ETHNOBOTANICAL STUDY IN KHAS COMMUNITY OF RAMAROSHAN RURAL MUNICIPALITY, ACHHAM, WESTERN NEPAL

A THESIS SUBMITTED FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE MASTER'S DEGREE IN BOTANY

BY

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degree. Any literature, data or works done by others and cited within this thesis h
been given due acknowledgement and listed in the reference section.

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RECOMMENDATION

This is to recommend that the proposed research work entitled "**Ethnobotanical St**
in Khas Community of RamaRoshan Rural Municipality, Achham, West
Nepal" is carried out by Mrs. Sanju Neupane "TU Reg. No. 5-2-0050-0286-20
under my supervision for the partial fulfillment of Master's Degree in Botany.
entire work is based on original scientific investigation. I therefore, recommend
thesis to be accepted for the Master's degree in Botany from Tribhuvan Univer
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The M.Sc. dissertation presented by **"Sanju Neupane"** entitled **"Ethnobotan Study in Khas Community of RamaRoshan Rural Municipality, Achh Western Nepal"** T.U. Reg. No: 5-2-0050-0286-2013" has been accepted as a pa fulfillment of the requirement for the completion of Master's Degree in Botany.

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ABBREVIATIONS AND ACRONYMS

ENT	Ear, Nose and Throat
FI	Frequency Index
ICF	Informant Consensus Factor
IUCN	International union for conservation of nature
KATH	National Herbarium and Plant Laboratory
KNP	Khaptad National Park
MASL	Meter Above Sea Level
RRMP	RamaRoshan Rural Municipality Profile
UV	Use Values
WCED	World Commission on Environment and Development
WHO	World Health Organization
Spp.	Species

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ABSTRACT

Ramaroshan Rural Municipality of Achham district lies in the Sudur Paschim Province in West Nepal. This area is rich in biodiversity. The present study includes documentation of ethnobotanically useful plant species found in this area. Different plant specimens were prepared during field visit. Quantitative parameters like Informant Consensus Factor (ICF), Frequency Index (FI), and Used Values (UV) were used during ethnobotanical analysis to find out the important uses of plant species in the study area. A total number of 156 plants belonging to 75 families were recorded from the study area. The grass family (Poaceae) was the most dominant family while the tobacco family (Solanaceae) was the least one. Among the different use categories, 56% of plants were used for single uses and 44% of plants were used for multiple uses. The highest ICF value was obtained for anticancer and antidote use while least ICF value was obtained for skeleton- muscular and cardiovascular disorders. Among 42 species in medicinal category, the frequency index showed that *Hymenidium dentatum*, *Neopicrorhiza scrophulariiflora* and *Hippolytia dolichophylla* were most used plant species having a high frequency index. 89% were considered to have a high use value, 7% a moderate value, and 4% a low use value. Among them, highest value for *Spinacia oleracea* (2.5), and *Acorus calamus* (2.35), and moderate value for *Ficus religiosa* (1.87), and *Cuscuta reflexa* (1.85) and the least use value (1) was known for 103 species such as *Aconitum lethale*, *Zingiber officinale*, and so on.

Keywords: Informant consensus factor, Frequency Index, interview, traditional knowledge, use value.

CHAPTER 1: INTRODUCTION

1.1. Background

The interaction between the plants and people of the different ethnic communities has been more prevalent since long ago (Kunwar and Bussmann, 2008). People rely on plants to cater to a wide variety of their needs, like food, shelter, clothing, medicine, and art. Such knowledge is deeply rooted in local culture and practices (Malla *et al*., 2015; Heiser, 1995, and Nyazema, 1996). This information is vital for the development of new practices and innovations that emphasize socioecological and socioeconomic benefits (Gomez-Beloz, 2002). The geographic, cultural, traditional, and biological diversity of Nepal is one of the significant epistemological sources with wide scope and opportunities. Although numerous studies have been made previously to endeavor those knowledges, there are still a few areas unexplored with lots of possibilities in the Western rural areas of Nepalese geography (Rokaya *et al.*, 2010). Furthermore, ethnobotanical knowledge among different ethnic communities differs according to their practices, traditions, plant diversity, and feasibility. Thus, every community flourished with their own knowledge glossary that might be a future option for solving scientific problems or having ecological significance (Aniyam, 1995). This knowledge is now threatened by modernization and scientific progress in the physical and biomedical sciences. To address their scope and future aspects, documentation of such information before it disappears is an important concern, and the present work is part of it (Malla *et al.*, 2015).

In Nepal, documentation of ethnobotanical knowledge is believed to have started in the early 1900s (Rao, 1996), and later, many ethnobotanical studies were made to assess traditional knowledge among different ethnic communities from various regions of the country (Banerji, 1995; Shrestha and Pradhan, 1986; Manandhar, 2002; Singh *et al*., 2012, and Kunwar *et al.,* 2014). Different ethnic communities are still dependent on local plant resources to meet their basic requirements and for their economic generation. The secrecy of plant uses in aspects of ethnomedicinal use is due to the belief that the potency of plants will be lost if they revealed to other people (Malla and Chhetri 2009, and Singh *et al*., 2012). Beyond their ethical rights to their knowledge, changing lifestyles, social transformation, and acculturation have led to a

decline in the practices of folk medicine as well as a transformation of knowledge in new generations of their own communities (Malla *et al.*, 2015). Therefore, exploration and documentation of traditional ecological and medicinal indigenous knowledge on plant resources are consciously needed (Husain *et al*., 2008; Uprety *et al*., 2010; Ahmad *et al*., 2012, and Kunwar *et al*., 2013).

About 30,000 to 70,000 species of plants are used as medicinal plants throughout the world (Thomas *et al.*, 2009). Around 70%-80% of the world´s population relies on medicinal plants for their primary health care (Fransworth and Soejarto, 1997). Various communities in Nepal use approximately 2000 species of wild plants in traditional medicinal practice, the majority of which are still waiting for their proper documentation (Baral and Kurmi, 2006, and Ghimire, 2008).

International documents such as the Brundtland Commissions "Our Common Future" (World Commission on Environment and Development, 1987) explain the inter-relationship of the local people in the role of management of natural resources. Ethnobotany plays an important role in various fields such as biochemistry, pharmacognosy, medicine, nutrition, agriculture, anthropology, sociology, history, and archaeology. The study of traditional medicines leads to the discovery of new medicines and agrochemicals. Many important drugs like digitoxin, reserpine, tubocurarine, ephedrine, ergometrine, atropine, vinblastine, and aspirin have been discovered by following the knowledge of folk uses (Anyinam, 1995).

The ethnobotanical study is an important discipline of research that helps in natural resource management, biodiversity conservation, socio economic development, and the sustainable use of highly valued medicinal plants (Gemedo-Dalle *et al*., 2005). Thus, the present study is aimed at documenting the unexplored ethnobotanical knowledge among Khas community residing in the rural hilly region of Achham district in western Nepal.

1.2. Rationale

The use of native plants by the local people has been considered the foundation of traditional knowledge. Indigenous people have relied on a wide variety of plants for their survival for thousands of years. Additionally, for many generations up to the

present, the distinctive practice of using forest resources and other such facilities has been transmitted orally. However, the way of life of indigenous people is rapidly changing due to modern civilization in different forms, such as synthetic pharmaceuticals, road expansion, open markets, hydroelectricity, deforestation, rising settlement, industrialization, and shifting subsistence economies. The new generations have a belief in allelopathic treatment rather than ayurvedic, so they are giving up on the notion of using herbal treatments. Ethnic groups from Ramaroshan Rural Municipality in Achham District, including the Magar, Thakuri, Dalit, Brahmin, and Chettri, have long established their distinct lifestyles that are closely connected to the environment. They have been maintaining their own cultural and traditional customs, living far from the city and preserving the traditional knowledge contained within their own group. However, it is impossible to ignore the use and dissemination of traditional knowledge. Given the circumstances, it is imperative to preserve the priceless traditional knowledge of plant usage before it is lost forever. The goal of this research is to catalog the historic uses of plants for a variety of needs that could provide options for the needs of an expanding population in the future.

1.3. Research questions

- What are the traditional uses of plant species among the people of the Khas community?
- What is the status of ethnobotanical knowledge in different generation of community?

1.4. Objectives

The present study has a general aim to document ethnobotanical knowledge among the people of Khas Community Ramaroshan Rural Municipality in Achham district.

Specific objectives

The specific objectives of the study area are :

- To collect and identify the plants used by local people of Ramaroshan area.
- To calculate use value (UV) of most frequent useful plants.

- To assess the Informant Consensus Factor (ICF), and Frequency Index (FI) for medicinal plants.
- To find out the conservation practices throughout the ethnobotanical data.

1.5. Limitations of the study

The present study had following methodological limitations:

- Rare and threatened species were not collected for herbarium preparation.
- Complete medication practices (dosages, time, and methods) were not assessed due to informant's privacy concern to their knowledge.

CHAPTER 2: LITERATURE REVIEW

2.1. Development of Ethnobotany

Banerji (1955) accepted ethnobotanical study in Nepal with the publication of a paper on medicinal and food plants of Eastern Nepal (Manandhar, 2002). Since then, numerous studies have been carried out by several botanists (Shrestha and Pradhan, 1986; Kunwar *et al.,* 2014). Duthie (1911) first conducted the study of medicinal plants and documented over 200 species of medicinal plants used by the local people in the upper Gangetic plain and in the adjacent Siwalik and Sub-Himalayan tracts of India. The utilization of plants by indigenous people was initially coined by John Williams Harshberger in 1895 A.D. Ethnobotany derives from two words: "Ethno" refers to a group of people sharing a group of national and cultural traditions, and "Botany" is the study of plant life in that region. As a result, "Ethnobotany" is defined as the study of how people and plants interact in the wild. Over the years, attention has been paid to the interaction between human societies and plants as well as the use of plants (Shrestha *et al.,* 1997).

Ethnobotany as a field of study has its origins in colonial and economic botany. Explorers and traders have documented the commercial and medicinal usage of plants by indigenous people throughout history. The amount of ethnobotanical literature has increased significantly over the past century, with a number of renowned journals, periodicals, bulletins, and books devoted only to discussing various aspects of the field. Ethnobotany of Nepal (Rajbhandari, 2001) offers significant insights into earlier ethnobotanical studies in the context of Nepal. More than 590 studies on ethnobotany were conducted in Nepal (Shrestha *et al.*, 2004; Joshi and Joshi, 2005).

2.2. Indigenous Knowledge and ethnobotanical study

The indigenous people's knowledge, expertise, beliefs, and laws around the flora are native to that area. A number of ethnic communities in any area are partially or fully dependent on plant resources from which they obtain food, fodder, medicine, timber, firewood, and botanical tools (Martin, 1995). The systematic application and investigation of indigenous knowledge benefits greatly from sustainable resource use

and development (Thomas, 1995). Many significant modern-day medications have been made possible by the documentation of traditional knowledge, particularly regarding the medicinal benefits of plants (Balick and Cox, 2020). The relationship between the local people and their plant takes different forms like treatment of various ailments, economic and social value, and religious and cultural value (Malla and Chhetri, 2009).

2.3. Role of ethnobotanical and ethnomedicinal plants

Plants play an important role in the lifestyles of people where people are directly or indirectly depended on them for different purposes like food, medicine, timber, firewood, dying, religion, handicrafts, and others. Around 75–90% of the world's rural population relies on traditional medicines for health purposes (Kibebew, 2001). While 6500 species of plants are employed for home medicines in Asia, 1000 species are utilized for traditional medicinal uses in Nepal (Karki and Williams, 1999; Chaudhary, 1998). Around 80% of rural Nepalese residents rely on traditional medical practices (Bhattarai, 1998). In the past, plants were used as a basic ingredient in innovative dried chemicals used to treat ailments (Andrew *et al*., 2000).

2.4. Threats to traditional medicinal plants

There are many issues that traditional medicinal plants are currently experiencing. Due to the destruction of their natural habitats and the loss of indigenous knowledge, it is difficult for people to find them (Kelbessa *et al.*, 1992). Threats to medicinal plants can come from both man-made and natural causes. Due to anthropogenic factors like population growth, the need for fuel, urbanization, timber production, overharvesting, invasive species, commercialization, degradation, agricultural expansion, and habitat damage, as well as natural causes like droughts, bushfires, volcanoes, floods, landslides, diseases, and insect outbreaks, different risks were observed in the case of medicinal plants (Kelbessa *et al.*, 1992). Today's youth have different goals and interests, which hastens the loss of traditional wisdom even more quickly than plant life itself (Sofowora, 1982). Therefore, it is essential to put medicinal plants and associated indigenous knowledge under effective conservation.

2.5. Ethnobotanical studies conducted in Nepal

Manandhar (1989) illustrated 107 plant species having ethnobotanical importance among the Chepang Community of Makwanpur district, where Rijal (2011) collected 435 species for 845 ethnobotanical uses from the mid hills of Nepal. Muller and Boker (1993) carried out the ethnobotanical study among the Tharu of Chitwan district. In this study, they mentioned 61 plant species serving as food (the tubers, leaves, or fruit), construction and cultural materials, and reported 62 medicinal plants for curing different diseases or disorders. Kunwar (2003) documented 211 plant species belonging to 88 families with 188 genera used by the local people of Khaptad National Park (KNP), among which 51 species were used for medicinal values, 11 for vegetables, 6 for ornamental purposes, 18 for construction, furniture, and agricultural tools, and 10 for miscellaneous purposes. Plants were documented according to their families. Shrestha and Dhillion (2003) documented 113 medicinal remedies from 58 species belonging to 40 families to treat a wide range of ailments among nine rural communities in Dolakha district, Central Nepal. Roots and leaves were commonly used. Rosaceae, Liliaceae, Fagaceae, and Poaceae were the most dominated species documented in that study. Oli *et al.,* 2005 recorded 121 plant species belonging to 63 families and 110 genera used for food and medicine in the east churiya of Nepal among the major ethnic groups like Limbu, Rai, Tamang, Magar, and Brahmin/Chhetri, where 88 species belong to medicinal purposes and 43 species were categorized for food purposes. Among 88 medicinal plants, *Calotropis gigantea,* and *Hedyotis scandens* were used for treating bone fractures; *Oroxylum indicum* for jaundice; *Rauvolfia serpentina* for fever; and *Terminalia bellirica,* and *Terminalia chebula* for cough, cold, and tonsillitis.

Rokaya *et al.,* 2010 documented 161 plant species belonging to 61 families and 106 genera used for treating 73 human and 7 Veterinary ailments in Humla district, West Nepal. The ethnobotanical information was collected through semi-structured interviews and key-informant discussions. They had also documented culinary uses and additional uses for 67 and 33 species of medicinal plants respectively. Roots were mostly used part in the form of powder and orally. Among medicinal plants, only 136 plants were collected from the wild while 15 were cultivated, and 10 were collected from the wild and were also found in cultivated form. 67 medicinal plants with

culinary uses were found in the form of vegetables, spices, condiments, cooking oil, pickles, and tea. And also, additional plant species were being used as soaps, dyes, construction materials, fodder, incense, firewood, etc. Rijal (2011) studied the ethnobotanical knowledge of the Chepang Community of Chitwan district in the mid hills of Nepal. An artifact or interview approach was used for finding the uses of plants for different purposes as well as for identifying them. A total of 435 different plant species were reported for 845 various uses, of which 198 were fodder, 136 were edible plants and, 115 were medicinal. 246 species had single uses, while 189 species had multiple uses. Among them, 11 belonged to International union of conservation for nature (IUCN) threat categories including 3 endangered, 2 vulnerable, 2 rare, and 4 commercially threatened. Similarly, among nine edible plants, three were used for fish poisoning, four for oil extraction, one for environmental use. and one for brewing purposes. Uprety *et al.,* 2011 recorded 221 plant species distributed as herbs (80), trees (68), shrubs (28), climbers (19), pteridophytes (18), lianas (5), and epiphytes (3) belonging to 52 families and 81 genera from the Upper Seti Hydropower Project of Tanahun district in Central Nepal. Rapid Rural Appraisal was used for gathering, collecting, and validating ethnobotanical uses during the field visit. The most frequent species were *Murraya koenigii, Dioscorea* sp, *Acacia catechu, Mallotus philippensis,* and *Shorea robusta.* Leaves and roots were the msot frequently used parts for medicinal purposes. Uprety *et al.,* 2012 documented altogether 81 plant species belonging to Angiosperms (74), pteridophytes (5), and fungi (2); among them, 44 were fruits and 36 were vegetables, carried out in the Makwanpur, Tanahun, Dang, Bardiya, and Kailali districts of Nepal. A high number of food (9 species) belong to Moraceae, (7 species) to Anacardiaceae, (5 species) to Leguminosae, and (4 species) to Euphorbiaceae. *Ficus* species was highly dominated genera followed by *Bauhinia*.

Malla and Chhetri, (2012) identified 28 species belonging to 27 genera under 22 families, where 6 species were widely used for the treatment of mainly 4 different ailments like indigestion, muscular swelling, fever, and peptic ulcer. *Castanopsis indica* and *Desmodium concinnum* were used for the treatment of indigestion, *Osbeckia stellata* for diarrhea and dysentery, *Cleome viscosa* for cuts and wounds, *Acacia catechu* and *Gaultheria fragattissima* for fever and peptic ulcer, and *Anaphalis contorta* for backache problems, respectively, among four ethnic tribes such as Gurung, Magar, Kumal, and Majhi in Parbat district of Central Nepal. Malla *et al.*,

2013 identified 61 plant species belonging to 59 genera and 43 families used by different ethnic people, the Gurung, Magar, and Majhi of Parbat district of Central Nepal, for curing various human diseases. Out of 61 species, 31% were herbs, 26% were shrubs, 38% were trees and 5% were climbers. The plant parts were generally used for curing different ailments like diarrhea, dysentery, asthma, fever, stomach pain, ulcers, cuts and wounds, sore throat, rheumatism, high blood pressure, urinary problems, and constipation. They commonly use plants and parts such as roots, rhizomes, tubers, leaves, stems, wood, bark, flowers, seeds, and fruits for various purposes in their daily life. Bhattarai and Acharya (2015) documented 64 plant species used by local people for medicine (30 spp.), construction materials and household appliances (26 spp.), food (14 spp.), cultural and religious ceremonies (9spp.), fodder and firewood (7spp.), fiber (4 spp.), pesticides (4 spp.), fish poison (2 spp.), fermenting agent (1 sp.) and fishing net (1sp.) in the Tharu community of Gadariya and Phulwari VDCs of Kailali District, West Nepal. A total of 132 ethnomedicinal plants from 67 families and 99 genera were recorded by Malla *et al.*, (2015) of the Magar and Majhi ethnic communities as being utilized to cure various diseases and disorders in accordance with 12 categories in Parbat district of Central Nepal. Out of 67 families, Lamiaceae and Orchidaceae have the highest number of medicinal plants, followed by Asteraceae and Fabaceae. The most highly dominant part was seen in the leaf (41.6%), followed by the root (31.8%), whole plant (18.2%), fruits (13.6%), bark (8.3%), rhizomes (6.8%), flowers, seed, and stem (4.5%), latex (2.2%), tuber and pseudobulb (1.5%), and corm (0.75%), respectively.

Chaudhary and Rai (2017) identified a total of 119 plant species under 92 genera and 52 families for different purposes, such as traditional medicinal practices, cultural and religious ceremonies, edibles, and fodder, in a community on the north-east side in Pakali of Sunsari district of Nepal. Participatory Rural Appraisal (PRA) and interviews were conducted during the collection of ethnobotanical documentation. Out of 119 plants, herbs are maximum followed by shrubs, and the trees were least in number. Fabaceae was the largest dominant family, including 23% of plants. Maximum plants were used for treating stomach problems, skin diseases, diarrhea, dysentery, cough, rheumatism, fever, and eye problems. Bhattarai, 2018 documented a total of 30 plant species belonging to 24 families and 29 genera used as food, fodder, medicine, and in rituals by the Thami community in Ilam district of eastern

Nepal. The ethnobotanical data were collected using structured and semi-structured questionnaires with key-informant interview. A questionnaire survey was carried out in order to compare and analyze the knowledge among the informant. The highest number of plant species were used for treating various ailments in 12 categories, with gastro-intestinal disorders followed by eye, nose, and throat (ENT) problems. Most of the medicines were prepared from underground parts in the form of paste and used orally. Different parts of the same plants were used for different purposes, like food, fodder, fuel, and for different ailments. Among the 30 species, *Buddleja asiatica* was found only for ritual purposes and *Cannabis sativa* for cattle ailments. The remaining were used for treating human ailments and other purposes. Pangeni *et al.,* 2020 reported 58 ethnobotanically useful plant species used to treat various ailments, including skin diseases, asthma, eye irritation, rheumatism, cancer, fever, and gastro-intestinal disorders, in the Magar ethnic community of Palpa district of Nepal. PRA and direct interaction with local people were used to collect data. Informant consensus factor (IFC) and Relative Frequency Citation (RFCs) were applied to explore the cultural importance of ethnomedicinal plants. About 69% of the 58 species were reported for medicinal purposes. Some of them were *Diploknema butyracea*, *Aegle marmelos*, and *Colebrookea oppositifolia*. About 17% were reported for fodder, 7% for wild edibles and 7% for miscellaneous uses. Among them, the most dominant were herbs, followed by trees, shrubs, and climbers. Pradhan *et al.,* 2020 reported a total of 139 plant species belonging to 74 families used to treat different ailments, followed by other uses such as fodder, veterinary, religious, pesticide, and timber in Khandadevi and Gokulganga Rural Municipality of Ramechap district of Nepal. The study was carried out using semi-structured questionnaires and rapid rural appraisal to get knowledge from local people regarding ethnobotanical uses in their surroundings. Among these, herbs were the most dominant species, followed by trees, shrubs, climbers, grasses, epiphytes, ferns, fungi, and lichens. Out of which, 136 were used for treating medicinal values, and others were followed by fodder, veterinary, religious, pesticides, timber, etc. Das *et al.,* 2021 revealed that the Kewrat Community used a total of 60 medicinal plants in the Morang district to treat 35 different ailments in addition to their traditional applications in various rituals and religious occasions. Ethnobotanical participatory appraisal (EPA) method was conducted for gathering ethnobotanical documentation. Among the collected species, 48% were herbs, 20% were shrubs, 25% were trees, and 7% were climbers.

From the concept, importance, and historical inferences from previous literature, there was a poor status of botanical exploration and a lack of ethnobotanical documentation in the selected study area of the present work. The ethnobotanical documentation gives a scientific as well as philosophical perspective that assembles plant use knowledge in systematics with social importance, ecological significance, conservation practice, and helps in policy development. Furthermore, present ethnobotanical documentation may give some sight as pioneer work on plant science for the taxonomic studies on detail for valuable plants in the area or people, both from an ecological or economic aspect.

CHAPTER 3: MATERIALS AND METHODS

3.1. Study Area

Ramaroshan Rural Municipality, known for land of 12 lakes and 18 patches of meadows is famous for tourist attraction. It is situated in Achham district of Far-Western Province of Nepal. There are total 7 wards in Ramaroshan rural municipality among which, the largest ward is ward no. 5 by population as well area where present study was carried out. There are mainly 5 villages: Nilkantha maadu, Tallo Paatal, Sallisen, Alledi and Netakot. The geographical location of the area was 29°20'N and 81°42'E. The altitudinal range of the study area was between 1700 masl (Village area) to 2700m (Lakes area) above sea level.

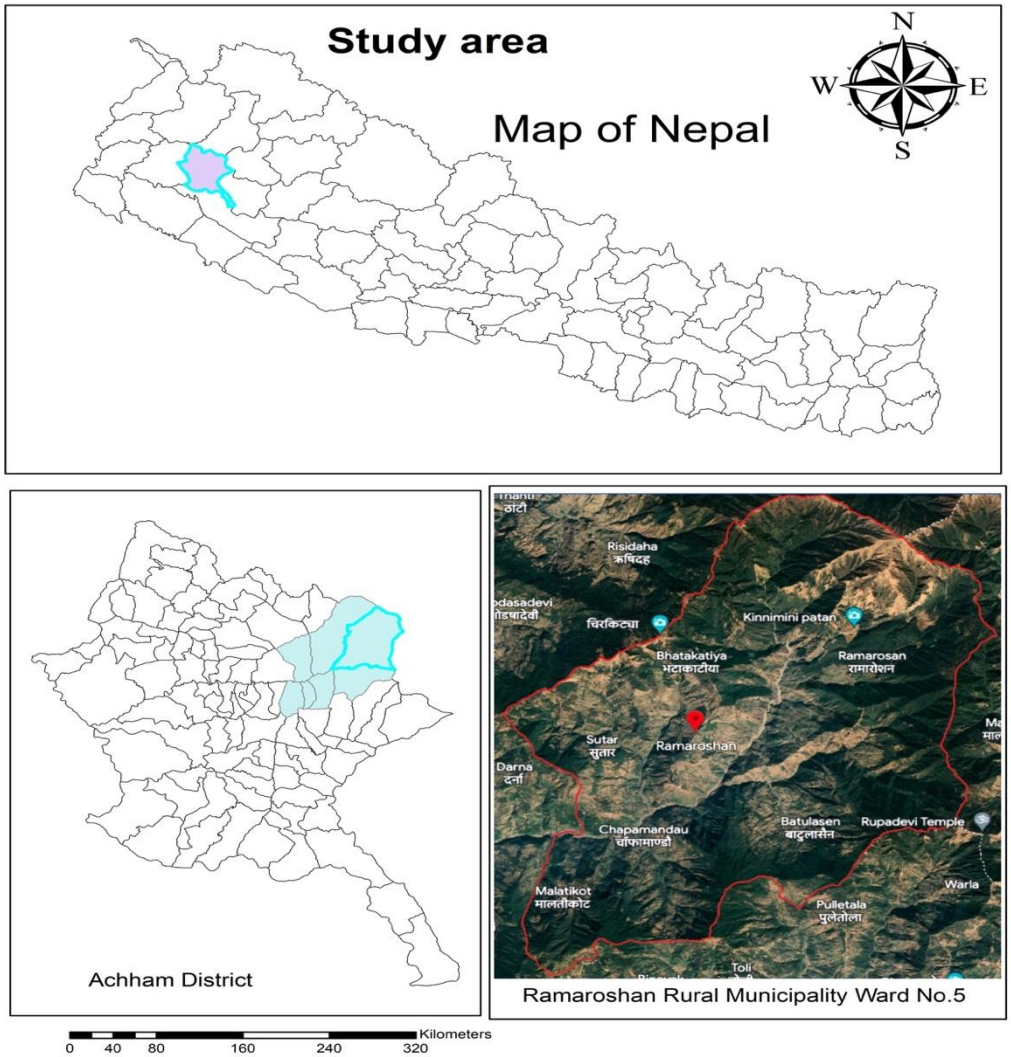


Figure 1: Map of the study area

3.2. Vegetation and forest types

The present study area comprised of different types of vegetation from sub-tropical to upper temperate region with following major forest types:

3.2.1. Daphiphyllum-Alnus forest

Daphiphyllum-Alnus forest is distributed from 1750 to 2100 masl near to the villages along the trail of Ramaroshan lake. The dominant tree species are *Daphiphyllum himalayense* and *Alnus nepalensis* associated with *Lyonia ovalifolia*, *Prunus cerasoides* and *Aesculus indica*. The major shrub species are *Prinsepia utilis* and *Berberis aristata* while the major herb species are *Bergenia ciliata* on the rocks and *Acorus calamus* in wetland areas.

3.2.2. Rhododendron-Castanopsis forest

Rhododendron-Castanopsis forest is distributed from 2100 to 2350 masl on the way to Ramaroshan lakes and meadows above the region of *Daphiphyllum-Alnus* forest. The dominant tree species are *Rhododendron arboreum* and *Castanopsis indica,* associated with *Lindera neesiana, Eurya acuminata,* and *Rhododendron campanulatum.* The major understory vegetation consisted of species of *Daphne bholua, Cirsium verutum, Rumex hastatus and Fragaria nubicola.*

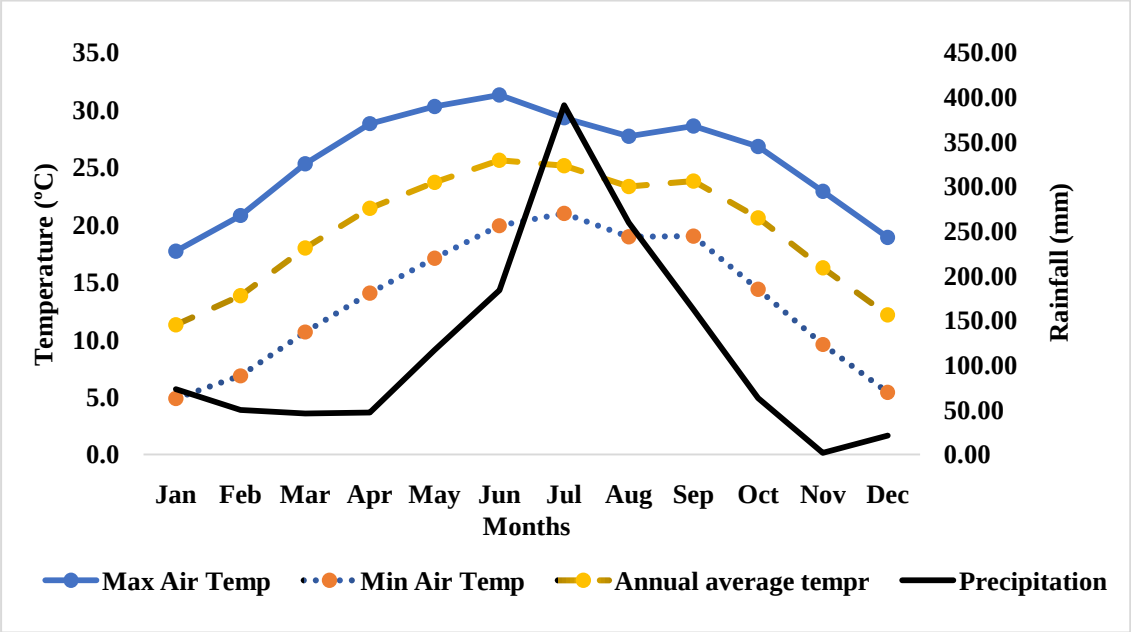
3.2.3. Mixed Conifer forest

Mixed Conifer forest is distributed from 2350 to 2700 masl along the upper part of Ramaroshan lakes and way to Alledi. The dominant tree species are *Rhododendron campanulatum, Ilex dipyrena, Tsuga dumosa,* and *Cedrus deodara*. The major shrub and herb species are *Daphne papyracea, Sarcococca saligna,* and *Rumex nepalensis*.

3.3. Climate

The climate shows the detail of the past nine years from a nearby hydrological station, showing nearly all dry months in the area except from mid-June to August. The average maximum and minimum average air temperature were 25.7℃ and 13.5℃ respectively. Similarly, the mean annual precipitation in the study area was 1414.4

mm **(Figure 2)**. The field study was conducted from April to May, a dry month, where most of the plants were just sprouting.



(Source: Department of Hydrology and Meteorology, 2023)

Figure 2: Climate of study area from 2014 to 2022

3.4. Ethnicity

Ramaroshan Rural Municipality was dominated by the Khas Community as a major indigenous group, including Chhetri, Brahmin, Thakuri, Kami, Damai, Sarki, and Sanyashi. People normally speak Achhami language however, they communicated with us in Nepali as much as possible. In total, 29,623 people were inhabiting the Ramaroshan rural municipality among which 14,917 were male and 14,706 female residing in 4,897 households (RRMP, 2018). The selected ward was inhabited by 3393 females and 3501 males in 3501 households. Most of the people depended on agricultural production and handicrafts for their livelihood. In addition, their sources of cash income were tourism, hotels, handicrafts, government jobs, and the trade of medicinal plants.

3.5. Collection of ethnobotanical data

3.5.1. Data collection on traditional knowledge

The traditional knowledge on useful plants in the study area was gathered by interviewing local people in the area between April to May 2022, where intensive work has been done. In total, 80 people were interviewed, including 40 men and 40 women. For the purpose of the study, the snow-ball sampling method was used to select the respondents. Respondents were categorized into four groups: under 20, 20-40, 40-60, and above 60. In order to avoid unnecessary influence from other respondents, 60 respondents of a later age group were interviewed individually. However, 20 respondents from group discussion, i.e., under 20 from the young generation were interviewed for focus group discussion, in Nilkanthamadu Madhyamik Vidalaya, a public school, to get the ethnobotanical uses. Among the three, two local healers were interviewed as key informants for recording information on medicinal plants in the area. Furthermore, farmers, teachers, social workers, government officers, and business owners were interviewed. Based on the objectives, a semi-structured questionnaire was made and used for the interview.

Ethical guidelines were followed for both interview, and specimen collection. Informant consent was taken prior to the interview, and permission for its publication as well as submission to the university was considered. Approval for sample collection was taken from the ward office, and informants were informed a day before the interview and asked for time. A mandatory effort was made to minimize the errors during the interview and accurately document the names of local plants, their uses, and their importance in both written and audio form.

3.5.2. Specimen collection and Herbarium Preparation

Four local guides were carried to the field for specimen collection and identification. In the case of shrubs and trees, two to three short twigs were cut from a healthy, uninfected plant. In the case of small herbaceous plants, the entire rooted plant was collected. The collected samples were immediately labeled with proper tags and transported in a zip-lock bag to the hotel for pressing. The details of the specimens were noted in a field notebook. In the case of rare plants, only photographs were

taken. Bridson and Forman, (1998) method was used for the systematic collection of specimens, herbarium preparation and management.

3.5.3. Plant identification

Prepared herbarium specimens were identified with the assistance of taxonomic experts by comparison with available herbarium specimens in KATH herbaria and digital herbaria (KEW, TI, and KATH). Furthermore, final confirmations were made by consulting appropriate published and unpublished literature, local flora, and other standard botanical literature like Manandhar (2002), Hooker (1872-1897), Polunin and Stainton (1984), and Stainton (1988).

3.6. Analysis of ethnobotanical data

The collected data were entered and analyzed using MS Excel 2010. The following quantitative parameters were assessed for the traditional uses of plants in the area:

3.6.1. Used values (UV_i)

The use values of different plants used by the local community can be calculated by using the equation given by Phillips *et al.*, (1994),

$$\text{Use Value (UVi)} = \frac{\Sigma \text{Ui}}{\text{Ni}}$$

Where,

Ui= No. of use reports cited by each informant for a given plant species i

Ni = Total number of informants interviewed for a given plant species i.

3.6.2. Frequency Index (FI)

The frequency index of different plants used as medicines was calculated by Madikizela *et al.*, (2012),

$$FI = \frac{Fc \times 100}{N}$$

Where,

Fc = Number of informants who mentioned the use of the species for all ailments

N = Total number of all informants

3.6.3. Informant Consensus Factor (ICF)

The informant consensus factor is used for identifying the categories of ailments first introduced by Trotter and Logan (1986), calculated as;

$$FIC = \frac{Nur - Nt}{Nur - 1}$$

Where, Nur = Number of use report in a particular illness category by informants and

Nt = Number of taxa or species used to treat that particular category by informants.

CHAPTER 4: RESULTS

4.1. Enumeration of Useful Plants

The present study revealed the uses of a total of 156 plants belonging to 75 families and 138 genera from Ramaroshan Rural Municipality-5 (**Annex 1**). The study included plants from both interviews and herbarium specimens collected from local people. It included vascular plants and fungi with the highest number of species under Angiosperms, followed by Gymnosperms, Pteridophytes, and Fungi taxa (**Table 1**).

Table 1: Number of ethnobotanical species in different taxa

Taxa	**No of families**	**No of genera**	**No of species**
Fungi	1	1	1
Pteridophytes	1	1	1
Gymnosperms	3	4	4
Angiosperms	70	132	150
Total	**75**	**138**	**156**

Species were widely distributed in 75 different families. The largest family in terms of number of species in the area was Poaceae (13 species), followed by Rosaceae (11spp.), Moraceae (8 spp.), Asteraceae (7 spp.), Polygonaceae (6 spp.), Urticaceae (6 spp.), Ranunculaceae (5 spp.), Apiaceae (4spp.), and Acanthaceae (3 spp.) **(Figure 3)**. In the study area, Poaceae was the highly dominant family in terms of species, and among the genera, *Ficus* (family Moraceae) was the largest genus with 7 species. It was followed by *Delphinium*, *Prunus*, and *Quercus* (each with 3 species), and *Rhododendron*, *Rosa*, *Persicaria*, and, *Rumex* (each with 2 species). Concurrently, Acanthaceae and Aspragaceae were the least dominant families, with a very few number of species in the area.

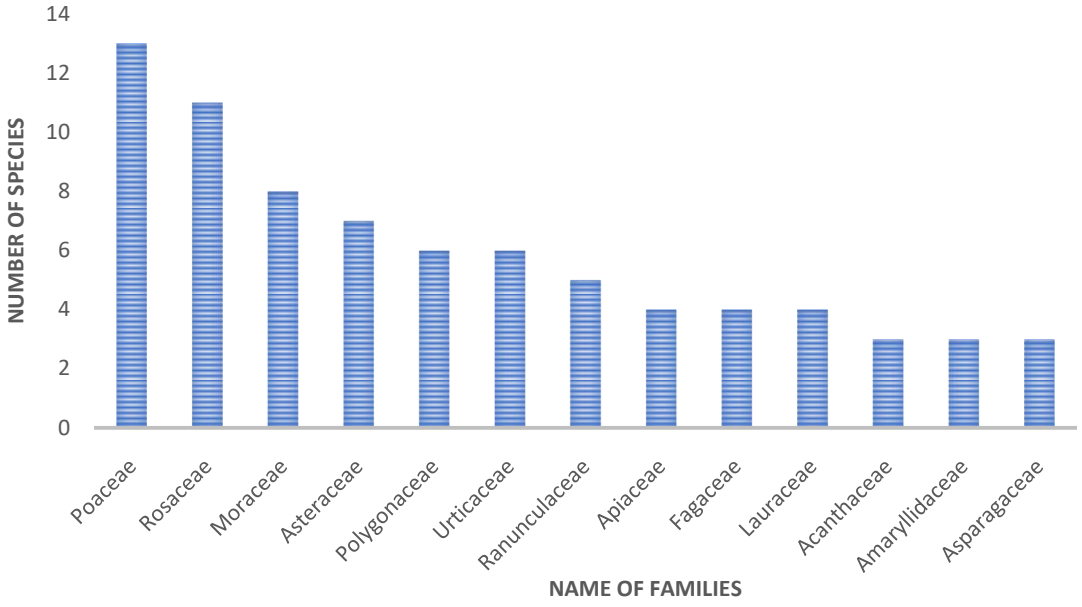


Figure 3: Families with their respective number of species

4.2. Categorization of ethnobotanical uses

Various uses were reported for different plants via interview which were categorized into the following broader group of uses i.e., use categories **(Table 2)**.

Table 2: Categorization of plant uses

S.N	Use categories	Use Reported
1	Timber	Construction purposes
2	Firewood	Fuelwood and firewood
3	Handicraft	Musical instrument, making *Tapari*, Nepali paper, agricultural tools and decoration tools.
4	Food	All kinds of edible plants used as fruits, vegetables, spices and oil.
5	Fodder	Used to feed domestic animals
6	Religious	Used for making incense, religious ceremonies like: Puja (worshiping God), bratabanda, birth, marriage, and funeral
7	Human Medicine	All kinds of medicines used for human
8	Miscellaneous	Fencing, dye, making brooms, fiber, animal bedding and ornamental uses

They were broadly included with similar types of uses in the same category which made analysis more feasible and meaningful than in individual form. The potential use, its form, function, and importance were considered during the categorization of these uses reported in the study. The broadest category among these all included religious purposes, and more interestingly, the miscellaneous category, though it includes unrelated uses, is important and rarely reported in the present work.

4.2.1. Use category of plant species

Use category states variation in uses of particular plant species for different purposes such as food, medicine, fodder, religious, handicraft, timber, firewood, and others. The present study classified total uses into eight broader categories. The majority of the plant species reported in the area were primarily used for food purposes (59 species), followed by human medicine (42 spp.), fodder (43 spp.), religion (13 spp.), firewood (20 spp.), timber, handicraft (16 spp.), and miscellaneous with (11 spp.) (**Figure 4**).

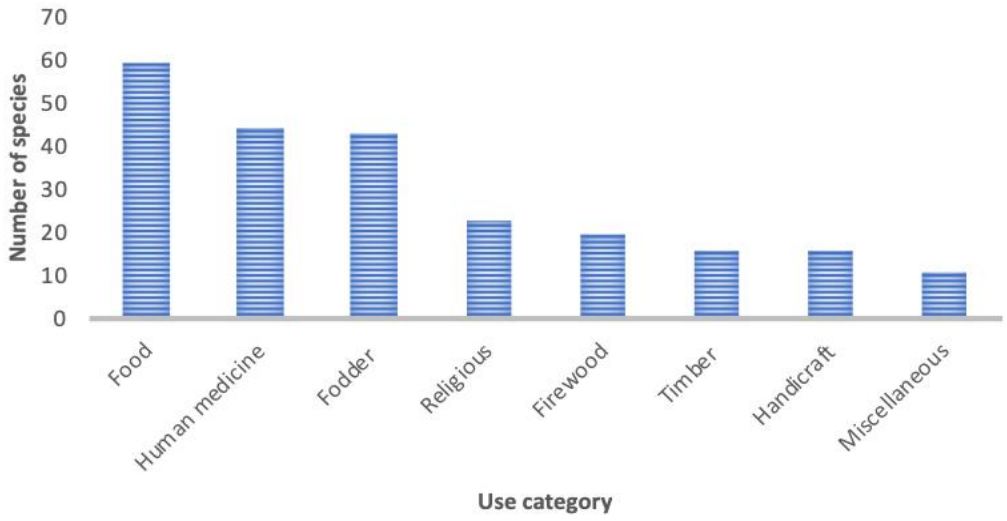


Figure 4: Plant species in different use category

4.2.2. Plant parts used

Every plant part has a specific composition of chemical constituents that differ in their use. Different parts of plants were used for different purposes **(Figure 5)**. Leaves were the most commonly used parts of plants (63 spp.), followed by whole parts (32 spp.), fruits (22 spp.), shoots (17 spp.), and bark (7 spp.). Flowers (6 spp.) were the

least commonly used parts among reported plants. In the case of plant parts for food, there were different parts used by the local people of that community, where fruit (29%) was the commonly used part of the plant, followed by leaf (26%), whole plant (14%), seed (14%), and root (2%). The leaf (79%) was the most commonly used part, followed by the bulb (9%), seed (6%), and root (3%) for fodder or animal feed purposes. Plant parts were also used for handicraft preparation, where the shoots (62%), followed by leaves and bark (15% each) resins (8%), were the least used parts.

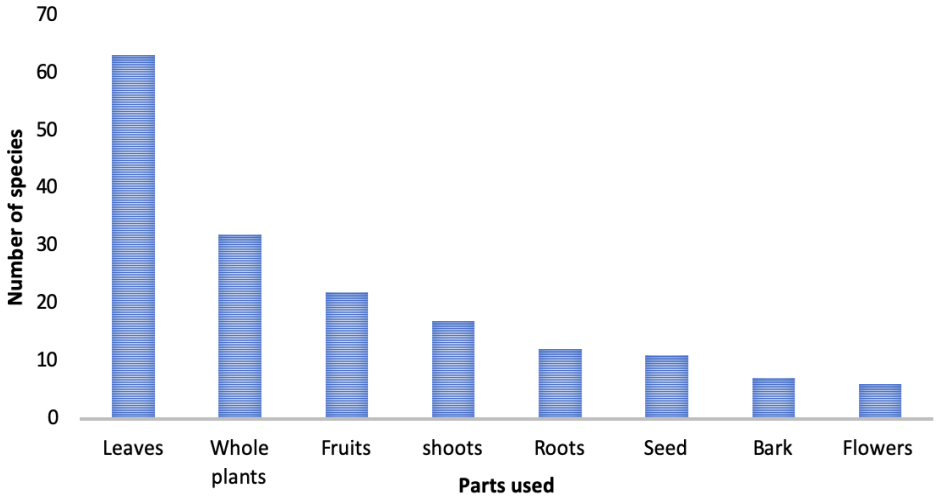


Figure 5: Number of species with different parts used

4.2.3. Life forms of plant used

Among the species, 68 were herbs, 43 trees, 33 shrubs, 7 climbers, 4 grasses, and 1 fungus **(Figure 6).** Herbs (48%) were the dominant life form for useful plants, followed by trees (27%), shrubs (18%), grasses (4%), and climbers (3%). Trees (66%), were highly used than herbs (28%), and grass (2%) for fodder purposes. *Prunus cerasoides*, *Quercus leucotrichophora*, *Pyracantha crenulata*, and others were known to be used for making handles for agricultural tools.

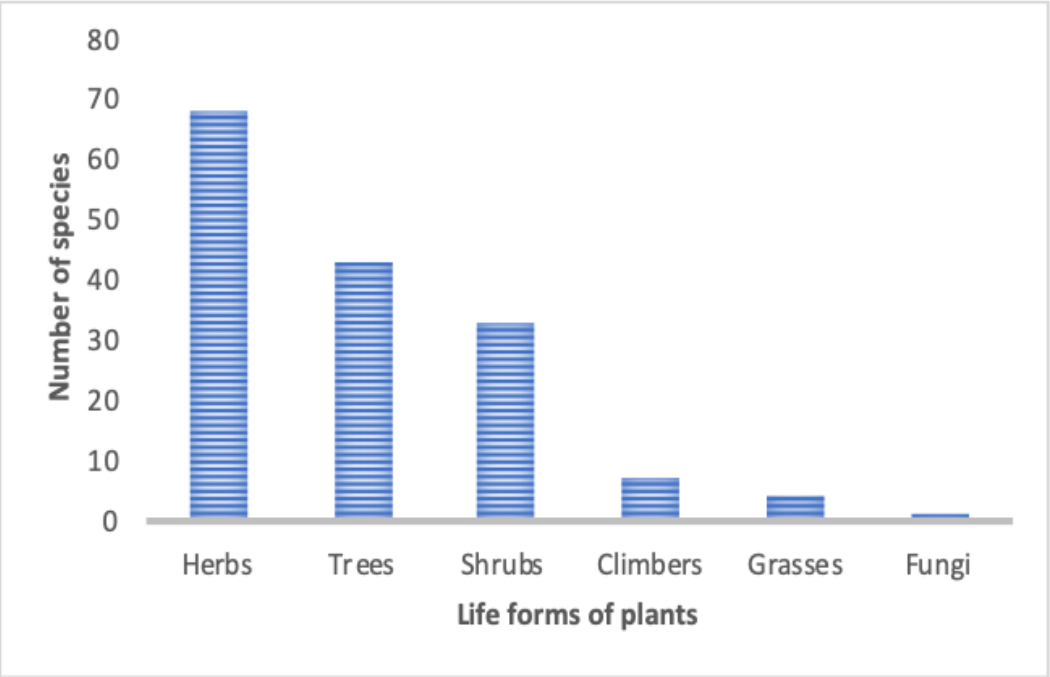


Figure 6: Life forms of species

4.3. Ethnobotanical study

Ethnobotany states that plants and people are related mainly among indigenous and ethnic communities residing in a particular area and utilizing the available resources for different livelihood purposes or economic benefits. Such resource utilization includes food, medicine, fodder, firewood, timber, and religion. These uses are relevant to their practices, culture, tradition, and the plant diversity available in their locality.

4.3.1. Use diversity of plants

On further detailed study of 135 plant species frequently reported in the area, 75 species were reported with particularly specific uses i.e., single uses and 60 species were known for multiple uses **(Figure 7)**. The diversity of use for particular species varied based on use knowledge and frequency in the community. It adds a reference to understanding the necessity of particular species in the locality for specific as well as multiple purposes.

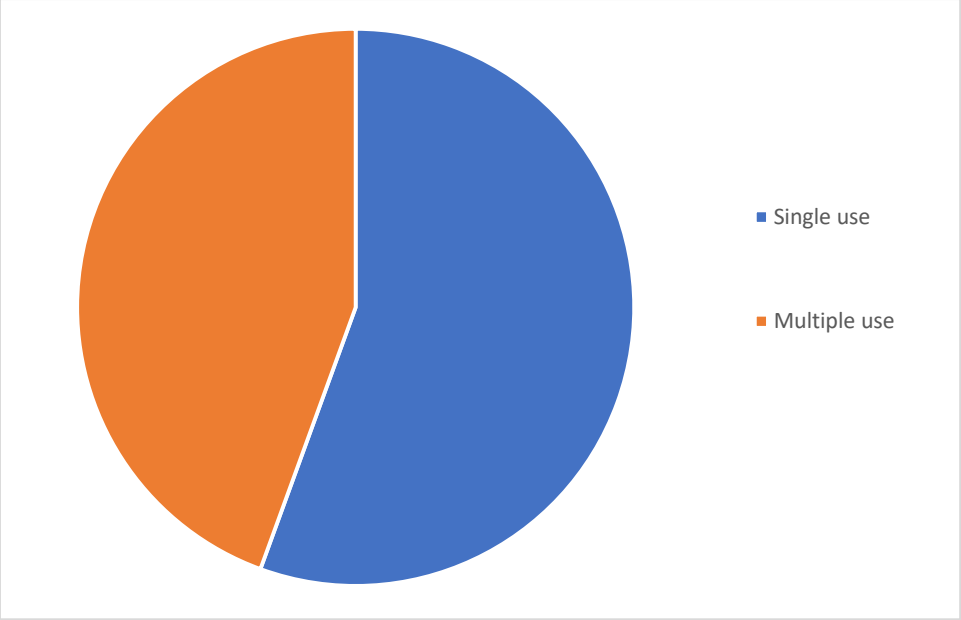


Figure 7: Number of uses of plant species

4.3.2. Trend of traditional knowledge

Traditional knowledge is treated as old-fashioned and blind beliefs; however in the present day, it harbors well deserved respect and documentation as basic and raw information for further development. This knowledge is generally transferred from one generation to another via verbal communication. In the present study, knowledge on different species is seen to decline in younger generations, as most of the people with substantial knowledge on different plant species were mostly older than 60 years of age **(Figure 8)**.

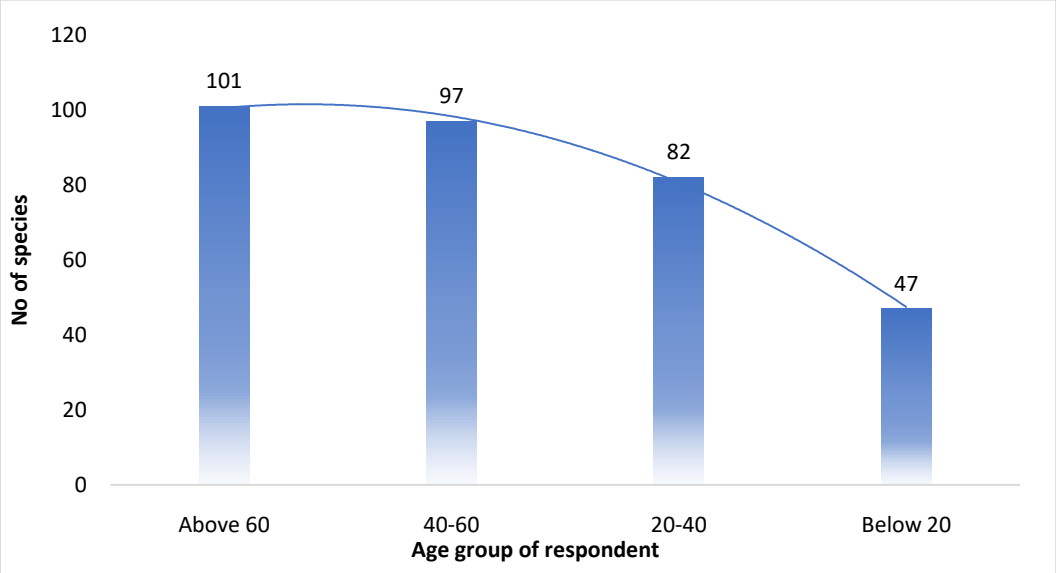


Figure 8: Ethnobotanical knowledge in different age groups

The occupation of informants at the study site also affected the traditional knowledge as their income source is a major influencing factor for the existence and continuity of traditional knowledge. Among the total respondents, 66% regarded themselves as subsistence farmers, 25% as students, 4% as politician, 3% as local healers, and 3% as government job holders (**Figure 9**).

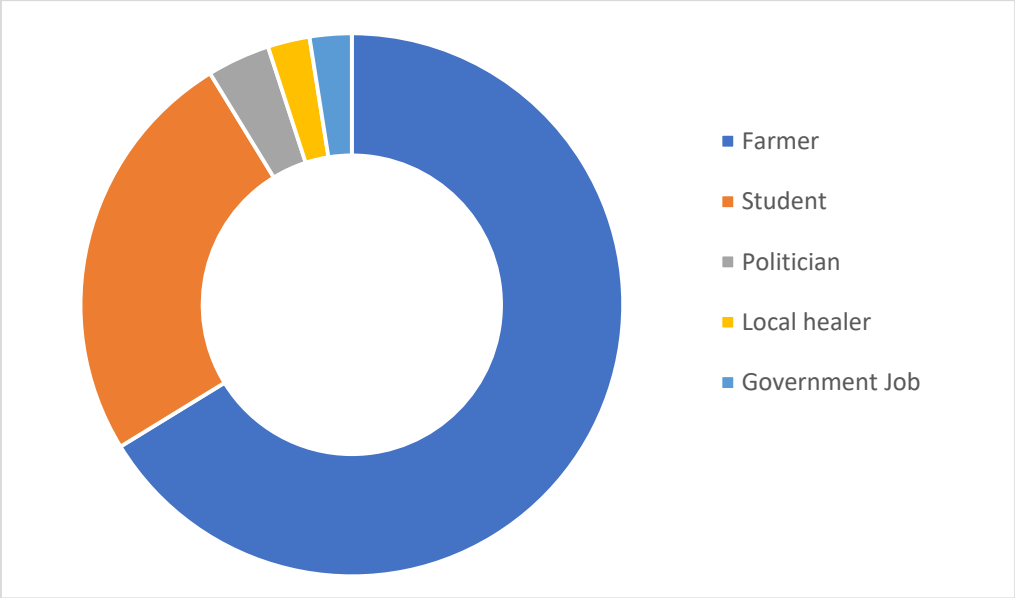


Figure 9: Occupation of respondents

4.3.3. Use value (UV):

Use value gives quantitative importance to particular species in the locality based on people´s knowledge of their use. Among the 135 plants under study for quantitative analysis, 90% of the 121 species were categorized as having high use value, 7% (9 spp) as having moderate value, and 4% (5 spp) as having low use value **(Figure 10)**. Use values were found to be highest for *Spinacia oleracea* (2.5), *Acorus calamus* (2.35), *Tsuga dumosa* (2.11), *Ilex dipyrena* (2), and *Rumex nepalensis* (2). Similarly, the lowest use value (1) was known for 103 species **(Annex 2)**. Some of them were *Aesculus indica*, *Allium carolianianum*, *Astilbe rivularis*, *Bergenia ciliata*, *Persicaria amplexicaulis*, *Coriaria nepalensis,* and *Zanthoxylum armatum***.**

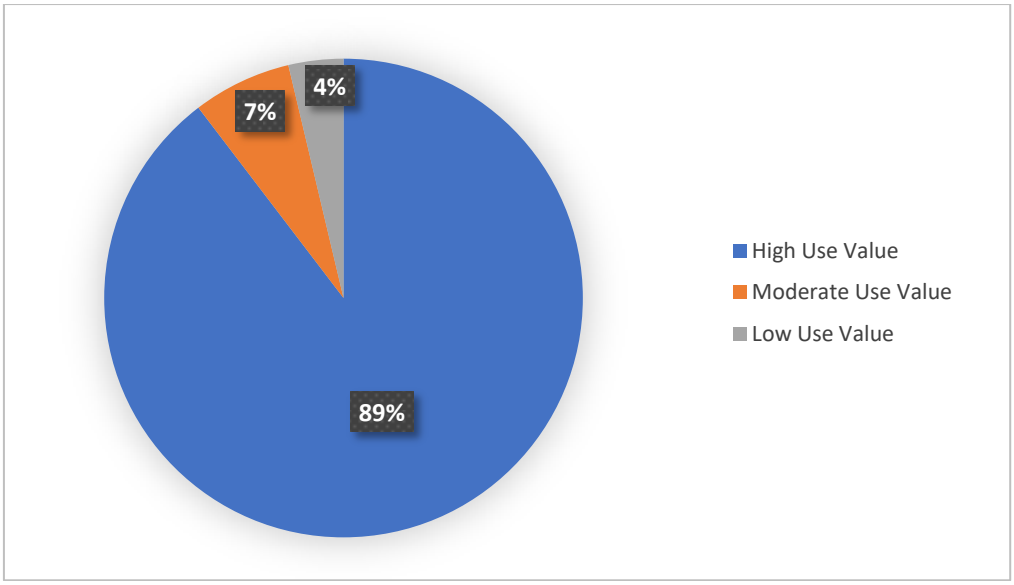


Figure 10: Use value of selected ethnobotanical plants

4.4. Ethnomedicinal plants

Ethnomedicinal plants are those plants that have been traditionally used by indigenous people of any community for medicinal purposes. The plants have been used for thousands of years to treat various ailments and are an important source of medicine for many people around the world.

4.4.1. Frequency Index (FI):

The present study reported 42 medicinal plants from the selected locality of Ramaroshan rural municipality. The frequency index gives information on how frequently medicinal plants are used and are familiar to locals. Among 42 ethnomedicinal plants, the highest number of species was 15; each species scored frequency index of 0-10 and 10-20. Similarly, a frequency index of 20-30 was scored by eight species. And the highest frequency index of 50-60 was scored by only two species. The least number of species attained the highest use frequency, showing variation in knowledge distribution and reliability **(Table 3)**. *Hymenidium dentatum*, *Neopicrorhiza scrophulariiflora* and *Hippolytia dolichophylla* were the most commonly used plant species having a frequency index of (56.67%), (51.67%), and (46.67%) respectively, while *Pyracantha crenulata*, *Asparagus racemosus*, *Ficus neriifolia*, *Hordeum vulgare*, *Prunus persica*, *Buddleja paniculata* and *Secale cereale* were the least utilized with a frequency index of 1.67% **(Annex 3)**.

Table 3: Category of frequency index with number of species

S.N.	Category of frequency index	Number of species
1	0-10	15
2	10-20	15
3	20-30	8
4	30-40	1
5	40-50	1
6	50-60	2
	Total	**42**

4.4.2. Informant Consensus Factor (ICF):

The informant consensus factor describes the reliability of information from total informants. The highest ICF value was obtained for the anticancer and antidote category (1), followed by respiratory problems (0.84) and gastrointestinal disorders (0.83). Similarly, dermatological disorders (0.82) obtained a better value, followed by, oral and dental (0.76), gynecological disorders (0.67), anti-venom (0.67) and least value for fever and headache (0.57), and cardiovascular disorders (0.00) respectively (**Table 4**).

Table 4: Informant Consensus Factor (ICF) for different ailments

Ailments	No. of taxa used(Nt)	No of use reports(Nur)	ICF=(Nur-Nt/Nur-1)
Anti-cancer	1	5	1.00
Antidote	1	5	1.00
Respiratory problems	9	52	0.84
Gastro-intestinal disorder	21	118	0.83
Dermatological disorder	16	83	0.82
Oral and dental	5	18	0.76
Gynecological disorder	3	7	0.67
Anti-venom	3	7	0.67
Skeleton- muscular	10	23	0.59
Fever and headache	7	15	0.57
Cardio-vascular disorder	2	2	0.00

4.5. Conservation practices

Conservation and promotion of different plant species were done in this study area. The community is also playing a role in better communication and formulation in the case of highly important and useful plants. Out of 42 medicinal plants, 9 are categorized as least concern (LC), 1 as threatened (T), 2 as vulnerable (V), 1 as endangered (E), and 2 are categorized in Appendices II of CITIES **(Annex 4).** Bagbachala community forest in Alledi village was highly concerned about the conservation and plantation of plant species.

CHAPTER 5: DISCUSSION

5.1. Plant diversity and categorization

Plants are domestically used for medicine, fruits, vegetables, ornaments, furniture, spices, and condiments, and religious purposes. Such adaptation raises people´s awareness about the conservation of plants at low cost to a greater extent (Chhetri, 2006). In the study area, plant diversity was found to be high. Angiosperms were the largest and most diverse group within the plant kingdom, so a high number of species were recorded in this category. A high number of ethnobotanical species belonging to different families and genera might be recorded due to various microclimates, geographical variation, and diverse knowledge of ethnic communities, their culture, traditions, lives and beliefs. Similar to previous studies, they were known for various purposes like medicine, fodder, food, fiber, religion, etc (Singh, 2017). Poaceae was the dominant family, followed by Rosaceae followed by Moraceae, followed by Asteraceae in this study area. Similar findings have also been reported during the ethnobotanical study of some wild herb species in the Parsa district forest of Nepal Singh (2015).

Pradhan *et al.*, (2020) documented a total of 139 species belonging to 74 families found to have ethnobotanical importance, among which herbs accounted for 41% followed by trees(29%), shrubs(14%), climbers(9%), grasses(3%), epiphytes(1%), ferns(1%), fungi(1%), and lichens(1%) from Khandadevi and Gokulganga Rural Municipality of Ramechhap District of Nepal. Similarly, the result is the same as in this study area where herbs (48%), trees (27%), shrubs (18%), grasses (4%), and climbers (3%) were recorded.

Similarly, the leaves were the most commonly used parts, followed by fruits, shoots and roots. It might be because a large site of nutrient synthesis results in a high concentration of phytochemicals and nutrients in leaves, which are used for food, medicine, and other purposes (Poudyal *et al.,* 2012). Acharya and Acharya (2009) and Singh (2017) also reported similar results. People were more knowledgeable about wild plants since they spent most of their time in the forest with livestock (Chaudhary *et al*., 2020). Most plants were used as food, human medicine, fodder, and animal

medicine due to the priority given to health and food and the high abundance of wild edible fruits as well as natural medicinal plants. Similar results have also been reported in other ethnobotanical studies (Shrestha and Dhillion, 2003; Uprety *et al.,* 2010).

Herbs are the primary source of medicine, followed by trees, shrubs, climbers, and fungi. Similar reports have also been reported on medicinal plant knowledge and its erosion among the Mien communities in northern Thailand (Srithi *et al.,* 2009). It might be due to their profusion and relative richness in bioactive chemicals. The ease with which herbs can be collected, stored, and transported from one place to another may be one of the factors that contributes to their high ethnobotanical value among different life forms. Furthermore, a higher diversity of short plants like herbs might also have contributed to their higher uses in various ethnobotanical applications. The use of shrubs was generally less than that of trees for medicinal purposes. All these were similar to previous research carried out in Central Nepal (Shrestha and Dhillion, 2003; Uprety *et al.,* 2010) and West Nepal (Kunwar *et al.,* 2006).

Fruits were highly used in the form of food found easily in the forest and also benefited their health. Fodder trees are indispensable resources for animal feed in Nepal, mainly in the dry season (Rana *et al.,* 1999), which may be due to containing their high levels of protein and calcium compared to grasses and straws. Rijal (2011) reported the highest number of fodder plants (198 sp), followed by edible plants (136 sp), and medicinal use species (115 sp) in the chepang community of Chitwan district, Nepal. In the case of handicraft uses, 50% of the plants used were trees, followed by shrubs (42%). Similar findings were also reported during ethnobotanical studies in handicraft in Andhra Pradesh, India (Reddy *et al.,* 2008). Woody plants like trees and shrubs plays a dominant role in the case of handicraft purposes like *Drepanostachyum falcatum,* a shrub locally termed “Nigalo” used for making agricultural tools like baskets locally termed “Doko”, “Kotho”, and also used in religious practices like Hindu marriage, house warming rituals, etc. (Nepal *et al*., 2018).

5.2. Ethnobotanical uses of plants

A high percentage of single uses of plants were recorded compared to multiple uses because of their unique structure and specific character, similar to the study of

ethnobotany in the Chepang community of the mid Hills (Rijal, 2011). People in the older age group (above 60) have more knowledge about plants, as seen in relation to medicinal plants, their use patterns, and their availability in the lower Kailash sacred landscape in Nepal (Kunwar *et al*., 2019). As the respondents were mainly farmers, they have interaction with the plants on a daily basis. They cultivate a wide range of plant species, including both traditional crops and wild plants. They have knowledge of farming and cultivation from their older generation (Sharma and Bastakoti, 2009).
The use values of these various species were examined for both medicinal and non-medical uses. Based on the used values, 121 species were considered highly used, indicating that those species are more important for the local people and may have significant cultural, economic, and other values. The information can be useful for conservation efforts and sustainable management of natural resources in the area. The fact that the high use value species were widely prevalent and frequently used by the local population due to their high availability and low use value due to their scarce availability in the study site.

5.3. Ethnomedicinal plants

Based on frequency index, the two species with a frequency index of 50–60 were mentioned most frequently and are likely to be highly valued for their medicinal values by the local people. It means the plants with the highest frequency index are likely to be the most important for local people and may have significant cultural and economic value. Cuts and wounds, fever and headache, gastro-intestinal disorders, respiratory disorders, anticancer properties, antidote properties, dermatological problems, cough and cold, skeleton-muscular disorders, oral and toothache problems, and gynecological disorders were the main ailments treated with the medicinal plants in this community. Gastrointestinal disorders, dermatological infections, respiratory problems, and skeleton-muscular problems were treated with a high diversity of medicinal plants. The study from central Nepal (Uprety *et al.*, 2010) revealed a high ICF value (1) in *Berberis asiatica, Swertia multicaulis, and Juniperus recurva* for ophthalmological problems, toothache, and kidney problems, respectively. In the present study, however, high ICF values (1) were found in *Taxus mairei* and *Delphinium denudatum* for anticancer and antidote activities recorded in this study. This might be an indication that the high ICF species that are traditionally used to

treat ailments are worth searching for bioactive compounds. However, in this study, the lowest ICF values were discovered for cardiovascular diseases. Anticancer and antidote have the highest ICF, which may be a result of people having more awareness of these diseases and better communication skills.

Bhattarai *et al.,* (2011) recorded 45 plant species found to be more useful for curing 34 different ailments in the Panchase region of the midhills, while in this study, 42 species were used for treating 11 ailments. A high number of use values may indicate that the people of that community have more knowledge about those plants and have better communication about them. Plants with low use values are not necessarily unimportant, but they indicate that there is very limited traditional knowledge about them (Chaudhary *et al*., 2006).

Local healers and traditional healers believe in the holiness of the curative power of medicinal plants. They do this because they believe that if the names of the medicinal plants are revealed, their effectiveness will be diminished (Uprety *et al.,* 2010). Similar beliefs among the local healers of many rural areas have been reported (Singh *et al*., 1979; Bhat *et al*., 1985; Jain and Saklani, 1991; Bhat and Jacobs, 1995). This study showed that the elders or traditional healers, have greater knowledge of the utilization of medicinal plants in comparison to the younger generation. The low socio-economic status of the people has also impelled them to rely on traditional medicinal practices. The younger generation showed less interest in traditional practices, mostly because of the poor recognition of traditional healers and the availability of modern health facilities. To preserve these valuable natural resources, younger generations should be made aware of their importance before they are lost or disappear.

5.4. Conservation practices

Different high-altitude plants like *Corallodiscus lanuginosus, Dactylorhiza hatagirea, Delphinium denudatum, Delphinium himalayae, Delphinium vestitum, Hippolytia dolichophylla, Hippophae salicifolia, Hymenidium dentatum, Paris polyphylla, Persicaria amplexicaulis,* and *Rheum australe* were highly used as medicinal plants. Different conservation practices were done, such as pegging down the wire mesh curtain to halt the animal as well as people´s movements near the conservation area of

Taxus mairei. Local people were actively participating in the planting program of various wild edible plants once a year. Local people used to believe in some traditional practices, like not consuming *Symplocos paniculata* for any ethnobotanical uses because it does not help in bee farming. Local plant species were mainly given priority and planted in the community forest so that the local people could benefit in the future. Some medicinal plants like *Girardinia diversifolia* and *Valeriana hardwickii* fetch good market prices, while *Drepanostachyum falcatum* was naturally cultivated in farmlands for handicraft purposes. Collection and consumption of medicinal plants in a sustainable manner is an integrated process with potential for development and conservation (Kunwar *et al*., 2013).

CHAPTER 6: CONCLUSION AND RECOMMENDATION

6.1. Conclusion

Ramaroshan Rural Municipality, the beautiful municipality of Achham district, is rich in cultural diversity, biological diversity, and traditional knowledge. The present work addresses biological diversity in terms of useful plants and traditional knowledge still in practice as fundamental to livelihood and primary treatment for different common ailments. Useful species were found in all life forms of herbs, shrubs, trees, and climbers. Among these species, specific uses were recorded more than the multiple uses for the species, including all medicinal, handicraft, firewood, timber, dying, and other purposes. Though the community plays a major role in conservation, sustainable utilization was not properly implemented, and the nation was totally unaware of these resources. Areas harbor highly medicinal plants along their high elevational areas that are of high importance but have not been well managed and regulated for the economic enhancement of the local people in the area yet, instead being used directly from the forest in a wilder state. Hereby, the area still needs more exploration and study of plants.

6.2. Recommendations

- Since traditional knowledge and skills among ethnic communities are likely to decrease in new generations, efforts should be made to document, utilize, and transfer knowledge to younger generations.
- Local people should be made aware of the conservation of rare and endangered species.

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Annex 1: Ethnobotanical uses of Collected Plants

S.N.	Botanical Names	Family	Local Name	Life Form	*Parts Use	**Use Category	Parts Use	Voucher specimens
1	*Aconitum lethale* Griff.	Ranunculaceae	Bikh	Herb	Rt, Sh	Po	Root and shoot are poisonous	
2	A*corus calamus* L.	Acoraceae	Bojho	Herb	Rt	Md	Root used orally for cough and common cold	
3	*Aesculus indica* (Wall. ex Cambess.) Hook.	Sapindaceae	Paagar	Tree	St, Lf, Sd	T, Fd, Md	Stem for timber and leaf as fodder, seed is rubbed for the treatment of cattle´s wounds	SG 34
4	*Agave cantala* var. *cantala*	Asparagaceae	Hattibado	Shrub	Fb, Sh,	Md, Fo	Fiber as a bandage for backpain, young shoot are cooked as vegetables and orally for mouth allergies	
5	*Ageratina adenophora* (Spreng.) R.M.King & H.Rob.	Asteraceae	Mawobadi bhad	Herb	Lf	Md	Leaf is used for curing eye problems and also for stopping blood from cuts and wounds	
6	*Allium carolinianum* Redouté	Amaryllidaceae	Bhaisey lasun	Herb	Bu, Lf	Md, Fo	Bulb is mixed with fodder for the treatment of swollen legs of the cattle and leaf as vegetables	
7	*Allium cepa* L.	Amaryllidaceae	Pyaaj	Herb	Bu	Md, Fo	Bulb is used for stomach pain for the cattle and also cooked as a vegetable	
8	*Allium sativum* L.	Amaryllidaceae	Lasun	Herb	Lf, Bu	Md	Leaves and tubers are used to cure fever and cough	SG 15
9	*Alnus nepalensis* D.Don	Betulaceae	Uttis	Tree	Wd, Br	T, Md	Wood is used for timber and furniture,	

							bark paste is used for leg injury	
10	*Aloe vera* (L.) Burm.f.	Asphodelaceae	Gheuri kumeli	Herb	Lf	Md	Leaf gel is used as cooling agent	
11	*Arisaema jacquemontii* Blume	Araceae	Baako	Herb	Lf	Fo	Leaf as vegetable	
12	*Artemisia indica* Willd.	Asteraceae	Paati	Herb	Lf, Fl	Md, R	Leaf paste for bursting carbuncle and flowers in religious purpose like puja	
13	*Asparagus racemosus* Willd.	Asparagaceae	Kurilo	Herb	Rt, Sh	Md, Fo	Roots are used for gastritis and young shoot as vegetables	
14	*Astilbe rivularis* Buch.-Ham.	Saxifragaceae	Jhusey	Herb	Rt	Md	Root of *Astilbe rivularis* is mixed with *Paris polyphylla* and *Thalictrum cultratum* for increasing immunity power for postnatal women	SG 38
15	*Berberis aristata* DC.	Berberidaceae	Trikhula/Chotra	Shrub	Fr, Rt, Br	Fo, Md	Ripen fruits are edible, root soup is used for antileech and also for stomach pain, fever and diarrhea for children and mouth allergies, and bark powdered as lowering pressure.	
16	*Bergenia ciliata* (Haw.) Sternb.	Saxifragaceae	Silpaadi	Herb	Rt, Lf	Md	Root powder mixed with ghee and honey used for increasing milk for post-natal women and also used for stomach pain and fever and leaf paste as chewable tablets for joint pain	
17	*Betula alnoides* Buch.-Ham.	Betulaceae	Saud	Tree	St	Fw, T	Stem is used for firewood and construction purposes	

18	*Brassaiopsis hainla* Seem.	Araliaceae	Chindey/Chindeya/Churato	Tree	Lf	Fd	Leaves as fodder	SG 25
19	*Brassica* sp	Brassicaceae	Barsaley	Herb	Lf, Sd	Fo, Ol	Leaf as vegetables and seeds as oil	
20	*Buddleja paniculata* Wall.	Scrophulariaceae	Seutaaro	Shrub	Lf	R	Leaf used for religious purposes like puja	
21	*Cannabis sativa* L.	Cannabaceae	Bhango	Herb	Sd	Fo	Seed used for making pickle or eaten raw as snacks	SG 30
22	*Capsicum annuum* L.	Solanaceae	Bhedey khursaani	Shrub	Fr	Fo	Fruits are used for spice and other food preparations	
23	*Castanopsis indica* A.DC.	Fagaceae	Katus	Tree	Wd, Fr	Fr, Fo	Wood as firewood and construction purposes, fruits are edible	SG 41
24	*Centella asiatica* (L.) Urban	Apiaceae	Ghodtaapre	Herb	Lf	Md	Leaf taken as orally used for treatment of skin diseases and headache	
25	*Chenopodium album* L.	Amaranthaceae	Bethu	Herb	Wp	Fo	Whole plant as vegetable	
26	*Chrysopogon zizanioides* (L.) Roberty	Poaceae	Kush	Herb	Lf	Fd, R	Leaf as fodder, also used in religious purposes like puja	
27	*Cinnamomum burmanni* (Nees & T.Nees) Blume	Lauraceae	Dalchini	Tree	Lf, Br	Fo	Spices in vegetables	SG 24
28	*Cirsium verutum* Spreng.	Asteraceae	Thakaili	Herb	Sh	Md	Young shoot as rehydration and also for urinary problems	
29	*Clematis buchananiana* DC.	Ranunculaceae	Gadiulya	Climber	Lf	Md	Leaf as cough and cold	SG 14
30	*Colocasia esculenta* (L.) Schott	Araceae	Papdo	Herb	Wp	Fo	Making dried leaf locally called as	

							"Masaura" and used for long time as vegetables	
31	*Corallodiscus lanuginosus* (Wall. ex R.Br.) B.L.Burtt	Gesneriaceae	Taampatey	Herb	Wp	Fd	Whole plant as fodder	SG 50
32	*Coriandrum sativum* L.	Apiaceae	Dhaniya	Herb	Wp	Fo	Spice and condiments	
32	*Coriaria nepalensis* Wall.	Coriariaceae	Machaino	Shrub	Fr	Fo	Fruits are edible when it gets ripe	
34	*Cucurbita pepo* L.	Cucurbitaceae	Kadu	Herb	Lf	Fo	Leaf as vegetables	
35	*Cuscuta reflexa* Roxb.	Convolvulaceae	Aakash patali	Climber	Li	Md	Jaundice	
36	*Cynodon dactylon* (L.) Pers.	Poaceae	Dubo	Herb	Lf, Wp	R, Md	Stomach problems, cuts and wounds and also in religious purposes	
37	*Dactylorhiza hatagirea* (D.Don) Soó	Orchidaceae	Hattajadi/Panch auley	Herb	Rt	Md	Common cold, stomached and root paste for wounds, backpain, and joint pain by mixing with cow´s dung	
38	*Daphne bholua* Buch.-Ham. ex D.Don	Thymelaeaceae	Lokta	Shrub	Br	O	Handmade Nepalese paper production	SG 39
39	*Daphne papyracea* Wall. ex Steud.	Thymelaceae	Musey badu	Shrub	Br	O	Paper making	SG 40
40	*Daphniphyllum himalayense* (Benth.) Müll.Arg.	Daphniphyllaceae	Ragatchana/Ragatchalno	Tree	Lf	O	Used for making leaf plate locally termed as "Tapari"	SG 32
41	*Debregeasia longifolia* (Burm.f.) Wedd.	Urticaceae	Tusarey ghaas	Shrub	Fr	Fo	Edible	SG 42
42	*Delphinium denudatum* Wall.	Ranunculaceae	Nirbisi	Shrub	Rt	Md	Root for joint pain and antidote and	

							antivenom.	
43	Delphinium himalayae Munz	Ranunculaceae	Attesi	Herb	Rt	Md	Anti-vomiting, cough and cold	
44	*Delphinium vestitum* Royle	Ranunculaceae	Mauramulo	Herb	Rt	Md	Cuts and wounds and juice is given to animals during delivery for stimulating milk, paste of leaf used for backpain	
45	*Dicliptera bupleuroides* Nees	Acanthaceae	Saanokaaley ayero	Herb	Lf	Fd	Fodder	SG 17
46	*Diplazium* sp	Athyriaceae	Nigudo	Herb	Wp	Fo	Vegetables	
47	*Drepanostachyum falcatum* (Nees) Keng f.	Poaceae	Nigalo	Shrub	St, Wp	Hc, O	Shoots for making agricultural tools like basket locally termed as “Doko” and also for decorating houses in religious ceremony	
48	*Elaeagnus parvifolia* Wall.	Elaeagnaceae	Guenla	Tree	Fr	Fo	Edible	SG 45
49	*Elatostema sessile Var. Sessile* J.R. And G. Forest	Urticaceae	Gaglagdo/golka	Shrub	Br	Fo	Bark used for making locally termed as “Babar” for making Selroti soft	SG 31
50	*Eleusine coracana* (L.)	Poaceae	Kodo	Herb	Wh	Fo	Sources of food	
51	*Erigeron karvinskianus* Dc.	Asteraceae	Khantey bhad	Herb	Lf, Fl	Md, R	Toothache and leaves for cuts and wounds, religious purposes	SG 33
52	*Euphorbia royleana* Boiss.	Euphorbiaceae	Seudi	Tree	Wh	R, Hc	Plants were planted at the top of the houses for removing evil spirits and also protect the house from lightening and thundering, also used for making	

							locally handicraft called as “Madal”	
53	*Fagopyrum esculentum* Moench	Polygonaceae	Phaprey saag	Herb	Lf	Fo	Leaf as vegetables	SG 36
54	*Falconeria insignis* Royle	Euphorbiaceae	Khirro	Tree	Wd, St	Hc	Wood as making locally handicraft called “Madal” and “Hudka”, fish poisoning	
55	*Ficus auriculata* Lour.	Moraceae	Timilo/timila	Tree	Rn, Lf	Md, O	Resin used as snakebite and making locally plate leaf called as “Tapari”	SG 43
56	*Ficus benghalensis* L.	Moraceae	Bar	Tree	Lf	R	Decorative mandas in religious ceremony like puja, marriage, etc	
57	*Ficus neriifolia* Sm.	Moraceae	Dudhila/dudhelo	Tree	Br, Fg	Md	Paste of bark is used for anti-vomiting for children, edible figs	SG 22
58	*Ficus palmata* Forsk	Moraceae	Bedu	Tree	Lf, Fr	Fd, Fo	Fodder and ripen fruits are edible, also used for removing thrones	SG 27
59	*Ficus religiosa* L.	Moraceae	Peepal	Tree	Lf	R	Religious purposes like puja, fasting	
60	*Ficus sarmentosa* Buch.-Ham. ex Sm.	Moraceae	Bedula/Bedulo	Tree	Lf	Fd	Fodder	SG 29
61	*Ficus semicordata* Buch.-Ham. ex Sm.	Moraceae	Khanaya	Tree	Lf, Fr	Fd, Fo	Leaf as fodder, fruits are edible	
62	*Fragaria nubicola* Lindl. ex Lacaita	Rosaceae	Gadekaphal	Herb	Fr	Fo	Ripen fruits are edible	SG 26
63	*Fraxinus floribunda* Wall.	Oleaceae	Angaau	Tree	Lf, St	Fd, T	Leaf as fodder and stem as timber	SG 03
64	*Garuga pinnata* Roxb.	Burseraceae	Dabdabey	Tree	Wd	Fw	Firewood	
65	*Girardinia diversifolia* (Link)	Urticaceae	Allo	Herb	Rt, Sh	Md, O, Fo	Root paste of *Pouzolzia* and *Salix* and	

	Friis						used for covering fractured legs and cuts also extracted for fiber making like: threads, ropes, bags, etc, tender shoots are used as vegetables	
66	*Hedera nepalensis* K.Koch	Araliaceae	Bogatey	Climber	Lf	Fd	Leaf as fodder	SG 19
67	*Hippolytia dolichophylla* (Kitam.) K.Bremer & Humphries	Asteraceae	Bayojadi	Herb	Rt	Md	Common cold, stomach pain, gastritis, diarrhea, fine powder of roots are mixed with ghee and milk for immunity power of postnatal women	
68	*Hippophae salicifolia* D.Don	Elaeagnaceae	Tarachuk	Shrub	Fr	Fo, Md	Edible fruits and also for stomach problems	
69	*Hordeum vulgare* L.	Poaceae	Jahu	Herb	Wp	Fd, Fo	Fodder and grains are edible	
70	*Hymenidium dentatum* (DC.) Pimenov & Kljuykov	Apiaceae	Gadalno	Herb	Rt	Md	Root paste of soup is used for stomached, cough and cold, fever, indigestion, and mouth allergies, root is taken orally for gastritis	
71	*Ilex dipyrena* Wall.	Aquifoliaceae	Thinkya/Thinkey	Tree	St	T	Construction purposes	SG 47
72	*Juglans regia* L.	Juglandaceae	Okhhar	Tree	Lf, Fr	Fd, Fo	Leaf as fodder, edible fruits	
73	*Juniperus indica* Bertol.	Cupressaceae	Dhupi salla	Shrub	Wd	Fu	Fuelwood	
74	*Justicia adhatoda* L.	Acanthaceae	Asuro	Herb	Lf	Md	Fever and headache	
75	*Lecanthus peduncularis* (Royle)	Urticaceae	Galla	Herb	Lf	Fo	Vegetables	SG 49

	Wedd.							
76	*Lepidium sativum* L.	Brassicaceae	Chamsur	Herb	Wp	Fo	Vegetable	SG 44
77	*Lindera pulcherrima* (Nees) Benth. Ex Hook.f.,	Lauraceae	Kiddicaulo	Tree	Lf, St	Fd, Fw	Leaf as fodder and stem as firewood	SG 20
78	*Lyonia ovalifolia* (Wall.) Drude	Ericaceae	Ayer	Tree	Lf, Wd	Fd, T, R	Leaf as fodder, wood for construction purposes and also used in funeral	SG 10
79	*Machilus duthei* King ex Hook.f.	Lauraceae	Kupey caulo/Mahilo caulo	Tree	Lf	Fd	Fodder	SG 46
80	*Machilus clarkeana* King ex Hook. f.	Lauraceae	Caulo	Tree	Lf, Wd	Fd, Fw	Leaf as fodder, wood as fuelwood	SG 23
81	*Mahonia napaulensis* DC.	Berberidaceae	Mayeni/Maina	Shrub	Fr	Fo	Edible fruits	
82	*Malus domestica* (Suckow) Borkh.	Rosaceae	Shyau	Tree	Fr	Fo	Fruits are eaten raw as well as ripen	
83	*Mentha spicata* L.	Lamiaceae	Pudino	Herb	Wp, Lf	Fo	Making pickles	
84	*Momordica charantia* L.	Cucurbitaceae	Titey kareli	Herb	Wh	Fo, Md	Vegetables and also for lowering blood pressure	
85	Morchella esculenta (L.) Pers.,	Morchellaceae	Guchi chyau	Fungi	Wp	Fo	Vegetable	
86	*Morus serrata* Roxb.,	Moraceae	Kimbu	Tree	Fr	Fo	Edible fruits	
87	*Musa paradisiaca* L.	Musaceae	Kela	Tree	Wp	R	Religious functions like puja, marriage, etc	
88	*Myrica esculenta* Buch.-Ham. ex D.Don	Myricaceae	Kaphal	Tree	Fr, Wd, Lf	Fo, Fw, Fd	Edible fruits, wood as firewood and leaf as fodder	

89	*Neopicrorhiza scrophulariiflora* (Pennell) D.Y.Hong	Plantaginaceae	Katuki	Herb	Rt	Md	Leg injury and fever, common-cold, cough and stomach pain	
90	*Nerium oleander* L.	Apocynaceae	Parbati phool	Shrub	Fl	R	Religious ceremony like Puja and worshiping god	
91	*Nicotiana tabacum* L.	Solanaceae	Tamakhu/Tamu	Herb	Lf	Md	Dried leaves are used mainly for smoking by women used in “Sulpa”. Insecticide	
92	*Ocimum tenuiflorum* L.	Lamiaceae	Tulasi	Herb	Wp	R	Religious purposes	
93	*Oryza sativa* L.	Poaceae	Dhaan	Herb	Br	Md	Boiled bark is used as steamed for fever and also for indigestion	
94	*Oxalis corniculata* L.	Oxalidaceae	Chadimaalo	Herb	Lf	Fo	Leaf used for making pickle and also for thirst	
95	*Paris polyphylla* Sm.	Melanthiaceae	Satuwa	Herb	Rt	Md	Powdered root mixed with boiled water used for stomach pain, fever, headache, leg injury and snakebite	
96	*Pennisetum polystachion* (L.) Schult.	Poaceae	Furfurey ghaas	Herb	Wp	Fd	Whole plants are used as fodder	SG 21
97	*Persicaria amplexicaulis* (D.Don) Ronse Decr.	Polygonaceae	Chama phool	Herb	Lf, Rt	Md	Leaf as cuts and wounds, powdered roots for the treatment of gastro-intestinal problems	SG 28
98	*Persicaria capitata* (Buch.-Ham. ex D.Don) H.Gross	Polygonaceae	Tiley gayero	Herb	Lf	Fd	Fodder	
99	*Pinus wallichiana* A.B. Jacks.	Pinaceae	Salla	Tree	Wd, Rn	T, Md	Wood for construction purposes and	

							resin applied externally in cracked legs and hands	
100	*Pisum sativum* L.	Fabaceae	Kala	Herb	Lf, Sd	Fo	Leaf and seed as Vegetable	
101	*Plantago centralis* Pilg.	Plantaginaceae	Dhanbaley	Herb	Rt	Md	Stomach pain of children and also lose heat from body especially for children	SG 04
102	*Polygonatum verticillatum* (L.) All.	Asparagaceae	Khiraula	Herb	Lf, Sh	Fo	Vegetables	
103	*Pouzolzia rugulosa* (Wedd.) Acharya & Kravtsova	Urticaceae	Githa/githi	Shrub	Br	Fo	Bark paste /powder is mixed with rice flour to prepare "Selroti"	
104	*Primula glomerata* Pax.	Primulaceae	Dabey	Shrub	Lf	O	Leaves are used as plate for serving rice pudding	SG 07
105	*Prinsepia utilis* Royle	Rosaceae	Dhatelo	Shrub	S, Ol	Fo, Md	Seed is used for making oil used for making “Puriroti”, flowers for religious purposes, oil for heart problems	
106	*Prunus armeniaca* L	Rosaceae	Aarupokhara/Kulum	Tree	Lf, Fr	Fd, Fo	Leaf as fodder and edible fruits	SG 11
107	*Prunus cerasoides* D.Don	Rosaceae	Painyu	Tree	Lf, Wd, Fr, St	Fd, Fw, R, Fo, Hc	Leaf as fodder and wood for firewood and funeral, edible fruits and Stem for making handle of sickle (Hasiya)	
108	*Prunus persica* (L.) Batsch	Rosaceae	Aaru	Tree	Lf	Fo	Edible fruits	
109	*Pyracantha crenulata* (D.Don) M.Roem.	Rosaceae	Ghagaaru	Shrub	Fr, St	Fo, Hc	Edible fruits used for mouth allergies Stem for making police stick	SG 06

110	*Pyrus pashia* Buch.-Ham. ex D.Don	Rosaceae	Mel	Tree	Fr	Fo	Edible fruits	SG 12
111	*Quercus leucotrichophora* A. Campus	Fagaceae	Baanjh	Tree	Lf, Wd, St	Fd, Fw, Hc	Leaf as fodder and wood as firewood, Stem for making locally handicraft called as "Bausa"	SG 13
112	*Quercus glauca* Thunb	Fagaceae	Falat	Tree	Lf, Wd	Fd, T, Fw	Leaf as fodder and wood as timber and firewood	SG 16
113	*Quercus semecarpifolia* Sm.	Fagaceae	Bhedeya/Bhedey/Thingaau/Bhedeykhasru	Tree	Lf, Wd	Fd, Fw	Leaf as fodder and wood as firewood	SG 18
114	*Raphanus sativus* L.	Brassicaceae	Mula	Herb	Wp	Fo	Vegetables and fermented for making dried leaf locally termed as "gundruk"	
115	*Reinwardtia indica* Dumort.	Linaceae	Pyaali phool	Shrub	Fl	R	Worshiping God	
116	*Rheum australe* D.Don	Polygonaceae	Padamey/Padamchaal	Herb	Rt, Pt	Md, Fo	Muscle cramps and backpain, Powder of roots are used in an infected part, and also in mouth allergies, petioles for making pickles	
117	*Rhododendron arboreum* Sm.	Ericaceae	Laaliguras	Shrub	Lf, Wd, St, Fl	Fd, Fw, Hc, Md	Leaf as fodder, wood as fuelwood and Stem for making agricultural tools like "theki" and flower used for removing fish bones from throat	
118	*Rhododendron campanulatum* D.Don	Ericaceae	Chimal	Shrub	Fl, Wd	R, Fw	Flowers are used in religious purposes like Puja and worshiping God and	

							wood for fuelwood	
119	*Rosa multiflora* Thunb.	Rosaceae	Gulab	Shrub	Fl, St	R, Hc	Flowers used for worshiping God, locally stem used for handicraft called as “madani”	SG 01
120	*Rosa sericea* Lindl.	Rosaceae	Jangali gulab	Shrub	Fl, Fr	Fo	Fruits are edible	
121	*Rubia manjith* Roxb. ex Flem.	Rubiaceae	Majitho	Herb	Rt	Dt	Dye	
122	*Rubus ellipticus* Sm.	Rosaceae	Ainselu	Shrub	Fr	Fo	Edible fruits	
123	*Rumex hastatus* D.Don	Polygonaceae	Kapo	Herb	Lf	Fo,	Pickle	
124	*Rumex nepalensis* Spreng.	Polygonaceae	Hatelo/Hadela	Herb	Rt	Md	Paste of root are used for cuts and wounds and also for leg injury	SG 48
125	*Saccharum officinarum* L.	Poaceae	Ukhu	Shrub	Wp	R, Md	Decorating mandap in religious ceremonies and juice for cooling reagent	
126	*Salix babylonica* L.	Salicaceae	Bainsh	Tree	Wd	Fw, Hc	Firewood and also used for making local handicraft called as “Theki”	
127	*Sarcococca saligna* Müll.Arg.	Buxaceae	Telparo	Shrub	Rt	Md	Fever	SG 02
128	*Scutellaria scandens* Buch.-Ham.ex D.Don	Lamiaceae	Charikhuttey	Herb	Wp	Fd	Leaf used as fodder	
120	*Secale cereale* L.	Poaceae	Uwa/Uba	Grass	Sd	Fd	Fodder for increasing milk in cattles	
130	*Selinum wallichianum* (DC.)	Apiaceae	Bhutkesh	Herb	Lf	O	Dried smoke of leaf is used to remove evil spirits	
131	*Skimmia anquetilia* G.Taylor and Air	Rutaceae	Narpaati	Herb	Lf	R	Dried leaf for making incense for purifying air	

132	*Solanum tuberosum* L.	Solanaceae	Aalu	Herb	Tu	Fo	Vegetable	
133	Spinacia oleracea L.	Amaranthaceae	Palungo	Herb	Wp	Fo	Vegetable	
134	*Stauntonia latifolia* (Wall.) R.Br.	Lardizabalaceae	Guphla	Climber	Fr	Fo	Edible fruits	
135	*Stellaria neglecta* (Lej.) Weihe	Caryophyllaceae	Arimaley	Herb	Sh, Lf	Fo	Shoot and leaf as vegetables	SG 05
136	*Strobilanthes atropurpurea* Nees	Acanthaceae	Kaaley aayero	Herb	Lf	Md	Leaf paste is used for cuts and wounds	
137	*Symplocos paniculata* Miq.	Symplocaceae	Lodh	Tree	Lf	Fd	Fodder	
138	*Syzygium cumini* (L.) Skeels	Myrtaceae	Jamun	Tree	Fr	Fo, Md	Edible fruits and also used for the treatment of blood in stool and dysentery	
139	*Tagetes* sp	Asteraceae	Hajari phool	Shrub	Fl	R	Worshiping God	
140	*Taxus mairei* (Lemee & H.Lév.) S.Y.Hu	Taxaceae	Lauth salla	Tree	Br	Md	Tea for curing cancer	
141	*Thalictrum cultratum* Wall.	Ranunculaceae	Chatarey	Herb	Rt	Md	Paste of root is mixed with boiled milk for increasing immunity power for postnatal women and also mixed with rice flour and used for stopping excessive bleeding during mensuration in women	SG 08
142	*Thysanolaena latifolia* Honda	Poaceae	Amilso	Shrub	In	O	Bundles of inflorescence is used to make brooms	
143	*Tinospora sinensis* (Lour.) Merr.	Menispermaceae	Gurjo	Climber	St	Md	Powdered of stem used for cough and colds and also used in Covid period	

144	*Toona ciliata* M.Roem.	Meliaceae	Tuni	Tree	Lf, Wd	Fd, T	Leaf as fodder and wood as furniture	
145	*Toxicodendron wallichii* Kuntze	Anacardiaceae	Bhakamilo	Tree	Fr	F, Md	Edible fruits and powders are used for pickle making and also for stomach pain, cough and common cold, and diarrhea	
146	*Triticum aestivum* L.	Poaceae	Gahu	Grass	Gr, Sr	Fo, Fd	Grains are edible and Straw for feeding cattle in dry season	
147	*Tsuga dumosa* Eichl.	Pinaceae	Thegrey sallo	Tree	St	T	Construction purposes	
148	*Urtica dioica* L.	Urticaceae	Sanayu	Herb	Wp	Fo, Md	Vegetables, mixed with Cynodon to cure cuts and wounds, leaf used for controlling heavy blood during mensuration	
149	*Valeriana hardwickii* Wall.	Caprifoliaceae	Samayo/Samaya	Shrub	Rt, Lf	Md, Fo	Roots for gastritis and vomiting, cuts and wounds, leaf as vegetables	SG 09
150	*Vetiveria zizanoides* (Linn.)	Poaceae	Khar	Grass	Rt	Md	Root juice used for purifying blood	
151	*Viburnum mullaha* Buch-Ham ex D.Don	Viburnaceae	Gahumutey	Shrub	Wd, Fr	Fw, Fo	Wood for fuelwood. Edible fruits	SG 37
152	Vitis Vinifera L.	Vitaceae	Dakh	Climber	Fr	Fo	Edible fruits	
153	*Woodfordia fruticosa* Kurz	Lythraceae	Dhapino	Shrub	Fl	Fo	Flowers are edible	
154	*Zanthoxylum oxyphyllum* Edgew.	Rutaceae	Laato timur	Shrub	Sd	Md	Seed powder is used with boil water to cure stomach pain and fever	SG 35
155	*Zea mays* L.	Poaceae	Makai	Grass	Wp	Fd, Fo	Fodder, grains as of food.	

156	*Zingiber officinale* Roscoe	Zingiberaceae	Aduwa	Herb	Rh	Fo	Rhizome can be used directly or in the form of tea

(*Parts use: Rt: Root, Wd: Wood, St: Stem, Sh: Shoot, Br: Bark, Lf: Leaf, Fr: Fruit, Fl: Flower, In: Inflorescence, Sd: Seed, Tu: Tuber, Petiole: Pt, Rh: Rhizome, Rn: Resin, Ts: Tender shoot, Ct: Cotyledon, Wp: Whole Plant, Tr: Tree, Bu: Bulb, Lt: latex; **Use categories: Dt: Dye and Tanning, Fb: Fiber, Fo: Food, Fd: Fodder, Fw: Fuelwood, Md: medicine, Po: Poison, Sr: Social and Religious, T=Timber, Tr: Trade, Ol: Oil, O: Others)

Annex 2: Use value of ethnobotanical plants

S.N.	Name of species	ΣUVis	ns	Uv= (Uvis/ns)
1	*Spinacia oleracea* L.	10	4	2.50
2	*Acorus calamus* L.	134	57	2.35
3	*Tsuga dumosa* Eichl.	19	9	2.11
4	*Ilex dipyrena* Wall.	6	3	2.00
5	*Rumex nepalensis* Spreng.	16	8	2.00
6	*Ficus religiosa* L.	86	46	1.87
7	*Cuscuta reflexa* Roxb.	37	20	1.85
8	*Saccharum officinarum* L.	74	45	1.64
9	*Lindera pulcherrima* (Nees) Benth. Ex Hook.f,	21	13	1.62
10	*Myrica esculenta* Buch.-Ham. ex D.Don	24	15	1.60
11	*Quercus leucotrichophora A. Campus*	11	7	1.57
12	*Fraxinus floribunda* Wall.	40	26	1.54
13	*Solanum tuberosum* L.	20	13	1.54
14	*Diplazium* sp	21	14	1.50
15	*Capsicum annuum* L.	19	13	1.46
16	*Skimmia anquetilia* G.Taylor and Air	16	11	1.45
17	*Ficus neriifolia* Sm.	39	27	1.44
18	*Fagopyrum esculentum* Moench	10	7	1.43
19	*Thysanolaena latifolia* Honda	37	26	1.42
20	*Rhododendron arboreum* Sm.	25	18	1.39
21	*Fragaria nubicola* Lindl. ex Lacaita	15	11	1.36

22	*Elaeagnus parvifolia* Wall.	12	9	1.33
23	*Ficus palmata* Forsk	25	19	1.32
24	*Betula alnoides* Buch.-Ham.	40	32	1.25
25	*Hymenidium dentatum* (DC.) Pimenov & Kljuykov	52	42	1.24
26	*Mentha spicata* L.	6	5	1.20
27	*Toxicodendron wallichii* Kuntze	19	16	1.19
28	*Polygonatum verticillatum* (L.) All.	7	6	1.17
29	*Pyracantha crenulata* (D.Don) M.Roem.	17	15	1.13
30	*Musa paradisiaca* L.	19	17	1.12
31	*Juniperus indica* Bertol.	10	9	1.11
32	*Strobilanthes atropurpurea* Nees	13	12	1.08
33	*Aconitum lethale* Griff.	16	16	1.00
34	*Aesculus indica* (Wall. ex Cambess.) Hook.	1	1	1.00
35	*Agave cantala var. cantala*	3	3	1.00
36	*Ageratina adenophora* (Spreng.) R.M.King & H.Rob.	1	1	1.00
37	*Allium carolinianum* Redouté	2	2	1.00
38	*Allium cepa* L.	4	4	1.00
39	*Alnus nepalensis* D.Don	3	3	1.00
40	*Stellaria neglecta* (Lej.) Weihe	6	6	1.00
41	*Arisaema jacquemontii* Blume	1	1	1.00
42	*Artemisia indica* Willd.	24	24	1.00
43	*Asparagus racemosus* Willd.	16	16	1.00
44	*Astilbe rivularis* Buch.-Ham.	3	3	1.00

45	*Erigeron karvinskianus* Dc.	12	12	1.00
46	*Berberis aristata* DC.	9	9	1.00
47	*Bergenia ciliata* (Haw.) Sternb.	6	6	1.00
48	*Brassaiopsis hainla* Seem.	5	5	1.00
49	*Brassica* sp	15	15	1.00
50	*Buddleja paniculata* Wall.	10	10	1.00
51	*Cannabis sativa* L.	8	8	1.00
52	*Castanopsis indica* A.DC.	4	4	1.00
53	*Chenopodium album* L.	33	33	1.00
54	*Chrysopogon zizanioides* (L.) Roberty	1	1	1.00
55	*Cinnamomum burmanni* (Nees & T.Nees) Blume	18	18	1.00
56	*Clematis buchananiana* Wall.	6	6	1.00
57	*Colocasia esculenta* (L.) Schott	9	9	1.00
58	*Corallodiscus lanuginosus* (Wall. ex R.Br.) B.L.Burtt	5	5	1.00
59	*Coriandrum sativum* L.	8	8	1.00
60	*Coriaria nepalensis* Wall.	2	2	1.00
61	*Cucurbita pepo* L.	6	6	1.00
62	*Cynodon dactylon* (L.) Pers.	3	3	1.00
63	*Dactylorhiza hatagirea* (D.Don) Soó	34	34	1.00
64	*Daphne bholua* Buch.-Ham. ex D.Don	2	2	1.00
65	*Delphinium denudatum* Wall.	6	6	1.00
66	*Delphinium himalayae* Munz	5	5	1.00
67	*Delphinium vestitum* Royle	8	8	1.00

68	*Drepanostachyum falcatum* (Nees) Keng f.	13	13	1.00
69	*Elatostema sessile Var. Sessile* J.R And G. Forest	20	20	1.00
70	*Eleusine coracana* (L.)	11	11	1.00
71	*Euphorbia royleana* Boiss.	1	1	1.00
72	*Falconeria insignis* Royle	13	13	1.00
73	*Ficus auriculata* Lour.	8	8	1.00
74	*Ficus benghalensis* L.	4	4	1.00
75	*Ficus sarmentosa* Buch.-Ham. ex Sm.	6	6	1.00
76	*Ficus semicordata* Buch.-Ham. ex Sm.	5	5	1.00
77	*Garuga pinnata* Roxb.	3	3	1.00
78	*Girardinia diversifolia* (Link) Friis	19	19	1.00
79	*Hippolytia dolichophylla* (Kitam.) K.Bremer & Humphries	13	13	1.00
80	*Hippophae salicifolia* D.Don	6	6	1.00
81	*Hordeum vulgare* L.	13	13	1.00
82	*Juglans regia* L.	1	1	1.00
83	*Justicia adhatoda* L.	5	5	1.00
84	*Lepidium sativum* L.	4	4	1.00
85	*Lyonia ovalifolia* (Wall.) Drude	3	3	1.00
86	*Machilus duthei* King ex Hook.f.	16	16	1.00
87	*Machilus odoratissimus* Nees	4	4	1.00
88	*Mahonia napaulensis* DC.	1	1	1.00
89	*Momordica charantia* L.	12	12	1.00
90	*Morchella esculenta* (L.) Pers.,	4	4	1.00

91	*Morus indica* L.	9	9	1.00
92	*Neopicrorhiza scrophulariiflora* (Pennell) D.Y.Hong	4	4	1.00
93	*Nerium oleander* L.	5	5	1.00
94	*Nicotiana tabacum* L.	1	1	1.00
95	*Ocimum tenuiflorum* L.	3	3	1.00
96	*Oryza sativa* L.	1	1	1.00
97	*Paris polyphylla* Sm.	5	5	1.00
98	*Persicaria amplexicaulis* (D.Don) Ronse Decr.	5	5	1.00
99	*Pinus roxburghii* Sarg.	1	1	1.00
100	*Plantago centralis* Pilg.	8	8	1.00
101	*Pouzolzia rugulosa* (Wedd.) Acharya & Kravtsova	5	5	1.00
102	*Prinsepia utilis* Royle	8	8	1.00
103	*Prunus cerasifera* Ehrh.	4	4	1.00
104	*Prunus cerasoides* D.Don	26	26	1.00
105	*Prunus persica* (L.) Batsch	7	7	1.00
106	*Pyrus pashia* Buch.-Ham. ex D.Don	9	9	1.00
107	*Quercus lineata* Blume	4	4	1.00
108	*Quercus semecarpifolia* Sm.	9	9	1.00
109	*Raphanus sativus* L.	11	11	1.00
110	*Reinwardtia indica* Dumort.	13	13	1.00
111	*Rheum australe* D.Don	8	8	1.00
112	*Rosa sericea* Lindl.	34	34	1.00
113	*Rubia manjith* Roxb. ex Flem.	11	11	1.00

114	*Rubus ellipticus* Sm.	1	1	1.00
115	*Rumex hastatus* D.Don	3	3	1.00
116	*Salix sikkimensis* Andersson	19	19	1.00
117	*Sarcococca saligna* Müll.Arg.	3	3	1.00
118	*Stauntonia latifolia* (Wall.) R.Br.	5	5	1.00
119	*Secale cereale* L.	1	1	1.00
120	*Selinum wallichianum* (DC.)	2	2	1.00
121	*Symplocos paniculata* Miq.	4	4	1.00
121	*Syzygium cumini* (L.) Skeels	8	8	1.00
123	*Tagetus sp*	3	3	1.00
124	*Taxus mairei* (Lemee & H.Lév.) S.Y.Hu	9	9	1.00
125	*Thalictrum cultratum* Wall.	1	1	1.00
126	*Tinospora sinensis* (Lour.) Merr.	5	5	1.00
127	*Toona ciliata* M.Roem.	1	1	1.00
128	*Urtica dioica* L.	1	1	1.00
129	*Valeriana jatamansi* Jones	6	6	1.00
130	*Vetiveria zizanoides* (Linn.)	31	31	1.00
131	*Viburnum erubescens* Wall. ex DC.	5	5	1.00
132	*Woodfordia fruticosa* Kurz	8	8	1.00
133	*Zanthoxylum armatum* DC.	3	3	1.00
134	*Zea mays* L.	5	5	1.00
135	*Zingiber officinale* Roscoe	7	7	1.00

Annex 3: Frequency index of ethnomedicinal plants

S.N.	Name of the species	Fc	N	FI=(Fc*100)/N
1	*Hymenidium dentatum* (DC.) Pimenov & Kljuykov	34	60	56.67
2	*Neopicrorhiza scrophulariiflora* (Pennell)D.Y.Hong	31	60	51.67
3	*Hippolytia dolichophylla* (Kitam.) K.Bremer & Humphries	28	60	46.67
4	*Allium carolinianum* Redoute	18	60	30.00
5	*Ageratina adenophora* (Spreng.) R.M. King and H. Rob.	17	60	28.33
6	*Bergenia ciliata* (Haw.) Sternb.	17	60	28.33
7	*Rheum australe* D.Don	16	60	26.67
8	*Agave cantala* var. *Cantala*	13	60	21.67
9	*Dactylorhiza hatagirea* (D.Don) Soó	13	60	21.67
10	*Rumex nepalensis* Spreng.	13	60	21.67
11	*Girardinia diversifolia* (Link) Friis	12	60	20.00
12	*Rumex hastatus* D.Don	12	60	20.00
13	*Acorus calamus* L.	11	60	18.33
14	*Cannabis sativa* L.	11	60	18.33
15	*Zanthoxylum oxyphyllum* Edgew.	11	60	18.33
16	*Cynodon dactylon* (L.) Pers.	10	60	16.67
17	*Thalictrum cultratum* Wall.	10	60	16.67
18	*Urtica dioica* L.	10	60	16.67
19	*Artemisia indica* Willd.	9	60	15.00
20	*Delphinium denudatum* Wall.	9	60	15.00
21	*Toxicodendron wallichii* Kuntze	9	60	15.00

22	*Erigeron karvinskianus* Dc.	8	60	13.33
23	*Mentha spicata* L.	8	60	13.33
24	*Valeriana hardwickii* Wall.	8	60	13.33
25	*Pinus roxburghii* Sarg.	7	60	11.67
26	*Cuscuta reflexa* Roxb.	6	60	10.00
27	*Hippophae salicifolia* D.Don	6	60	10.00
28	*Taxus mairei* (Lemee & H.Lév.) S.Y.Hu	5	60	8.33
29	*Tinospora sinensis* (Lour.) Merr.	5	60	8.33
30	*Plantago centralis* Pilg.	4	60	6.67
31	*Syzigium cuminii* (L.) Skeels	4	60	6.67
32	*Allium cepa* L.	3	60	5.00
33	*Delphinium himalayae* Munz	3	60	5.00
34	*Delphinium vestitum* Royle	3	60	5.00
35	*Ficus auriculata* Lour.	3	60	5.00
36	*Nicotiana tabacum* L.	2	60	3.33
37	*Persicaria amplexicaulis* (D.Don) Ronse Decr.	2	60	3.33
38	*Prinsepia utilis* Royle	2	60	3.33
39	*Asparagus racemosus* Willd.	1	60	1.67
40	*Paris polyphylla* Sm.	1	60	1.67
41	*Prunus persica* (L.) Batsch	1	60	1.67
42	*Pyrus pashia* Buch.-Ham. ex D.Don	1	60	1.67

Annex 4: Threat Status

S. N.	Name of species	CITIES appendix	IUCN threat status	National threat status
1	*Acorus calamus* L.		LC	Threatened by over collection for Trade
2	*Alnus nepalensis* D.Don		LC	
3	*Bergenia ciliata* (Haw.) Sternb.		T	
4	*Centella asiatica* (L.) Urban		LC	
5	*Dactylorhiza hatagirea* (D.Don) Soó	II		
6	*Juglans regia* L.		LC	
7	*Juniperus indica* Bertol.		LC	
8	*Mentha spicata* L.		LC	
9	*Paris polyphylla* Sm.		V	
10	*Neopicrorhiza scrophulariiflora* (Pennell) D.Y.Hong		V	
11	*Pinus wallichiana* A.B. Jacks.		LC	
12	*Prunus cerasoides* D.Don		LC	
13	*Taxus mairei* (Lemee & H.Lév.) S.Y.Hu	II	E	Banned for export
14	*Urtica dioica* L.		LC	

(Note: II-CITIES appendix II, LC-Least concern, DD-Data Deficient, NT-Near Threatened, V-Vulnerable, R-Rare, E-Endangered)

Annex 5: Questionnaire for interview

Personal information:

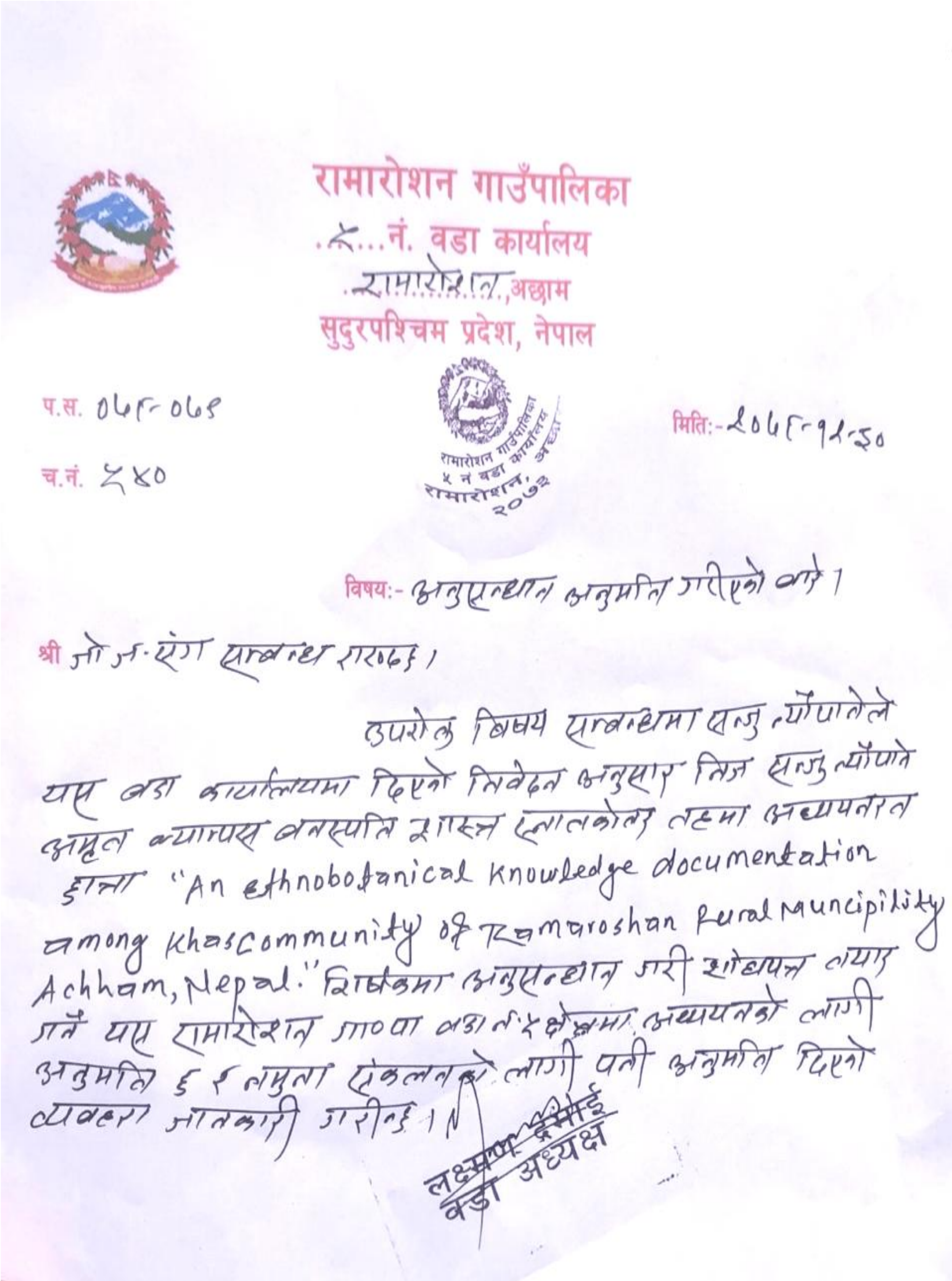
1. Name of the informant…….
2. Age:
   a. >20 b. >20-40 c. >40-60 d. >60
3. Occupation…….
4. Sex:
   a. Male b. Female
5. Contact number……..
6. Locality……
7. Ward……..
8. VDC/Municipality……..

Objective oriented questions:

1. Being a ……..What is your opinion regarding the importance of forest?
2. Have you ever been to forest for any type of activities? What are they?
3. Are you a member of that community forest?
4. What are the purposes of collecting from forest?
5. What are the things that you collect from forest?
6. Do you need to pay for those collections? If yes then to whom?
7. What are the rules and regulations to users for collections/collectors?
8. Have you noticed any changes on these forest resources/landscape through your life time? Please share some experiences.
9. What did you find between traditional conservation and modern/scientific conservation?
10. Which one did you find more significant and why?
11. What are the changes in biodiversity landscape that you feels not to be happened?
12. What are the wild plants that you uses in daily life/more often?
13. Are you allowed to collect firewood and grasses/animal breeding?
14. What are the plants that are used for livestock feeding and breeding?
15. Do you know any plant used to treat any diseases in your livestock?

16. What are the animal disease and medicine you can use from forest?
17. Although allelopathic medicines and health facilities are increasing, do you know or use that are used for human ailments/illness?
18. What are the ailments, used methods, dosage(tablets) and plants/animals product used?
19. Is there anything that can be sold anywhere near the market which can increase socio economy if proper cultivation and sustainable harvesting is applied?
20. What are the plants with their religious values?
21. what are the wild edible plants that can be used as spices/dyes/cosmetics/food,etc?
22. What are the plants that can be used to make instruments (handicrafts)?

Annex 6 : Consent from respective ward office (Ramaroshan Rural Municipality-5)



रामारोशन गाउँपालिका
५ नं. वडा कार्यालय
रामारोशन, अछाम
सुदुरपश्चिम प्रदेश, नेपाल

प.स. ०७८-०७९

च.नं. ५४०

मिति:- २०७८-१२-३०

विषय:- अनुसन्धान अनुमति गरीएको बारे।

श्री जो जस सँग सम्बन्ध राख्दछ।

उपरोक्त विषय सम्बन्धमा सन्जु न्यौपानेले यस वडा कार्यालयमा दिएको निवेदन अनुसार निज सन्जु न्यौपाने अमृत क्याम्पस वनस्पति शास्त्र स्नातकोत्तर तहमा अध्ययनरत छात्रा "An ethnobotanical knowledge documentation among Khas community of Ramaroshan Rural Muncipility Achham, Nepal." शिर्षकमा अनुसन्धान गरी शोधपत्र तयार गर्न यस रामारोशन गा.पा. वडा नं ५ क्षेत्रमा अध्ययनको लागी अनुमति र नमुना संकलनको लागी पनी अनुमति दिएको व्यहोरा जानकारी गरीन्छ।

लक्ष्मण [illegible]
वडा अध्यक्ष

Photoplate 1

(A)&(B): Interviewing local people **(C):** Focus group discussion with students **(D):** Tagging collected plant specimens **(E)&(F):** People making handicrafts

Photoplate 2

(G) Woods collected for firewood. **(H)** Bark of *Pouzolzia rugulosa* harvested for use **(I)** Local grain store pot *Kotho* **(J):** Drying grains **(K)** Stored dry wild grasses **(L)** Peeled root of *Berberis*

Photoplate 3

(M): *Rhododendron campanulatum* **(N):** *Rumex hastatus* **(O):** *Brassaiopsis hainla* **(P):** *Agave cantala var. cantala* **(Q):** *Aesculus indica* **(P):** *Daphniphyllum himalayense*

Photoplate 4

S

T

(S) & (T): A young girl showing local vegetables *Diplazium* sp and women showing roots of *Hippolytia dolichophylla* as a medicine.