe rivularis* (Thulo Okhat), *Bergenia ciliata* (Pakhanbed), *Viscum articulatum* (Hadchur) with 2-3 spoon honey and mustard oil (*Brassica campestris*), a raw hen's egg (*Gallus gallus domesticus*) and a glass of cow's milk (*Bus inducus*) for back and body pain.

Dose: A glass full every day before bed.

Apis dorsata (Putka)

Type - Insect

Product used - Honey

Form of medication - Raw

Medicinal uses:

- (a) Apply over the wound of snakebite. It reduces pain and effect of poison.
- (b) It is also taken orally about 1-2 teaspoon for the cure of vomit, fatigue and loss of appetite.

2. **Bovidae:**

Bubalus bubalus 'Bhaisi'

Type - Mammal

Organ used - Tooth, Bile.

Form of medication - Raw.

Medicinal uses:

- (a) Paste of tooth is used to cure boils.
- (b) The bile is taken orally to cure Asthma.

Bos indicus 'Gai'

Type - Mammal

Organ used - Tooth and milk.

Form of medication - Raw and boiled

Medicinal uses:

- (a) The paste of tooth is used to cure boils.
- (b) Powdered 10-15gm, each of *Astilbe rivularis* (Thulo okhat), *Bergenia ciliata* (Pakhanbed), *Viscum articulatum* (Hadchur), with 2-3 spoon honey (*Apis cerana*) and mustard oil (*Brassica compestris*), a raw hen's egg (*Gallus gallus domesticus*) and a glass of milk for back and body pain.

Dose: 1 glass daily before bed.

Capra hiscus: 'Bakhra'

Type - mammal

Organ used - Bile

Form of medication - Raw.

Medicinal use:

The bile is taken orally to cure Asthama.

3. Canidae:

Canis aureus 'Syal'

Type - Mammal

Organ used - Meat, Bone and Hide.

Form of medication: Cooked and raw. Medicinal uses:

(a) Liquor made from the meat is drunk as medicine to cure Rheumatism.

Dose: 10-15 ml for 2 times a day.

(b) One should eat cooked meat with food and apply paste made from bone to cure Rheumatism.

Dose: 1-2 spoons of bone's paste and 50-100 gm of meat until cure.

Precaution: One shouldn't drink alcohol during medication.

(c) Sleeping on hide and eating cooked meat with food to cure T.B.

Dose: 50-100 gm of meat until cure.

Canis familiar 'Kukur'

Type - Mammal

Organ - Brain

Form of medication - Raw

Medicinal use:

Tablets made by mixing white mud (Lisailo Kamero) with brain of mad dog are used orally to prevent rabbies.

Dose: A tablet of 200-250 mg is taken orally for 7 days.

4. Cervidae:

Axis axis 'Harin'

Type - Mammal

Organ used - Hoof and Foetus.

Form of medication - Raw

Medicinal uses:

(a) Foetus from dead pregnant deer is taken out and dried in sun and taken orally to cure dysentery.

Dose: Small pieces of 20-30 gm until cure

(b) Make the paste of hoof and take orally to reduce mushroom poisoning

Dose: About 1 teaspoon full.

5. Elephantidae

Elephas maximus 'Hatti'

Organ used - Bone

Form of medication: Raw

Medicinal use: Make pastes of bone of elephant and shell (that is used to blow in puja and when people die) administer orally to cure internal Eczema.

Dose: 1 teaspoon, 2 times a day for 2 days.

6. Equidae

Equus caballus 'Ghoda'

Type - Mammal

Product used - Milk

Form of medication - Raw.

Medicinal use: Applying horse milk on whole body to reduce the pungent smell coming from body suffering from 'Thagne Biram'.

7. Felidae

Panthera tigris 'Baagh'

Type - Mammal

Organ used - Bone

Form of medication : Raw.

Medicinal use: Apply paste made from bone over the wound 'Baaghe' to cure it.

8. Helicidae

Anadenus species. 'Chiple Kire'

Type - Mollusc

Product used - Saliva, whole body.

Form of medication – Raw

Medicinal use:

- (a) Applying the saliva stops bleeding in cut wound.
- (b) Rubbing the fresh body on ring worm (Dadh) cures it.
- (c) Eating whole fresh body or dead body with banana (*Musa paradisiaca*) to cure fractured bone and applying paste on fractured area to join the bone.

9. Hystricidae

Hystrix brachyura 'Dumsi'

Type - Mammal

Organ used - Stomach

Form of medication - Raw.

Medicinal use - Small pieces of dried stomach is taken orally to cure Asthma.

10. Paleomonidae

Paleomon malcolmsonii 'Jhinge Macha'

Type - Arthropods

Organ used - Mandible

Form of medication - Raw.

Medicinal use - Paste of mandible is applied to take out thorn from body.

11. Phasinidae

Gallus gallus domesticus 'Kukhura'

Type - Aves

Product used - Egg, Fat

Form of medication - Raw

Medicinal uses:

- (a) Fat of male rooster and yolk is applied to cure burnt wound.
- (b) Paste of egg is applied on eczema below eye.
- (c) Powdered 10-15gm of *Astilbe rivularis* (Thulo Okhat), *Bergenia ciliata* (Pakhanbed), *Viscum articulatum* (Hadchur) with 2-3 teaspoon honey (*Apis cerana*), mustard oil (*Brassica campestris*), an egg and a glass of cow (*Bos indicus*) milk for back and body pain.

Dose: 1 glass daily before bed.

12. Pisces

Any kind of fish. 'Macha'

Type - Pisces

Product used - Fat.

Form of medication - Raw

Medicinal use - Application of fat over burnt wound to cure it.

13. Ranidae

Rana tigrina 'Manpaha'

Type - Amphibian

Product used Meat and Egg

Form of medication - Boiled.

Medicinal uses -

(a) Drinking of juice made by boiling meat to cure dysentery.

Dose: 50ml, .1-2 times per day until cure.

(b) Take orally the meat and egg by boiling to cure piles (Harsa).

14. Reptile

Any kind of snake

Type - Reptiles

Organ used - Bile

Form of medication - Raw

Medicinal use - Apply bile on the cut wound to cure.

14. Suidae

Sus species. 'Pig'

Type - Mammal

Organ used - Bile

Form of medication - Raw

Medicinal use - Take orally the bile to cure Asthma.

5.2.2 Medico-ethnobotany

The present research work reveals that the Lapcha people of the study area have profound knowledge about different plant species having medicinal value used in their traditional healing practices. It was found that they make use of some 61 species of medicinal plants belonging to 35 families and 58 genera for curing 36 different ailments by using their own indigenous knowledge.

The list of plant species used in the traditional medicine by the local Lapcha people of the study area is shown below along with their family and habit.

Table 4: List of Medicinal Plants used by the local Lapchas of Fikkal VDC, Ilam.

S.N.	Family	Latin name	Nepali name/Local name	Life form
1.	Apiaceae/ Umbelliferae	<i>Heracleum nepalense</i>	Chimfin/Singden	Small Tree
2.	Araceae	<i>Acorus calamus</i> L.	Bojho/Rockrop	Herb
3.	Asteraceae/ Compositae	<i>Ageratum conyzoides</i> L.	Ilame Jhar	Herb
4.	Bignoniaceae	<i>Oroxylum indicum</i>	Totalo/Pragorip	Tree
5.	Brassicaceae/ Cruciferae	<i>Raphnus sativus</i> L.	Mula?Pajonk-labuk	Herb

6.	Bromeliaceae	<i>Anana comosus</i> L.	Bhuikatahar	Herb
7.	Caryophyllaceae	<i>Drymaria cordata</i> L.	Abhijalo/Tajyomyok	Herb
8.	Chenopodiaceae	<i>Chenopodium album</i>	Bethu/Simbe-bi	Herb
9.	Compositae	<i>Artemesia indica</i> Willd	Titepati/Takmel	Herb
10.	Compositae	<i>Tagetes crecta</i> L.	Sayapatri	Herb
11.	Cruciferae	<i>Brassica campestris</i>	Tori/Kanglang	Herb
12.	Cruciferae	<i>Lepidium sativum</i> L.	Chamsur	Herb
13.	Cucurbitaceae	<i>Cucumis sativus</i>	Kankro/Saret	Climber
14.	Dioscoreaceae	<i>Dioscorea species</i>	Bhyakur/Kasokding	Climber
15.	Dryopteridaceae	<i>Tectaria coadunata</i>	Kaloniguro/Tonggroknok-bi	Fern
16.	Ericaceae	<i>Rhododendron arboreum</i>	Laligurans	Tree
17.	Euphorbiaceae	<i>Embllica officinalis</i>	Amala/Puom-kung	Tree
18.	Fabaceae/ Leguminosae	<i>Piptanthus nepalensis</i> (Hook D. Don)	Bakhre Lahara	Climber
19.	Gentianaceae	<i>Swertia chirata</i>	Chiraito/Rungkin	Herb
20.	Gramineae	<i>Imperata cylindrica</i>	Siru/Nyong	(Herb) Grass
21.	Gramineae	<i>Dendrocalamus hamiltonii</i>	Choya Bans/Poly-po	Tree
22.	Gramineae	<i>Saccharum officinarum</i>	Ukhu/Pa-amnok	Grass
23.	Gramineae	<i>Eleusinae coracana</i>	Kodo/Mong	Shrub
24.	Labiatae	<i>Mentha sp. L.</i>	Pudina	Herb
25.	Labiatae	<i>Ocimum basilicum</i> L.	Babari/Ridhyongrip	Herb
26.	Lauraceae	<i>Lindera neesiana</i> Benth	Siltimur/Tanrelchook-kung	Tree
27.	Leguminosae	<i>Dolichos biflorus</i>	Gahat/Kalahklep	Herb
28.	Leguminosae	<i>Trigonella foenumgraceum</i>	Methi	Herb
29.	Liliaceae	<i>Aloe barbadensis</i>	Ghui Kumari	Herb
30.	Loranthaceae	<i>Viscum articulatum</i>	Hadchur	Shrub
31.	Meliaceae	<i>Azadirachta indica</i> (A. Juss)	Neem	Tree
32.	Moraceae	<i>Ficus religiosa</i> L.	Peepal	Tree

33.	Musaceae	<i>Musa paradisiaca</i> L.	Kera/Kurdung	Tree
34.	Myrtaceae	<i>Psidium guajava</i>	Ambak	Tree
35.	Nephrolepidaceae	<i>Nephrolepis auriculata</i>	Paniamala/Tongkrok-mat	Tree fern
36.	Polypodiaceae	<i>Dryopteris filixmas</i>	Hade unyu/Tongkrok	Tree fern
37.	Ranunculaceae	<i>Aconitum palmatum</i>	Bikhama	Herb
38.	Ranunculaceae	<i>Clematis buchananiana</i>	Pinashe lahara	Climber
39.	Rosaceae	<i>Rubus ellipticus</i>	Ainselu/Kushyom	Shrub
40.	Rosaceae	<i>Rosa brunonii</i>	Bhainsi Singe/Mahirongrik	Tree
41.	Rosaceae	<i>Pyrus pashia</i>	Mel/Maliu-bong	Tree
42.	Rubiaceae	<i>Rubia manjith</i>	Majitho/Syam-rik	Herb
43.	Rubiaceae	<i>Spermadictyon suaveolens</i>	Bhui champa/Matli-rip	Shrub
44.	Rutaceae	<i>Citrus medica</i> L.	Bimira	Shrub
45.	Rutaceae	<i>Citrus reticulata</i>	Suntala/Cholum	Tree
46.	Rutaceae	<i>Citrus aurantifolia</i>	Kagati	Small Tree
47.	Rutaceae	<i>Evodia fraxinifolia</i> (Hook. F.)	Khanakpa/Kuru	Small Tree
48.	Rutaceae	<i>Zanthoxylum armatum</i>	Timur	Small Tree
49.	Saxifragaceae	<i>Bergenia ciliata</i>	Pakhanbed	Herb
50.	Saxifragaceae	<i>Astilbe rivularis</i>	Thulo Okhat	Herb
51.	Solanaceae	<i>Capsicum annum</i> L.	Dalle Khursani/Sangkar	Herb
52.	Solanaceae	<i>Datura metel</i> L.	Kalo Dhaturu	Herb
53.	Solanaceae	<i>Datura sp.</i>	Seto Dhaturu	Herb
54.	Solanaceae	<i>Solanum indicum</i>	Kande Bean	Herb
55.	Tenstroemiaceae	<i>Schima wallichii</i> Chois	Chilaune/Sang-ram	Tree
56.	Umbelliferae	<i>Carum copticum</i>	Jwano	Herb
57.	Umbelliferae	<i>Anethum sowa</i>	Swoup	Herb
58.	Urticaceae	<i>Urtica dioca</i> L.	Sissnu/Kajyang	Herb
59.	Zingiberaceae	<i>Amomum subulatum</i>	Alainchi/Tumrap	Herb
60.	Zingiberaceae	<i>Curcuma longa</i>	Haledo/Gyasing	Herb
61.	Zingiberaceae	<i>Zingiber officinale</i>	Aduwa/Hing	Herb

5.2.2.1 Diversity of the Medicinal Plants

The total of 61 medicinal plant species was found to be used by the Lapcha people of the study area in their traditional healing practices. Among the 61 medicinal plant species, 16 species were small and large trees, 5 species were shrub, 31 species were herbs, 3 species were fern, 4 species were climber and 2 species were grass based on the life forms.

5.2.2.2 Disease/Ailments Treated

The different plant species recorded for medicinal value have been found to be used for curing 38 different diseases/ailments by the local Lapcha people of the study area. The list of diseases along with the plant species is shown in the table below.

Table 5: List of the Disease/Ailments with the Plant Species Used.

S.No.	Name of disease/ailments	Name of plants used
1.	Diarrhoea (Pakhala lageko)	<i>Mentha sp.</i> (Pudina), <i>Psidium gaujava</i> (Ambak)
2.	Dysentery (Maasi)	<i>Pyrus pashia</i> (Mel), <i>Tectaria coadunata</i> (Kalo niguro), <i>Embllica officinalis</i> (Amala).
3.	Stomach pain/Disorder (Bhudi dukheko)	<i>Heracleum nepalense</i> (Chimfin)
4.	Intestinal worm (Juka Pareko)	<i>Imperata cylindrica</i> (Siru), <i>Citrus medica</i> (Bimira)
5.	Fever (Jwaro)	<i>Swertia chirata</i> (Chiraito), <i>Azadirachta indica</i> (Neem), <i>Aconitum palmatum</i> (Bikhama), <i>Tagetes crecta</i> (Sayapatri), <i>Anana comosus</i> (Bhui Katahar), <i>Neprolepsis auriculata</i> (Pani Amala)
6.	Common cold (Rugha)	<i>Drymaria cordata</i> (Abhijalo) <i>Cucumis sativus</i> (Kankro)
7.	Cough (Khoki)	<i>Zingiber officinale</i> (Aduwa), <i>Trigonella foenumgraceum</i> (Methi)
8.	Tonsil	<i>Neprolepis auriculata</i> (Pani Amala)
9.	Gastric (Ganogola)	<i>Capsicum annum</i> (Dalle khorsani), <i>Carum copticum</i> (Jwano), <i>Piptanthus nepalensis</i> (Bakhre lahara), <i>Lindera neesiana</i> (Siltimur).
10.	Sinusitis (Pinas)	<i>Clematis buchananiana</i> (Pinashe lahara)
11.	Jaundice (Pafele)	<i>Saccharum officinarum</i> (Ukhu), <i>Oroxylum indicum</i> (Totalo)
12.	Fracture (Haddi Bhachiyeko)	<i>Viscum articulatum</i> (Hadchur), <i>Spermadietyon suaveolens</i> (Bhui Champa), <i>Rosa brunonii</i> (Bhainsi singe), <i>Lepidium sativum</i> (Chamsur), <i>Eleusinae coracana</i> (Kodo), <i>Bambusa nutans</i> (MalBans).

13.	Scabbies (Luto)	<i>Ocimum basilicum</i> (Babari), <i>Acorus calamus</i> (Bojho), <i>Artemesia indica</i> (titepati), <i>Rubia manjith</i> (Majitho)
14.	Nose bleeding (Naathri phutne)	<i>Artemesia indica</i> (Titepati)
15.	Vomitting (Vanta)	<i>Ammomum subulatum</i> (Alainchi), <i>Concuma longa</i> (Haledo), <i>Citrus aurantifolia</i> (Kagati)
16.	Burnt wound (Aagole Poleko)	<i>Aloe barbadensis</i> (Ghuikumari), <i>Raphnus sativus</i> (Banmula)
17.	(Khorna)	<i>Schima wallichii</i> (Chilaune)
18.	Toothache (Danth Kirale khako)	<i>Datura species</i> (Seto Dhaturu), <i>Solanum indicum</i> (Kande bean)
19.	Measles (Dadura)	<i>Eleusinae coracana</i> (Kodo), <i>Dolichos biflorus</i> (Gahat).
20.	Pneumonia (Sannipat)	<i>Heracleum nepalense</i> (Chimfin), <i>Dendrocalamus hamiltonii</i> (Bans)
21.	Dog bite (Kukurle Tokeko)	<i>Datura metel</i> (Kalo Dhatura), <i>Bergenia ciliata</i> (Pakhanbed), <i>Utica dioca</i> (Sissnu)
22.	Throat pain (Ghati Dukhelko)	<i>Raphnus sativus</i> (Banmula)
23.	Cut wound (Kateko ghau)	<i>Artemesia indica</i> (Titepati), <i>Drymaria cordata</i> (Abhijalo), <i>Dryopeteris filixmas</i> (Hade unyu)
24.	Rheumatic pain (Haad-jorni dukheko)	<i>Heracleum nepalense</i> (Chimfin), <i>Zanthoxylum armatum</i> (Timur), <i>Evodia fraxinifolia</i> (Khanakpa)
25.	Typhoid	<i>Citurs reticulata</i> (Suntala), <i>Ficus religiosa</i> (Peepal)
26.	Body and Back pain (Dhad/Jhiu dukhuko)	<i>Lepidium sativum</i> (Chamsur), <i>Brassica compestris</i> (Tori), <i>Astilbe rivularis</i> (Thulo Okhat), <i>Viscum articulatum</i> (Hadchur)
27.	Ear problem (Kan pakeko)	<i>Ocimum basilicum</i> (Babari)
28.	Tongue Eozema (Jibroko khatira)	<i>Rubus ellipticus</i> (Ainselu)
29.	Snake bite (Sarpale Tokeko)	<i>Musa paradisiaca</i> (Kera)
30.	Internal Eczema (Jhium Bhitra ko khatira)	<i>Carum corticum</i> (Swoup)
31.	Headache (Tauko dukhejo)	<i>Heracleum nepalense</i> (Chimfin), <i>Lindera neesiana</i> (Siltimur)
32.	Low appetite	<i>Lindera neesiana</i> (Siltimur)
33.	Insect bit (Kirale tokeko)	<i>Ageratum conyzoides</i> (Ilame jhar)
34.	Indigestion and stomach disorder	<i>Ammomum subulatum</i> (Alainchi),
35.	Constipatin (Kabjiyat)	<i>Dioscorea species</i> (Bhyakur), <i>Chenopodium album</i> (Bethu)
36.	A fish bone prick (Kada Adkeko)	<i>Rhododendron arboreum</i> (Laligurans)

5.2.2.3 Plant parts used:

Different parts of the plants were used either in the raw form or through processing to extract important drugs out of them in the traditional medicine system by the Lapcha people of the study area. The roots, leaves, seeds and bark were the most used parts of plant. In some cases a whole plant was used. In the same way, rhizome, flower, young shoots and latex were the other parts and products of plants that have been used for medicinal purposes.

5.2.2.4 Forms of medication:

The different plant species used in the traditional healing system of Lapcha were used in different forms like juice, decoction, infusion, diluted drugs, raw, paste and powder. It was made by crushing, pounding and grinding the parts to be used or the whole plants to extract important drugs out of them applying the indigenous knowledge present in the community.

5.2.2.5 Routes of Administration:

The medicines extracted from different plants were administered through different routes by inhalation, instillation, oral administration and massage. Most of the medication were administered orally (in 44 different cases), applying (20 different cases) and inhalation (in 4 different cases).

5.2.2.6 Detailed Study of medicinal Plants.

The plants which were used in the traditional medicine system by the Lapchas of the study area were described primarily based on the information collected during the field survey. The descriptions are given in alphabetical order of families of plant species.

1. Apiaceae

Heracleum nepalense 'Chimfin'

Habit - Small tree

Parts used - Flower, Fruit.

Forms of medication - Powder, Paste, Raw.

Medicinal uses:

- a) The fruit of *Heracleum nepalense* is cut into pieces and chewed where as paste made of it is applied on head to cure headache.
- b) The fruit and flower of *Heracleum nepalense*, fruit of *Evodia frazinifolia* (Khanakpa) and *Zanthoxylum armatum* (Timur) is cut into small pieces and grinded to make paste which is applied over joint which is aching to cure it.
- c) The fruit of *Heracleum nepalense* is cut into pieces and administered orally to cure stomach pain.
- d) 3-4 flowers are taken and grinded to make powder. The powder is taken orally with water once a day to cure pneumonia.

'Belief about Chimfin'

In Lapcha community, there is a traditional belief about Chimfin. It is believed that it should be picked on the first Tuesday after Teej (a Hindu festival) otherwise it will lose its medicinal values.

2. Araceae

Acorus calamus L.'Bojho'

Habit – Herb

Part used - Root.

Form of medication – Paste.

Medicinal use-

The leaves of *Artemisia indica* (Titepati), flower of *Ocimum basilicum* (Babari phool) and root of *Acorus calamus* is mixed and grinded to make paste. The paste is applied to cure scabies.

3. Asteraceae.

Ageratum conizoides L. 'Ilame Jhar'

Habit - Herb.

Part used - Leaf.

Form of medication - Juice

Medicinal use -

The juice extracted from the leaves is applied over the skin to cure wounds due to insect bite.

4) Bignoniaceae.

Oryxylum indicum Vent. 'Totalo'

Habit - Tree

Part used – Bark.

Form of medications - Juice.

Medicinal use -

The stem of *Saccharum officinarum* (Ukhu) and bark of *Oroxylum indicum* is crushed to make juice and fed orally to cure jaundice.

Does - 2 teaspoon for infant and a glass for adult.

5) Brassicaceae

Raphanus sativus L.'Ban Mula'

Habit - Herb

Part used - Root.

Forms of medication - Paste, Raw.

Medicinal uses:

- a) The paste of the root is applied over burnt wound to cure it.
- b) The root of the plant is cut into pieces and chewed to cure throat pain.

6) Bromeliaceae

Anana comosus L. 'Bhuikatahar'

Habit - Herb

Part used – leaf.

Form of medication - Decoction

Medicinal Use -

The leaves of *Anana comosus* and *Tagetes crecta* (Sayapatri) are boiled in water and thus formed decoction is drunk as tea to cure fever.

7) Caryophyllaceae

Drymaria cordata L.'Abhijalo'

Habit - Herb

Part used - leaf.

Form of medication - Juice, stem.

Medicinal Use-

- a) The leaves of *Drymaria cordata* are crushed and juice is taken to cure common cold.
- b) Leaves of the plant are crushed into small pieces and filled into a bamboo pipe and steamed over a fire. When it produces smoke vapour, inhale it strongly through nose to cure common cold.
- c) The juice of leaves is also applied over cut wound to cure it.

8. Chenopodiaceae

Chenopodium album 'Bethu'

Habit - Herb

Part used - whole plant.

Form of medication - Cooked.

Medicinal use:

The whole plant is cooked as vegetable and taken to cure constipation.

9. Compositae

Artemisia indica Willd 'Titepati'

Habit - Herb

Part used - Leaf.

Form of medication - Powder, juice, paste.

Medicinal uses -

- a) The leaves of *Artemisia indica* should be rubbed in hand and inhaled through nose to stop nose bleeding.
- b) The leaves of *Artemisia indica* are crushed and juice is applied over cut wound which helps to stop bleeding.
- c) The leaves, root and flower of *Artemisia indica*, *Acorus calamus* (Bojho) and *Ocimum basilicum* (Babari phool) respectively is crushed to make paste. The paste is applied to cure scabies.

Tagetes crecta L. 'Sayapatri'

Habit - Herb

Part used – Leaf.

Form of medication- Decoction.

Medicinal use -

The leaves of *Tagetes crecta* and *Ananas comosus* (Bhui katahar) is boiled in water and drunk as tea to cure fever.

10. Cruciferae

Brassica campestris 'Tori'

Habit – Herb

Part used – Seed.

Form of medication - Oil (Raw).

Medicinal use -

Powdered 10-15 gm of *Astilbe rivularis* (Thulo Okhat), *Bergenia ciliata* (Pakhanbed), *Viscum articulatum* (Hadchur) with 2-3 spoon honey of bee (*Apis cerana*), oil of *Brassica campestris* and an egg of hen (*Gallus gallus domesticus*) with a glass of cow's (*Bos indicus*) milk daily before bed for back and body pain.

Lepidium sativum L. 'Chamsur'

Habit - Herb

Parts used - Whole plant, seed.

Form of medication - Cooked, powder.

Medicinal use:

- a) The vegetable of *Lepidium sativum* is eaten to cure body pain.
- b) The powdered seed is administered orally by mixing with hot water to cure body pain.

11. Cucurbitaceae.

Cucumis sativus L. 'Kankro'

Habit – Climber

Part used – Fruit.

Form a medication - Powder.

Medicinal use -

The fruit of *Cucumis sativus* is burnt till black and grinded to make powder which is administered orally by mixing with hot water to cure common cold and fever made severe by eating cucumber (*Cucumis sativus*).

12. Dioscoreaceae

Dioscorea sp. (Bhyakur)

Habit – Climber

Part used – Rhizome.

Form of medication – Boiled

Medicinal use -

The rhizome of *Dioscorea species* (Bhyakur) is simple boiled and eaten. It contains high fibres so that it helps to wash out any unnecessary foodstuff in the small and large intestines and cleans the bowel and helps to cure constipation.

13. Dryopteridaceae:

Tectaria coadunata 'Kaloniguro'

Habit - Fern

Part used - Root.

Form of medication – Powder.

Medicinal use-

The root of *Tectaria coadunata* is grinded into powder and administered orally with water to cure dysentery.

Dose - About 50 gm of powder mixed with as glass of water until cure.

14. Ericaceae

Rhododendron arboreum Sm. 'Laligurans'

Habit - Tree

Part used – Flower.

Form of medication – Raw.

Medicinal use -

The flower (dried for fresh) is chewed gently and swallowed to release fish bone from the throat.

15. Euphorbiaceae

Emblica officinalis Gaerth 'Amala'

Habit- Tree

Part used – Bark.

Form of medication – Powder.

Medicinal use -

The bark of *Pyrus pashia* (Mel) and *Emblica officinalis* is grinded to make powder and administered orally mixing with water to cure dysentery.

Dose: About 250 ml, two times a day until cure.

Precautions: If there is fever, don't mix *Pyrus pashia* (Mel).

16. Fabiaceae

Piptanthus nepalensis 'Bakhrelahara'.

Habit - Climber

Part used – Root.

Form of medication – Powder.

Medicinal use -

The root of *Piptanthus nepalensis* is grinded to make powder and administered orally by mixing with water to cure gastric. Also, the small pieces of root can be chewed.

The older roots are preferred as it makes good medicine.

17. Gentianaceae

Swertia chirato Roxb.ex fleming 'Chiraita'

Habit - Herb

Partsused - Leaf, stem.

Form of medication – Decoction.

Medicinal use -

The leaves and stem of *Swertia chirata* is boiled with water to make decoction and administered orally to cure fever.

Dose - About 250 ml twice a day for 2 days.

18. Gramineae

Dendrocalamus hamiltonii 'Choya Bans'

Habit - Tree

Part used – Buds.

Form of medication – Paste.

Medicinal use -

The buds of *Dendrocalamus hamiltonii* (Choya Bans) are grinded to make paste and administered orally to cure pneumonia. But firstly it must be cut bottom up with knife then top down. It must be cut with these actions otherwise it doesn't have medicinal effect.

Eleusinae coracana 'Kodo'

Habit - Shrub

Part used – Seed.

Form of medication – Cooked

Medicinal use -

The powdered seed of *Eleusinae coracara* is cooked and administered orally to the child twice a day to cure measles.

Imperata cylindrical L. 'Siru'

Habit - Grass

Part used – Root.

Form of medication – Powder.

Medicinal use -

The root of *Imnperata cylindrica* is grinded to make powder and administered orally by mixing with water to cure Intestinal worms.

Dose: About 250 ml of prepared medicine once a day.

Precaution: Infant below 9 month shouldn't be fed.

Saccharum officinarum 'Ukhu'

Habit - Grass

Part used – Stem.

Form of medication – Juice.

Medicinal use -

The bark of *Oroxylum indicum* (Tatalo) and stem of *Saccharm officinarum* is crushed and juice made is administered orally to cure jaundice.

Dose - About half a glass for children and 250 ml for adult.

19. Labiatae

Mentha sp. L. 'Pudina'

Habit - Herb

Part used – Leaf.

Form of medication – Juice.

Medicinal use -

The juice extracted from the leaves of *Mentha aquatica* is administered orally to cure Diarrhoea.

Ocimum basilicum 'Linn. 'Babari Phool'.

Habit - Herb

Part used - Flower.

Form of medication - Paste, Juice.

Medicinal use-

- (a) The leaves, roots and flowers of *Artemesis indica* (Titepati), *Acorus calamus* (Bojho) and *Ocimum basilicum* respectively is mixed and grinded to make paste. The paste is applied to cure scabbies.
- (b) The solution made from the leaves of *Ocimum basilicum* is used as medicine of ear problem. Few drops of it are administered into the affected area.

20. Lauraceae

Lindera neesiana Benth 'Siltimur'

Habit - Tree

Part used – Fruit.

Form of medication - Raw, oil.

Medicinal use -

- (a) The fruit of the plant is taken orally to cure gastric and low appetite.
- (b) Oil extracted from seed is used to massage head during headache.

21. Leguminosae

Dolichos biflorus 'Gahat'

Habit - Herb

Part used – Seed.

Form of medication – Cooked

Medicinal use-

The seed of *Dolichos biflorus* is cooked to make dal and administered orally to cure

measles.

Dose - About 250 ml twice a day.

Trigonella foenumgraceum 'Methi'

Habit - Herb

Part used – Seed.

Form of medication – Powder.

Medicinal use -

The seed of the plant is roasted and grinded to make powder. The powder is taken orally to cure cough.

22. **Liliaceae**

Aloe berbadensis 'Ghui Kumari'

Habit - Herb

Part used – Leaf.

Form of medication – Juice.

Medicinal use -

- a) The leaf of the plant is broken and the latex inside it is applied over burnt wound to cure it.
- b) The leaf of the plant is soaked in water for 1 day and is broken. The latex inside it is mixed with lukewarm water and administered orally to cure stomach disorder.

23. **Loranthaceae**

Viscum articulatum Burn f. 'Hadchur'

Habit - Shrub

Part used – Leaf.

Form of medication – Paste.

Medicinal use -

The leaves of *Viscum articulatum*, tuber and roots of *Spermadictyon suaveolens* (Bhui Champa), root of *Rosa brunnonil* (Bhainsi singe) and seeds and leaves of *Lepidium sativum* (Chamsur) along with Rato mato (Red soil), Simrik (red rock) grinded and mixed together to make paste. This medicinal paste is further mixed with cooked and semi cooked *Eleusinae coracana* (kodo) flour. This combination is then used as plaster to cover the fractured bone and is wrapped with hand made Nepali (Lokta paper). In addition a piece of *Bambusa nutans* (Mal Bans) is used to make

fractured bone immovable and hence cured.

24. Meliaceae

Azadirachta indica (A. Juss) Neem

Habit - Tree

Part used – Leaf.

Form of medication – Decoction.

Medicinal use -

The leaves of the plant are boiled in water and decoction is made. The decoction is administered orally to cure fever.

25. Moraceae

Ficus religiosa L. 'Peepal'

Habit - Tree

Part used – Root.

Form of medication – Powder.

Medicinal use -

The root of *Ficus religiosa* and *Citrus reticulata* (suntala) is grinded to make powder. The powder is administered orally by mixing with water to cure typhoid.

Dose - About 50 gm powder mixed with water for 2-3 days.

26. Musaceae

Musa paradisiaca L. 'Kera'

Habit - Tree

Part used – Stem.

Form of medication – Juice.

Medicinal use -

The stem of the plant is cut and water (Juice) coming out of it is applied over the wound of snake bite to reduce the burning effect of poison.

27. Myrtaceae

Psidium guajava 'Ambak'

Habit - Tree

Part used – Bark.

Form of medication – Syrup.

Medicinal use -

The bark of *Psidium guajava* is grinded to make powder. The powder is mixed with

water and mishri (processed sugar) and administered orally to cure diarrhoea.

Dose: About 250 ml, 2-3 times a day.

28. Nephrolepidaceae

Nephrolepis auriculata L.'Pani Amala'

Habit- Tree fern

Part used – Tuber.

Form of medication – Raw.

Medicinal use -

The tuber of plant is cut into pieces and chewed to cure fever and tonsil.

29. Polypodiaceae

Dryopteris filixmas 'Hade Unyu'

Habit - Fern

Part used – Leaf.

Form of medication – Juice.

Medicinal use -

The juice extracted from leaves by rubbing is applied over the cut wound to stop bleeding.

30. Ranunculaceae

Aconitum palmatum Buch-Ham 'Bikhama'

Habit - Herb

Part used – Root.

Form of medication – Boiled

Medicinal use -

The root of the plant is boiled in water. The boiled root is cut into pieces and chewed to cure fever.

Clematis buchananiana 'Pinashe lahara'

Habit - Climber

Part used – Root.

Form of medication – Powder.

Medicinal use -

The root of the plant is grinded to make powder. The powder is kept over a piece of cloth and inhaled to cure sinusitis.

31. Rubiaceae

Rubia manjith Roxb. Ex Flemming 'Majitho'

Habit - Herb

Part used - Whole plant.

Form of medication – Paste.

Medicinal use:

The paste of plant is applied over scabbies to cure it.

Spermadicyon sauveolens Roxb. 'Bhuichampa

Habit - Shrub

Parts used - Tuber, root.

Form of medication – Paste.

Medicinal use-

The leaves of *Viscum articulatum* (Hadchur), tuber and roots of *Spermadictyon suaveolens* (Bhui champa, root of *Rosa drunonii* (Bhaisi singe) and seeds and leaves of *Lepidium sativum* (Chamsur) along with Rato mato (Red soil) Simrik (Red rock) were grinded and mixed together to make a paste. This medicinal paste is further mixed with cooked and semi cooked *Eleusinae coracana* (Kodo) flour. This combination is then used as plaster to cover the fractured bone and is wrapped with hand made Nepali paper). In addition, a piece of *Bambusa nutans* (Mal Bons) is used to make the fractured bone immovable and hence cured.

32. Rosaceae

Rubus ellipticus Sm. 'Ainselu'

Habit - Shrub

Part used - Young shoot.

Form of medication – Paste.

Medicinal use-

The young shoots of the plant is grinded to make paste which is applied over the eczema (khatira) of tongue to cure it.

Rosa brunonii 'Bhainsi singe'

Habit - Herb

Part used – Root.

Form of medication - Paste.

Medicinal use - As described in Hadchur

Pyrus pashia 'Mel'

Habit - Tree

Part used - Fruit, Bark, Young shoot.

Form of medication - Juice, powder, Raw.

Medicinal use -

- (a) The bark of *Pyrus pashia* and *Emblica officinalis* (Amala) is grinded to make powder and administered orally to cure dysentery.
- (b) Young shoots of the plant is grinded and juice formed is mixed with water and administered orally to cure dysentery. Also small pieces of dried fruit can be chewed to cure dysentery.

Precaution: It there is fever, *pyrus pashia* shouldn't be given.

33. **Rutaceae**

Citrus aurantifolia Chrism 'Kagati'

Habit - Small Tree

Part used – Fruit.

Form of medication – Juice.

Medicinal use -

The juice extracted from the fruit of the plant is administered orally to stop vomiting.

Citrus medica 'Bimiro'

Habit - Shrub

Part used – Root.

Form of medication – Powder.

Medicinal use - The root of the plant is grinded to make powder and administered orally to cure Intestinal worms.

Dose: About 50 gm powders mixed in water twice a day before eating food.

Citrus reticulata L.'Suntala'

Habit - Tree

Part used – Root.

Form of medication – Powder.

Medicinal use -

The root of *Citrus reticulata* and *Ficus religiosa* (Peepal) is grinded to make powder which is administered orally by mixing with water to cure typhoid.

Dose: About 50 gm powders mixed with water for 2-3 days.

Evodia fraxinifolia (Hook. F) 'Khanakpa'

Habit - Small tree

Part used – Fruit.

Form of medication – Paste.

Medicinal use:

The fruit and flower of *Heracleum nepalense* (Chimfin), fruit of *Evodia fraxinifolia* and *Zanthoxylum armatum* (Timur) is cut into pieces and grinded to make paste. The paste is applied over the area of joint ache to reduce pain and finally cure it.

Zanthoxylum armatum Dc. 'Timur'

Habit - Small tree

Part used - Fruit (seed).

Form of medication – Paste.

Medicinal use - As described above.

34. Saxifragaceae

Bergenia ciliata Howorth 'Pakhanbed'

Habit - Herb

Part used – leaf.

Form of medication – Paste.

Medicinal use -

The leaf of the plant is grinded to make paste which is applied over the wound of dog bite to prevent infection as primary treatment.

Astible rivularis 'Thulo Okhat'

Habit - Herb

Part used - Root

Form of medication - Powder

Medicinal use - As described in *Brassica campestris*.

35. Solanaceae

Capsicum annum (Linn). 'Dolle Khorsani'

Habit - Herb

Part used – Fruit.

Form of medication – Raw.

Medicinal use -

The fruit of the plant is eaten with food to cure gastric.

Datura metel Linn. 'Kalo Dhaturu'

Habit - Herb

Part used - Seed

Form of medication - Raw

Medicinal use -

The seed of *Datura metel* is administered orally with fruit of *Musa peradiasiaca* (Kera) to prevent rabbies.

Dose: About of seeds for 7-10 days for adult.

Datura species 'Seto Dhaturo'

Habit - Herb

Part used - Seed.

Form of medication - Inhalation.

Medicinal use -

The seed of *Dhaturo* species is burnt and puff of it is taken to cure tooth ache.

Solanum indicum Linn. 'Kande Bean'

Habit - Herb

Part used - Seed.

Form of medication- Raw.

Medicinal use -

The seed of *Solanum indicum* is kept in the cavity of tooth to cure toothache.

36. Ternstroemiaceae

Schima wallichii Chois. 'Chilaune'

Habit - Tree

Part used - Stem and Root.

Form of medication-Raw.

Medicinal use:

The base of stem or root of the plant is unbarked and 'Paitala' (foot palm) is rubbed to cure a skin disease of foot palm called 'Khorna'

37. Umbelliferae

Anethum sowa 'Swoup'

Habit - Herb

Part used – Seed.

Form of medication – Decoction.

Medicinal use -

The seed of the plant is boiled in water and the decoction made is administered orally to cure internal eczema.

Carum copticum 'Jwano'

Habit - Herb

Part used – Seed.

Form of medication – Powder.

Medicinal use - The seeds of *Carum copticum* is mixed with few seeds of *Zanthoxylum armatum* (Timur) and small amount of black salt (Birenoon). The is then grinded to make powder. One teaspoon of thus made powder is taken with lukewarm water to cure gastritis.

38. Urticaceae

Urtica dioica 'Sissnu'

Habit - Herb

Part used - Leaf, Young, shoot.

Form of medication - Paste.

Medicinal use -

Fresh young shoots of *Urtica dioica* is grinded with the shit of rat and then mixed with water to make paste. The paste is then applied on the wound of dog bite to avoid infection.

39. Zingiberaceae:

Amomum subulatum Roxb. 'Alainchi'

Habit - Herb

Part used – Seeds.

Form of medication - Powder, Raw.

Medicinal use -

(a) Seeds of the plant is chewed during indigestion.

(b) Similarly powder made by grinding is mixed with hot water and administered orally to control vomiting.

Zingiber officinale Ross 'Aduwa'

Habit - Herb

Part - Herb

Part used - Root, Rhizome.

Form medication - Paste, Raw, Juice.

Medicinal use:

The rhizome of the plant is burnt in fire for a while and cut into pieces which are chewed to cure cough. Also, juice and paste made by grinding the rhizome of is mixed with honey of bee (*Apis cerana*) to cure cough.

Corcuma longa 'Haledo'

Habit - Herb

Part used – Rhizome.

Form of medication – Paste.

Medicinal use -

The rhizome of the plant is grinded to make paste and administered orally with lukewarm water to prevent vomiting.

5.3 Indigenous Knowledge System

5.3.1 Indigenous foods of Lapcha Community

During the field study, it was found that the Lapcha people have been happy to eat whatever they found in the forest. Their indigenous foods can be categorized as wild edible foods, food grains, vegetables and mushrooms. Indigenous knowledge regarding the food processing technique of some wild edible foods is as below:

5.3.1.1 Food processing technique of Giththa (*Dioscorea species*):

Gittha, as a wild edible food, has a specific procedure of preparation for eating. It has a bitter taste and has to be boiled with ash to neutralize its bitterness. After that, it has to be left under running water to further reduce its bitterness i.e. in a stream or tap to make it ready for eating. It tastes like boiled potato and becomes more tasty and delicious with normal milk or sour milk.

5.3.1.2 Food processing technique of Simal Tarul (*Manihot utilissima*):

Simal Tarul is poisonous in nature. Cattle will die immediately not only by eating it but also if it drinks the water left after boiling unbarked simal tarul. It also affects the human health if consumed without debarking. Therefore, precautions need to be taken while using this tarul. The debarked Tarul is simply boiled and eaten.

5.3.1.3 Food processing technique of Sissnu (*Urtica dioca*):

Firstly, tender leaves of sissnu (*Urtica dioca*) are picked and put into the loose knitted bamboo basket. Maize flour is spread over these leaves. This is used as an ingredient to separate the insect from the leaves and this process take around half an hour, but it depends on the quantity of the leaves. After removing insects in the leaves, it is put into the boiling water and mixed with maize flour to make sisnu curry gravy. In addition, simple salt and chilly are used to make it tasty.

5.3.1.4 Identification of Edible and Non-Edible Mushrooms:

There are a number of varieties of wild mushroom that have been used by the Lapcha people of study area. They believe that these foods contain as much protein as in animal meat and use it as a substitution for animal meat. So, identification of edible or non-edible mushroom becomes important which is identified as follows.

(a) Non-edible mushroom (Poisonous mushrooms):

The non-edible mushroom contains black and dark blue coloured rings beneath its head and colour of head is orange and black. These mushrooms are very poisonous. Likewise, mushroom found in the bamboo clumps and stumps of Chilaune (*Schima wallichii*) is also known to be non-edible.

(b) Edible mushrooms:

Mushroom grown in the stumps of the Khanyu (*Ficus semicordata*), Katus (*Castanopsis* species), Mauwa (*Angel hardtiaspicata*), Jhhingane (*Eurya accuminata*), Uttis (*Alnus nepalensis*) and Mel (*Pyrus pashia*) are considered edible by the local Lapcha people of the study area.

5.3.2 Indigenous Knowledge on Natural Dye

(a) Red colour:

There are two types of Majitho (*Rubia manjith*), i) Small leaved Majitho (roots and leaves) and ii) large leaved majitho (roots). Roots and leaves of these two majithos are firstly grinded and mixed with cold water to make a solution. This gives a red and permanent colour. One can dye cloth with this solution to make it red. However one should avoid washing this dyed cloth in hot water because this makes it fade.

(b) Black colour:

Zea mays (Maize) is roasted till it gives a black colour and then grinded to make powder. This powder is mixed with cold water with solution of tender leaves of *Artemesia indica* (titepati) to make a black solution. This solution was used as black ink to write by old Lapcha folks.

(c) Blue colour:

The matured seeds of *Dichroa febrifuga* (Basak) are grinded to make powder and are mixed with cold water to give blue colour, which can be used to dye cloth.

5.3.3 Indigenous knowledge on usage of Bamboo

Bamboo is the most used plant species in the Lapcha community. The Lapcha maxim says like this "*Pomik Potong Ayit kung mo sa dook*", which means God, had actually created the bamboos along with the Lapchas (Tamsang, 1983). The various species of bamboo is used for several purposes like building houses, bridges, handicrafts, bows, arrows, furnitures, baskets, fences, firewood, flutes etc. Because of such wide usage of bamboo, they use it with care. They believe that Bamboo shouldn't be harvested on Tuesday and Saturday for any purpose because the durability of the bamboo decreases due to the effects of insect borer. Some important bamboo species used for different purpose is described below:

5.3.3.1 Bhalu Bans (*Dendrocalamus hookeri*)

This bamboo has had many uses in the Lapcha community ever since the time of their ancestors. A bamboo container made from three nodes is used to fetch water as one node has capacity to hold four litres of water. Like wise, single node bamboo is used to keep milk for the processing of sour-milk, butter and ghee. It is also used for drinking 'Tumba', a fermented drink made from millet. It is also used for storing salt, food grains like wheat, maize, rice etc. This bamboo is also used as a construction material for building huts and

houses. It is basically used as pillars and beams, planks for flooring, trusses to support a roof etc.

5.3.3.2 Choya Bans (*Dendrocalamus hamiltonii*)

This Bamboo is taken as soft. The bark of one to two year old bamboo is used to make 'Choya' (threads and ropes). Various Bamboo crafts are made with this Bamboo 'Choya' such as Doko and 'Thunche' (use as a backpack to carry loads), Tokari and Dalo (use to keep food grains and other), Kokro (used to keep small baby as baby sitter), Chhapani (used to filter millet wine (Janda'), Mandro and Nanglo (used to spread food grains in sun), Ghum (used to prevent from the rain as raincoat) and Dhadiya (used to catch fishes in the river).

5.3.3.3 Mal Bans (*Bambusa nutans*)

This is the strongest and straight Bamboo that the Lapcha use. It is therefore used as a construction material i.e. pillars, beam and other load bearing structure such as house ladders. This Bamboo is useful for making local bridges as well as kila (nail), Siyo (needle) and Sinka (a traditionally weaving material). Kitchenware is made of this Bamboo as well, such as Panyu (Spatula) to make rice and Dhido (an indigenous food made of millet flour).

Mal Bans are useful for making Dhanush-Ban (Bow and Arrow) and Guleli (catapult), a traditional weapon for hunting and handles of spades.

5.3.4 Indigenous knowledge in Agriculture and livestock

The Lapcha's indigenous knowledge in making insecticides and pesticides to prevent different insects and pests from damaging their agricultural crops and livestock are as follows:

5.3.4.1 Insecticides for Agricultural crops against Aphid (Lai Kira)

The fresh and matured tobacco (*Nicotiana tabacum*) leaves is firstly grinded in the 'Okhali' (a wooden grinder) in order to extract juice from them. The local Lapchas from their experiment have found that steamed leaves are more effective and easy to make juice, the juice is then made into a solution with water at a ratio of 1:2 (tobacco: water). This solution is sprayed over infected plants.

5.3.4.2 Pesticides for livestock against different ecto-and endo-parasites.

- a) The thick paste made from powdered leaves of *Nicotiana tabacum* (Tobacco) is applied thickly over the body of cattle to kill parasites like lice, etc.
- b) Fat of pig can also be applied for the same purpose.
- c) If pig is suffering from scabies then fresh blood of pig should be applied to cure it.
- d) The mixture of vegetable and kerosene oil is applied on head of rooster to remove sulzulle (an ectoparasite).

5.3.4.3 Medicines used for livestock for different diseases

- a) The leaves of *Cannabis sativa* (Gaza) are grinded to make powder and mixed with water. The mixture is administered orally to cure indigestion and diarrhoea in cattle.
- b) The fruit juice of *Citrus aurantifolia* (Kagati) is administered orally to cattle if they don't eat grass (low appetite).
- c) The powdered *Zanthoxylum armatum* (Timur) is also administered orally by mixing with water in case of low appetite in cattle.
- d) The paste of *Allium sativum* (Lasun) is administered orally to calf of cow and buffalo to prevent intestinal worm.
- e) *Dioscorea species* (Khasre Bhyakur) is used as medicine for cattle when they suffer from the disease of *Diphtheria* (Bhyagute disease). The paste of Bhyakur is applied on the cattle's tongue. Before it, the effected part needs to be washed and cleaned by rubbing with the *Zea mays* (maize) cobs.
- f) 7-10 seeds of *Datura metel* (Kalo Dhaturu) is administered orally, to prevent *Canis familiar* (dog) from being mad.
- g) The paste made from roots of *Urtica dioica* (sisnu) is applied over the fractured leg and tied with piece of cloth to cure it.

5.3.5 Indigenous Knowledge on Seed Storage and Preservation

The dust powder of *Acorus calamus* (Bojho) helps to preserve the seeds of wheat, maize and beans. The root of Bojho is firstly dried either in the sun or in an oven. After that, these dried Bojho is then grinded into dust powder. The dust powder is packed into thin cloth and placed into the centre of the storage seeds. The smell of this Bojho powder prevents the stored seeds from the Ghun Kira (grain borer). 50 grams of this powder is necessary for 1 pathi (about 4 kg) of seeds.

5.3.6 Indigenous Knowledge System on Biodiversity Conservation

5.3.6.1 Conservation of Animals

Lapcha people have the tradition of killing males of animals if they are more than necessary and preserving females of both domestic and wild animals. This helps in continuation and conservation of successive generation of animals.

5.3.6.2 Conservation of Wild Food (Githa Bhyakur):

Lapcha people also conserve the wild Githa Bhyakur as it is one of their main indigenous foods. While taking out the yam, they don't take out all, but leave some parts inside the pit and cover with leaves, twigs and fertile soil so that it can grow into new plants and produces fruit continuously. They also put a wall of stone of the plant is in sloppy area so that running water doesn't sweep away the plant. They also put a flat stone beneath the pit to make sure that the yam doesn't go deep inside the earth so that it will be hard to dig out.

5.3.6.3 Conservation of forest:

During the field visit it was known that Lapchas were aware of the importance of forest and preserving it since time immemorial. *There was a rule to plant eight trees if anybody cut one tree.* Nowadays also most of the Lapcha families have their own forest to fulfill their need and they preserve it with keen interest.

5.3.6.4 Conservation of Medicinal Plants:

Lapcha people believe that medicinal plants should be collected on Saturday and Tuesday only as it has better effects on the respective ailments and diseases. Usually, Yaba-Yam Boongthing and Mun (traditional healers) revive these medicinal plants with 'mantras' to get good effects of the medicine. Likewise, first Tuesday after the Teej (a Hindu festival) is known as the day of collection of medicinal plants. Similarly, days of sun eclipse and Moon eclipse are the best period for collecting medicinal plants. On these days, they believe that rays of solar and lunar have beneficial effects on the medicinal plants. In addition, the plants collected in these days don't need to be revived by the traditional healers. This traditional belief helps in the preservation of medicinal plant as it allows harvesting of such plants only in certain days and by certain people and prevents over harvesting leading to its conservation.

Chapter VI

Discussion

6. Discussion

Lapchas are one of the original inhabitants of Nepal comprising 0.02% of Nepal's population (CBS, 2003) that accounts for one of the least populated indigenous group and has been designated as one of the ten endangered ethnic groups of Nepal by the act "National Foundation for Development of Indigenous Nationalities Act, 2058 (2002 AD)". They are found mostly concentrated in Ilam district of eastern Nepal. Most Lapcha in Nepal are peasants: small subsistence farmers trying to get what they can produce on their small plots of land situated near the forest or forest patches. Because of their close association with nature, they have abundant knowledge and skill in utilizing natural forest products found in their vicinity for traditional medicinal practices.

The local Lapcha people of Fikkal VDC have been using both wild and domesticated plants and animals in their traditional medicinal practices since time immemorial. They have a rich tradition, culture and indigenous knowledge to support the utilization of various plants and animal species for medicinal purposes. The present study unveiled that they used about 19 animal species both wild and domesticated belonging to 10 order and 13 families and 61 species of medicinal plants belonging to 35 families, 58 genera for medicinal purposes for their traditional healing practices where plant species were dominant over animal species.

Analysis of data showed that 19 animal species recorded from the study area was used in the treatment of 21 different diseases/ailments by the local Lapchas using their indigenous knowledge. Among the 19 animal species, 11 species were mammals, 1 species each of Aves, Reptiles, Amphibian and Pisces and 4 species were invertebrates. For different medicinal purpose different parts as well as products of animal species such as honey, teeth, bile, milk, meat, horn, hide, brain, hoof, foetus, saliva, stomach, e.g., fat etc as well as the whole organism were used. The most frequently used animal part was bile for 4 medical remedies followed by bone for 3 remedies and meat, egg, fat, milk, honey for 2 remedies each. Among the total animal species used for medicinal purposes, 6 species of them were used to cure disease of respiratory track and for cuts and wounds, 5 species each for gastrointestinal and skeletal problems and 1 each for dog bite, mushroom's poison, ring worm, snake bite and pungent smell from body (Thangne); respectively. Most of the species were used raw for medicine and some of the animal species were used to treat more than one disease. Medicines were basically administered in two ways, orally for internal medication (15 remedies) and applying for external medication (11 remedies).

Among the 19 animal species used for medicinal purpose, 11 species were wild and 8 species were domesticated. *Bubulus bubalus*, *Bos indicus*, *Capra hiscus*, *Sus species Canis*

familiar, *Equus coballus*, *Gallus gallus domesticus*, *Apis cerana* were domesticated where as *Axis axis*, *Canis aureus*, *Panthera tigris*, *Elephus maximus*, *Hystrix brachyura*, *Rana tigrina*, *Palaemon malcolmosonii*, *Apis dorsata*, *Anadenus* species, fish and snake were wild species.

The animal species reported to have folk medical utility in the present study area are also supported by the findings of other researchers. For example the cooked meat and alcohol of meat of *Canis aureus* was used for the treatment of rheumatism in the present finding which was also reported by Kaundinya (1998), Acharya (1999), Dhakal (2004) and Thapa (2008) in their study. However, Negi and Palyal (2007) reported the use of meat of this species in curing paralysis and arthritis and blood for asthma. Thakur (2008) reported the use of urine of this species in treatment of insanity and epilepsy. The stomach of *Hystrix brachyura* was used for curing Asthma in the present study was also reported by Kaundinya (1998), Acharya (1999), Tamang (2003), Dhakal (2004), Koirala (2004), Negi and Palyal (2007) and Thapa (2008). The egg and fat of *Gallus gallus domesticus* was used to treat burnt wound, body pain was reported in present study. Kafle (2000), Koirala (2004) and Thapa (2008) reported the use of this species for curbing burn and Kaundinya (1998) and Dhakal (2004) reported the use of this species for bone fracture. The honey of *Apis cerana* was reported for curing cough, body and back pain was supported by findings of Koirala (2004), Tamang (2003) and Thapa (2008). *Anadenus species* was used for treatment of cut wounding worm and bone fracture in present study. Thapa (2008) reported its use in treatment of fractured bone. The honey of *Apis dorsata* was reported for curing vomit, fatigue, loss of appetite and snake bite in this present study; however Tamang (2003) reported its use for curing cough and cold and as tonic.

Similarly the tooth and bile of *Bubatus bubatus* was used for treating boils and asthma; respectively, the tooth and milk of *Bos indicus* was used for curing boils and body and back pain. The bile of *Capra hiscus* and *Sus species* was used for treating asthma, the hoof and foetus and *Axis axis* for treating dysentery and mushroom poisoning. The meat and egg of *Rana tigrina* was used for curing dysentery and piles. The brain of *Canis familiar* for treating rabbies and meat and hide of *Canis aureus* for curing T.B. The bone of *Panthera tigris* was used for curing Baaghe and that of *Elephus maximus* to cure internal eczema. The milk of *Equus coballus* was used for treating Thangne Biram whereas mandibles of *Palaemon malcolmosonii* were used to remove thorn from body. The bile of snake and fat of fish was used for curing cut and burnt wound respectively.

The documented 61 species of medicinal plants have been used for the treatment of 36 different ailment/diseases. Among these 61 medicinal plants species, 77.04% belongs to dicotyledons, 18.03% monocotyledons and 4.91% pteridophytes. The primary source of medicinal plants in terms of number of species were herbs (50.82%), followed by trees (26.23%), shrubs (8.19%), climber (6.56%), fern (4.91%) and grass (3.27%) of total species. The different plant parts used for medicinal preparations were roots, leaves, seeds, bark, rhizome, flower, young shoots, stem, tuber, buds and sometimes whole plant is also used. The most repeatedly used plant part was the root (14 medical remedies) followed by leaf (13 medical remedies), seed (11 medical remedies) and fruits (8 medical remedies). The frequently treated disease or ailments in their traditional healing system are respiratory tract infections, gastro-intestinal ailments, skeleto-muscular problems and dermatological infections: The highest number of remedies i.e. 25% of all the remedies were used to treat

gastro-intestinal ailments (diarrhoea, dysentery, stomach pain, intestinal worm, gastric, low appetite, indigestion and stomach disorder and constipation) by using 16 medicinal plant species. 19.44% remedies were used to cure respiratory tract infection (fever, cold, cough, sinusitis, headache etc.) using 16 medicinal plant species, 8.33% remedies were used to cure ENT problems (Tonsillitis, ear pain etc) using 3 plant species where as 5.55% of remedies were used to cure dermatological infections (Scabbies, khorna etc.) using 5 plant species. Similarly 3 medicinal plants species is used to cure vomiting, dog bite and cut wounds, 2 plant species for burnt wound, measles, jaundice, toothache, and typhoid and 1 medicinal plant species each for fish bone prick, insect bite, tongue and internal eczema and snake bite respectively.

The administration of different medicines formed from various plant species in the traditional medicinal system of Lapcha were used in the different forms like juice, paste, powder, decoction, infusion, diluted drugs and smoke. The required plant parts were crushed and grinded using mortar and pestle made of wood and stone. The crushed part is filtered using thin cloth to obtain juice. Likewise paste was prepared by pounding the plant part with some water. For a decoction, the plant part or whole plant, were boiled with water to about half the amount. The powder was obtained by grinding the dried plant part. The plant part was soaked in water for a day or night to prepare infusion and diluted in water to form diluted drugs.

Some of the medicinal plants were found to have more than a single therapeutic uses. The plant species having multiple medicinal purposes were *Heracleum nepalense*, *Lindeera neesiana*, *Aloe barbadensis*, *Ammomum subulatum*, *Ocimum basilicum*, *Viscum articulatum*, *Lepidium sativum*, *Drymaria cardata*, *Artemesia indica*, *Raphnus sativus*, *Eleusinae coracane*. The plant species were either used singly or in combination with other plant species for traditional healing purposes. For e.g. the bark of *Oroxylum indicum* (Totalo) and stem of *Saccharum officinarum* (Ukhu) is crushed and juice made from it is used to cure jaundice. The bark of *Pyrus pashia* (Mel) and *Embllica officinalis* (Amala) is grinded to make powder and administered orally to cure dysentery. The seeds of *Carum copticum*, *Zanthoxylum armatum* and small amount of black salt (Birenoon) are grinded and the powder is taken with lukewarm water to cure gastritis.

The medicinal plant species documented in the study area to have folk medicines utility are also supported by the findings of other researcher. For example, leaf of *Aloe barbadensis* was used in curing the burnt wound and stomach disorder in the present study was supported by the study of Ghimire (1999), Rai (2003), Tamang (2003) also reported the use of the species for treating the burnt wound but Ramana (2008) reported the use of this species for curing eye infection. The leaf and stem of *Swertia chirata* was used in curing fever in the present study is also supported by the study of Thapa (2008) whose finding also revealed its use in controlling fever. However, Ghimire (1999) reported its use as antihelminthic drug and Rai (2003) reported its use in treating Hypertension and Diabetes. Oli (2003) reported the use of the same species for fever, pneumonia, cough and diarrhoea/dysentery. Also Pandey (2006) reported the use of *Swertia species* for fever, jaundice, indigestion, cough, cold, blood and gall bladder problems. The leaf of *Artemesia*

indica was found to cure nose bleeding, cut wound, scabbies in the present study. The study of Oli (2003), Kunwar and Adhikari (2005), Thapa (2008) reported the use of this species in cuts and wounds to stop bleeding supporting the present findings. Joshi and Joshi (2007) reported its use in curing itching which supports the present study. However, Ghimire (1999), Rai (2003) reported its use in helminthic cure and nervous fresher respectively and Tamang (2003) for nausea problem and intestinal worms. Pandey (2006) reported the use of same species for cough and cold. The use of the root of *Imperata cylindrica* was reported to cure intestinal worms in present study is also supported by the findings of Tamang (2003) Oli (2003) who reported the use of this species for similar purposes. However, Rai (2003) has reported the use of this species for curing piles, diarrhoea. The seed and whole plant of *Lepidium sativum* was reported to be used in the treatment of body and back pain and bone fracture in the present study. Thapa (2008) reported the use of the some species in curing back and body pains. However, Rai (2003) has reported the use of this species in curing asthma, cough, poles and diuretic. The use of flower of *Rhododendron arboreum* for fish bone prick in the present study is similar to the study of Subedi (1998), Karki (2001), Gurung (2002), Shrestha and Dhillion (2003), Oli (2003), and Thapa (2008). Also the use of the same plant has been reported by Rai (2003) and Thapa (2008) for curing dysentery. The present study revealed the use of *Viscum articulatum* in curing bone fracture is also supported by findings of Ghimire (1999), Oli (2003) and Rai (2003).

There is no doubt Lapcha community has tremendous indigenous knowledge on wild edible foods, mushroom, use of medicinal plants and animal for treating different diseases/ailments. However, they were less flexible in sharing their every knowledge regarding the use of medicinal plants and animals as they had a belief that if such knowledge is shared then the medicinal plants and animals would loose their medicinal values and also because of the closed society and shyish nature. However, some of the healers and knowledgeable people were very enthusiastic in preserving their knowledge for future generation and they had a strong belief that it was impossible without the documentation of present knowledge, so they were very cooperative and shared their knowledge openly.

The dependency on traditional medicine is decreasing day by day because of the popularization and easy access to modern medicine. The people of Fikkal VDC visit the nearby health post. However, a large population still uses traditional medicine and use modern medical facilities as an alternatives or vice-versa. Hence, it was revealed that the villagers still treat simple and common ailments at home for their primary health care and seek for modern health facilities for serious diseases.

With increase in the awareness among the Lapcha people due to increase of educated people and interaction with other communities they are not only preserving their culture, tradition and language, but also their pristine and precious indigenous knowledge system. Along with the raising awareness their own cultural belief and tradition has also supported in the conservation and sustainable use of medicinal plant species. They have selected days for collection of plant species for medicinal purposes like Saturday and Tuesday first Tuesday

after the Teej (a Hindu festival) and days of solar and lunar eclipse. Also only the needed part and amount of plants were collected which ensured the prolonged and sustainable use and management of these species.



CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

The present study carried out in Fikkal VDC of Ilam district revealed that the Lapcha community of the study area has a sound knowledge on the usage of locally available animals and plant species for traditional healing system as medicines. The plant species were used mostly in comparison to animal species. The local healers (Yaba/Yama, Boongthing/Mun) were the most popular one in the village for utilizing the medicinal plants and animals in the traditional healing practices. Along with them the Lamas, elderly people, women and others also had knowledge on traditional medicine gained from their experiences and practices done from generations and used them as home remedy.

With the rise of younger generations and increment of the modern health facilities, the traditional healing practices have been shadowed a bit. The inclination of younger generation towards modern medicines is also due to lack of awareness and reluctance of older generation in sharing their knowledge with them which poses a great threat to its existence. Despite such gloomy facts, still many of villagers depended on traditional medicine for their primary health care and cure simple diseases/ailments such as fever, diarrhoea, dysentery, cold, cough, cut and burnt wound etc at home. Therefore, there is still rays of hope in popularizing the traditional medicinal systems and uplifting it with proper management and scientific approach helping the Lapcha community to upgrade their health standard in low cost effectively and efficiently.

After the reestablishment of democracy in our country it brought openness and awareness to the marginalized indigenous communities which helped them to realize about their culture, tradition, language and religion and work for its preservation. This awareness has brought significant changes in protecting their indigenous knowledge system regarding medicinal utility of plants and animals, conservation of biodiversity and others. So, it has also brought positive attitude in Lapcha community in preserving their rich cultural and traditional wealth inherited from their ancestors.

7.2 Recommendations:

- Create awareness about the importance of medicinal plants and animals with the feeling of ownership.
- Provide expertise help and training for local people to promote preservation and conservation of medicinal plants and animals for sustainable use.

- Increase frequency of research and investigation of indigenous knowledge system on biodiversity conservation.
- Initiate to record and document different medicinal plants and animals species.
- Provide scientific and technical support for youngsters for enhancing nursery to cultivate medicinal plants.
- Develop market of the medicinal plants to raise the economic standards of local people.
- Provide education and awareness for the preservation and conservation of the natural habitats of plant and animal species.
- Motivate the traditional healers for dissemination of their knowledge to youngsters for benefit of their community and mankind at large.
- The bio chemical analysis of the plants and animal parts should be done for its efficacy and verification and their patent rights should be taken to stop their abuse.
- Lastly, the government should recognize the indigenous knowledge system present in the indigenous communities and encourage preserving it by bringing comprehensive plans and policies in national level.

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ANNEX 1: CHECKLISTS.

Preparation and use of Medicine

- a. Name of disease:
- b. Symptoms of disease
- c. Name of Medicinal plants/ parts of animal used:
- d. Procedure of preparing medicine:
- e. Process of treatment along with required doses and duration of intake.
- f. Source of medicinal plants and animals.

Check list for the focus group discussion and local knowledge on the management of medicinal plants and animals.

1. How is the use of traditional medical therapy working in the present context?
2. Is there more influence of modern health facilities among the people?
3. Is there any difficulty or barrier to pass such traditional knowledge to new generation?
4. How curious are the youngsters to get and adopt such knowledge or they don't care about learning such knowledge?
5. How is the belief of youngsters towards such traditional medicinal practice?
6. What is the status of medicinal plants and animals being used are they rare in number or scarce?
7. Are people fascinated with modern health facilities like hospital, health post and primary health care center?
8. Is there any documentation done so far on the plant and animal species of medicinal values found in your area as well as their traditional knowledge?
9. What are the risks you have noticed for raring such traditional medical practice and what is your opinion for the conservation of such knowledge?
10. What are your expectations from the government and other organization in order to preserve such knowledge?
11. What are the sources of medicinal plants and animals?
12. How are the medicinal plants and animals collected?
13. Are there any specific guidelines and techniques for the harvesting and collection of medicinal plants?
14. Are there specific sites for collecting medicinal plants and animals where they are found excess?
15. In which season medicinal plants are collected excessively?
16. Are there any social or cultural rules limiting harvesting to specific period?
17. If yes, what are they and why so?

18. Which parts of plant are excessively harvested?
19. Are there any effort taken at local level towards conservation of medicinal plants?
20. Do you have taken any initiation for conserving medicinal plants?
21. Your last words?
22. Any suggestions for policy makers towards conservation of medicinal plants?

ANNEX 2: LIST OF TABLES.

Table 6: Categorization of Animal Species Used in Folk Medicines by the local Lapcha of Fikkal VDC, Ilam.

S.N.	Order	Family	Latin Name	Type	Nepali name/Local name	English Name	Organ Used
1.	Artiodactyla	Bovidae	<i>Bubalus bubalus</i>	Mammal	Bhaisi/Mahi	Buffalo	Tooth, Bile
2.	Artiodactyla	Bovidae	<i>Bos indicus</i>	Mammal	Gai/Bikh	Cow	Tooth, mill
3.	Artiodactyla	Bovidae	<i>Capra hiscus</i>	Mammal	Bakhra/Saar	Goat	Bile
4.	Artiodactyla	Cervidae	<i>Axis axis</i>	Mammal	Harin	Deer	Hoof and Foetus
5.	Artiodactyla	Suidae	<i>Sus sps</i>	Mammal	Sugur/Mona	Pig	Bile
6.	Anura	Ranidae	<i>Rana tigrina</i>	Amphibia	Kukur/Ku-jeu	Indian Bull Frog	Meat and Egg
7.	Carnivora	Canidae	<i>Canis familiar</i>	Mammal	Syal/Siwal	Dog	Brain
8.	Carnivora	Canidae	<i>Canis aureus</i>	Mammal	Baagh/Suthong	Jackal	Meat, Bone and Hide
9.	Carnivora	Felidae	<i>Panthera tigris</i>	Mammal	Ghoda/Ona	Tiger	Bone
10.	Decapoda	Palaemonidae	<i>Palaemon malcolmsoni</i>	Crustacean	Hatti/Thang-mu	prawn	mandible
11.	Galliformes	Phasinidae	<i>Gallus gallus domesticus</i>	Aves	Dhumsi/Sat him	Rooster	Egg, Fat

12.	Hymenoptera	Apidae	<i>Apis cerana</i>	Insect	Kukhura/Hik	Honey Bee	Honey
13.	Hymenoptera	Apidae	<i>Apis dorsata</i>	Insect	Sarpa/Bu	Honey Bee	Honey
14.	Perrisodactyla	Equidae	<i>Equus coballus</i>	Mammal	Manpaha/Talok	Horse	Milk
15.	Robocidea	Elephantidae	<i>Elephus maximus</i>	Mammal	Macha/Ngu	Elephant	Bone
16.	Rodentia	Hystricidae	<i>Hystric brachyura</i>	Mammal	Jhingemacha/Aarang-li	Porcupine	Stomach
17.	Stylomatophora	Helicidae	<i>Anadenus sps</i>	Mollusca	Gharmauri/Hu	Slug	Saliva, whole body
18.				Reptile	Putka/Ei	Snake	Bile
19.				Pisces	Chiplekira/Tok-nol	Fish	Fat

Table 7: Categorization of Plant Species Used in Folk Medicine by the local Lapcha of Fikkal VDC, Ilam.

S.N.	Division	Family	Latin name	Neoli name/Local name	Life form	Parts Used	Form medic
1.	Dicotyledon	Apiaceae/ Umbelliferae	<i>Heracleum nepalense</i>	Chimfin/Singden	Small tree	Flower, fruit	Powd, Paste,
2.	Dicotyledon	Asteraceae/ Compositae	<i>Ageratum conyzoides L.</i>	Ilame Jhar	Herb	Leaf	Juice
3.	Dicotyledon	Bignoniaceae	<i>Oroxylum indicum</i>	Totalo/Pragorip	Tree	Bark	Juice
4.	Dicotyledon	Brassicaceae/ Cruciferae	<i>Raphnus sativus L.</i>	Mula/Pajonk-labuk	Herb	Root	Paste,
5.	Dicotyledon	Caryophyllaeceae	<i>Drymaria cordata L.</i>	Abhijalo/Tajyomyok	Herb	Leaf	Juice,
6.	Dicotyledon	Chenopodiaceae	<i>Chenopodium album</i>	Bethu/Simbe-bi	Herb	Whole plant	Cool
7.	Dicotyledon	Compositae	<i>Artemesia indica Willd</i>	Titepati/Takmel	Herb	Leaf	Powd, Juice,
8.	Dicotyledon	Compositae	<i>Tagetes erecta L.</i>	Sayapatri	Herb	Leaf	Decoc
9.	Dicotyledon	Cruciferae	<i>Brassica Campestris</i>	Tori/Kanglang	Herb	Seed	Oil (R)

10.	Dicotyledon	Cruciferae	<i>Lepidium sativum</i> L.	Chamsur	Herb	Whole plant, seed	Cooking Powder
11.	Dicotyledon	Cucurbitaceae	<i>Cucumis sativus</i>	Kankro/Saret	Climber	Fruit	Powder
12.	Monocotyledon	Dioscoreaceae	<i>Dioscorea sp.</i>	Vyakur/Kasokding	Climber	Rhizome	Boiled
13.	Dicotyledon	Ericaceae	<i>Rhododendron arboreum</i>	Laligurans	Tree	Flower	Raw
14.	Dicotyledon	Euphorbiaceae	<i>Emblica officinalis</i>	Amala/Puom-kung	Tree	Bark	Powder
15.	Dicotyledon	Fabaceae/ Leguminosae	<i>Piptanthus nepalensis</i>	Bakhrelahara	Climber	Root	Powder
16.	Dicotyleadon	Gentianaceae	<i>Swertia chirayita</i>	Chiraito/Rungkin	Herb	Leaf, stem	Decoction
17.	Dicotyledon	Labiatae/Lamiaceae	<i>Mentha sp. L.</i>	Pudina	Herb	Leaf	Juice
18.	Dicotyledon	Labiatae	<i>Ocimum basilicum L.</i>	Babari/Ridhyongrip	Herb	Flower	Paste,
19.	Dicotyledon	Lauraceae	<i>Lindera neesiana</i> Benth	Siltumur/tanrelchok-kung	Tree	Fruit	Raw,
20.	Dicotyledon	Leguminosae	<i>Dolichos biflorus</i>	Gahat/kalahklep	Herb	Seed	Cooking
21.	Dicotyledon	Leguminosae	<i>Trigonella foenumgraceum</i>	Methi/	Herb	Seed	Powder
22.	Dicotyledon	Loranthaceae	<i>Viscum articulatum</i>	Hadchur	Shrub	Leaf	Paste
23.	Dicotyledon	Meliaceae	<i>Azadirachta indica</i> A. Juss	Neem	Tree	Leaf	Decoction
24.	Dicotyledon	Moraceae	<i>Ficus religiosa</i> L.	Peepal	Tree	Root	Powder
25.	Dicotyledon	Myrtaceae	<i>Psidium guajava</i>	Ambak	Tree	Bark	Syrup
26.	Dicotyledon	Ranunculaceae	<i>Aconitum palmatum</i>	Bikhama	Herb	Root	Boiled
27.	Dicotyledon	Ranunculaceae	<i>Clematis buchannania</i>	Pinashe lahara	Climber	Root	Powder
28.	Dicotyledon	Rosaceae	<i>Rubus ellipticus</i>	Ainselu/Kushyom	Shrub	Young shoot	Paste
29.	Dicotyledon	Rosaceae	<i>Rosa brunonii</i>	Bhainsi singe/Mahirongrik	Shrub	Root	Paste
30.	Dicotyledon	Rosaceae	<i>Pyrus pashia</i>	Mel/Maliubong	Tree	Fruit, Bark, Young shoot	Juice, powder, Raw

31.	Dicotyledon	Rubiaceae	<i>Rubia manjith</i>	Majitho/Syam-rik	Herb	Whole plant	Pas
32.	Dicotyledon	Rubiaceae	<i>Spermadictyon suaveolens</i>	Bhuichampa/Matli-rip	Shrub	Tuber, Root	Pas
33.	Dicotyledon	Rutaceae	<i>Citrus medica</i> L.	Bimira	Shrub	Root	Pow
34.	Dicotyledon	Rutaceae	<i>Citrus reticulata</i>	Suntala/Cholum	Tree	Root	Pow
35.	Dicotyledon	Rutaceae	<i>Citrus aurantifolia</i>	Kagati	Small tree	Fruit	Jui
36.	Dicotyledon	Rutaceae	<i>Evodia frakinifolia</i> Hook. F	Khanakpa/Kuru	Small tree	Fruit	Pas
37.	Dicotyledon	Rutaceae	<i>Zanthoxylum armatum</i>	Timur	Small tree	Fruit, seed	Pas
38.	Dicotyledon	Saxifragaceae	<i>Bergenia ciliata</i>	Pakhanbed	Herb	Leaf	Pas
39.	Dicotyledon	Saxifragaceae	<i>Astilbe rivularis</i>	Thulo Okhat	Herb	Root	Pow
40.	Dicotyledon	Solanaceae	<i>Capsicum annum</i> L.	Dalle Khursani/Sangkar	Herb	Fruit	Ra
41.	Dicotyledon	Solanaceae	<i>Datura metel</i> L.	Kalo Dhaturu	Herb	Seed	Ra
42.	Dicotyledon	Solanaceae	<i>Datura sp.</i>	Seto Dhaturu	Herb	Seed	Inhal
43.	Dicotyledon	Solanaceae	<i>Solanum indicum</i>	Kande bean	Herb	Seed	Ra
44.	Dicotyledon	Tenstroemiaceae	<i>Schinna wallichii</i> 'Chois'	Chilaune/Sang-ram	Tree	Stem, Root	
45.	Dicotyledon	Umbelliferae	<i>Anethum sowa</i>	Swoup	Herb	Seed	Deco
46.	Dicotyledon	Umbelliferae	<i>Carum copticum</i>	Jwano	Herb	Seed	Pow
47.	Dicotyledon	Urticaceae	<i>Urtica dioica</i> L.	Sisnu/Kajyang	Herb	Leaf, Young shoot	Pas
48.	Monocotyledon	Araceae	<i>Acorus calamus</i>	Bojho/Rockrop	Herb	Root	Pas
49.	Monocotyledon	Bromeliaceae	<i>Ananas comosus</i> L.	Bhuikatahar	Herb	Leaf	Deco
50.	Monocotyledon	Gramineae/ Poaceae	<i>Eleusine coracana</i>	Kodo/Mong	Shrub	Seed	Cook
51.	Monocotyledon	Gramineae	<i>Imperata cylindrica</i>	Siru/Nyong	Shrub	Root	Pow
52.	Monocotyledon	Gramineae	<i>Saccharum officinarum</i>	Ukhu/Pa-amnok	Grass	Stem	Jui

53.	Monocotyledon	Gramineae	<i>Dendrocalamus hamiltonii</i>	Choya Bans/ Poly-po	Tree	Buds	Pas
54.	Monocotyledon	Liliaceae	<i>Aloe barbadensis</i>	Ghiukumari	Herb	Leaf	Juic
55.	Monocotyledon	Musaceae	<i>Musa paradisiaca</i>	Kera/ Kurdung	Tree	Stem	Juic
56.	Monocotyledon	Zingiberaceae	<i>Ammomum subulatum</i>	Alainchi/Tu mrap	Herb	Seeds	Pow Ray
57.	Monocotyledon	Zingiberaceae	<i>Curcuma longa</i>	Haledo/ Gyasing	Herb	Rhizome	Paste, Juic
58.	Monocotyledon	Zingiberaceae	<i>Zingiber officinale</i>	Aduwa/ Hing	Herb	Rhizome	Pas
59.	Pteridophyta	Dryopteridaceae	<i>Tectaria coadunata</i>	Kalo niguro/ Tonggrokno k-bi	Fern	Root	Pow
60.	Pteridophyta	Nephrolepidaceae	<i>Nephrolepis auriculata</i>	Paniamala/ Tonggrokno k-bi	Tree fern	Tuber	Ray
61.	Pteridophyta	Polypodaceae	<i>Dryopteris filixmas</i>	Hade unyu Tonggrokno k	Tree fern	Leaf	Juic

Table 8: Rainfall (mm) at Ilam Tea State Weather Station, Ilam from 1998 to 2007.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct
1998	0.0	2.0	124.4	166.9	99.2	329.9	561.5	418.8	224.0	106.8
1999	0.6	0.0	0.0	38.5	122.6	440.2	516.6	567.4	266.2	124.2
2000	8.2	0.1	0.0	54.4	2257.2	379.6	309.8	332.2	186.7	16.4
2001	0.0	24.5	0.0	34.5	97.2	168.4	254.2	230.0	188.5	333.4
2002	23.6	0.0	13.4	65.6	92.8	303.0	584.1	347.4	83.2	28.6
2003	16.6	41.2	33.4	79.8	73.6	387.1	784.2	297.4	101.9	148.8
2004	27.4	0.0	NA	NA	NA	NA	NA	NA	NA	NA
2005	NA	0.0	30.1	50.4	119.9	NA	290.6	NA	41.9	60.2
2006	0.0	1.2	31.8	67.5	156.6	183.7	327.7	197.9	121.2	11.6
2007	NA	87.0	8.0	27.3	52.4	NA	206.0	54.6	86.5	NA
Sum	76.4	156	240.3	584.9	1070.7	2191.9	3835.3	2445.7	1300.1	830
Avg. rainfall (mm)	9.55	15.6	26.7	64.98	118.96	313.12	426.14	305.71	144.45	103.75

Table 9: Minimum Temperature (°C) at Ilam Tea State Weather Station, Ilam from 1998 to 2007.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct
1998	8.1	10.4	11.4	14.9	19.4	20.1	19.8	20.1	19.5	18.4
1999	10.7	14.3	16.2	18.9	18.2	20.2	20.3	19.7	18.9	17.5
2000	9.4	9.0	13.6	16.2	17.8	19.2	19.4	19.1	18.0	17.8
2001	9.0	11.0	14.1	17.1	17.4	19.0	19.6	19.6	18.2	16.7
2002	9.1	11.8	14.7	15.8	17.9	19.5	19.3	19.5	18.7	16.4
2003	8.5	9.3	11.9	14.9	NA	NA	NA	NA	18.3	16.7
2004	8.9	11.1	NA	NA	NA	NA	NA	NA	NA	NA
2005	NA	11.3	15.0	17.2	17.8	20.2	19.7	NA	20.0	17.5
2006	10.7	13.7	15.4	16.6	18.3	20.2	20.6	20.6	19.7	18.0
2007	NA	NA	NA	NA	19.3	20.3	20.8	19.5	20.1	NA

Sum	74.4	101.9	112.3	131.5	145.1	158.7	159.5	138.1	171.4	139
Avg. temp. (°C)	9.3	11.32	14.03	16.43	18.13	19.83	19.93	19.72	19.04	17.37

Table 10: Maximum Temperature (°C) at Ilam Tea State Weather Station, Ilam from 1998 to 2007.

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct
1998	16.6	18.8	20.5	24.3	26.3	26.2	25	24.9	25.5	25.1
1999	18.9	22.6	24.4	26.8	25.2	26.1	25.5	25.0	25.1	23.9
2000	16.7	17.0	22.0	25.4	25.4	25.8	25.1	24.6	24.5	24.5
2001	16.7	19.5	23.4	26.0	26.0	26.5	26.0	26.4	25.1	24.6
2002	16.9	19.9	22.8	23.7	25.4	25.1	24.6	25.6	25.4	24.3
2003	16.8	17.9	20.7	25.3	26.3	25.8	25.3	26.0	23.2	23.8
2004	16.9	18.9	NA	NA	NA	NA	NA	NA	NA	NA
2005	NA	18.7	22.6	25.0	25.1	26.8	25.9	NA	27.1	24.5
2006	18.2	21.2	23.4	25.5	26.5	26.5	26.7	27.5	25.6	26.1
2007	NA	NA	NA	NA	26.3	27.4	26.8	27.0	27.3	NA
Sum	137.7	174.5	179.8	202	232.5	236.2	230.9	207	223.8	196.8
Avg. temp. (°C)	17.21	19.38	22.47	25.25	25.83	26.24	25.65	25.87	25.64	24.6

ANNEX 3: LIST OF PHOTOGRAPHS



Fig1: *Rhododendron arboreum*
Dendrocalamus species



Fig2:



Fig 3: *Anana comosus*
subulatum



Fig 4: *Ammomum*



Fig5: Amriso (Cash crop)
Dryamaria cordata



Fig6:





Lapche pidalu(An indigenous food of Lapcha)

Fig7:*Spermadictyon suaveolens* Fig8 :



Fig9: *Rubus ellipticus* species

Fig10: *Anadenus*



**Fig11: *Datura metel*
of medicine**

Fig12: Preparation



Fig13: *Aloe barbadensis*
Dryaotherium boryanum

Fig14:



Fig15: Researcher with a Lapcha couple
(Research Area)

Fig16: Fikkal



**Fig17: Researcher with a key Informant
Researcher with a Lapcha
collecting information.**

**Fig18:
woman**