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An Assessment of the Ethnobotanical Knowledge of Danuwar Community in Udayapur District, Nepal

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Abstract

This study investigated the Danuwar community's traditional plant-based knowledge dwelling in the Katari municipality, Udayapur district, with the objective of documenting the diversity, medicinal applications, and cultural significance of the plant species they utilize. Data was collected from March to June, 2024 using semi-structured questionnaires, field observations, and group discussions with 89 informants (43 men and 46 women), along with six key informant interviews and two focus group discussions. Data was analyzed in R studio using Ethnobotanical indices: Use value (UV), Use Reports (UR), Relative Frequency of Citation (RFC) and Cultural Value (CV). A total of 111 plant species from 103 genera and 58 families were documented, primarily for medicinal, cultural, and daily use, with herbs being the most commonly used and 24% of documented species were used to treat gastro-intestinal/digestive disorders. The most significant species was *Achyranthes aspera* (RFC 0.568) whereas *Aegle marmelos* had the highest use value (UV 0.784) with 69 use reports. Similarly, *Achyranthes aspera* shows culturally significant, with their highest Cultural Value (CV 0.100). Deforestation, encroachment, grazing, forest fire and unsustainable practices threatened the use of these valuable plants. Raising awareness about the importance of non-timber forest products and empowering the Danuwar community can help to preserve their cultural heritage and medicinal practices for future generations.

Keywords: Cultural value, ethnobotany, Medicinal plants, Traditional knowledge

Introduction

Ethnobotany is the study of the relationship between plants and people: From "ethno"-study of people and "botany"-study of plants (Rahman et al., 2010). The term "ethnobotany" was first given by John Hershbergerin 1896 which deals with the science of documentation and conservation of original knowledge, which has been used by ethnic people since ancient history (Manandhar, 2002). Ethnobotany focuses on how plants have been utilized, managed and perceived in human societies which includes plants for food, medicine, divination, cosmetics, dyeing, textiles, for building, tools, currency, clothing, rituals and social life (Rahman et al., 2010).The documentation of age-old knowledge plays a vital role in safeguarding biodiversity and responsibly handling natural resources.

Though the country covers only 0.1% of the Earth's terrestrial territory, it is home to about 2% of global biodiversity and ranks 25th in terms of species richness (Kunwar et al., 2021). Nepal is the country with the most diverse and superb landscape with a diversity of plants, animals and fungi (Pangeni et al., 2020), due to its significant variations in altitude, topography and climate, Nepal has an important floral biodiversity comprising nearly 6500 species of flowering plants, (Shrestha et al., 2018) of which about 1,600 to 1,900 species are commonly used in traditional healing practices (Gaire & Subedi, 2011).

In Nepalese communities, medicinal plants are an integral part of traditional medicine (Bhattarai, 2018). They are used as basic ingredients in Ayurveda, Tibetan, homeopathic, and mainstream medicine, among other medical practices (Ghimire et al., 1999). A significant majority, over 75% of the Nepalese population, still relies on indigenous herbal remedies for healthcare due to limited access to modern medical services in rural areas and a shortage of trained healthcare professionals (Kafle & Dani, 2022). There have been more than 590 ethnobotanical studies carried out in Nepal (Joshi & Joshi, 2005; Shrestha et al., 2004). A review of 822 publications made between 1968 and 2014 was done

by Rajbhandary and Winkler (2015) which revealed that 44% of published studies were associated with ethnomedicine and 23% with ethnobotany.

Nepal consists of a diverse population of 29.22 million people, consisting of 142 different ethnic groups speaking 124 distinct languages (National Population & Housing Census [NPHC], 2021). Indigenous knowledge (IK) is abundant among the ethnic groups and is firmly established in their traditions and cultures. Danuwar, an indigenous tribe of Nepal comprising population of 82,784 (NPHC, 2021), has a unique culture, traditions, language, and history. The word 'Danuwar' is derived from the Sanskrit word Droniwar. In Sanskrit, 'droni' means flat land between two hills. The people who lived in the inner Tarai between the mountains were called Droniwar and hence, they are called Danuwar in Nepali (Regmi & Thakur, 2016). Danuwars are found throughout the hills and Tarai regions of central and eastern Nepal but they mainly reside in Sindhuli and Udayapur district. There are mainly three clans in Danuwar: Janghariya, Rai Danuwar, and Kachhadiya Danuwar (Bhandari, 1989). Katari Municipality consists of Rai and Kachhadiya Danuwar speaking Nepali and Maithili language respectively (Regmi & Thakur, 2016). They have extensive knowledge about plant utilization and medicinal practices. Agriculture is the Danuwar's primary occupation. Although fishing and hunting were the Danuwar people's traditional occupations, farming is now their main source of income (Acharya & Bhandari, 2024). Limited research exists on Danuwar in Nepal. Furthermore, Katari Municipality of Udayapur district remains unexplored till date on the current status of ethnomedicinal practices and the conservation of plants. Large number of medicinal plants in the region along with their indigenous knowledge is still waiting for proper documentation, thus, making this study vital for documenting traditional knowledge and preserving indigenous culture.

Materials and Method

Study area

Udayapur, Inner Tarai district situated in the Eastern part of Nepal in Koshi Province, lies between (26°392 -27°222 N latitude and 86°92 -87°102 E longitudes). Its geographical limit is 2,063 sq. km. and altitudinal variation starts from 90 m to 2340 m above the sea level. The area has tropical and subtropical climate with an annual minimum temperature of 16.8°C, and an annual maximum temperature of 28.1°C and annual rainfall is about 1349.2 mm. Due to the unique geographical features and various climatic conditions (from lower tropical to temperate), the area is endowed with excellent habitats for diverse flora and fauna. Different topography, geology, and altitude have established three distinct physiographic zones i.e., Inner Tarai, Churia and Mahabharat range. Katari one of the municipality of the Udayapur district consists the population of 59,507 and 20,240 households (NPHC, 2021). Out of 82,784 Danuwar population in Nepal, 9.3% lives in the Katari Municipality (NPHC, 2021). The present research was mainly focused on one ward i.e. ward no. 4 of Katari Municipality which consists an area of 15.46 sq. km. and Danuwar households of about 250.

Data collection

Ethnobotanical data was collected from March to June 2024 through field observations and semi-structured questionnaires administrated to 89 informants (43 men and 46 women) belonging to the Danuwar ethnic group. Additionally, six key informant interviews and two focus group discussionswas conducted with traditional healers, elderly individuals, and frequent users of medicinal plants. The Danuwar ethnic group was selected purposively, while individual respondents within the community were selected randomly. Herbarium specimens were collected during field visits and identified using standard taxonomic reference (Shrestha et al., 2018) with plant nomenclature following the guidelines of Shrestha et al. (2018). Voucher specimens numbered *P. Sharma 01*(FOF) to *P. Sharma 19* (FOF) were deposited at the Faculty of Forestry Herbarium, Hetauda and their identification was cross-verified with existing collections at the National Herbarium and Plant Laboratories (KATH), Kathmandu. All research activities were conducted in accordance with the Code of Ethics of the International Society of Ethnobiology

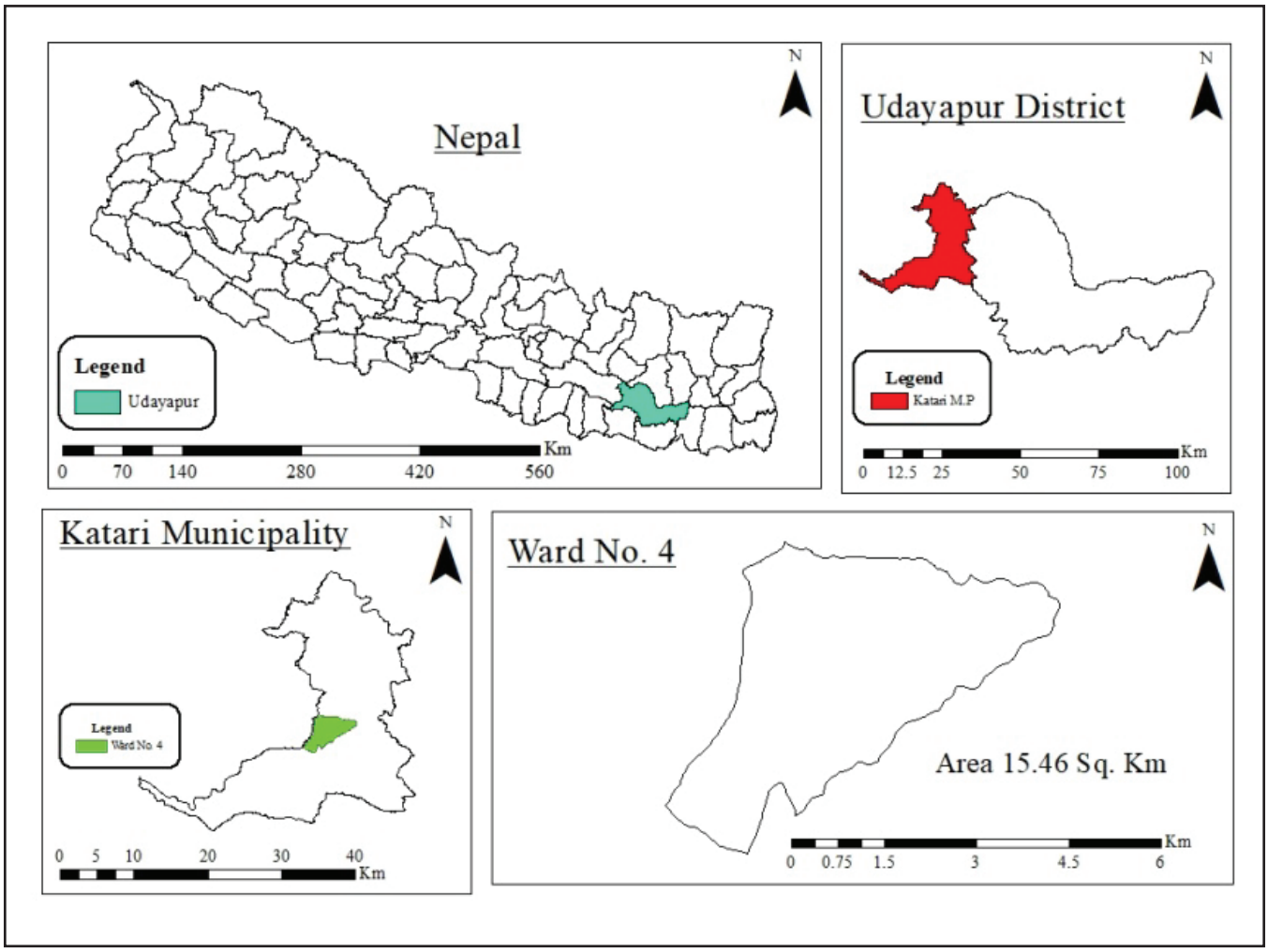

Figure 1: Map of study area

(http://ethnobiology.net/code-of-ethics/). Prior to participation, verbal informed consent was obtained from each respondent through a process of free, prior, and informed consent. Participants were fully informed about the research objectives, their voluntary participation, their right to withdraw at any time, and the measures taken to ensure anonymity and confidentiality.

Data analysis

MS-Excel was used to assess life form; plant parts used, mode of preparation and R studio was used to analyze the quantitative indices.

Use Report (URs): The use report URs () function calculates the use report (UR) for each species in the data set. URs= $\sum_{u=u_1}^{uNC} \sum_{i=i_1}^{iN} UR_{ui}$ URs computes the total uses for a species as reported by all informants (from i1 to iN) within each specific use category. It counts how many informants mention each use category (NC) for that species and sums all reported uses within those categories (from u1 to uNC) (Prance et al. 1987).

Relative Frequency of Citation (RFC): The Relative Frequency of Citation (RFC) is a quantitative measure used to determine the local importance or popularity of a particular plant species (or item of cultural interest) based on how frequently it is mentioned by informants in a study. RFC is obtained by dividing the number of informants who mention the use of the species, also known as frequency of citation (FC), by the number of informants participating in the survey (N).

RFCs=*FCs/N*

FCs is the frequency of citation for each species s, and N is the total number of informants 9 Interviewed in the survey (Tardío & Pardo-De-Santayana, 2008).

RFC values range from 0 to 1. A higher RFC means the plant is widely recognized and used among the informants, indicating higher local importance.

Use Value (UV): The relative importance of ethno medicinal plant species was calculated by using the use value (UV) for each species (Phillips et al., 1994).

$$UVs = \sum \frac{Us}{Ns}$$

Where Us = Total number of use-reports cited by each informant for a given plant species s and Ns = Total number of informants interviewed for plant species.

Cultural Value (CV): Cultural Value (CV) is a comprehensive index that reflects the overall significance of a plant (or other cultural item) to a community. It considers not only how frequently a plant is cited but also how many different uses it has and how widely these uses are known among the population.

$$CV = \left[\frac{NU_s}{NC}\right] \times \left[\frac{FC_s}{N}\right] \times \left[\sum_{u=u_i}^{u_{NC}} \sum_{i=i_1}^{i_N} UR_{ui}/_N\right]$$

Where, NUs = No of uses, NC = No. of Use Categories, FCs = Frequency of Citation, N = No. of Informants (Reyes-García et al., 2006).

A higher CV indicates a plant with many uses, known by many people, and of high cultural importance.

Results and Discussion

Plant diversity and uses

From the present study 111 plant species were recorded as ethnobotanical use, and they belonged to 58 families and 103 genera (Appendix 1). Lamiaceae represented the highest number of plants (11 species), which was followed by Fabaceae (8 species) and Euphorbiaceae (5 species). The herbs were primary sources of medicine (43%), followed by tree (29%) and shrub (18%). The study showed that different parts of the same plants were used for different purposes (food, medicine, cultural). The uses of plant species were classified into 11 categories (traditional medicine, species used to cure animal disorder, vegetables, edible fruits, cultural value, ritual, spice, tonic, NTFPs contributing economy, agricultural food, and plant related with taboos) (Table 1). The highest number of species (105) was used as traditional medicine, followed by species used as vegetables (15) and edible fruits (13). The extensive utilization of medicinal plants indicates inhabitants of the studied areas possess rich traditional knowledge, enabling them to treat various ailments using locally available natural resources. Plants are utilized as food, cultural value, contributing economy, and as a veterinary care in Katari Municipality shows how locals uses the plants for multiple requirements, as also recorded in earlier studies (Manandhar, 2002). The widespread use of these plants was due to easy availability, cultural significance and their ability to cure the illnesses.

Based on the information gathered from informants, the uses of medicinal plants for culinary purpose were categorized into 11 ailments (Table 2). Out of these, digestive system disorders showed the use of highest number of plants (41), followed by skin /integumentary system disorders with the use of 33 plant species and respiratory system disorders with the use of 21 species. The frequent use of plants for gastrointestinal disorders indicates the significance of these ailments and suggests the potential existence of additional, yet undocumented, ethnomedicinal knowledge relevant to the treatment of gastrointestinal conditions. This information is similar to findings of several studies (Bhattarai, 2017; Kafle & Dani, 2022; Shrestha et al., 2014). First choice of majority of people is traditional medicine and the Dhami/Jhankri systems; if that doesn't work, they look for alternative solutions. The villagers treat simple common illnesses including cough and allopathic cold, scrapes and wounds, low fever, typhoid, jaundice, pains, and other conditions at home. This shows that the primary healthcare services used by the locals have not entirely relied on modern medicine.

Table 1: Ethnobotanical category of plant species

S.N.	Categories	Plant species	No. of species
1	Plant-based food (Vegetables)	*Amorphophallus paeoniifolius, Asparagus racemosus, Bambusa bambos, Brassica juncea, Cantharellus odoratus, Celosia argentea, Jatropha curcas, Lablab purpureus, Musa×paradisiaca, Ophioglossum reticulatum, Oroxylum indicum, Oxalis corniculata, Senna tora, Syzygium aromaticum, Urtica dioica*	15
2	Edible Fruits	*Aegle marmelos, Ananas comosus, Areca catechu, Artocarpus lacucha, Carica papaya, Citrus aurantiifolia, Cocos nucifera, Mangifera indica, Melastoma malabathricum, Musa×paradisiaca, Phyllanthus emblica, Syzygium cumini, Ziziphus mauritiana*	13
3	Cultural Value	*Achyranthes aspera,Aegle marmelos, Bambusa bambos, Calotropis gigantea, Dalbergia sissoo, Elsholtzia fruticosa, Ficus religiosa, Mangifera indica, Phyllanthus emblica, Shorea robusta, Tagetes erecta*	11
4	Species used to cure animal disorder	*Allium*sp., *Alstonia scholaris, Artemisia indica, Asparagus racemosus, Cannabis sativa, Cissus quadrangularis, Datura metel, Melia azedarach, Opuntia monacantha, Pogostemon benghalensis, Zingiber cassumunar*	11
5	Ritual	*Areca catechu, Bombax ceiba, Cocos nucifera, Musa× paradisiaca, Ocimum tenuiflorum, Oroxylum indicum, Saccharum officinarum, sesamum indicum, Vitex negundo*,	9
6	Spice	*Capsicum frutescens, Mentha spicata, Perilla frutescens, Sesamum indicum, Syzygium aromaticum*	5
7	Tonic plant	*Brassica campestris, Cocos nucifera, Leucas aspera, Terminalia chebula, Tinospora sinensis*	5
8	NTFPs contributing economy	*Bambusa bambos, Mangifera indica, Phoenix acaulis, Shorea robusta*	4
9	Agricultural Food	*Macrotyloma uniflorum, Oryza sativa*	2
10	Plant related with Taboos	*Cannabis sativa*	1

Table 2: Aliments categories of medicinal plants

S.N.	Categories of ailments	Ailments type/medication	No. of species used
1	Digestive System	Gastritis, Swollen stomach, Mouth infection, Diarrhea, Vomiting, Constipation, Dysentery, Stomach disorder, Food aversion, Fish bone pricking, Yellowish teeth, Indigestion, Appetizer, Stomache, Toothache, Worm infection, Energy boost, Piles.	41
2	Skin and / Integumentary System disorder	Allergy, Bleeding, Boils, Burn, Wounds and cuts, Foot/hand cracks, Scar removing, Scorpion bite, Skin infection, Skin irritation due to latex, Hair tonic, Hair color, Hair growth, Chicken pox, Snake bite, Anti-inflammatory, Trench foot, Dog bite, Remove leech.	33
3	Respiratory System disorder	Asthma, Common cold, Cough, Tonsillitis, Sinusitis, Chest pain.	21
4	Fever		14
5	Domestic animal disorder	Milk production, Bone breakage, Diarrhea, Cut and wounds, Foot and mouth disease, Weight gain, Corneal ulcer.	11
6	Reproductive System disorder	Menstrual cramp, Milk production, Vaginal discharge,	8
7	Skeleto-Muscular system disorder	Body pain, Swollen body, Bone breakage.	8
8	Cardiovascular System disorder	Balance Blood pressure, Blood purification	6
9	Nervous system disorder	Headache, Cooling agent	6
10	Urinary Disorder	Kidney stone, Piles, Urinary troubles,	5
11	Others	Sugar, Jaundice, Typhoid	19

Life form of species, plants parts used and mode of preparation of traditional remedies

From the reported species herbs showed 43% of the use, followed by trees (29%), shrubs (18%) least with climbers (10%) (Figure 2). Dominance of herbs resembled with various other studies from Nepal (Ambu et al., 2020; Luitel et al., 2014; Malla et al., 2015; Rokaya et al., 2010). Herbs were preferred over other types possibly because they are more readily available, easier to gather, and more convenient to carry (Uprety et al., 2010). Different parts of plants-leaves (42), fruits (31), roots (26), bark (14), latex (8), stem (10), seeds (8), flowers (6), whole plant (6) and rhizome (3) were used to cure various ailments and used for various purposes (Figure 3). Because of their easy availability, different aerial parts of medicinal plants, such as leaves, flowers, and fruits were commonly used. Based on the types of plant parts used, various modes of preparation were recorded for treating human ailments. The most common mode of use was plant juice (33), followed by decoctions (18), pastes (15), infusions (10), powders (8), cooked forms (8), massages (6), poultices (7), raw applications (7), topical use (5), and less frequently by fumigation (1), smoke (1), and steam inhalation (1) (Figure 4). The majority of plants were used highly in the form of juice, align to that of Ambu et al. (2020) and Malla et al. (2015). Most remedies were prepared and used immediately after harvesting. Fresh forms were favored since this form is considered to be strong and healthy. The majority of herbal preparations are administered orally to treat human disorders, which have been found to be useful. Similar findings have been documented in number of research related with ethnic groups in Nepal, nearby countries, and globally (Bhattarai et al., 2011; Luitel et al., 2014; Uprety et al., 2010). The collection places of the recorded plant species were mostly from wild (46), followed by cultivated (41), agricultural land (18) and roadside (7). Similar observations were also reported by Malla et al. (2015).

Source of knowledge among various age groups

Traditional healers in the study area claim that their ancestors were the primary source of their traditional

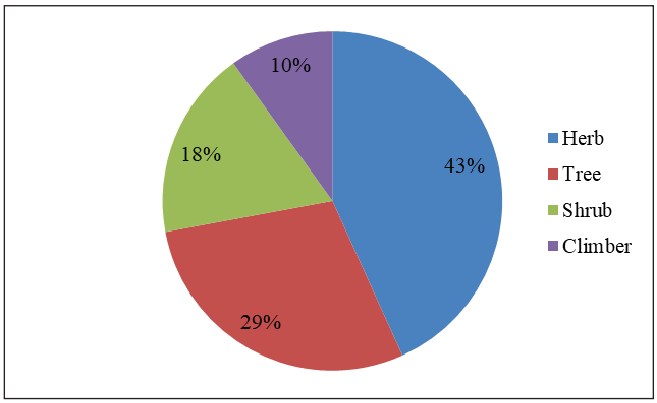

Figure 2: Life form of identified species

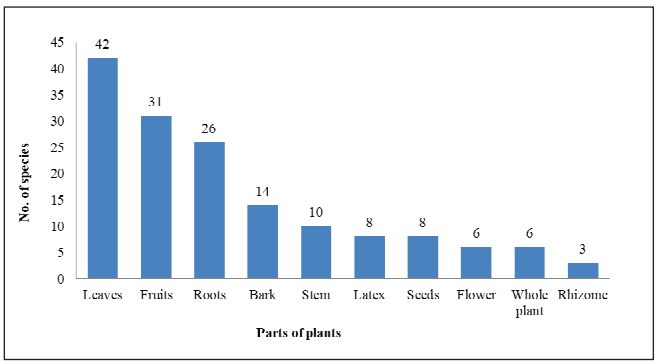

Figure 3: Plants parts used

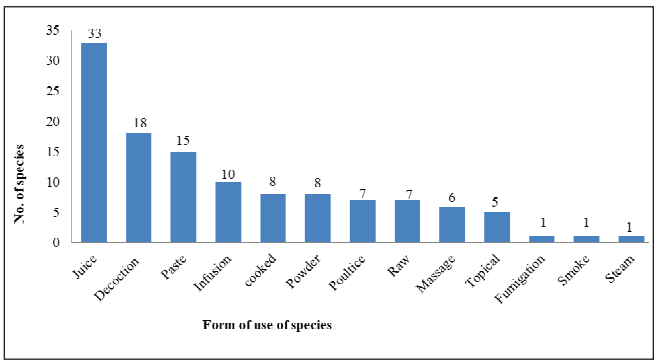

Figure 4: Form of use of species

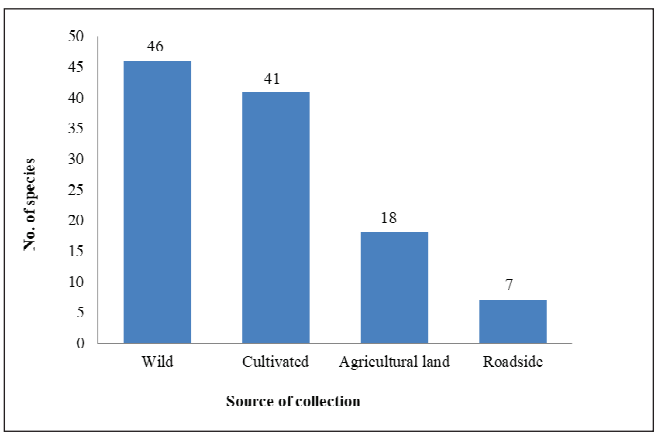

Figure 5: Source of collection of recorded species

knowledge. The other knowledgeable groups, in addition to Dhami/Jhankri, learned about the use of medicinal plant species from family members who had previously used such therapeutic techniques. During the interviews, the elderly people were most familiar with the various types of medicinal plant species. When comparing males and females, females were better at identifying plant species than males because they regularly visit forests for firewood or fodder collection. This information is similar to Luitel et al. (2014) and TorresAvilez et al. (2016). Due to the effects of modernization, fast land degradation, deforestation, and people's reliance on verbal transformation, traditional medical knowledge and practices are rapidly disappearing. Additionally, experts do not transfer or share their knowledge among learners or younger generations. Traditional healers kept their knowledge secret, sharing their knowledge only within their families to preserve efficacy which was also reported by many previous researchers (Bhattarai, 2017; Luitel et al., 2014; Rokaya et al., 2010; Shrestha et al., 2014). It was observed that the poor education level/illiteracy amongst this community led them to be dependent fully on the superstitious culture of Dhami during sickness, relevant to the study by Ambu et al. (2020).

Ethnobotanical indices

According to Use Value (UV), *Aegle marmelos* (L.) Correa (UV=0.784) was the most important with 69 use reports. It was followed by *Bambusa bambos* (L.) Voss (UV=0.682) with 60 use reports and *Oroxylum indicum* (L.) Kurz (UV=0.636) with 56 use reports. The species with least importance were *Ricinus communis* L.*, Spondias pinnata* (L.f.) Kurz. and *Syzygium nervosum* DC. with only 3 use reports respectively (Table 3). The highest use value of *Aegle marmelos* (UV=0.784) indicates that it was utilized in a wide variety of contexts, potentially spanning food, medicine, and rituals. The lowest Use Value (UV) reflects lesser recognition or fewer uses reported for the plants. *Achyranthes aspera* L. has the highest Relative Frequency of Citation (RFC=0.568) followed by *Centella asiatica* (L.) Urb. (0.330) and *Azadirachta indica* A. Juss. (0.318) indicating it was frequently cited by informants, due to its prominent role in both medicinal and cultural contexts. Elevated Relative Frequency of Citation (RFC) values indicate a high level of local usage and cultural importance of these species, suggesting that they embody substantial traditional knowledge and should be prioritized for further ethnobotanical investigation. *Achyranthes aspera* shows the highest Cultural Value (CV) which signifies these species shows more than one usage with cultural significance.

Conclusion

The present study reveals a deep connection between the Danuwar community and local plant species, unveiling the significance of 111 species including *Aegle marmelos, Bambusa bambos, Oroxylum indicum,* as the most important which are primarily used for medicine, cultural, and daily use. The high value of quantitative indices suggests that there is

Table 3: Value of Ethnobotanical indices

S.N.	Species name	Use Reports (URs)	Relative Frequency of Citation (RFC)	Use Value (UV)	Cultural Value (CV)
1.	*Achyranthes aspera* L.	54	0.568	0.614	0.100
2.	*Aegle marmelos* (L.) Correa	69	0.273	0.784	0.076
3.	*Azadirachta indica* A.Juss.	36	0.318	0.409	0.028
4.	*Bambusa bambos* (L.) Voss	60	0.170	0.682	0.066
5.	*Cannabis sativa* L.	38	0.148	0.432	0.014
6.	*Centella asiatica* (L.) Urb.	29	0.330	0.330	0.008
7.	*Leucas aspera* (Willd.) Link	26	0.239	0.295	0.010
8.	*Mangifera indica* L.	49	0.148	0.557	0.035
9.	*Mimosa pudica* L.	20	0.216	0.227	0.007
10.	*Oroxylum indicum* (L.) Kurz	56	0.318	0.636	0.058
11.	*Phyllanthus emblica* L.	48	0.205	0.545	0.040
12.	*Piper longum* L.	19	0.205	0.216	0.006
13.	*Shorea robusta* C.F.Gaertn.	48	0.193	0.545	0.045

high potential for further ethnobotanical research and bio-prospecting. Pants of the study area are facing threats from deforestation, habitat loss, and unsustainable harvesting. Thus, empowering both men and women in the Danuwar community can help in preserving cultural heritage and traditional medicinal practices in that community.

Author Contributions

Both authors contributed in analysis, literature review, and concept formulation. P Sharma conducted an in-depth literature review and composed a preliminary draft of the manuscript whereas S Bhattarai analyzed the quantitative indices, revised manuscript and supervised the study. Furthermore, Both authors worked together to refine the content and assure the validity and integrity of the research.

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Appendix 1: Identification of plant species with their uses

Scientific name	Family	Voucher number	Local name (Danuwari)	Life form	Parts used	Form of use	Habit	Indigenous uses	Similar use reports
Abrus precatorius L.	Fabaceae		Lal Gedi	Herb	fruits	Powder	Agricultural land	Eye impurities	Acharya & Acharya, 2009; Miya et al., 2021
Achyranthes aspera L.	Amaranthaceae	*P. Sharma 01* (FOF)	Datiwan	Herb	Roots, seeds	Juice, Infusion	Roadside	Typhoid, Tonsillitis, Sinusitis, Scorpion bite	Kafle & Dani, 2022; Rijal 2011
Aconitum palmatum (D.Don)	Ranunculaceae		Bikhma	Herb	Roots, Bark	Juice	wild	Vomiting, Diarrhea, Fever, Body pain, Irregular menstrual, Sinusitis	Bhattarai, 2018; Uprety et al., 2010
Acorus calamus L.	Acoraceae		Bojho	Herb	Rhizome	Decoction, Powder, Massage	Cultivated	Cough, wounds, Fever, Body pain, Tonsillitis,	Acharya & Acharya, 2009; Ambu et al., 2020; Bhattarai, 1993; Kafle & Dani, 2022; Poudel & Singh, 2016; Rokaya et al., 2010; Shrestha and Dhillion, 2003; Singh et al., 2012; Uprety et al., 2010
Adina cordifolia (Roxb.) Hook.f. & Benth.	Rubiaceae		Kadam	Tree	Bark, leaves	Paste, Poultice	Wild	Anti-inflammatory , Toothache	
Aegle marmelos (L.) Correa	Rutaceae		Bel	Tree	Fruit, Leaves	Juice	Wild	Cooling agent, Tonsillitis, Blood purification, Edible fruits, Used in Ritual	Ambu et al., 2020; Kafle & Dani, 2022; Panthi & Chaudhary, 2003; Pangeni et al., 2020
Ageratum conyzoides L.	Asteraceae		Gandhe jhar	Herb	Leaves	Paste	Agricultural land	Wounds caused by burns	Singh et al., 2012
Aleuritopteris bicolor (Roxb.) Fraser-Jenk	Pteridaceae		Ratjara	Herb	Root	Infusion	Agricultural land	Fever, Worms infection	Kafle & Dani, 2022
Allium sp.	Amaryllidaceae		Ban pyaj	Herb	Root	Powder	wild	Used during bone fracture in Goat,	
Aloe vera (L.)Burm.f.	Xanthorrhoeaceae		Ghiu Kumari	Herb	Leaves	Gel/topical	Cultivated	Burns, Remove scars, Hair growth, Lower pressure	Bhattarai et al., 2009; Ghimire, 2016; Joshi et al., 2011; Kafle & Dani, 2022; Miya et al., 2021; Poudel & Singh, 2016; Singh, 2020; Singh et al., 2012
Alstonia scholaris (L.)R.Br.	Apocynaceae		Chattiwan	Tree	Bark	Powder	Wild	Tonic,weight gain in animals, Milk production,	
Alternanthera dentata Stuchlík ex R.E.Fr.	Amaranthaceae		Rato phul	Herb	Leaves	paste	Cultivated	Cuts and wounds	
Amorphophallus paeoniifolius (Dennst.) Nicolson	Araceae		Oal	Herb	Leaves, flower	Cooked	Cultivated	Spinach, Swollen body	Kafle & Dani, 2022
Ananas comosus (L). Merr.	Bromeliaceae		Bhuikatahar	Herb	Leaves , Fruit	Steam	Cultivated	Cold and Cough, Edible fruits, Fever	Kafle & Dani, 2022
Areca catechu L.	Arecaceae		Supari	Tree	Fruit	Raw	Cultivated	Scar removing, Beautify the mouth, Induce purification, Edible fruits, Used in Ritual	Kafle & Dani, 2022; Poudel & Singh 2016

Scientific name	Family	Voucher number	Local name (Danuwari)	Life form	Parts used	Form of use	Habit	Indigenous uses	Similar use reports
Artemisia indica Willd.	Asteraceae	*P. Sharma 02*(FOF)	Titepati	Herb	Leaves	Paste, Decoction, Infusion	Wild	Allergy, Cuts and Wounds in both Human and Animal, Abdominal pain, Chicken pox,	Kafle & Dani, 2022; Pangeni et al., 2020; Singh et al., 2012
Artocarpus lacucha Buch.-Ham.	Moraceae		Barhar	Tree	Bark, Fruit, leaves	Powder, Infusion	Wild	Pimples, cracked skin, Fever, Edible fruits, Used as Fodder for animals	
Asparagus racemosus Willd.	Asparagaceae		satawari/ kurilo	Shrub	whole plant	Juice, Cooked	Cultivated	Milk production in both Women and Animals, Spinach	Ambu et al., 2020; Bhattarai et al., 2009; Kafle & Dani, 2022; Rjbanshi & Thapa, 2019; Shrestha & Dhillion, 2003; Uprety et al., 2010
Azadirachta indica A.Juss.	Meliaceae		Neem	Tree	Leaves, Bark	Decoction, Poultice	Cultivated	Pesticide in Agriculture, Allergy, Fever, Lower Pressure, Snake bite, Toothache, Toothbrush, Vaginal discharge	Kafle & Dani, 2022; Miya et al., 2021; Singh et al., 2012
Bambusa bambos (L.) Voss	Poaceae		Baans	Herb	Young shoot ,leaves	Cooked	wild	Used as Toothbrush, Young shoot as vegetables, Blood purification, Used as building material, Fodder for Livestock,Used during marriage ceremony and funeral	Kafle & Dani, 2022
Bombax ceiba L.	Malvaceae		Simal	Tree	seed	raw	wild	Seed are edible, Whole plant is used during marriage ceremony and funeral, Root is used as tonic	Singh et al., 2012
Brassica juncea (L.)Czern.	Brassicaceae		Rayo	Herb	leaves	Cooked	Cultivated	Used as spinach	
Brassica campestris L.	Brassicaceae		Tori	Herb	seed	Massage	Cultivated	Used for Oil production, Body pain, Hair tonic	Kafle & Dani, 2022
Calotropis gigantea (L.) W.T. Aiton	Apocynaceae		Aakon	Shrub	Milky latex , Root, leaves	Decoction	Roadside	Latex is used to stop bleeding of wounds, lower pressure, Diabetes, Swollen stomach, Used during marriage ceremony	Miya et al., 2021; Singh et al., 2012
Cannabis sativa L.	Cannabaceae	*P. Sharma 03*(FOF)	Ganja	Shrub	leaves	Juice	wild	Swollen stomach in both human and animal, Diarrhea, Gastritis	Kafle & Dani, 2022; Miya et al., 2021
Cantharellus odoratus (Schwein.)Fr.	Cantharellaceae		Champe chau/Hardayana chhati	Herb	whole plant	Cooked	wild	As vegetable	
Capsicum frutescens L.,	Solanaceae		Khursani	Herb	Fruit	Raw	Cultivated	Used as spice, Gastritis	
Carica papaya L.	Caricaceae		Mewa	Shrub	Fruit, latex	Juice	Cultivated	Edible fruit, latex is used in Identification of snake bite	Ambu et al., 2020

Scientific name	Family	Voucher number	Local name (Danuwari)	Life form	Parts used	Form of use	Habit	Indigenous uses	Similar use reports
Casia fistula L.	Fabaceae		Banarshot	Tree	Fruit	Juice	wild	Diarrhea, Vomiting, Constipation, Used in banana ripening, Urine retension	Kafle & Dani, 2022; Miya et al., 2021; Rijal, 2011; Sharma et al., 2014
Centella asiatica (L.) Urb.	Apiaceae	*P. sharma 04* (FOF)	Ghodtapre	Herb	Root, Leaves	Juice	wild	Urinary trouble, Tonsillitis, Fever Burn,	Acharya & Pokhrel, 2006; Bhattarai et al., 2009; Kafle & Dani, 2022; Luitel et al., 2014; Mueller-Boeker, 1993; Sharma et al., 2014; Shrestha & Dhillion, 2003; Tamang & Sedai, 2016
Chromolaena adorata (L.) R. King & H. Rob.	Asteraceae		Banmara	Herb	Leaves	Paste	wild	Cuts and Wounds	Kafle & Dani, 2022
Cissus quadrangularis L.	Vitaceae		Hadjora	Climber	Roots	Paste	Cultivated	Bone fracture of animal,	Rajbanshi & Thapa, 2019
Citrus aurantiifolia (L.) Osbeck	Rutaceae		Kagati	Shrub	Fruit	Juice	Cultivated	Kidney stone, Energy boost, Diarrhea, Edible fruits	Rajbanshi & Thapa, 2019
Clerodendrum indicum (L.) Kuntze	Lamiaceae		Agiyathi	Shrub	Root	paste	wild	Wounds, Allergy	
Clerodendrum infortunatum(L.) Kuntze	Lamiaceae		Bhatik patta	Herb	Root	Juice	wild	Tonsillitis, Fever, Chest pain	Miya et al., 2021; Mueller-Boeker, 1993
Cocos nucifera L.	Arecaceae		Nariol	Tree	Fruit	Juice	Cultivated	Hair tonic, Edible fruit, Used in marriage ceremony	Kafle & Dani, 2022
Celosia argentea var. cristata (L.)	Amaranthaceae		Surwale sag	Herb	leaves	Decoction	Cultivated	Fever, Spinach	
Curcuma caesia Roxb.	Zingiberaceae		Kalo Besar	Herb	Root	Juice	Cultivated	Swollen stomach, Tonsillitis, Back pain	Thapa, 2012
Cuscuta reflexa Roxb.	Convolvulaceae		Amarlatti/sikari lahara	Climber	whole plant	Decoction	wild	Jaundice, Piles, Fractures	Ambu et al., 2020; Ghimire, 2016; Kafle & Dani, 2022; Miya et al., 2021; Rajbanshi & Thapa, 2019; Rokaya et al., 2010; Singh, 2020; Singh et al., 2012
Cyperus rotundus L.	Cyperaceae	*P. Sharma 05* (FOF)	Motha	Herb	Flower	Massage	Roadside	Headache,	Kafle & Dani, 2022
Dalbergia sissoo Roxb. ex DC.	Fabaceae		Sissau	Tree	Latex		wild	Diarrhea, Dysentery, Used in marriage ceremony	Acharya & Pokhrel, 2006 ; Miya et al., 2021; Singh et al., 2012
Datura metel L.	Solanaceae	*P. Sharma 06* (FOF)	Dhaturo	Herb	Fruit, Leaves	Poultice, Massage	Cultivated	Asthma, Swollen leg, Swollen stomach, Dog bite,	Singh et al., 2012
Elsholtzia fruticosa (D.Don) Rehder	Lythraceae	*P. Sharma 07* (FOF)	Dhursi	Shrub	Leaves	Juice	wild	Banana ripening, Religious value	

Scientific name	Family	Voucher number	Local name (Danuwari)	Life form	Parts used	Form of use	Habit	Indigenous uses	Similar use reports
Euphorbia royleana Boiss.	Euphorbiaceae		Paspatko patta	Herb	leaves	Poultice	Cultivated	Chest pain in children, whooping cough	Ghimire, 2016; Miya et al., 2021
Falconeria insignis Royle	Euphorbaceae		Khirro	Tree	Bark	paste	Cultivated	Milk production,	
Ficus religiosa L.	Moraceae		Peepal	Tree	Root		wild	Religious value	
Hellenia speciosa (J.Koenig) S.R.Dutta	Costaceae		Betlauri	Herb	Root	Juice	Cultivated	Weakness, Jaundice	
Ichnocarpus frutescens (L.) W.T.Aiton	Apocynaceae		Dudhiya lathhi	Climber	Root	Powder	wild	Milk production	Kafle & Dani, 2022
Jatropha curcas L.	Euphorbiaceae		Bagandi/ Sajiwan	Tree	Fruit	Cooked	Cultivated	Lower pressure, used as vegetables	
Juniperus L.	Cupressaceae		Dhupi	Tree	Leaves, Fruit		Cultivated	Dried leaves are used in making incense, Used in marriage ceremony	
Justicia adhatoda L.	Acanthaceae	*P. Sharma 08* (FOF)	Aasuro	shrub	Leaves	Infusion, Decoction	wild	Leaves are used as fertilizer, Jaundice, cough and cold, Fever	Bhattarai et al., 2009; Luitel et al., 2014; Singh et al., 2012; Tamang & Sedai, 2016
Lablab purpureus (L.) Sweet	Fabaceae		Chhimi	Climber	Leaves	paste	Cultivated	Allergy, used as vegetables	Tamang & Sedai, 2016
Lawsonia inermis L.	Lythraceae		Mehendi	Herb	Leaves, stem	paste	Cultivated	Hair colour, Trench foot, Fungal infection	Kafle & Dani, 2022; Singh, 2020
Leucas aspera (Willd.) Link	Lamiaceae	*P. Sharma 09* (FOF)	Danduke	Herb	Flower, leaves	paste, Decoction	Agricultural land	Tonic, Tonsillitis, Fever, Skin allergy	
Leucas cephalotes (Roth) Spreng.	Lamiaceae		Dhulphi	Herb	Root	Decoction	Agricultural land	Fever	Singh, 2017
Lygodium palmatum (Bernh.) Sw.	Lygodiaceae	*P. Sharma 10* (FOF)		Climber	Leaves	Massage	Agricultural land	Headache	
Macrotyloma uniflorum (Lam.) Verdc.	Fabaceae		Gahat	Herb	Fruit	Cooked	Cultivated	Kidney stone, Cough, Agricultural food	Kafle & Dani, 2022
Mallotus philippensis (Lam.) Müll.Arg.	Euphorbiaceae		Sindure	Tree	Bark	Paste	Wild	Dysentery	
Mangifera indica L.	Anacardiaceae		Aap	Tree	Bark, Leaves, fruit	Infusion	Cultivated	Jaundice, Edible fruit, Agricultural tool, Perform Mango marriage	
Melastoma malabathricum L.	Melastomataceae	*P. Sharma 11* (FOF)	Aageri	Shrub	Fruit	After ripening	Wild	Wild edible Fruit, Typhoid, Fever,	
Melia azedarach L.	Meliaceae		Bakaino	Tree	Leaves, Bark	Juice	Cultivated	Foot and mouth disease in chicken, lower pressure	Malla & Chhetri, 2009
Mentha spicata L.	Lamiaceae		Pudina	Herb	Leaves	Juice	Cultivated	Indigestion, Gastritis, Leaves as condiment	Ghimire, 2016; Malla & Chhetri, 2009; Rokaya et al; 2010

Scientific name	Family	Voucher number	Local name (Danuwari)	Life form	Parts used	Form of use	Habit	Indigenous uses	Similar use reports
Mimosa pudica L.	Fabaceae		Lajoni	Herb	Root, young shoot	paste	Roadside	Wounds, Control bleeding, Tonsillitis, Diabetes	Ghimire, 2016
Mucuna pruriens (L.) DC.	Fabaceae		Kauso	Climber	Root	Juice	Cultivated	Abortion, Tonsillitis	
Musa balbisiana colla	Musaceae		Ban kera	Shrub	Fruit	Raw	wild	Fish bone/Bone pricking, Asthma	Kafle & Dani, 2022
Musa×*paradisiaca* L.	Musaceae		Kera	Shrub	Fruit	Raw, Cooked	Cultivated	Ripen fruits are edible, cooked like vegetables, Diarrhea, Used in ritual	Luitel et al., 2014; Malla & Chhetri, 2009; Singh et al., 2012
Nerium oleander L.	Apocynaceae	*P. Sharma 12* (FOF)	Hardyana phula	Shrub	Latex	Poultice	Agricultural land	Wounds	
Nicotiana tabacum L.	Solanaceae		Surti	Herb	Leaves	Topical	Agricultural land	Remove leech	Kafle & Dani, 2022; Miya et al., 2021; Rai, 2004
Nyctanthes arbor-tristis L.	Oleaceae		Parijat	Shrub	Leaves	Decoction	Roadside	Cold and Cough, Fever	Ambu et al., 2020; Kafle & Dani, 2022
Ocimum basilicum L.	Lamiaceae		Babari	Herb	Flower, Fruit, Laves	Decoction	Cultivated	Typhoid,	Poudel & Singh, 2016
Ocimum tenuiflorum L.	Lamiaceae		Tulasi	Herb	Leaves	Decoction	Cultivated	Cough, Cold, Fever, Gastritis, Used in the worship of Bishnu	Ambu et al., 2020; Bhattarai et al., 2009; Kafle & Dani, 2022; Singh et al., 2012
Ophioglossum reticulatum L.	Ophioglossaceae		Jibiya sag	Herb	whole plant	Juice	Wild	Diarrhea/ Dysentery, Used as vegetable	Kafle & Dani, 2022; Rajesh et al., 2013
*Opuntia monacantha*Haw.	Cactaceae		Bagiya kanda	Shrub	Latex		Cultivated	Eye infection in animal, Food aversion	
Orchid sp.(Epiphytic)	Orchidaceae		Sunakhari	Herb	Root /Stem	Poultice	Wild	Bone Breakage	Kafle & Dani, 2022
Oroxylum indicum (L.) Kurz	Bignoniaceae		Totela	Tree	Flower, Fruit Bark	Juice	Cultivated	Used as vegetables, Jaundice, Gastritis, Used in Ritual	Ghimire, 2016; Tamang & Sedai, 2016
Oryza sativa L.	Poaceae		Dhan	Herb	Rhizome	Paste, Poultice	Cultivated	Scorpion bite	
Oxalis corniculata L.	Oxalidaceae		aamti	Herb	whole plant	Juice	Agricultural land	Stomach disorder, Used as Spinach	Ghimire, 2016; Malla et al., 2015; Rokaya et al., 2010
Paederia foetida L.	Rubiaceae		Gulatti	Climber	Root	Juice	Wild	Tonsillitis , Appetizer	Kafle & Dani, 2022
Perilla frutescens (L.) Britton	Lamiaceae		Silam	Herb	Seed	Raw	Agricultural land	Used as spice	Ambu et al., 2020
Phoenix acaulis Roxb.	Arecaceae		Thakkal	Shrub	Fruits	after ripening	Wild	Used in making traditional drink	
Phyllanthus emblica L.	Phyllanthaceae		Rhikhiya	Tree	Fruits, Leaves/Stem	Raw	Wild	Gastritis, Edible fruits, Used in Ritual	Acharya & Acharya, 2009; Bhattarai et al., 2009; Luitel et al., 2014;
Piper longum L.	Piperaceae	*P. Sharma 13* (FOF)	pipila	Climber	Root, Fruit	Juice	Agricultural land	Cough, Fever, Headache	Malla et al., 2015; Miya et al., 2021; Shrestha et al., 2016

Scientific name	Family	Voucher number	Local name (Danuwari)	Life form	Parts used	Form of use	Habit	Indigenous uses	Similar use reports
Plumbago zeylanica L.	Plumbaginaceae		Chitu	Herb	Leaves, Bark	Juice	Cultivated/ Wild	Wounds, Removing scars, Swollen stomach, Food aversion	Ambu et al., 2020; Bhattarai et al., 2009
Pogostemon benghalensis (Burm.f.) Kuntze	Lamiaceae		Utjara	Shrub	Leaves, Root	Juice	Agricultural land	Treatment of lice in Goat, Fever	Bhattarai et al., 2009; Dangol & Gurung, 1991; Kafle & Dani, 2022; Malla et al., 2015
Premna serratifolia L.	Lamiaceae		Gineri	Shrub	Bark , Latex	Decoction	Agricultural land	Burning sensation ,Dysentery	
Psidium guajava L.	Myrtaceae		Biloki	Tree	Leaves, Bark	Decoction	Cultivated	Diarrhea, Dysentery	Bhattarai et al., 2009; Luitel et al., 2014; Malla & Chhetri, 2009; Singh, 2020; Tamang, 2003; Tamang & Sedai, 2016
Ricinus communis L.	Euphorbiaceae	*P.Sharma 14* (FOF)	Andi	Shrub	Root , Latex, seed	Juice , Topical	Roadside	Amoebic dysentery , Hand or foot cracks	Bhattarai et al., 2009; Kafle & Dani, 2022; Singh et al., 2012
Saccharum officinarum L.	Poaceae		Ukhu	Herb	Stem	Juice	Cultivated	Edible Stem, Jaundice, Used in Marriage ceremony	Ghimire, 2016; Malla & Chhetri, 2009; Miya et al., 2021; Poudel & Singh, 2016; Singh, 2020
Scoparia dulcis L.	Plantaginaceae	*P. Sharma 15* (FOF)	Balyari	Herb	Stem/Root	Juice	Wild	Cough, Diarrhea	Kafle & Dani, 2022
Semecarpus anacardium L.f.	Anacardiaceae		Bhala	Tree	Fruit	Topical	Wild	Skin irritation due to latex	Kafle & Dani, 2022
Senegalia catechu (L.f.) P.J.H. Hurter & Mabb.	Fabaceae		Khair	Tree	Core stem	Decoction	Wild	Cough, Used in colouring the Traditional drink, Bone fracture	Ambu et al., 2020; Kafle & Dani, 2022
Senna tora (L.) Roxb.	Fabaceae	*P. Sharma 16* (FOF)	chekor	Herb	Leaves, Seed	Juice	Roadside	Kidney stone, Used as vegetables,	Rajesh et al., 2013
Sesamum indicum L.	Pedaliaceae		Til	Herb	Seed	Topical	Agricultural land	Used as spice, Reduce pain, Ringworms, Used in ritual	Rai, 2004
Shorea robusta C.F.Gaertn.	Dipterocarpaceae		Sakhuwa	Tree	Bark, Leaves, Latex	Smoke	Wild	Used in making incense, Leaves are used in making plate, Used in Ritual	Ghimire, 2016; Miya et al., 2021; Rijal, 2011; Sharma et al., 2014
Sida cordifolia L.	Malvaceae	*P. Sharma 17* (FOF)	Seto balu	Herb	Root	Raw	Agricultural land	Boils, Toothache	Miya et al., 2021; Rajbanshi & Thapa, 2019
Sida rhombifolia L.	Malvaceae		Kalo balu	Herb	Root	Infusion	Agricultural land	Stomache, Wounds	Miya et al., 2021 ; Mueller-Boeker, 1993; Rijal, 2011
Smilax aspera L.	Smilacaceae	*P. Sharma 18*(FOF)	Kukurdaino	Climber	Stem	Paste	Wild	Scorpion bite	
Solanum torvum Sw.	Solanaceae		Badmi	Shrub	Fruits, Leaves	Decoction	Agricultural land	Fever, Cough, Antidote against poisoning	
Spondias pinnata (L.f.) Kurz.	Anacardiaceae		Amaro	Tree	Burned fruit pulp		Wild	Common cold	Kafle & Dani, 2022
Syzygium aromaticum (L.) Merr.&L.M.Perry	Myrtaceae		Nong	Tree	Fruit	Put in Teeth	Wild	Toothache, Used as Spice	Ghimire, 2016; Miya et al., 2021
Syzygium cumini (L.)	Myrtaceae		Phadim/Jamuna	Tree	Bark of Fruits	Juice	Cultivated	Diarrhea, Diabetes , Edible	Ambu et al., 2020; Bhattarai et al.,

Scientific name	Family	Voucher number	Local name (Danuwari)	Life form	Parts used	Form of use	Habit	Indigenous uses	Similar use reports
Skeels								fruits	2009; Kafle & Dani, 2022; Miya et al., 2021; Rijal, 2011; Singh, 2020; Singh et al., 2012
Syzygium nervosum DC.	Myrtaceae		Thumki jam	Tree	Leaves	Fumigation	Wild	Sinusitis	Kafle & Dani, 2022
Tagetes erecta L.	Asteraceae		Saipatri	Herb	Flower	Decoction	Cultivated	Tonsillitis, Used in Festival	Ambu et al., 2020
Terminalia alata B.Heyne ex Roth	Combretaceae		Saj	Tree	Bark	Infusion	Wild	Dysentery	
Terminalia bellirica (Gaertn.) Roxb.	Combretaceae		Barro	Tree	Fruits	Juice	Wild	Used in making Traditional drink, Gastritis	Ambu et al., 2020; Poudel & Singh, 2016
Terminalia chebula Retz.	Combretaceae		Harro	Tree	Bark of Fruits	Powder , Infusion	Wild	Cough, Fever, Tonsillitis, Gastritis, Tonic	Acharya & Acharya, 2009; Kafle & Dani, 2022; Poudel & Singh, 2016; Rajbanshi & Thapa, 2019; Singh et al., 2012
Tinospora sinensis (Lour.) Merr.	Menispermaceae		Guuji	Climber	Root ,Stem	Decoction, juice	Wild	Stomach disorder	Singh, 2020
Trichosanthes cucumerina L.	Cucurbitaceae		Ban ghiraula	Climber	Fruit, Seed	Powder	Wild	Jaundice, Yellowish teeth, Sinusitis, Headache	Kafle & Dani, 2022
Urtica dioica L.	Urticaceae	*P. Sharma 19*(FOF)	Sisno	Shrub	Whole plant	Decoction , Cooked	Wild	Lower pressure, Diarrhea, Used as vegetables, Rheumatism	Kafle & Dani, 2022; Miya et al., 2021; Poudel & Singh, 2016; Shah & Laminachhane, 2017; Shrestha et al., 2016; Thapa, 2012
Vitex negundo L.	Lamiacae		Simali	Shrub	Leaves	Massage	Agricultural land	Headache, Used in marriage ritual	Kafle & Dani, 2022
Zingiber cassumunar Roxb.	Zingiberaceae		Phachang	Herb	Rhizome	Infusion	Cultivated	Jaundice, Swollen stomach in both Human and livestock	
Ziziphus mauritiana Lam.	Rhamnaceae		Bayer	Tree	Root	Juice	Wild	Typhoid	Kafle & Dani, 2022; Malla et al., 2015; Pangeni et al., 2020