

## TRADITIONAL USES AND CONSERVATIVE LIFESTYLE OF LEPCHA TRIBE THROUGH SUSTAINABLE BIORESOURCE UTILIZATION – CASE STUDIES FROM DARJEELING AND NORTH SIKKIM, INDIA

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### Abstract

*The major objective of the present communication was to document the traditional knowledge regarding ethnomedicinal uses of different plant species and conservative lifestyle of the Lepcha community in Darjeeling and some parts of North Sikkim. Extensive field surveys were undertaken between 2006 (groundwork) and 2010 (comprehensive) in selected study sites of North Sikkim and Darjeeling district of West Bengal, India. Information was gathered using semi-structured formats, interviews, and group discussions. Lepchas have profound knowledge about the plants and animals in their surroundings and are reputed for their age-long traditions in herbal medicine. The present work brings into light 34 plant species from the ethno botanical survey among Lepcha people in Darjeeling district, West Bengal, India, which have multifarious uses. The major areas of their utilization include folk medicine. Present ethnobotanical survey among the Lepchas in North Sikkim, India brings into light 44 plant species that indigenous people use in medicinal purposes and the plants they use to make different domestic utensils and musical instruments. Based on our field investigations, it appears that habitat loss due to increasing anthropogenic activities has promoter greater damage towards bioresources diversity of the concerned study sites. Therefore, awareness and documentation of traditional knowledge is vitally important.*

**Keywords:** Lepcha; Traditional knowledge; Ethnobotanical survey; North Sikkim; Heritage

### Introduction

The Lepcha are autochthonous of Sikkim and Darjeeling and their land was extended from the Himalayas down to Tilalaya, in the vast plain of India. They were very primeval people of the world and once a ruling race equal in power and status to many contemporary outside rulers. Lepchas call themselves Rongkup/Rumkup, which means “*the son of the snowy peak*”. Sikkim Himalaya is the inherent repository of Lepcha Tribe. [1, 2]. This tribe claims to have its origin in the “Ne Meyel Lyang” (the land of hidden paradise), or “Ne Male Lyang” (land of internal purity), a legendary kingdom on the slopes of Khangchendzonga mountain, comprising Sikkim and Ilam hills, now in Nepal [3]. The Lepchas are characterized by mongoloid morphological features [1]. According to some earlier works Lepchas came from the east, from Assam and Burma and settled in Sikkim [4]. The distinct Lepcha language known as “Rong”, belonging to Tibeto Kanauri group, included in Tibeto-Burman family of languages,

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is distinguished by having its own script (is supposed to be invented by the Lepcha scholar Thikúng Men Salóng sometimes during the 17 century) and literature [5]. Lepchas identify themselves as "Rong-kup" meaning the 'son of snowy peak', "Rong-Pa" meaning "*Ravine Folk or the dwellers of the valley*" and "Mutanchi" which means "*beloved people of mother earth*" [6, 7]. The Lepchas were hunters and gatherers and used to live complete nomadic lives. Since mid-nineteenth century, they began practicing settled agriculture particularly due to the increased production of large cardamom, as a cash crop [8]. In addition, Lepchas also grow rice, maize, millet, wheat, buckwheat, pulses, and vegetables, and in some parts sugarcane and fruits, with animal husbandry as another important economic activity. The diet of Lepchas is supplemented with plants mushrooms, tubers, all gathered from the wild and produces grown in small kitchen gardens such as ginger, chilies, beans, cucumber, garlic, sweet potatoes, yams and sugarcane. Originally, the Lepchas were the followers of Shamanism; they converted to Bhuddism in the eighteenth century and since the mid nineteenth century a significant number of Lepchas has converted to Christianity, although indigenous Lepcha Shamanism has managed to exist till today [9]. Ethnobiological studies involve the examination of reciprocal relationships between indigenous societies and the living world. Specially, ethnobotany includes any such studies, which relate to plants, including how they are classified and named, how they are used and managed and how they evolve under the influence of man [10, 11]. Sikkim Himalaya is a rich repository of medicinal plants that has been nurturing several distinct ethno medicinal systems through ages. Historically, Darjeeling was once a part of Sikkim and hence it is customary for authors to include Darjeeling hills when preparing any book or write up on the medicinal plants of Sikkim Himalayas. Darjeeling Himalayan region, being very rich in biodiversity, is one of the potential homes for medicinal plants in the country, as revealed in the work of several researchers [8, 12-18].

The earliest mention of the medicinal use of plants is found in the traditional tale of Tamsangthing, perhaps the oldest repository of Lepcha knowledge, originated from Pundim Choo, which is the Pundim mountain peak. Ethnomedicine in vogue among Lepchas of Darjeeling-Sikkim region has remained inadequately represented in literature [19]. Due to the rapid erosion of this indigenous knowledge caused by their modern life style, immediate documentation was deemed necessary.

Darjeeling Himalayan region is very rich in biodiversity. One third of the medicinal plant flora of the country is found here, but so far it wasn't possible to exploit the full potential of this sector. The traditional agricultural practice in this region has been characterized by low input, low risk and low yield. Modern chemically based intensive agricultural practices are also not suitable for this fragile ecological zone. Only 13% of the land area is available for agriculture. Therefore, for the farmers here, a high economic return from limited land holding, maintenance of sustainable conditions and preservations of biodiversity are the challenges. Considering the special conditions found here, the best way of sustenance is to go for high-value low-volume cash crops. The cultivation of medicinal plants is such an alternative. Some Government agencies are doing work towards conservation and commercial cultivation of medicinal plants in this region and they have already identified certain suitable plants, for which financial support is provided. Some workers studied certain potential crude drugs used by the tribal inhabiting the forests of Gundlabrahmeswaram Wild life Sanctuary [20]. Ethno botanical investigations on the plants seen in the Periyar Tiger Reserve and used by the tribes were carried out by some researchers, which observed that more than 180 species of plants were recognized as important from an ethno botanical point of view, from which 66 have medicinal use [21]. Some workers revealed 35 species of weeds from winter crops in Dhulikhel, Nepal that are traditionally utilized by ethnic people for various purposes, like medicine, vegetables, compost, fodder etc. Earlier works highlighted the use of 16 ethno medicinal plants by the Tharu tribal and other rural inhabitants in Bahraich district [22-23]. These plant species are used either singly or in combination with others as polyherbal medicines, as treatment for various ailments and healthcare. It appears that the work on ethnic use of plants among Lepcha people in this region is inadequate.

We feel that there should be an immediate evaluation of their ethno botanical potential on an interdisciplinary framework so that the programs of conservation and management for an optimum sustainable utilization could be escalated to the brim of success. In view of this, the present work was undertaken.

The major objective of this study was to document the traditional knowledge of the Lepcha communities on the ethno-medico-botany, ethnomusic and ethno culture. The ethno-medico-botany investigation may possibly open an avenue for the therapeutic assessment of the information thus leading to the documentation and popularization of herbal remedies in primary health care system.

### Study Site

Administratively, Sikkim is divided into four districts viz. East, West, North and South. This study mainly concentrates on a segment of the north district. Dzongu (North Sikkim) is situated between the high mountains and the perennial rivers, Dikchu, Taleing and Rongnyu. Dzongu lies in the northern part of Sikkim which is geographically largest in size among the four districts of Sikkim, and it shares an area of 42, 26km<sup>2</sup>. It is the only area where the Lepcha language is commonly spoken in every family. This study mainly concentrates on Dzongu, Lingthem, Hedyathang, Gour, and Lingoong blocks of North Sikkim. The Dzongu, a Bhutia derived name meaning "*a place with nine districts*", is located about 70km north to the State Capital, Gangtok – in the north district of Sikkim, India. The Dzongu is bounded to the south-east by Teesta River, to the north-east by Tholung chu River and to the west by rising mountains leading to Khangchendzonga. A fairly triangular shaped Dzongu landscape covers an approximately 78 km geographical area, that extends between 27°28' – 27°38' N latitude and 88°23' – 88°38' E longitude (as judged from Google Earth), with an average altitude between 700 m to 6000 m. Dzongu further extends from 2<sup>nd</sup> Sheep-Gyer in the east to Sakyong-Pentong village in the west and from Kishong Cho Lake in the north to Lum village in the south. It is situated on northern part of lower Dzongu and is quite a remote place. People that populate this site prefer ethno medicine. The place is rich in vegetation. It is situated below Lingthem. It is about few km from Lingthem and the time required to reach it from Mangon is two hours.

Darjeeling Himalaya is situated between 87°59' - 88°53' E and 28°31'-27°13' N in the Eastern Himalayan region of India. The total area covered by this district is 3254.7km<sup>2</sup>, 2417km<sup>2</sup> of which are occupied by hills with an altitudinal variation between 130m (at Sukana) to 3670m (at Phalut). The annual mean maximum temperature of the region is 14.9°C, the annual mean minimum temperature is 8.9°C and average annual rainfall is 3092mm. The altitudinal of this hilly region varies from 130 to 3660m. Due to this, wide arrays of climatic zones are available, which favors the luxuriant growth of diversified and rich vegetation. This region is also the abode of many endemic elements and to a number of species which have become rare, threatened and endangered [8]. In this area, a considerable number of medicinal plants are collected and used to cure different ailments by the rural people [24-26]. Rimbick is situated away from Darjeeling town. A place called Maneydara of Rimbick, which is just above from the main bazaar, is a remote place. People of Maneydara can be regarded as ethnic people. When sick, many prefer to use ethno medicine rather than visit a doctor. In Maneydara, Nepalese of all castes are found including Lepcha. But the major caste is Sherpa and they are the dominant people of Maneydara. The place is rich in vegetation. Pokhriabong is situated below Sukhiapokhari, at about 24km away from Darjeeling main town. It is quite warm compared to the main Darjeeling town. Here too, Nepalese of different castes are found including Lepcha, which live here in harmony and peace with each other and with the nature. The place is rich in vegetation. People of Pokhriabong are not so advanced, and they can be regarded as a pure ethnic people. They believe in using natural things. They use ethno medicine in different kinds of ailments. Lebong is situated 8km away from main Darjeeling town. The area has a rich biodiversity of plants. The temperature of Lebong is quite warm, compared to the main Darjeeling town.

Glenburn tea estate is situated below Tukdah. The temperature of this place is quite warm, compared to Darjeeling town. The dominant plants of this region are the plain plants. The people of Glenburn tea estate are not so advanced in allopathy. So, the “*dhamis, jhakris*”, or local healers are socially indispensable among the Nepalese people and play an important role in the life of common people.

## Methods

At first, extensive literature and internet search was carried out to review and assess the existing information on the medicinal plants used by Lepcha tribe, as baseline for our research. The necessary information from the websites, scientific papers, articles, booklets and books was used. To get first hand data and further, for confirming authenticity of the existing information, extensive field surveys were undertaken between 2006 (groundwork) and 2010 (comprehensive) in selected study sites of North Sikkim and Darjeeling district of West Bengal, India. Information was gathered, using semi-structured formats, interviews and group discussions on the indigenous uses of plant species as medicines by the Lepcha tribe.

During the survey period, the conversations with the informants were held with the assistance of local resource persons. In view of their belief of not sharing their knowledge to the outsiders, the collection of information was not easy. The objectives of the study were elaborated and efforts were made to convince the locals that the purpose of this study is just to document and preserve the traditional knowledge of Lepchas on medicinal plants.

A rapid resource appraisal was conducted in the Lepcha localities in the described areas during 2006-2010, using structured questionnaire. No less than four “*Maondaok*”, Lepcha medicine men, 15 knowledgeable aged persons and 10 middle-aged women were used as primary sources of information. The names of plants used by them were communicated in Nepali, the most commonly spoken language of Sikkim. Information were also collected from other sources such as Thyongs (elderly person in village), Bongthings or Padem (priest following Shamanism), Monks, Muns (a healer who exorcises demons, helps to heal illness and guides souls to the after life), graziers and different categories like villagers, farmers, housewives, teachers, shopkeepers, forest managers, contractors, etc., and by adopting participatory and field observation data were further crosschecked through group interaction approach among the males and females in different study villages .

Necessary photographs of plant species were collected and documented. As per the suggestion of respondents and relevant literatures, all the ethnobotanical plant species were collected during flowering time covering all seasons of the year. The collected specimens were worked out both in the field and laboratory and pressed in blotting paper. Herbarium preparation, identification and documentation work was done at *PG Department of Conservation Biology, Durgapur Government College, University of Burdwan* and *West Bengal, India*. Properly identification and authentication was done using the *Flora of British India: medicinal plants* and the *Herbarium of Department of Botany, Burdwan University, Burdwan; Central National Herbarium, Indian Botanical Garden, Sibpur, Howrah*. The collected specimens were finally deposited in the *Herbaria of Conservation Biology Research Laboratory* [12, 20, 27-30].

## Results

The Lepcha are the true autochthones of Sikkim and Darjeeling. They were once a ruling race equal in power and status to many contemporary outside rulers. Reliable information on the early history of the Lepcha ruling dynasty is scarce; there are enough evidences to prove that formerly their land was extended from Himalayas down to Tilalaya, in the vast plan of India.

The Lepchas call themselves Rongkup/Rumkup or in short Rong, which means the *son of the snowy peak, the son of God* or in short *snowy peak*. The Lepcha claim to be not only the

very indigenous people of Sikkim and Darjeeling district, but also the very primeval people of the world.

The Lepcha language is one of the ancient languages of the world, because in Lepcha language there is no trace whatsoever of Mongolian Semite or Indo-Germanic origin.

The way of life of the Lepcha of Sikkim, Darjeeling, Illam and Zaongsaw is reflected by their religious practices, dogmas, history, language, literature, customs, manners, etiquettes, tradition, songs, dances, music and the geographical and economical conditions of the country. The salient features of the Lepcha culture and the Lepcha way of living, customs, manners are indelibly stamped on the language, arts and architecture of this country Sikkim and Darjeeling.

### ***Ethnomedicine among Lepchas***

They use folk medicine not only for human, but also for animals. They emphasize material culture, faith or tradition related to conservation of bio resources. The ethnic group has magi-co-religious belief about plant like sacrificial plants, plants as human adornment and plants in puja (Rum taat in lepcha) etc. The knowledge about the plants was verbally transmitted from generation to generation to the ethnic people of Dzongu and its sub-district and hence, it is natural. The art of treatment and prevention of disease is pre-historic, as people have always tried to overcome death and disease. Therefore man has always relied on natural products to sustain the substance of life.

Lepcha medicine men generally use flowers, roots, barks, leaves seeds etc of plants in indigenous medicine. Some medicinal plants are freshly taken while some are preserved either by sun drying or by keeping it in a container with raw salt. Some containers are of glass and some are made out of bamboo. During the course of the present study 34 plant species used by Lepcha communities residing in the district of Darjeeling, along with medicinal uses of 44 plants could be recorded from the Lepcha communities residing in the district of North Sikkim, a precise account of which is presented in Table 1.

**Table 1.** An enumeration of the ethno botanically important plants used by Lepcha people of different study sites of Darjeeling District, West Bengal.

Sl. No.	Name [Family]	Local name	Common Name	Medicinal uses	Medicinal uses	Habit	Status
1	<i>Abelmoschus esculentus</i> Linn Fam:Malvaceae	Aphimbee Kahlyaab	Lady's finger	Entire Plant	Used to treat the bite of venomous animals, the fruit is prescribed for peptic ulcers.	Herb	Planted
2	<i>Abrus precatorious</i> Linn Fam:Papilionaceae (Fabaceae)	Sushuslign	Crab's eye	Roots, leaves and seeds.	Seeds are used for chronic conjunctivitis, leaves and roots are used for treatment of asthma and chest problems.	Climber	Planted
3	<i>Aconitum ferox</i> Wall Fam:Ranunculaceae	Nyine	Aconite	Tuberous root	Used in asthma, cough leprosy, fever and muscular rheumatism.	Deciduous Shrub	Common
4	<i>Aegle marmelos</i> , Roxb. Fam:Rutaceae	Lee	Wood apple	Ripe and unripe fruits and roots	Roots for dysentery & palpitation of heart. Ripe fruits for constipation and unripe for appetizer.	Tree	Planted
5	<i>Allium sativum</i> Linn Fam:Liliaceae	Aoo tsong	Garlic	Leaves and bulbs	Used as antiseptic, anticancerous & anti T.B.	Herb	Planted
6	<i>Benincase hipsida</i> , Thunb. Fam:Cucurbitaceae	Tung Zong	White Gourd	Fruits and seeds	Anticancer	Climber	Common
7	<i>Berberis aristata</i> DC Fam:Berberidaceae	Sutong Kung	Barberry	Root bark, Branch lets and fruits	In skin diseases, jaundice, gastric disorder	Shrub	Common
8	<i>Betula utilis</i> D.Don, Fam:Betulaceae	Sanglikung	Birch	Bark	Used as tonic, alexitric used in convulsion, blood diseases, leprosy bronchitis.	Shrub/Tree	Common
9	<i>Buddleia asiatica</i> Lour Fam: Buddlejaceae	Pondam Kong	Butterfly bush	Leaves, flower and stem	For skin complaints and as an abortifacient.	Climber	Sparse
10	<i>Camellia thea</i> Linn Fam:Theaceae	Chau	Tea	Leaves	In eye trouble & piles.	Evergreen shrub /Small tree	Common
11	<i>Cannabis sativa</i>	Nam	Indian	Leaves &		Herb	Sparse

	Linn Fam:Cannabiaceae	bobung	hemp	seeds	In hypertension.		
12	<i>Capsicum frutescens</i> Linn Fam:Solanaceae	Sangkar	African chilly	Fruits and leaves	Used in brain complaint and night blindness.	Large perennial Shrub Tree	Common
13	<i>Carica papaya</i> Linn, Fam:Caricaceae	Manyam	Papaya	Fruits and seeds	As a reliable source of antibiotic.		Planted
14	<i>Gaultheria fragrantissima</i> Wall Fam:Ericaceae	Kolomba	Winter green	Leaves	Oil from leaves distillation is effective in Rheumatism.	Shrub	Common
15	<i>Gloriosa superba</i> linn Fam:Liliaceae	Sunkri buk	Flying lily	Tubers, roots and flowers	Used in abdominal pains, itching, piles etc.	Herb	Planted
16	<i>Helianthus annuus</i> Linn Fam:Asteraceae	Sachuk	Sunflower	Flower, roots, seeds and leaves	Flowers used to cure ulcers, leprosy, anemia and asthma.	Shrub	Planted
17	<i>Imperata culindrica</i> Hubb ex Hubbet Vaughan Fam:Poaceae	Nysnga	Thatch grass	Root flower & stem	Root is good in fever, cough, internal bleedings, jaundice and kidney problems.	Perrenial Herb	Abundant
18	<i>Ipoemea batatus</i> Lam Fam:Convolvulaceae	Mungur	Sweet potato	Tuber & plant	Plant is anti- diabetic; useful in lever and skin diseases.	Herb	Planted
19	<i>Juglans regia</i> Linn Fam:Juglandaceae	Kanola	Walnut	Barks, leaves and fruits	Bark and leaves are detergents. Bark is used in cancer.	Tree	Frequent
20	<i>Laportea crenulata</i> Gaud Fam:Urticaceae	Ongyalop	Devil nettle	Entire plant	Used for long standing fever.	Shrub	Common
21	<i>Lycopersicum esculentum</i> Mill Fam:Solanaceae	Beeru poat	Tomato	fruits	Used to treat headache and rheumatism.	Shrub	Planted
22	<i>Mangifera indica</i> Linn Fam:Anacardiaceae	Ambhi	Mango	Entire plant except stem	Used in piles and liver disease	Tree	Common
23	<i>Mentha viridis</i> Linn Fam:Lamiaceae	Jeera	Mint	Leaves and tender shoot tops	It is given in bronchitis and vomiting, the leaves are astringent and used for rheumatic pains	Biannual Herb	Sparse
24	<i>Ocimum sanctum</i> Linn Fam:Lamiaceae	Satul	Holy basil	Leaves, seeds and roots	Used in malarial fever	Perennial Herb	Sparse in cultivation
25	<i>Pavetta indica</i> Linn Fam:Rubiaceae	Sundok kung	Indian pellet shrub	Roots	Roots used in visceral obstructions, drosy & rheumatism	Shrub	Sparse
26	<i>Raphanus sativus</i> Linn Fam:Brassicaceae	Raphup	Radish	Roots, leaves & seeds	Used in tumors, piles, hiccups leprosy & cholera.	Shrub	Planted
27	<i>Rhododendron arboretum</i> Smith Fam:Ericaceae	Aetok koong	Rhododendron	Flowers, young leaves	Fresh and dried leaves used in dysentery & diarrhea.	Tree	Frequent
28	<i>Rumex nepalensis</i> Spr Fam:Polygonaceae	Chyasu	Yellow dock	Roots & leaves	Infusion of leaves is given in colic, applied to syphilis ulcer. The root paste is used in wounds	Herb	Common
29	<i>Spondias mangifera</i> wild Fam:Anacardiaceae	Ronchiling	Bile tree	Fruits & barks	Fruits are used in ulcers rheumatism, burning sensation. Bark is used in dysentery and ear aches.	Tree	Frequent
30	<i>Symplocos racemosa</i> Roxb Fam:Symplocaceae	Palyok Singankung	Lodh	Bark	Used in alexiteric, eye diseases, dysentery, etc.	Tree	Common
31	<i>Terminalia bellirica</i> (Gaertn) Roxb Fam:Combretaceae	Kanom Kong	Bastard myrobalan	Bark & fruits	Bark is used in anemia & leucoderma. Fruits are used in bronchitis sore throat, and piles	Perennial Tree	Rare
32	<i>Urtica dioca</i> Linn Fam:Urticaceae	Sarong	Common nettle	Entire Plant	Used in hemorrhages and jaundice	Herb	Sparse
33	<i>Vitis vinifera</i> Linn Fam:Vitaceae	Gundoom	Grape	Entire plant	Used in lungs, kidney, liver disease.	Liana	Planted
34	<i>Zingiber officinale</i> Rose Fam:Zingiberaceae	Heeng	Ginger	Rhizomes	Used in heart disease.	Herb	Planted

Table 1 presents a brief description of 34 plant species having ethnomedicinal importance. Among the different study sites in Darjeeling district it was found that 34

plant species were used for medicinal purposes. Families like *Liliaceae*, *Solanaceae*, *Ericaceae*, *Anacardiaceae*, *Lamiaceae* were represented by two genus each. Roots and leaves were found to be most useful than other plant parts as well as the whole plant body. Entire plant body is mostly used for the treatment of venomous animal bites, diabetes, skin treatments, long standing fever, jaundice, hemorrhages, jaundice, lungs, kidneys, liver, diseases etc. Roots and leaves were mostly used in the treatment of conjunctivitis, asthma, chest problems, leprosy, fever and muscular rheumatism, dysentery and palpitation of heart, antiseptic, anticancerous, anti TB, skin problems, eye trouble, piles, hypertension, night blindness etc. Combination of plant parts was found to be effective for skin diseases, jaundice, gastric disorder, brain complaint, night blindness, leprosy, anaemia, asthma, malaria fever etc

Here in Lepcha community there are various plants which are used for the same medicinal purpose or for the same ailments. As for e.g. to treat asthma plants like *Abrus precatorious*, *Aconitum ferox*, *Dolichos uniflorus*, *Helianthus annuus* are used. Various plants used by Lepcha people like *Allium sativum*, *Juglans regia* etc., are anticancerous. Plants like *Aconitum ferox*, *Mentha viridis*, *Pavetta indica*, *Spondius mangiferay* etc are used to treat rheumatism. *Symlocos racemosa*, *Spondius mangiferav*, *Luffa cylindrica*, *Cedrela toona* etc. are used to treat dysentery. Such plants as *Urtica dioca*, *Imperata cylindrica* etc. are used to treat jaundice. Fruits of *Aconitum ferox*, *Betula utilis*, and bark of, *Raphanus sativus* etc. are employed to treat leprosy. To treat piles different plants like *Terminalia balerica*, *Raphanus sativus*, *Mangifera indica*, *Dolichos uniflorus*, *Camellia thea* etc. are used. To treat skin diseases plants like *Berberis aristata*, *Dalbergia sisoo*, *Ipomoea batatas* etc., are used. *Aconitum ferox*, *Imperata cylindrica* etc. are employed in treating cough. To treat bronchitis various plants like *Terminalia bellirica*, *Mentha viridis*, *Betula utilis* are employed (Table 1).

**Table 2.** An enumeration of the ethno botanically important plants used by Lepcha people at different study sites of North Sikkim.

Sl. No.	Name [Family]	Local name	Common Name	Medicinal uses	Habit	Status
1	<i>Aegle marmelous</i> (L.)Correa [Rutaceae]	Bael	Fruit and root	Constipation, appetites, dysentery.	Tree	Planted
2	<i>Aconitum heterophyllum</i> Wallich [Ranunculaceae]	Bikhuma	Root	Stomach ache, fever, coughs asthma.	Herb	Common
3	<i>Anomum subulatum</i> L. [Zingiberaceae]	Bara alainchi	Seeds and roots	Infection of teeth and gums , in curing gonorrhoea.	Herb	Planted
4	<i>Artimesia vulgaris</i> L. [Asteraceae]	Titepathi	Whole plants	Gout and rheumatism, skin diseases and ulcer. It stops nose bleeding. Mosquito and insect repellent.	Herb	Frequent
5	<i>Allium cepa</i> L. [Liliaceae]	Onion	Bulb	Stimulant, expectorant. Promotes the menstrual discharge of woman. In summer it prevent sunstroke	Shrub	Planted
6	<i>Allium sativum</i> L. [Liliaceae]	Lasun/ Garlic	Leaves of bulbs	Relieve indigestion, flatulence. In high altitudes it helps to cure headaches, and mountain sickness. Juice- in skin diseases and as ear drops for ear aches.	Herb	Common
7.	<i>Bergenia ciliata</i> (Hayworth)Sternberg [Saxifragace]		Roots	Diarrhea and dysentery	Annual herb	Planted
8.	<i>Cedrela toona</i> Roxb. ExRottl. & Wild. [Meliaceae]	Tun	Bark or flower	Powerful astringent, curing various forms of ulceration. Flowers -used for promoting the menstrual discharge.	Tree	Sparse
9.	<i>Coriandrium sativam</i> L. [Apiaceae]	Aoosu	Seeds and green leaves	Seeds- aromatic used in cookery; leaves- stomachic.	Herb	Common
10	<i>Cucurbita pepo</i> DC. [Cucurbitaceae]	Farsi	Seeds leaves and fruit	Destroy intestinal worms and leaves are externally applied for healing burns	Shrub	Planted
11.	<i>Curcuma caesia</i> Roxburgh [Zingiberaceae]	GeysHYing	Rhizome	It relieves flatulence.	Herb	Sparse
12.	<i>Curcuma longa</i> L. [Zingiberaceae]	Hardi	Rhizome	Sprain and wounds, remedy for cough and cold. The fresh juice is used as anti parasitic for skin infections	Biannual Herb	Sparse

13	<i>Datura fastuosa</i> L. [Solanaceae]	Kajyoo	Roots, and seeds	Rheumatic swelling, lumbago, sciatica and inflammation complaints and in chronic asthma. The seeds are poisonous and will cause death if taken in over dose. It is also taken for mad- dog bites.	Herb	Frequent
14.	<i>Daphne cannabina</i> [Thymelacaceae]	Kagate	Root	Antidotes in poisoning.	Shrub	Sparse
15.	<i>Dichroa febrifuga</i> Lour. [Hydrangeaceae]	Basaka	Roots and leaves	The decoction of root is taken in fevers, treatment of malaria	Herb	Sparse
16.	<i>Evodia fraxinifolia</i> [Rutaceae]	Khanakpa	Fruits	Typhoid and also helps in digestion.	Tree	Frequent
17.	<i>Glycine max</i> L. Mers [Fabaceae]	Bhatmas	Roots and seeds	Astringent and supplement for nutritional diet.	Shrub	Planted
18.	<i>Gloriosa superba</i> L. [Liliaceae]	Kulhari	Roots and flowers ,tubers	Abdominal pain, itching, piles, etc.	Herb	Planted
19.	<i>Helianthus annuus</i> L. [Asteraceae]	Ghamphul	Seed	Useful in lung diseases, cough, cold and bronchitis.	Herb	Frequent
20.	<i>Hordeum vulgare</i> L. [Poaceae]	Jauno	Grain	Grains- soothing or mollifying as a medicinal substance or agent, very easy to digest and given to the sick.	Herb	Planted
21.	<i>Hibiscus esculentus</i> L. [Malvaceae]	Bhendi	Fruits	Gonorrhea, treatment of painful urination.	Herb	Planted
22.	<i>Imperata cylindrica</i> (L.)Reauselel [Poaceae]	Siru	Root, flower and stem	Fever, cough, internal bleeding, jaundice and kidney problems.	Perennial Herb	Abundant
23.	<i>Juglans regia</i> L. [Juglandaceae]	Okhar	Bark and fruits	Bark- destroys and expels intestinal worms. Fruits- an alternative remedy in rheumatism	Tree	Frequent
24.	<i>Leea robusta</i> Roxb. [Vitaceae]	Puntom	Leaves and young shoots.	Bandaged over the fractured or sprained part, relives pain, body ache and helps in subsiding the swollen legs.	Annual Shrub	Frequent
25.	<i>Lens culinaris</i> [Fabaceae]	Musuri dal	Seeds or grains	Recovers measles	Shrub	Common
26.	<i>Luffa acutangula</i> Roxburgh [Cucurbitaceae]	Ghiraula	Seeds, leaves	Seeds purgative. Leaves -in granular conjunctivitis.	Herb	Planted
27.	<i>Lycopersicum esculentum</i> Miller [Solanaceae]	Golbhera	Fruits and leaves.	Headaches and rheumatism. Juice from leaves applied in wound.	Shrub	Planted
28.	<i>Marsdenia tenacissima</i> Wight & Arnott [Asclepiadaceae]	Bahuni lahara	Root leaves	Treatment of gonorrhea	Shrub	Common
29.	<i>Mentha spicata</i> L. [Lamiaceae]	Pudina	Leaves and shoots tip	Remedy for headache and for cholera. It is carminative, stimulant and digestive	Herb	Sparse
30.	<i>Mimosa pudica</i> L. [ Mimosae]	Buharijhar	Leaves and root	Treatment of piles.	Shrub	Frequent
31.	<i>Michelia champaca</i> L. [Magnoliaceae]	Champ	Bark, flower and fruits	Bark- reduces fever and effects phlegm from the throat and lungs by coughing and spitting.	Tree	Common
32.	<i>Momordica charantae</i> L. [Cucurbitaceae]	Karela	Leaves, fruits	In gastric troubles	Climber	Common
33.	<i>Nasturtium officinale</i> R. Brown [Brassicaceae]	Simrayo	Entire plant	Scurvy, unloads toxin, the juice dissolves nicotine.	Herb	Sparse
34.	<i>Piper longum</i> L. [Piperaceae]	Pipla	Fruits and roots	Asthma, cough, rheumatism, gonorrhea, piles, spleen.	Shrub	Common
35.	<i>Phyllanthus emblica</i> L. [Euphorbiaceae]	Amla	Bark and fruit	Diarrhea, dysentery, indigestion, gonorrhea .If taken with honey cures white leucorrhoea in women, relieves pain in urine trouble.	Tree	Sparse
36.	<i>Rumex nepalensis</i> Sprengel [Polygonaceae]	Halhaley	Root and leaves	Colic pain, applied to syphilis, ulcer, the root paste used in wounds.	Herb	Common
37.	<i>Rosa calamascena</i> (Rosaceae)	Kadaorip	Petals, buds, and roots	Stops discharge of blood. Buds and roots- useful in curing tuberculosis	Shrub	Planted
38.	<i>Rubus ellipticus</i> Smith [Rosaceae]	Aselu	Roots, fruit, young shoot leaves	Colic pains and for killing intestinal worms in children.	Shrub	Sparse
39.	<i>Rubus moluccanus</i> L.	Bhotay	leaves	Leaves are useful for promoting the	Shrub	Sparse



40.	[Rosaceae] <i>Rubia cordifolia</i> L. [Rubiaceae]	pan Manjito	Roots, fruits and leaves	menstrual discharge. Ointment in skin disease. Dye from root and leaves used for coloring wool , blankets, carpets, clothes etc.	Climber	Sparse
41.	<i>Urtica parviflora</i> Roxb [Urticaceae]	Sishnu	Roots, leaves,fl owers	Medicines for fracture and dislocation, cure of gonorrhea	Herb	Sparse
42.	<i>Viscum album</i> L. [Loranthaceae]	Harchur	Whole plant	Treatment of muscular pain, fracture	Shrub	Endangered
43.	<i>Zanthoxylum acanthopodium</i> DC [Rutaceae]	Boke timbur	Seeds, bark and fruits	Fever, dyspepsia and cholera. Gout, rheumatism and toothache.	Small tree	Rare
44.	<i>Zingiber officinale</i> Roxburgh. Roscoe [Zingiberaceae]	Adua	Rhizome roots	It is a valuable medicine for cold, asthma palpitation, piles and dropsy. Cures rheumatism. It is an appetizer and cures throat trouble.	Herb	Planted

During the present investigation it was found that leaves, bulbs, roots were the most frequently used parts. Leaves and bulbs of 14 different species, fruits of 10 different species followed by roots of nine different species were used during traditional medicinal practices by the Lepcha community of Darjeeling District. Even seeds of seven different plant species were used in medicinal purposes (Fig. 1).

Table 2 presents the general distribution pattern of 34 ethno-medicinal important plant species in selected study sites of the Darjeeling District. The results showed that mostly the vegetation stand of ethno-medicinal plant species were herb and shrub dominated (Fig. 2). There were eleven representatives of herb and shrub community, followed by 8 species of tree. Most of the plant species were common or cultivated by the Lepcha people, thereby leading to their over harvesting and exploitation.

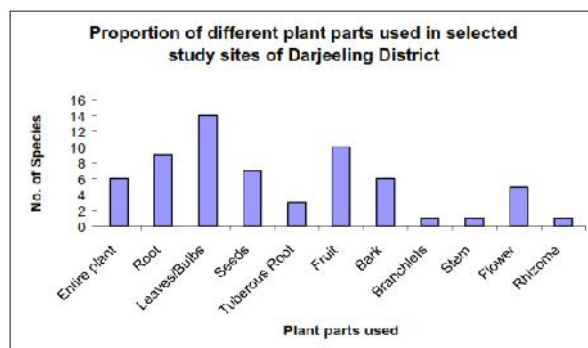


Fig. 1. Proportion of different plant parts used in selected study sites of Darjeeling district

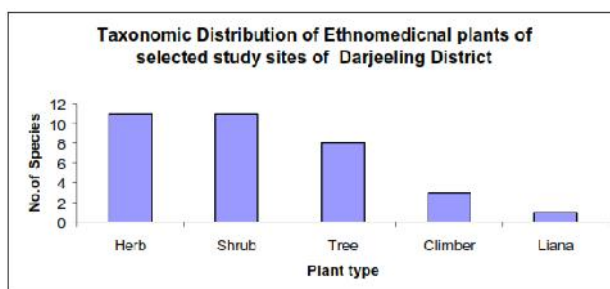


Fig. 2. Taxonomic Distribution of Ethnomedicinal plants of selected Study sites of Darjeeling District.

Twelve plant species were planted, 11 of which belong to the common category, followed by six species categorized as sparse. *Terminalia bellirica* (Gaertn) Roxb was found to be one of the rare plant species which requires prior conservation (Fig 3).

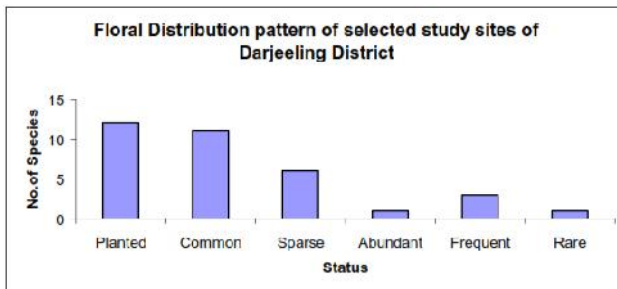


Fig. 3. Distribution of Ethnomedicinally important plant species at selected study sites of Darjeeling District

Forty four plant species were used as medicinal plants by Lepchas at different study sites at North Sikkim. Families viz., *Cucurbitaceae*, *Liliaceae*, *Rutaceae*, *Zingiberaceae*, *Rosaceae* were represented by three species followed by *Asteraceae*, *Fabaceae*, *Solanaceae*, *Poaceae* each represented by two species. The seeds of nine species, green leaves of 14 plant species and roots of seventeen plant species were mostly used for medicinal purposes by the Lepcha people at different study sites of North Sikkim. Combination of using different plant parts were attributed to eight plant species. In different study sites of North Sikkim, roots and leaves were the most extensively used plant parts. Roots and leaves were mostly used in the treatment of gonorrhoea, healing burns, conjunctivitis, gastric troubles, piles, fever, malaria, headache, abdominal pain, itching, skin disease, constipation, appetites, dysentery, diarrhoea, headache, rheumatism, colic pain, syphilis, ulcer, healing of wounds. Combination of plant parts were found to be most effective for destroying intestinal worm, heals burning, skin diseases, fever, dyspepsia, cholera, gout, rheumatism, gonorrhoea, curve, for fracture and bone dislocation, infection of teeth and gums, jaundice, kidney problem etc. (Table 2).

During the present investigation at selected study sites of North Sikkim destructive harvesting was identified as the predominant feature leading towards their endangerment. Root, leaves, bulbs and fruits were found to be the mostly used part of different plant species (fig. 4). Roots of 18 species, leaves of 15 species followed by fruits of 13 species were extensively used for ethno-medicinal practices.

Table 2 further presents the general distribution pattern of 44 ethno-medicinal important plant species in selected study sites of Darjeeling District. From the results, it was found that the vegetation stand of ethnomedicinal plant species were mostly herb dominated (Fig. 5).

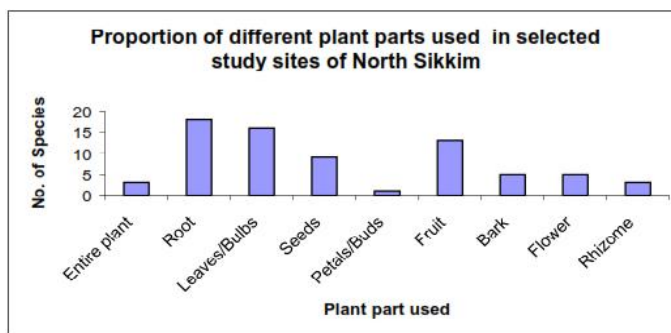


Fig. 4. Proportion of different plant parts used in selected study sites of Darjeeling district

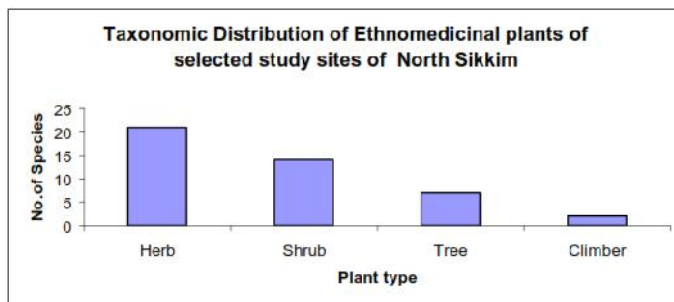


Fig. 5. Taxonomic Distribution of Ethnomedicinal plants of selected Study sites of North Sikkim

There were 21 representatives of herbs, 14 species belonging to the shrub community, followed by seven species of trees. Most of the plant species were common or cultivated by the Lepcha people, thereby leading their over harvesting and exploitation. Twelve plant species were planted; eleven belong to the common category, followed by six species under sparse category. *Viscum album* were found to be under endangered category and *Zanthoxylum acanthopodium* DC is the rarest in terms of occurrence (Figs. 6 and 7).

The way of life of the Lepchas of Sikkim, Darjeeling, Ilam and Zaongsaw is reflected by their religious practices, dogmas, history, language, literature, manners, etiquettes, tradition, songs, dances and the geographical of the country.

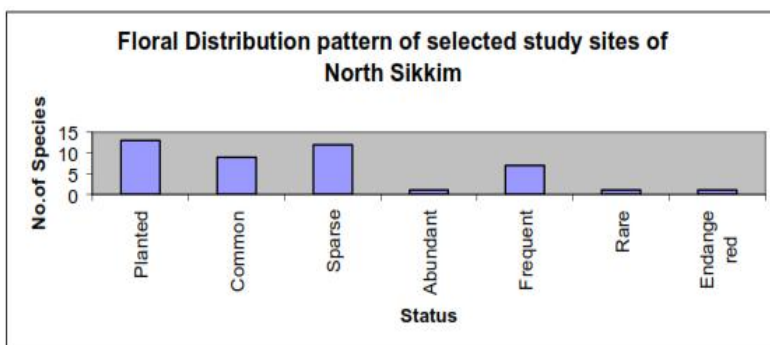


Fig. 6. Distribution of Ethnomedicinally important plant species at selected study sites of North Sikkim



Fig. 7. Different preserved medicinal plants and medicines used by the Lepcha community

### Bioresources and socio-religious life

In Lepcha communities there were many traditions, customs and rituals which they followed in their life from birth to death. During their festival celebration of the “losoong”, Tendong lho rum faat” (celebration of the tendong hill), according to legend, the hill had risen like a horn during a great flood to save the lepchas. They make “chang” from maize (*Zea mays*) and millets (*Pennisetum glaucum*) and chapatti, made from the small grinded pieces of maize and larger pieces are given to animals or used in preparation of “chang”. Chapatti is also made from millets which are powdered in “Guttha” which works by the force of running water. Lepchas are usually engaged in agricultural practice. All aspects of folk literature namely folk song, folk talks and folk proverbs of their land have profound references to trees, shrubs, climbers, flowers and fruits. Folk proverbs that contain references to plants can be and indicative of the deep insight, common sense and practical wisdom of the common folk.

### Lepchas dress

The Lepcha used to wear clothes which are known as ‘paki’. It is like bakhku made from the clothes having black and white strap on it. Women used to wear *sari*, which covered their legs from above the waist and stretching by bamboo’s pin from border of shoulder left upto outside to knee . It to called ‘Dumhun’, which is made of black cotton or silk. They have a kind of hat on their head, which is round in shape made from bamboos (Fig. 8).



Fig. 8. Traditional Lepcha Dress Materials

### Lepchas language

The Lepcha language is a very ancient language, theory sustained by the fact that there are no traces whatsoever of Mongolian Semite or Indo-German origin.

### Lifestyle

The Lepchas were very much fond of hunting, agriculture, gardening and rearing of cows. Like other tribes, they also had priests, known as “*bongthing*” who used to kill the ox as a ritual during any religious anniversary and festival. The Lepchas have their national weapon called ‘Bamphok’ and most of them used to hold it on their waists having covered it by a small box made up of wood. They are very much simple in nature, open hearted, kind in speaking, acceptable to show hospitality with guest, yellowish face and moderate height.

### Lepcha as food gatherer

There was the custom of gathering foods from forest like fruits, yam edible wild roots etc among the Lepcha tribe. Long before today they used to cultivate cardamom and ginger but now a day they also cultivate other vegetables and crops. They used to collect yam from jungle

by digging up the land wherever it is found and they left those dig up hole by filling leaves and litter on it so that it will be easy to take out those food materials

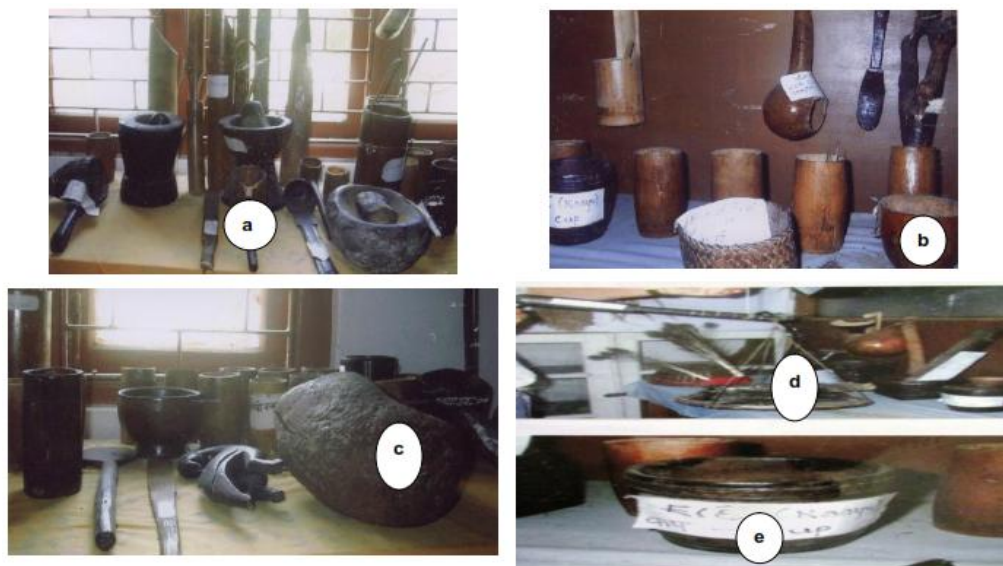
for the next time. According to the regulation act of Lepcha regarding the conservation of forest, that one should grow eight sprouts in exchange of cutting one tree and this rule prevailed since the Namghyal regime. This system was called ‘Bukchung’ in Lepcha language.

**Architecture**

The Lepchas architecture and art of making musical instrument, houses, weapons etc has been of highest order from the earliest times. The bamboo called “poo” in Lepcha is the most useful plant by which they made construction of cane bridges, bamboo rafts, houses etc. the Lepchas are well acquainted with twenty two varieties of bamboos that are abundantly found from the whole valley up to twelve thousand feet high attitude of Sikkim. The bamboo seeds are also used to make into a fermented drink and into bread in time of scarcity. The Lepchas says that when bamboo flowers, it may be a bad signs like warning of famine, scarcity of food, unfortunate disaster etc.

**Lepcha Utensils**

Table 5 represents a brief account of different types of utensils utilized by Lepcha community people. Most of the utensils commonly used belonging to utensil categories like forceps, cup, spoon and spoon holder, container , basket etc used in maintaining their daily livelihoods. Most of them were build from two species of Bamboos(*Dendrocalamus* sp and *Bamboosa* sp) (Fig. 9).



**Fig. 9.** Utensils used by Lepcha’s (a) Stem of Bambusa and Dendrocalamus, (b) Stem and root of Bambusa and Dendrocalamus, (c) Stem of Dendrocalamus (d) Single pan Balance made up of stem of Bambosa. (e) Kaayu (cup) from the stem of Dendrocalamus sp.

**Lepchas House**

The roof is made of rough wooden battens, rafters, beams and bamboo poles and then thatched with thick layers of grass, reeds, so that it may last for several years. Not a single iron nail is used by the Lepcha in building their gigantic house. The house is earthquake proof and if any land slide occurs, the flood soil passes away through the open spaces in between the huge pillars without damaging the house.

**Ethno-music among Lepchas**

Lepchas music and dance are really a treat to the ears and eyes. The rhythmic background of music astonishes one by the way these traditional rituals are meticulously

performed. Their traditional instrument includes; Satsong, Tungbok, Bangno Tungdar, Tungdarbong, suno, palerth etc which really thrills us with their sound (Table 6).

**Table 5.** Traditional utensils used by lephas at different study sites of North Sikkim

Sl. no	Name of utensils	Plant used	Uses
1	FYET (Chimti/ Forceps)	Bamboo <i>Dendrocalamus</i> sp. (Poaceae)	Holding utensils.
2	KAAYU (cup)	<i>Dendrocalamus</i> sp. (Poaceae)	Drinking.
3	PUTAK (Spoon holder)	Bamboo	Holder where spoons and other are kept.
4	THURMA (spoon)	<i>Bambusa</i> sp. (Poaceae)	Serving of foods
5	SAARU LADLES (daru)	Bamboo <i>Dendrocalamus</i> sp. (Poaceae)	Serving of foods
6	TAFI (dalo/ container)	Bamboo <i>Bambusa</i> sp	Keeping goods or cereals
7	TAALYLOONG (nanglo)	Bamboo <i>Bambusa</i> sp	Used for husking
8	PODHYUM	Bamboo <i>Bambusa</i> sp. (Poaceae)	Utensils
9	CHIMOO YOJMOO (chee- putak)	Bamboo <i>Dendrocalamus</i> sp. (Poaceae)	Utensils
10	TALKE	Bamboo <i>Dendrocalamus</i> sp. (Poaceae)	Utensils
11	TOANGKO (Basket)	<i>Dendrocalamus</i> sp. (Poaceae)	Keeping vegetables and foods
12	CHOM TAFT	Bamboo <i>Dendrocalamus</i> sp. (Poaceae)	
13	GYANGRO	Bamboo <i>Dendrocalamus</i> sp. (Poaceae)	Used for making sangset
14	TEA FILTER PUNJET	Bamboo <i>Dendrocalamus</i> sp. (Poaceae)	Tea filter
15	KOYUK	Bamboo <i>Dendrocalamus</i> sp. (Poaceae)	Serving purpose
16	PUMGER	<i>Baincasa hispida</i> Cucurbitaceae	Used for keeping seeds

**Table. 6.** Some of the ethno musical instruments used by lephas of North Sikkim

Sl.no	Musical instrument	Made up of	Description of Instrument
1	SATANG	Bamboo <i>Dendrocalamus</i> sp. (Poaceae)	Length-24inches Circumference-30 inches,Length-20 inches
2	TUNG BAK	Hollow wooden block+animal skin+strings (made of stinging nettle)	Length -36 inches, Diameter- 11 inches, Height - 6 inches, Strings - 3 inches.
3	BANGNO	Hollow wooden trunk + animal skin <i>Bambusa</i> sp (Poaceae)	Diameter- 36 inches, Height - 30 inches, Sticks - one pairs.
4	BAMPATHYUT	Short bamboo <i>Dendrocalamus</i> sp (Poaceae)	Length - 2 inches.
5	TANGDYO	Chipped wood of bamboo <i>Dendrocalamus</i> sp (Poaceae)	Length - 6 inches.
6	PANTHONG PALEETH.	Bamboo <i>Dendrocalamus</i> sp (Poaceae)	Shapely thin bamboo with four holes.
7	CHAKPARZANG Drum (resembling chyabrung of bamboo)	<i>Castronopsis</i> sp. (Fabaceae)	Length - 30 inches, Diameter -10 inches up broad side and 15 inches of hard side
8	TUNG DAR (Madal)	Bamboo+Animal skin.. <i>Dendrocalamus</i> sp. (Poaceae)	Diameter-26 inches, Height - 1 inches
9	TUNG DARBONG	<i>Bambusa</i> sp (Poaceae)	Length - 20 inches, Diameter-15 inches
10	NIBYOKOPALSETH	<i>Dendrocalamus</i> sp. (Poaceae)	Long bamboo with five holes
11	POPATEK	<i>Dendrocalamus</i> sp. (Poaceae)	Small bamboo with four holes.

### Lepcha Ornaments and Weapons

Lepcha community has got its own cultural heritage and rituals. They are hunters as well as food gatherers. (Table 7)

**Table 7.** Ornaments and weapons of Lepcha tribe of North Sikkim region

No.	Ornaments used	Weapons used
1.	Roong Iyaak	Kung Dar Tuck
2.	Kagyer-Kawo	Suthong soat
3.	Tukwill-Iyaak	Bomfok
4.	Kwill-Iyaak	Bampayok
5.	Nure Kung	Sunghlyo
6.		Fyenlaak loo
7.		Crop
8.		Salée zong
9.		Phapri

During marriage ceremony as well as in different indigenous festivals different types of ornaments were used by the Lepcha community. Takwill-Iyaak are the dress code of the brides during their marriage. Lepcha female frequently uses ear rings named Nure Kung. Other ornaments such as Roong Iyaak, Kagyer-Kawo, Kwill-Iyaak are different forms of necklaces. Different types of weapons are used by the Lepcha people during their hunting process. They use spear type weapon named Sunghlyo, bow and arrow named Salée zong and hunter cap named Phapri (Table 7).

### Discussion

Darjeeling may be considered as one of the ethno botanically enriched place as people of this area are very much associated with ethnomedicobotanical knowledge. Many ethnic groups of Darjeeling use plants for medicine and food. They use folk medicine for humans as well as for animals. The ethnic groups have magi co-religious belief about plants, fire sacrificial plants, plants as human adornment, and plants in puja etc. The knowledge about the medicinally important plants and other uses has been inherently encrypted through generation after generation among the different ethnic groups of Darjeeling as plants have been integral part of their daily livelihood from the very beginning. Folk literatures such as folk song, folk tales and folk proverbs have perfused reference to trees, shrubs, climbers and their flowers and fruits. Folk proverbs having reference to plant are indicative of deep insight, common sense and practical wisdom of the common folk. The art of treatment and prevention of disease is pre-historic as men always have tried to overcome death and disease and tried to live happily and gay. Therefore man has always relied on natural products for the sustenance of life. During the present investigation it was found that most of the respondents of the Lepcha community of both the study sites reflected a higher dependency towards allopathy treatment over traditional healthcare systems. This declining dependency towards traditional healthcare systems might be attributed towards hard and prolonged requirement of time for collection of plants, lack of adequate skill for proper identification of medicinal plants. The gradual improvement of modern healthcare systems and closeness towards modern treatment facilities in cities and townships as well as the availability of primary health centers and sub centers in each village in recent years have further diverted the dependency away from ethno medicinal practices also. Many researchers have reported the preference of traditional healthcare systems by the local community people over the allopathic drugs [31-33]. During the present investigation at both the study sites destructive harvesting due to uprooting underground part were found to be the major reasons behind loss of plant species. Species subjected to destructive harvesting using root may be related to their possible vulnerability towards endangerment. The threatened taxa could be under severe threat of extinction if they have small fragmented distribution in a particular area as well as if the species were wildly exploited for commercial purposes [4]. Therefore, it is very much essential to promote their

conservation as well as offer income opportunity to local Lepcha community. The present study also reflects ethno medicinal application of drugs are not standardized in general, but depends mostly on age, physical appearance of the patient, illness and diagnosis of the diseases. The doses of medicine are relatively smaller in amount for the children compared to the adult individuals. However it further depends upon the type of illness and treatment realized appropriate by the local medicine men. The severity and type of diseases decide the frequency of treatments. Each medicinal plant is properly processed before application.

### ***Ethno-medicinal practices of Lepcha tribe***

Village people have their own perception and belief about ethno medicinal practices, which is in their culture, social structure and tradition since ancient times. The different categories of village practitioners prepares the medicine by themselves for the treatment of the patient. The Lepcha people believes in "Virtue of Touch". The Lepcha people often is reluctant to go to a nearby medicinal practitioner as he himself does not prepares the medicine and only prescribes medicine which is available to local medicine shop. Most of the common diseases such as cough and cold, headache, diarrhea etc are considered as natural causes in terms of severe climatic conditions. The different collections of medicinal plants in the form of dried leaves, stems and roots, bark are stored in their home's ceiling known as "Bhar"- a place above the fire place. They also cultivate some of the medicinal plants in their courtyard which may be considered as an indirect way to promote conservation of the germplasm of some of the medicinally important plants. Sudden occurrences of diseases is assumed to be supernatural causes (Wrath of Goddesses, Evil spirit, Non-Human, Spirit of sickness, Demons, Ancestral spirit, Witchcraft). During the medical treatment the herbalist follows various ritual procedures. He asks the patient about his dreams or interrogates other family members of the patient to find out the cause of disease. Temperature and pulse rate were also recorded. Offerings of smoke in form of burning small pieces of leaves and twigs of scented plants (Dhup, Sukpa) on the charcoal were attributed towards "Kongchen-kaulo" (god of Himalayas). The medicine men dances around the patient with "Titepati" (leaves and twigs of *Artemisia vulgaris*) in hands enchanting spiritual words. It is during this process various herbal remedies were given to the patient. Once the herbalist completes his spiritual words, he assures the patient family about the cure of the patient from the disease as he has driven away all evil spirits and fed the patient with medicine. The information about the utility of plant and plant products were confined to limited number of individuals with utmost sanctity and secrecy. It is transferred from one generation of herbalists to the next generation through experience. The medicine men collect the medicine from the forests by themselves in order to maintain the secrecy of utility of the plants. The collection is followed by preparation and administration of the drug in the body of the patient. He takes the help of his helper or any member of the patient family for administering the drug. From the study of socio-religious life style of Lepcha Community of selected study sites of Darjeeling and North Sikkim it was observed that Lepchas are one of the primitive tribe who have utilized its surrounding plants and animals for their betterment. They can be considered as one of the most nature dependent community who are very much efficient in maintaining their sustainable lifestyle. The Bamboo plants are the most common plants among the Lepchas. They are well acquainted with twenty two varieties of bamboos and have explored the potential uses for building houses, handcrafts, utensils etc. The art of building houses purely of wood, utensils, musical instruments weapons etc displays a style of its own. Different musical instruments such as Satsang, Paleet made up of *Dendrocalamus* sp., Tungdar made up of *Katus*(*Castronopsis* sp.) etc. The different Lepcha ornaments and weapons are also made up of wood of different plants. Lepcha medicine consists of using flowers, roots, barks, leaves, seeds etc of plants and is therefore devoid of any side effects. Such type of practices therefore indicates towards the sustainable lifestyle of Lepcha Community through bioresource utilization. Biodiversity conservation has been a major topic of concern all over the world in this decade. Depletion of natural resources at a fast rate provides a challenge for the world scientists to conserve nature, wildlife and the socio-cultural atmosphere of inhabitants of earth in a sustainable manner. The diversity of phytoresources in Darjeeling and Sikkim



Himalayas needs to be scanned judiciously. Preservation and conservation of plant genetic resources have prime importance and needs to be studied on priority basis.

## Conclusion

Lepchas are one of the primitive tribes who have used their surrounding plants and animals for their health and sustenance. Since exploitation of natural plant resources is in full swing in the entire Darjeeling and Sikkim Himalayan region and many of the medicinally useful plant species have been depleted drastically, their conservation has become the need of the hour. Habitat depletion has also been conveying threats to them. Restorative steps needs to be taken in these areas and initiatives should be taken for sustainable use of these taxa. Moreover documentation of indigenous knowledge is given priority worldwide, since together with phytoresources the knowledge about their uses has also fallen victim to extinction. Advancement of the pharmaceutical researches has promoted increased exploitation of different natural resources through conversion of proprietary and secret remedies in to commercial industry. Such type of commercialization leads towards overexploitation of bioresources. Based on our field investigations, it appears that habitat loss due to increasing anthropogenic activities has promoted greater damage towards diversity of available bioresources of the concerned study sites. Therefore, awareness and documentation of traditional knowledge is vitally important.

## Acknowledgements

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