

Research Article:**DIVERSITY AND USE OF WILD AND NON-CULTIVATED EDIBLE FOODS IN RAJI COMMUNITY OF KARNALI PROVINCE, NEPAL**Priksya Yogi^a , Kamal Prasad Aryal^{b*}  and Shresty Paudel^c ^a Group of Helping Hands (SAHAS) Nepal^b International Centre for Integrated Mountain Development, Kathmandu, Nepal^c The Graduate School of Agriculture and Forestry, Mid-West University, Surkhet, Nepal

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ABSTRACT

Our study documents wild and non-cultivated edible foods, their use, status and contribution in livelihoods of the Raji community in Bheriganga Municipality of Karnali Province Nepal. Key Informants interview, focus group discussions, field observations, and individual household surveys were conducted. The use of 74 species belonging to 52 families were identified of which 70 were angiosperms, one gymnosperm and two pteridophytes and one termite mushroom. These species were used as food, medicines, spices and for rituals and income. Among these, 26 species had multiple uses followed by 19 as fruits, 15 as vegetables and 11 as medicines. Among the frequently used vegetable species the use value of *Termitomyces albuminosus* was found highest (0.97) followed by *Dryopteris cochleata* (D. Don.) C. Chr (0.94). The informant consensus factor on medicinal plants use was found highest on cuts and wounds (0.90) followed by cough, fever and cold (0.87). Nearly 90% of the households depends for at least one month on these plants during seasons of their availability. The availability of these species has declined over time. Raji people have started in-situ conservation and domestication of some important species like *Dioscorea bulbifera* L., *Asparagus racemosus* Willd., however these resources are not given due considerations in local, provincial and national research and development programmes of government and other research institutions.

Keywords: Domestication, indigenous knowledge, medicine, use value**INTRODUCTION**

Wild and Non-cultivated Edible Foods (WNEFs) represent an enormous yet underutilized component of global food diversity. Although the Earth contains a vast range of plant species, only a small fraction has been domesticated or widely consumed, leaving many species unexplored. WNEFs are naturally occurring edible species that have historically supported human diets across different ecological and cultural regions (Duguma, 2020) and remain largely uncultivated (Shaheen et al., 2017). Their importance is particularly evident in food-insecure regions, where nearly one billion people still rely on wild foods daily (Chakravarty et al., 2016; Yumkham et al., 2017). Beyond nutrition, these species hold medicinal significance, and used as traditional medicines (Astutik et al., 2019). Despite their cultural, nutritional, and livelihood value, WNEFs remain understudied and are increasingly recognized as strategic resources for food security, ecosystem resilience, and cultural heritage (Shirsat & Koche, 2024).

Globally, several countries have documented substantial WNEF diversity. Ethiopia, a hotspot for wild food plants, hosts 6027 higher plant species (Kelbessa & Demissew, 2014), of which an estimated 413 are used as WNEFs (Lulekal et al., 2011). Localized studies within Ethiopia

further highlight regional richness: 43 Wild Edible Plants (WEPs) species were recorded in Ensaro District (Asfaw et al., 2023), 33 species in Sedie Muja District (Abera et al., 2022), 137 species among the Konso community (Getachew et al., 2013), and 33 species in Chilga District (Mekuanen et al., 2018). In the Himalayan region, Bhutan, one of the world's key biodiversity hotspots has documented 120 WEPs species belonging to 63 families in southern part of Bhutan (Bajgai et al., 2023). Similarly, India reports 1403 species of wild edible plants from 183 families (Ray et al., 2020), Bangladesh lists 102 species (Mazhar et al., 2007). Other global studies reinforce this diversity, including 100 species from Uganda (Ojelel et al., 2019), 114 species from Tanzania (Shah et al., 2013), 72 species from western Kenya (Ogoye-Ndegwa, 2003). These findings collectively demonstrate the critical role of WNEFs in traditional diets, particularly among indigenous, tribal, and rural populations who depend on forests and natural ecosystems for sustenance (Ahlberg, 2025; Shad et al., 2013; Thapa et al., 2014; Ulian et al., 2020). Indigenous peoples constituting about 5% of the world's population, serve as custodians of deep traditional knowledge on plant use, food systems, and biodiversity (Shirsat et al., 2023).

Nepal hosts vast botanical diversity shaped by its altitudinal and ecological variation, and WNEFs remain deeply embedded in rural and indigenous food systems across the country. Many tribal and poor rural communities, including the Raji people who live near forested landscapes, depend heavily on WNEFs for food, nutrition, income, and basic healthcare needs (Thapa et al., 2014; Ulian et al., 2020).

The Karnali Province is Nepal's most underdeveloped region, grappling with chronic food insecurity and economic fragility. Its mountainous terrain and geographic isolation have historically led to political neglect, resulting in a critical lack of infrastructure and access to essential goods and services. This province is home to many ethnic communities and is a rich repository of WNEFs. Despite of their richness, the province remains poorly explored (Acharya & Paudel, 2020). The Indigenous community like Raji are known to rely heavily on these foods for their livelihoods (Poudel & Singh, 2016; Thapa et al. 2019; Thapa et al., 2014), but the current availability, use, contribution to livelihoods, and engagement of household members are poorly documented. The rapid erosion of traditional knowledge among the Raji community on the use and management of these species poses a serious threat to their long-term availability and sustainable use. The present study explores the diversity of WNEFs, their use value, and the role in livelihoods support, and local perceptions on conservation and management of these species in Bheriganga Municipality of Karnali Province, Nepal.

RESEARCH METHODS

Study site

The study was conducted in Bheriganga Municipality Ward Number 12 of Surkhet District in Karnali Province, located at 28° 27' 32" N and 81° 43' 06" E (Fig. 1). The Rajis are one of Nepal's most marginalized, semi-nomadic, and endangered indigenous groups, primarily distributed in Karnali and Sudurpaschim provinces (Adhikari, 2022; Thapa et al., 2019). According to the national census (CBS, 2021), the Raji population totals 5,125 individuals (2,483 males and 2,642 females), with the largest population in Sudurpaschim (2521), followed by Karnali (1502) and Lumbini provinces (1049). The Surkhet district in Karnali province is said to be the mainland of Raji communities hence we focused our study in Raji village of Bheriganga Municipality (Adhikari, 2022).

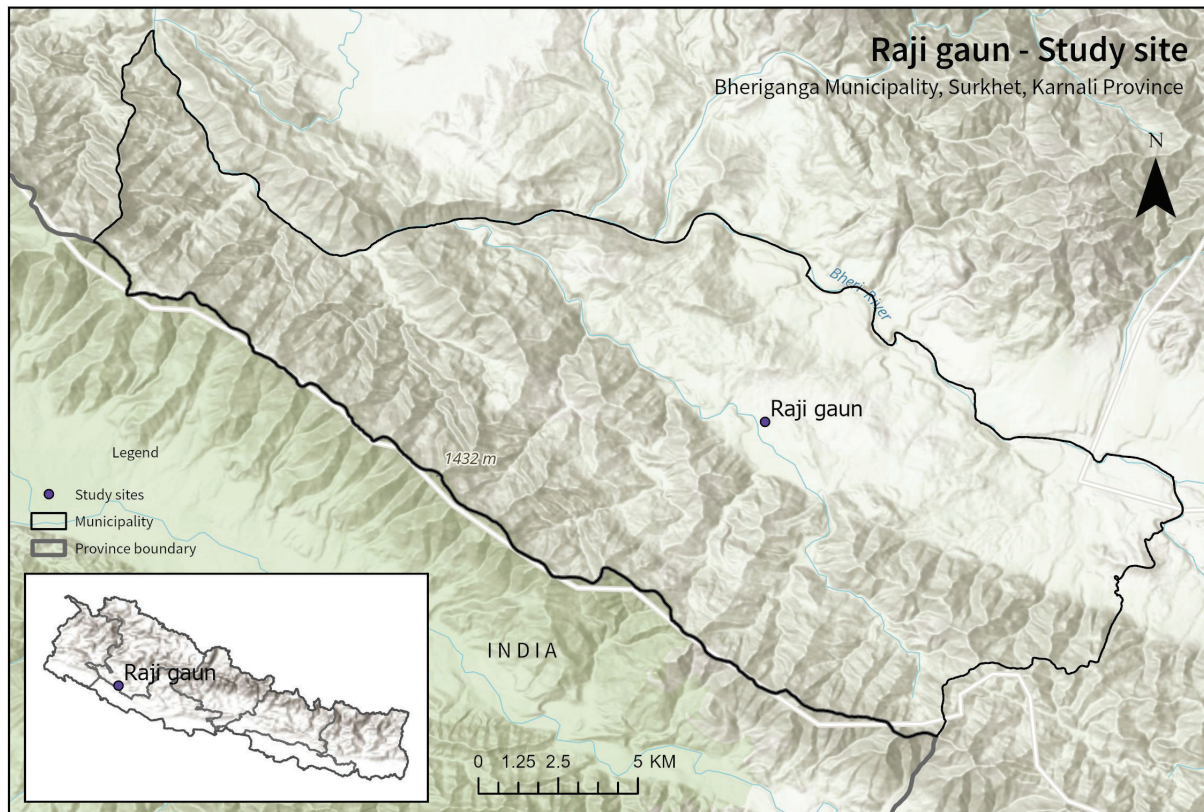


Fig. 1. The study site: Raji village in Bheriganga municipality in Surkhet district in Nepal

Overall, the Raji community in Surkhet is socio-economically marginalized with low income, limited education, and weak political voice. There have been some positive changes in livelihood diversification and access to welfare support, but persistent poverty and cultural erosion remain significant challenges. Traditionally, Rajis depended on fishing, hunting, honey collection, and forest resources for subsistence (Adhikari, 2022). The major crops that they grow are maize, finger millets and wheat. Their own production is generally sufficient only for 2-8 months a year. During the food deficit months Raji people depends on wage labour work and collection of wild and non-cultivated edible foods (Thapa et al., 2019). Besides, all individuals in Raji communities receive a monthly social security benefit of NPR 3,990 from the Government of Nepal through Bheriganga Municipality to support their livelihoods (personal communication with Hema Gurung, Chief, Social Security and Registration Section, Bheriganga Municipality, Surkhet, 2026).

Participatory tools

Our study applied three broad approaches and multiple tools. The primary approach for data collection was the use of participatory tools and techniques followed by a household survey supplemented by secondary data through literature review. A total of 15 key informants (10 female, 5 male) from the different categories (Local healers, Raji community leader, local government official, schoolteachers were interviewed individually. Key informants were selected at village level with the help of local pujari and agriculture officer of Bheriganga municipality, focusing on people expected to have extensive knowledge of WNEFs. Among the KII, three local healers from the village who had been treating people for various health-related problems were also interviewed. Key informants were interviewed about their perceptions of the availability, uses and status of WNEFs and their contribution to local livelihoods of the Raji communities. Three focus group discussions (two mixed groups and one focusing on women

only) were organised with 8-12 people in each group (32 participants: 24 women, 8 men). The discussions focused on the general status and use of WNEFs in the village and local issues and initiatives on WNEF management.

Household survey

A census survey with a structured questionnaire was carried out to obtain information about the use of WNEFs and any local level management initiatives and the socio-economic and demographic features of the local population. The questionnaire was pre-tested and translated into Nepali prior to individual household survey for data collection. The information gathered using the participatory tools was used in the survey design.

Field observations

Besides, four field visits were organised (February, May, July and October 2025) and WNEFs were also collected and identified by a multidisciplinary team including botanist, socio-economist and environmental experts including local people and students from the mid-west university in Ramghat, Surkhet. The unidentified specimens were identified with the help of reference collections (Press et al., 2000) and an expert taxonomist from the Central Department of Botany, Tribhuvan University. Furthermore, a rapid market assessment was conducted in Chinchu Bazar to see the WNEFs available during the season.

Analytical tools

The information and data were analysed using descriptive analysis and frequency calculation techniques, and results were presented in figures. For the most frequently used vegetable species, we calculated use value (UV) for individual plant species to give quantitative measures of its relative importance to the informants objectively (Phillips et al. 1994). Use value was calculated by using the following equation:

$$UV_s = \sum U/n,$$

where UV refers to the use value of a species, U is the number of use reports mentioned by the respondents and n is the total number of respondents interviewed.

In addition, informant consensus factor (ICF) was calculated to determine the homogeneity of the information and degree of overall agreement in using plant species with medicinal values, the species that are used for treating health-related problems at household level. The following formula was used Trotter and Logan (1986).

$$ICF = Nur-Nt/Nur-1$$

Here, Nur is the number of use reports mentioned by the informant for the given species and Nt is the number of taxa (species) used by majority of the households.

RESULTS AND DISCUSSION

Socio-economic status of local people

The Raji people in the study site live under different socio-economic conditions in terms of their occupation, food sufficiency level, income sources, education status, and family size and age categories. The number of interviewed respondents were 34 including 31 female and only 3 males. The mean age of the respondent was 41 years (where 53% of the respondents were older than 40 years and 47% were between 20-40 years old). The average household size of the study site is 5.3 which is higher than the national average of 4.37 (CBS, 2021). The literacy rate of the study population is lower (56%) compared to the national average of 76.3%. (CBS, 2021).

The respondents' households in the study sites depends heavily on agriculture farming as the primary source of livelihoods followed by wage labour. However, since farming is largely subsistence-oriented only less than 2% households were able to meet their annual food demand from their own production and the rest were only food self-sufficient for 2-8 months. During the food deficit months, these households adopted multiple strategies to meet their daily food demand which includes wage labour (95%), seasonal migration to Surkhet, Nepalgunj and India (75%) and collection of wild and non-cultivated edible foods (90%) are the major ones. During food deficit period, local people adopt similar coping strategy as reported by Adhikari (2022); Aryal et al. (2018); Thapa et al. (2019); Ulian et al. (2020).

Richness of WNEFs

Wild and Non-cultivated Edible Foods in our study includes all the resources that are collected and used by Raji communities from forest, farmlands, riverbanks, grasslands and fallow fields. Our study identified and documented 74 WNEFs belonging to 52 families of which 70 were angiosperms, one gymnosperm, two pteridophytes, and one termite mushroom. (Table 1). Among the families, Moraceae was the largest family with 7 species followed by Araceae and Rosaceae 4 each and Lamiaceae, Urticaceae, Dioscoreaceae, Poaceae, Cucurbitaceae, Malvaceae, Berberidaceae and Asteraceae has 2 species in each and rest has only one species.

Table 1. Wild and Non-cultivated Edible Foods used by Raji Community

| S.N | Botanical name | Family | Nepali name | Local name | Use ^a | Parts used ^b | Process of use for various purposes |
|-----|--|----------------|-------------|------------|------------------|-------------------------|--|
| 1 | <i>Acorus calamus</i> L. | Araceae | Bojho | Bojho | M | R | Rhizomes are dried and used to treat sore throat, coughs, and colds. Dried rhizomes are used for clearing the voice as well |
| 2 | <i>Aegle marmelos</i> (L.) Merr. | Rutaceae | Bel | Bela | F, R | F, L | The ripened fruit pulp eaten; also makes juice and leaves used for religious purposes, especially offering to gods during rituals |
| 3 | <i>Ageratina adenophora</i> (L.) King & Robinson | Asteraceae | Banmara | Banmara | M | L | The green leaves are crushed to prepare Juice and used to treat wounds and cuts |
| 4 | <i>Ageratum conyzoides</i> L. | Asteraceae | Gandhe | Gandhe | M | L | The green leaves are crushed to prepare Juice and used to treat wounds and cuts |
| 5 | <i>Amaranthus spinosus</i> L. | Amaranthaceae | Latte | Mate | V | L, Sh | Young leaves and shoots eaten as a green vegetable. During the season some households also sale in the market |
| 6 | <i>Angelica archangelica</i> L. | Umbelliferae | | Ganano | S, M | R, Se | Root grinded and made into soup to treat stomach pain. Seeds ground to flour and used as spice in curry |
| 7 | <i>Arisaema flavum</i> (Forssk.) Schott | Araceae | Bako | Bako | V | T | Corrms (tubers) boiled in ash and salt to remove toxic elements, cleaned, made into a paste, and mixed with buckwheat flour to prepare curry |
| 8 | <i>Arisaema tortuosum</i> (Wall.) Schott | Araceae | Bako | Bako | V | T | Boiled tubers eaten as vegetable |
| 9 | <i>Artemisia indica</i> Willd. | Compositae | Titepati | Kuljo | R, M | L | Leaves used in various rituals and offer to God. The young leaves crushed, and juice used to treat skin problems (irritation) |
| 10 | <i>Artocarpus lacucha</i> -Ham | Buch. Moraceae | Badhar | | F | FL | Ripened fruit is eaten and leaves are used as fodder for livestock |

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|----|---|----------------|--------------|--------------------------|---------|--------|---|
| 11 | <i>Asparagus racemosus</i> Willd. | Liliaceae | Kurilo | Jhijhirkani | V, M | R, Sh | Shoots and leaves eaten as a vegetable; roots used to treat urinary and liver problems |
| 12 | <i>Azadirachta indica</i> | Meliaceae | Neem | Neem | M | L | Leaves crushed and juice used for skin allergies as well as used for lowering the blood pressure |
| 13 | <i>Bauhinia variegata</i> L. | Fabaceae | Koiralo | Koiral | V, M | Bu, Fl | Buds and flowers are used as a vegetable and in pickles; flowers used to make soup to treat bacillary dysentery |
| 14 | <i>Bauhinia vahlii</i> Wight & Arn. | Fabaceae | Bhorla | | M, F | F, T | Ripened seeds are eaten; Fiber used for making ropes and mats |
| 15 | <i>Berberis aristata</i> DC. | Berberidaceae | Chutro | Chutro | F, O, M | F, Ba | Fruit eaten; bark used as a dye and to treat diarrhoea, piles, and malaria |
| 16 | <i>Berberis asiatica</i> Roxb. ex.DC. | Berberidaceae | Kirmando | Kirmada | F, O | F, Ba | Fruit eaten; bark used as a dye |
| 17 | <i>Bergenia ciliata</i> (Haw.) Stemb. | Saxifragaceae | Pakhanbed | Pakhanbed/ simpari phool | M | R | Rhizome used to make medicine to treat kidney stones |
| 18 | <i>Bombax ceiba</i> L. | Malvaceae | Simal | Simal | V | Fl | Flowers used in a vegetable curry |
| 19 | <i>Brucea javanica</i> (L.) Merr | Simaroubaceae | Tiju | | F | F | Fruit eaten |
| 20 | <i>Bryophyllum pinnatum</i> | Crassukaceae | Patharchatta | Patharchatta | M | L,R | Leaves and roots are crushed, and juice is used to cure the stone problem |
| 21 | <i>Cannabis sativa</i> L. | Cannabaceae | Bhang | Bhango | O, M | Se, L | Roasted seeds used to make pickles |
| 22 | <i>Castanopsis tribuloides</i> (Sm.) A. DC. | Fagaceae | Katus | Katauj | F, R | F | Fruit eaten and offered to gods during rituals |
| 23 | <i>Chenopodium album</i> L. | Chenopodiaceae | Bethe sag | Bethuwa | V | L, Sh | Leaves and young shoots eaten as a green vegetable |
| 24 | <i>Cinnamomum</i> (Buch.-Ham.) Eberm. | Lauraceae | Tejpaat | Tejpaat/ dalchini | S | L | Dried leaves used as spice for curries to add flavour and smell |
| 25 | <i>Coccinia grandis</i> (L.) Voiget | Cucurbitaceae | Golkakri | Golkakri | V | F | Fruits eaten as a vegetable |

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|----|---|-------------|------------|------------|---|
| 26 | <i>Colocasia esculenta</i> (L.) Araceae Schott. | Pidaalu | V | R, S, L | Rhizome boiled and eaten as a vegetable; young stem and leaves used as a vegetable and in pickle |
| 27 | <i>Commelina benghalensis</i> L. Commelinaceae | Kane Sag | V | L, Sh | Young leaves and shoots eaten as a green vegetable |
| 28 | <i>Cuscuta reflexa</i> Roxb Convolvulaceae | Aakas beli | M | W | Whole plant used to prepare medicine to treat livestock with cough and throat allergy |
| 29 | <i>Dendrocalamus hamiltonii</i> Neer & Arn. ex Munro Poaceae | Bans | V | Sh | Young shoots (tama) eaten as a vegetable |
| 30 | <i>Dioscorea bulbifera</i> L. Dioscoreaceae | Githi | V | T | Tubers boiled and eaten as a vegetable |
| 31 | <i>Dioscorea hamiltonii</i> Hook.f. Dioscoreaceae | Ban tarul | V, R | B, T | Tubers and bulbils cooked and eaten. Boiled tubers used during religious event first day of Nepali Month Magh (January) |
| 32 | <i>Drepanostachyum falcatum</i> (Munro) Keng f. Poaceae | Nigaalo | V, O | S, Sh | Stem used to make mats; young shoots eaten as a vegetable |
| 33 | <i>Dryopteris cochleata</i> (Don.) C. Chr. D. Aspidiaceae | Niuro | V, O | L, Sh | Young, coiled fronds and shoots cooked and eaten as a vegetable; sold in urban markets (high demand) |
| 34 | <i>Fagopyrum esculentum</i> Moench Polygonaceae | Phapar | V | L, Sh | Young shoots and leaves eaten as a vegetable |
| 35 | <i>Ficus auriculata</i> Lour. Moraceae | Timlo | F | F | Fruit eaten |
| 36 | <i>Ficus hispida</i> L. Moraceae | Khasreto | F | F | Fruit eaten |
| 37 | <i>Ficus lacor</i> Buch.Ham Moraceae | Kabhro | V | Bu, Fl | Buds and flowers boiled and eaten as vegetables and pickle |
| 38 | <i>Ficus nerifolia</i> Sm. Moraceae | Dudhilo | V, F | Sh, F | Young shoots eaten as a vegetable; fruit eaten |
| 39 | <i>Ficus semicordata</i> Ham.ex.Sm. Buch. Moraceae | Khaniyo | F | F | Fruit eaten |
| 40 | <i>Fragaria nubicola</i> Lindl.ex. Lacoita Rosaceae | Gande kafal | F, R, M | F, W | Fruit eaten; whole plant used in death rituals; whole plant used to treat stomach disorders |

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|----|---|-----------------------|-------------|-----------|------|--------|---|
| 41 | <i>Girardinia diversifolia</i> (Link) Friis | Urticaceae | Allo Sisnu | Allo | V, O | L, Sh, | Young leaves and shoots eaten; fibre extracted from stems used to make clothes and bags |
| 42 | <i>Grewia asiatica</i> L. | Malvaceae | Pharet | | F | F | Ripe fruit eaten |
| 43 | <i>Holboellia latifolia</i> Wall. | Lardizabalaceae | | Ghopala | F | F | Ripe fruit eaten |
| 44 | <i>Juglans regia</i> L. | Juglandaceae | Okhar | Okhad | F, R | F | Fruit eaten and offered to gods during festivals |
| 45 | <i>Loranthus odoratus</i> Wall. | Loranthaceae | Ajeru | Anjedu | F | F | Fruit very tasty |
| 46 | <i>Mentha arvensis</i> L. | Lamiaceae | Pudina | Padamchal | S, M | L | Leaves used in pickle; juice from leaves used for cooling in summer |
| 47 | <i>Momordica dioica</i> Roxb. Willd. | Cucurbitaceae | Bankarela | Bankarela | V, | F | Immature fruit eaten as a green vegetable |
| 48 | <i>Morus serrata</i> Roxb. | Moraceae | Kimbu | Kimu | F, O | F, L | Fruit eaten, very popular among children; leaves used as fodder, preferred by goats |
| 49 | <i>Myrica esculenta</i> Ham. ex D. Don | Myricaceae | Kafal | Kafal | F | F | Fruit tasty and popular |
| 50 | <i>Nephrolepis cordifolia</i> (L) Presl. | Devalliaceae | Pani amala | Rasmada | M | T | Tubers eaten to treat worms |
| 51 | <i>Ocimum sanctum</i> | Lamiaceae | Tulsi | Tulsi | M, R | L | Leaves crushed and drink to cure cough and also leaves are used for religious purpose |
| 52 | <i>Ophioglossum reticulatum</i> L. | Ophioglossaceae | Jibre Sag | | V | L | Used as vegetables and considered as tasty |
| 53 | <i>Oxalis corniculata</i> L. | Oxalidaceae | Chari amilo | Chalmado | S | L | Leaves used in preparing pickle |
| 54 | <i>Phoenix humilis</i> Becc. & Hook .f. | ex Arecaceae | Thakal | Khajuri | F, O | F, S | Fruit eaten; pith from stem eaten as vegetable; stem used to make thatched roofs |
| 55 | <i>Phyllanthus emblica</i> L. | Euphorbiaceae | Amala | Aaulla | F, M | F | Fruit eaten raw and dried; fruit used in preparation of some Ayurvedic medicines |
| 56 | <i>Pyrus pashia</i> D. Don. | Buch-Ham.ex. Rosaceae | Mayal | Mel | F | F | Fruit eaten |
| 57 | <i>Rhododendron arboretum</i> Sm. | Ericaceae | Laligurans | Gurauns | M, O | F | Flowers eaten; nectar used to treat diarrhoea and dysentery |

| | | | | | | | |
|----|---|---------------|------------|---------------------|------|-------|--|
| 58 | <i>Rubia manjith</i> Roxb. Fleming | Ex Rubiaceae | Majitho | Majitho | M | S, L | Stem and leaves used to treat cuts and wounds |
| 59 | <i>Rubus ellipticus</i> Sm. | Rosaceae | Ainselu | Anselu | F | F | Fruit very popular |
| 60 | <i>Rubus niveus</i> L. | Rosaceae | Ainselu | Katrya anselu | F | F | Fruit eaten |
| 61 | <i>Sambucus ebulus</i> L. | Adoxaceae | Pyari | Pyari | F | F | Fruit eaten |
| 62 | <i>Sapindus mukorossi</i> Gaerh. | Sapindaceae | Reetha | Reetha (not edible) | O | F | Fruit pulp used to wash hair |
| 63 | <i>Saurauia nepaulensis</i> DC. | Saurauiaceae | Gogan | Gogan | F | F | Fruit eaten |
| 64 | <i>Semecarpus anacardium</i> L. f. | Anacardiaceae | Bhalayo | Ryak | F | F | Fruits are edible |
| 65 | <i>Solanum nigrum</i> L. | Solanaceae | Kalokamai | Ninauni | F | F | Fruit eaten |
| 66 | <i>Swertia chirayita</i> (Roxb. ex Fleming) H. Karst. | Gentianaceae | Chiraita | Chiraito | M | W | Whole plant used to treat fever, diabetes, and skin diseases |
| 67 | <i>Syzygium cumini</i> (L.) Skeels | Myrtaceae | Jamun | Jamno | F | F | Fruit eaten |
| 68 | <i>Terminalia bellirica</i> (Gaerth.) Roxb. | Combretaceae | Barro | Barado | F, M | Se, F | Ripe fruit eaten; seeds used to treat coughs and colds |
| 69 | <i>Terminalia chebula</i> Retz. | Combretaceae | Harro | Harado | F, M | Se, F | Fruit eaten; fruit and seeds used to treat coughs and colds |
| 70 | <i>Termitomyces albuminosus</i> | Lyophyllaceae | Chyau | Salyaura | F | W | Highly nutritious edible mushroom cooked as vegetables |
| 71 | <i>Urtica dioica</i> L. | Urticaceae | Sisnu | Sisnu | V | L, Sh | Young leaves and shoots used as a vegetable |
| 72 | <i>Viola</i> species | Violaceae | Juke jhaar | Juke jhaar | M | L, R | Leaves and roots used to treat worms in children |
| 73 | <i>Zanthoxylum armatum</i> DC. | Rutaceae | Timur | Timur | S, M | F | Fruit dried and used as a spice in pickles and curries; dried fruit used in various allopathic medicines |
| 74 | <i>Ziziphus mauritiana</i> Lam. | Rhamnaceae | Bayer | Bayer | F | F | Fruit eaten |

Note: ^a Use: F = fruit, V = vegetable, M = medicine, O = other; R = religious, S = spice

^b Parts used: W = whole plant, B = bark, Bu = bulb, Ba = bark, Bu = buds, F = fruit, Fl = flowers, L = leaf, O = other, R = root/rhizome, S = stem, Se = seeds, Sh = shoots, T = tuber/corm

Trees and herbs are the most common life forms documented in this study (Fig. 2). Similar study conducted by Thapa et al. (2019) documented 67 wild edible species belonging to 56 genera and 38 families used by Raji households in Surkhet and Kailali districts of Nepal. Aryal et al. (2018) documented 99 wild non cultivated species belonging to 59 families from Darchula district of Nepal. Most of the collected species are also recorded and used in other parts of world, for instance, Bajgai et al. (2023) documented 120 wild edible plant species from 63 families in Bhutan; in India 1403 species of wild edible plants from 183 families were documented that are used by local people (Ray et al., 2020). However, the actual diversity and the use value of these resources and their contribution in food, medicinal and cultural values varied between households due to socio-economic factors (Aryal et al., 2018). The actual status of WNEFs their use and their role in livelihood support of the people have not yet been adequately documented.

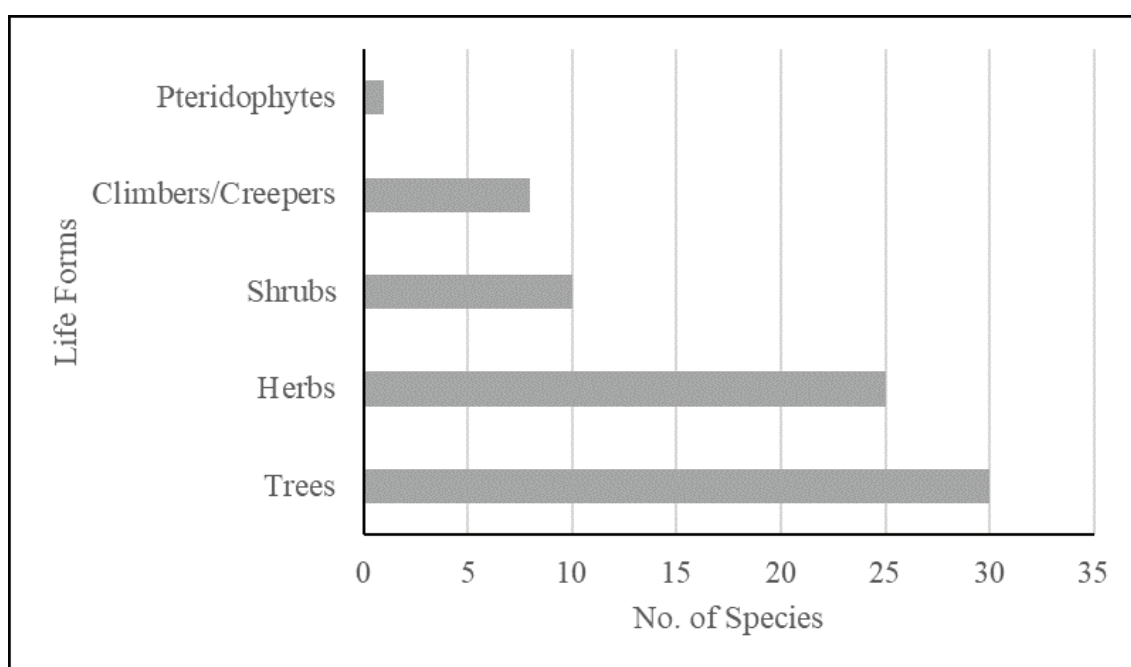


Fig. 2. Different life forms of WNEFs

Use of WNEFs

All 34 households in Raji community were using diversity of food (vegetables and fruits), medicine, spice, rituals and income generation. Among these, 26 species had multiple uses followed by 19 for fruits and 15 vegetables (Fig. 3). Several studies by other authors have documented a wide range of wild and non-cultivated edibles and their similar use. The study done by Aryal et al. (2018) documented a total of 99 species having 35 species with multiple use value, 40 species as fruit and 31 species consumed as vegetable only. Similar use has been found in study done by Aryal et al. (2009), Rumicha et al. (2025), Suwardi et al. (2023). The most used parts were the fruit (34), leaves (23), shoots (11) and roots/rhizome (7). Bulb, bark, flower, stem, seeds, tubers were also used (Table 1). People preferred to collect species which has multiple use value. When asked why they use WNEFs, 97% of the respondents mentioned that they are freely available in the nature while 78% noted their taste and organic nature.

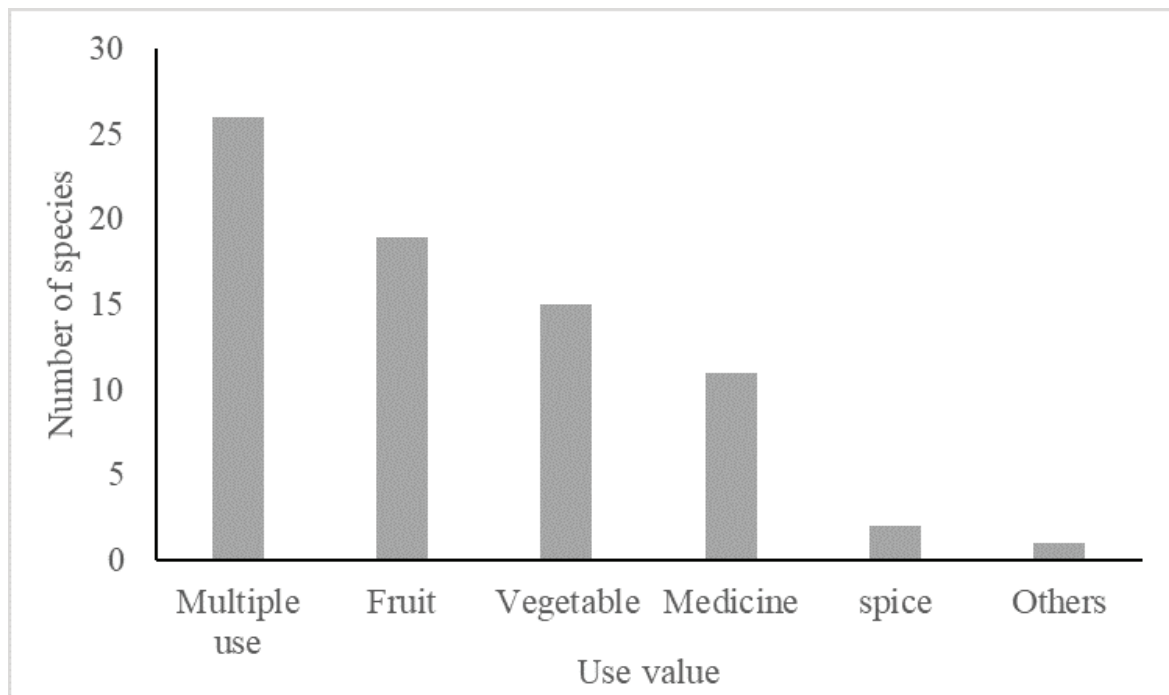


Fig. 3. Uses of WNEFs

WNEFs used as food

Among the WNEFs, 19 fruits and 15 vegetable species are used as a food by Raji people (Table 1). However, fruits contribute less in terms of food requirement. Species like *Phoenix humilis* Royle ex Becc. & Hook.f., *Syzygium cumini*, (L.) Skeels, *Phyllanthus emblica* L., *Aegle marmelos* (L.) Merr are the frequently harvested and used species during its availability in nature. Children collect fruits of *Phoenix humilis* during its availability and sale along roadside, however, the cash contribution is very negligible to household income.

Among 15 species used as vegetables, seven species have high use value (Fig. 4). These species are considered as important source of family nutrition and contribute highly to meeting their daily vegetable requirements. *Termitomyces albuminosus*, *Dryopteris cochleata* (D. Don.) C. Chr., *Urtica dioica* L., *Chenopodium album* L., *Amaranthus spinosus* L., *Ophioglossum reticulatum* L., *Dioscorea bulbifera* L. are the most frequently harvested and use as vegetables during their season of availability. Among the frequently used vegetable species the use value of *Termitomyces albuminosus* was found highest (0.97) followed by *Dryopteris cochleate* (0.94). The estimated annual extraction these seven species is presented in Fig. 5. The largest quantity of harvest was of *Termitomyces albuminosus* (48 kg), followed by 35 kg of *Dryopteris cochleata* and 30 kg of *Urtica dioica*. The reasons behind the higher use value of the first two species mentioned were that they are nutritious and taste better as well as use to make multiple recipes like fried and curry vegetable, use for making pickles. A diverse range of wild and non-cultivated vegetables are also harvested and used by other communities in other parts of the country. For instance, people in Naugad Rural Municipality in Darchula District were observed to collect an average of 85 Kg of *Dryopteris cochleate* as vegetable per annum (Aryal et al., 2018). Kafle et al. (2009) reported that Chepang people in Gorkha district of Nepal are using on average of 364 kg of *Dioscorea bulbifera* and 96 kg of *Urtica dioica* per annum for household consumption. This contention is supported by many studies around the globe (Aryal et al., 2021; Dorji 2012; Uprety et al., 2012). These food species serve as important supplements during food scarcity, contribute to enhance dietary diversity thereby strengthening household resilience.

However, the collection and harvesting trends for some of the species seems to be unsustainable. In the other hand, despite the meaningful contribution of the WNEFs to the livelihoods of the people, these species are often underutilized and ignored in the daily diets and other uses. This has to do with current food preferences, tastes, and lifestyles of the youth who opt for the readily available processed foods (Acharya et al., 2017; Aryal et al., 2018; Mothupi & Shackleton, 2025; Rumicha et al., 2025).

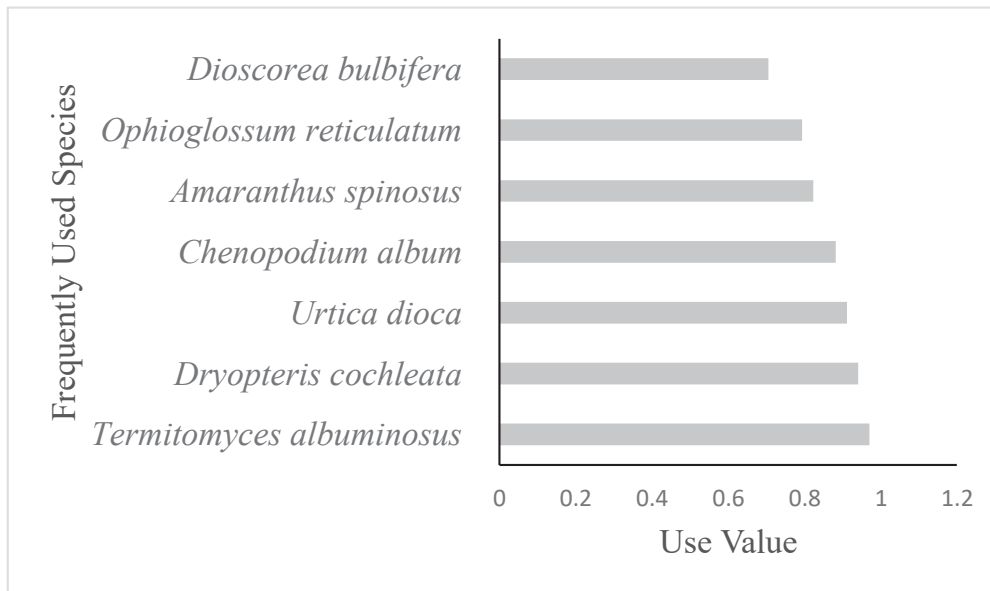


Fig. 4. Use value of frequently used vegetables

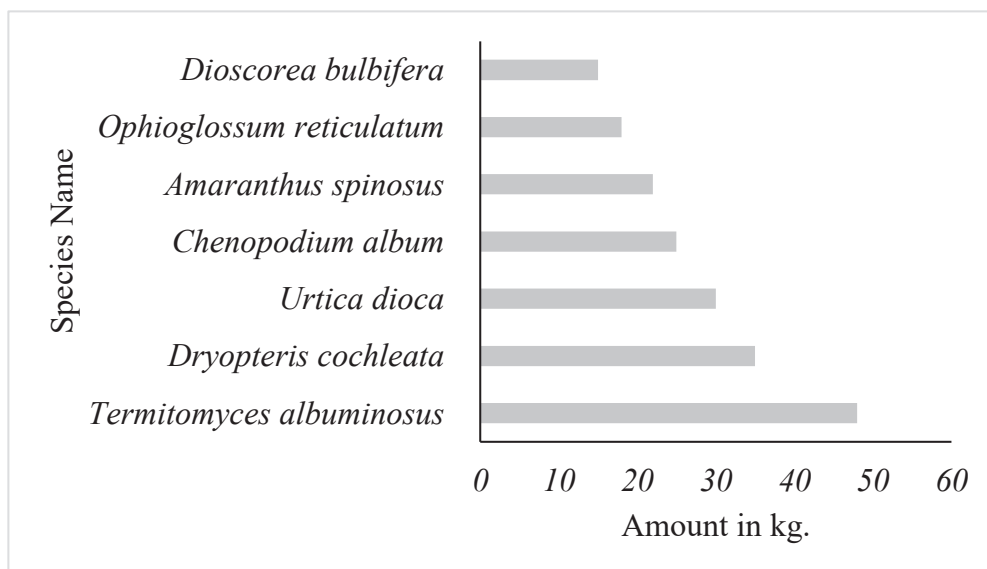


Fig. 5. Average extraction of frequently harvested vegetable species per annum

Medicinal plant species used for household level health care

Raji people in the study area use various plant species to cure the several ailments. A total of 25 plant species has been used for household level health care (Table 1). Among these 11 species are only used for medicinal purpose and 14 species having multiple use value (medicinal, food and cultural purpose). During the focus group discussion, we grouped the major illness into five types, and Informant Consensus Factor (ICF) was calculated for those health-related problems (Table 2). These includes stomach disorder (dysentery, diarrhoea), cuts and wounds,

skin irritation/allergy, cough and cold, and fever and headache. The informant consensus factor on medicinal plants use was found highest on cuts and wounds (0.90) followed by cough and cold (0.87). It is interesting that four species were used to treat cuts and wounds, with the highest number of use reports (34). This is followed by stomach disorders and cough and cold, each with 32 reports. The lowest number of use reports was for fever and headache (18). The informant consensus factor (ICF) values for medicinal plant use indicate that many plant species are commonly used to treat ailments such as wounds and cuts, coughs and colds, fever, and headaches. Rural people, especially indigenous communities, have used these plant species for generations to treat health problems based on their traditional knowledge and practices (Aryal et al., 2018; Kunwar et al., 2022; Kunwar et al., 2013; Paudel, 2015; Semanya & Potgieter, 2014; Suwardi et al., 2023). Several wild and non-cultivated plants having medicinal values are used to treat similar treatments by number of other study (Adhikari et al., 2019; Aryal et al., 2018; Cakir, 2017; Kunwar et al., 2015; Rijal, 2011; Samkaria & Kumari, 2025; Shah et al., 2025; Shirsat et al., 2023; Tadesse et al., 2025). Local healers in the village prepare medicines from raw herbs using their own experience and knowledge passed down from their ancestors. Although these traditional medicines are effective and trusted, their use is rapidly declining due to easy access to modern drugs, weak knowledge transfer, and low interest among younger generations (Khakurel et al., 2021; Miya et al., 2020; Thapa et al., 2019).

Table 2. Categories of ailments and informant consensus factor (ICF)

| Use categories | No.of taxa | No. of use reports | Consensus factor |
|-------------------------------|------------|--------------------|------------------|
| Stomach disorder | 8 | 32 | 0.77 |
| Cuts and wounds | 4 | 34 | 0.9 |
| Fever and headache | 5 | 18 | 0.76 |
| Skin diseases/Skin irritation | 4 | 24 | 0.86 |
| Cough and cold | 5 | 32 | 0.87 |

Challenges and sustainable management of WNEFs

In our study, we asked the respondents about changes in the availability and use of WNEFs compared to 10 years ago. Most respondents (90%) reported that both availability and use have declined. Only a few species, such as *Phoenix humilis* and *Termitomyces albuminosus*, were reported to remain common, mainly because they are in high demand and have good market value. Similar studies have noted the decreasing availability and use of such species (Aryal et al., 2018; Feyssa et al., 2011; Pawera et al., 2020; Powell et al., 2023; Rahayu et al., 2024). Respondents were further asked about their perceptions of major concerns related to WNEFs. The major issues identified were availability of readymade food in the local market (33), overharvesting and early collection (31) and neglect of the local food (29) (Fig. 6). We discuss this further during the three focus group discussions and 15 key informant interview and found that the declining trend of WNEFs use is due to easy access of readymade food in the nearby market, unsustainable harvesting and younger generations neglect such foods into their food recipe. Similar factors are also often cited as major drivers of the reduced availability and use of WNEFs (Aryal et al., 2018; Borelli et al., 2020; Getachew et al., 2013; Pawera et al., 2020).

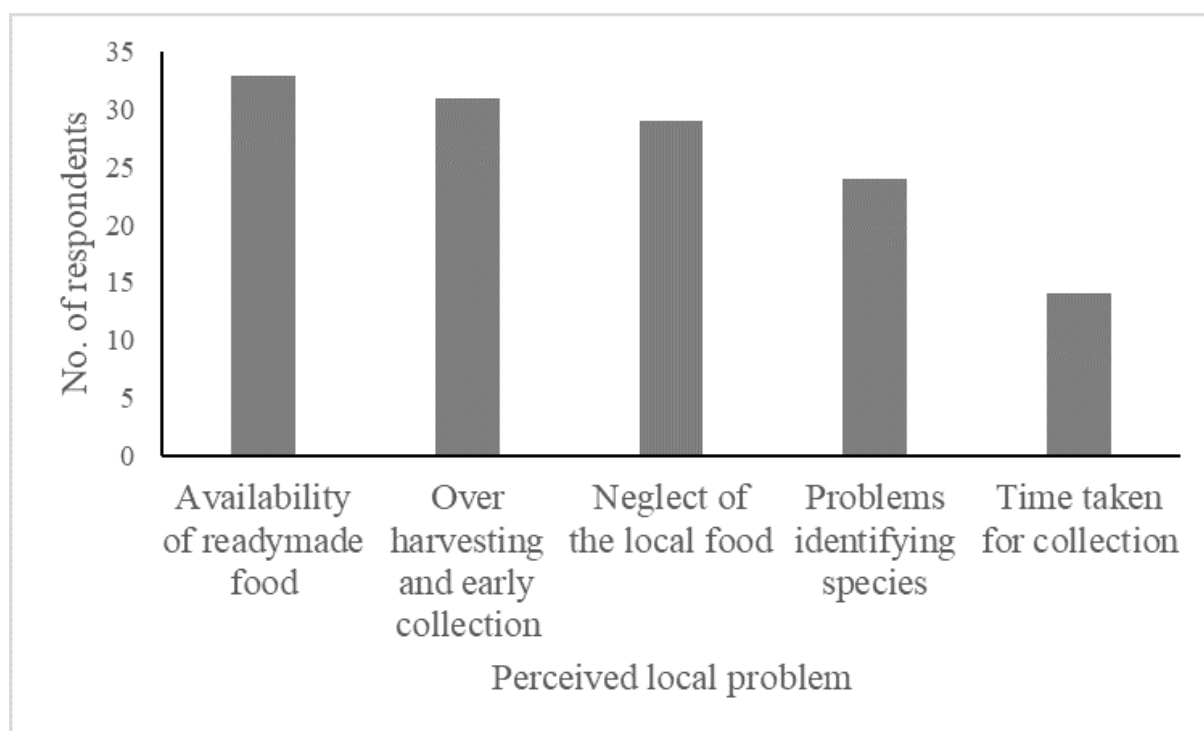


Fig. 6. Issues related to management and use of WNEFs

Despite local concerns, we explored current management practices among the Raji. Across all three FGDs, all the participants reported in-situ conservation of key species, with a few households initiating domestication of selected important species such as *Asparagus racemosus* Willd., *Dioscorea bulbifera* L. for their use. This conservation practices are further supported by the individual household survey, with most respondents (93%) reporting practising in-situ conservation, while only 42% domesticating important species in their home gardens. Number of studies around the globe reported the similar management practices followed by local people (Aryal et al., 2021; Aryal et al., 2018; Wambugu & Henry, 2022). A collaborative effort across sectors is needed to develop and implement in-situ conservation, domestication and other conservation and management strategies for long term sustainable use of these resources (Aryal et al., 2018; Kunwar et al., 2022; Valdes et al., 2025). The National Genebank can play a crucial role in conservation of some of the threatened WNEFs for future use. The Raji people should be actively involved in conservation and management, as they possess the greatest knowledge of these species. In addition, municipality-level diversity and food fairs showcasing WNEFs are needed to raise awareness, revive interest among the younger generation, and motivate local communities toward better management and sustainable use of these resources.

CONCLUSION

A total of 74 wild and non-cultivated edible food (WNEFs) species with multiple use values were documented in Raji community in Bheriganga Municipality of Karnali Province, Nepal. These species play a vital role in the food security, nutrition, medicine, and livelihoods of the local people. Species like *Termitomyces albuminosus*, *Dryopteris cochleate*, *Phoenix humilis* are important part of Raji People's livelihood. Despite their importance, the availability and use of many species have declined over 10 years' time mainly due to unsustainable and immature harvesting, availability of readymade food and changing dietary preferences among younger generations. There is growing pressure on WNEFs that required coordinated effort among government, research and private sectors for conservation and management of these important species for long run. The Raji people hold valuable traditional knowledge and actively

practice in-situ conservation and domestication of key species. However, broader support from municipality authorities, academic and research institutions (Mid-West University and NARC) are required for promotion of WNEFs. The Diversity and food fair can be organised at local and district level to raise awareness among the wide range of stakeholders. It would be an adversity if the Raji, a highly marginalized community relying on wild foods, wage labour, and subsistence farming, lost access to wild and non-cultivated edible foods, a key component of their food security. To ensure long-term food security, it is crucial to explore future opportunities for sustainable use and value addition of these resources.

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AUTHOR CONTRIBUTIONS

PY: Conceptualization, Methodology, Investigation, Resources, Writing – original draft, Writing – review & editing; **KPA:** Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Supervision; **SP:** Investigation, Data curation, Formal analysis, Writing – review & editing.

CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

ETHICAL APPROVAL AND PERMITS

Prior informed consent was obtained from all respondents and participants in the individual interviews and discussions regarding the documentation and dissemination of local knowledge and the use of WNEP species for research purposes.

REFERENCES

- Abera, M., & Belay, K. (2022). Ethnobotanical study of wild edible plants and their indigenous knowledge in Sedie Muja District, South Gondar Zone, Northwestern Ethiopia. *American Journal of Plant Sciences*, 13(2), 241–264. <https://doi.org/10.4236/ajps.2022.132015>
- Acharya, A. K., Joshi, B. K., Gauchan, D., & Poudel, Y. P. (2017). Associated biodiversity for food and agriculture in Nepal. In *The state of Nepal's biodiversity for food and agriculture* (pp. 60–72). Ministry of Agricultural Development (MoAD).
- Acharya, K. P., & Paudel, P. K. (2020). Biodiversity in Karnali Province: Current status and conservation. Ministry of Industry, Tourism, Forest and Environment, Karnali Province Government.
- Adhikari, K. P. (2022). Changing livelihood strategies of indigenous people: A case study of Raji community at Ghatgaun in Surkhet District, Nepal. *Journal of National Development*, 35(1), 111–123.

- Adhikari, M., Thapa, R., Kunwar, R. M., Devkota, H. P., & Poudel, P. (2019). Ethnomedicinal uses of plant resources in the Machhapuchchhre Rural Municipality of Kaski District, Nepal. *Medicines*, 6(2), 69. <https://doi.org/10.3390/medicines6020069>
- Åhlberg, M. K. (2025). Wild edible plants: Ensuring sustainable food security in an era of climate change. *Foods*, 14(9), 1611. <https://doi.org/10.3390/foods14091611>
- Aryal, K. P., Chaudhary, R. P., & Poudel, S. (2021). Food from farm and forest: A case study from Kailash Sacred Landscape. In R. Romeo et al. (Eds.), *Mountain farming systems – Seeds for the future* (pp. 70–72). Food and Agriculture Organization of the United Nations (FAO). <https://doi.org/10.4060/cb5349en>
- Aryal, K. P., Poudel, S., Chaudhary, R. P., Chettri, N., Chaudhary, P., Ning, W., & Kotru, R. (2018). Diversity and use of wild and non-cultivated edible plants in the Western Himalaya. *Journal of Ethnobiology and Ethnomedicine*, 14, 10. <https://doi.org/10.1186/s13002-018-0212-0>
- Aryal, K., Berg, Å., & Ogle, B. (2009). Uncultivated plants and livelihood support: A case study from the Chepang people of Nepal. *Ethnobotany Research and Applications*, 7, 409–422.
- Asfaw, A., Lulekal, E., Bekele, T., Debella, A., Tessema, S., Meresa, A., & Debebe, E. (2023). Ethnobotanical study of wild edible plants and implications for food security. *Trees, Forests and People*, 14, 100453. <https://doi.org/10.1016/j.tfp.2023.100453>
- Astutik, S., Pretzsch, J., & Ndzifon Kimengsi, J. (2019). Asian medicinal plants' production and utilization potentials: A review. *Sustainability*, 11(19), 5483. <https://doi.org/10.3390/su11195483>
- Bajgai, R. C., Bajgai, Y., & Johnson, S. B. (2023). The presence of wild edible plants and determinants influencing their harvest, consumption, and conservation in southeastern Bhutan. *PLOS ONE*, 18(10), e0285936. <https://doi.org/10.1371/journal.pone.0285936>
- Balemie, K., & Kebebew, F. (2006). Ethnobotanical study of wild edible plants in Derashe and Kucha Districts, South Ethiopia. *Journal of Ethnobiology and Ethnomedicine*, 2(1), 53. <https://doi.org/10.1186/1746-4269-2-53>
- Borelli, T., Hunter, D., Powell, B., Ulian, T., Mattana, E., Termote, C., ... Engels, J. (2020). Born to eat wild: An integrated conservation approach to secure wild food plants for food security and nutrition. *Plants*, 9(10), 1299. <https://doi.org/10.3390/plants9101299>
- Cakir, E. A. (2017). Traditional knowledge of wild edible plants of Iğdır Province (East Anatolia, Turkey). *Acta Societatis Botanicorum Poloniae*, 86(4). <https://doi.org/10.5586/asbp.3568>
- Central Bureau of Statistics (Nepal). (2021). *Statistical year book of Nepal 2021*. Government of Nepal.
- Chakravarty, S., Bhutia, K. D., Suresh, C. P., Shukla, G., & Pala, N. A. (2016). A review on diversity, conservation and nutrition of wild edible fruits. *Journal of Applied and Natural Science*, 8(4), 2346–2353.
- Chaudhary, S., Magar, G. T., Sah, S. N., & Parajuli, S. (2020). Ethnic plants of Tharu community of eastern Nepal. *International Journal of Applied Sciences and Biotechnology*, 8(2), 223–230.
- Dorji, Y. (2012). Women's roles in wild yam conservation, management and use in Bhutan. In K. Khadka & R. Verma (Eds.), *Gender and biodiversity management in the Greater Himalayas* (pp. 25–27). ICIMOD.
- Duguma, H. T. (2020). Wild edible plant nutritional contribution and consumer perception in Ethiopia. *International Journal of Food Science*, 2020, Article 1.
- Feyssa, D. H., Njoka, J. T., Asfaw, Z., & Nyangito, M. M. (2011). Seasonal availability and consumption of wild edible plants in semi-arid Ethiopia. *Journal of Horticulture and Forestry*, 3(5), 138–149.

- Getachew, A., Asfaw, Z., & Woldu, Z. (2013). Ethnobotany of wild and semi-wild edible plants of Konso ethnic community, South Ethiopia. *Journal of Ethnobiology*, 11, 121–141.
- Gurung, H. (2026, February 28). Personal communication.
- Kafle, G., Limbu, P., Pradhan, B., & Fang, J. (2009). Piloting ecohealth approach for addressing land use transition, climate change and human health issues. *NGO Group Bulletin on Climate Change*, 3.
- Kelbessa, E., & Demissew, S. (2014). Diversity of vascular plant taxa of the flora of Ethiopia and Eritrea. *Ethiopian Journal of Biological Sciences*, 13(1), 37–45.
- Khakurel, D., Uprety, Y., Łuczaj, Ł., & Rajbhandary, S. (2021). Foods from the wild: Local knowledge, use pattern and distribution in western Nepal. *PLOS ONE*, 16(10), e0258905. <https://doi.org/10.1371/journal.pone.0258905>
- Kunwar, R. M., Acharya, R. P., Chowdhary, C. L., & Bussmann, R. W. (2015). Medicinal plant dynamics in indigenous medicines in far-west Nepal. *Journal of Ethnopharmacology*, 163, 210–219.
- Kunwar, R. M., Baral, B., Luintel, S., Uprety, Y., Poudel, R. C., Adhikari, B., ... Bussmann, R. W. (2022). Ethnomedicinal landscape: Distribution of used medicinal plant species in Nepal. *Journal of Ethnobiology and Ethnomedicine*, 18(1), 34.
- Kunwar, R. M., Mahat, L., Acharya, R. P., & Bussmann, R. W. (2013). Medicinal plants, traditional medicine, markets and management in far-west Nepal. *Journal of Ethnobiology and Ethnomedicine*, 9(1), 24.
- Lulekal, E., Asfaw, Z., Kelbessa, E., & Van Damme, P. (2011). Wild edible plants in Ethiopia: A review on their potential to combat food insecurity. *Afrika Focus*, 24(2), 71–122.
- Mazhar, F., Buckles, D., & Satheesh, P. (2007). *Food sovereignty and uncultivated biodiversity in South Asia: Essays on the poverty of food policy and the wealth of the social landscape*. Academic Foundation.
- Mekuanen, T., Yohannis, G., Tadesse, M., Asmamaw, A., Amsalu, A., & Dagim, F. (2018). Uses of wild edible plants in Quara District, Northwest Ethiopia: Implication for forest management. *Agriculture & Food Security*, 7, 12–35. <https://doi.org/10.1186/s40066-018-0163-7>
- Miya, M. S., Timilsina, S., & Chhetri, A. (2020). Ethnomedicinal uses of plants by major ethnic groups of hilly districts in Nepal: A review. *Journal of Medicinal Botany*, 4, 24–37.
- Mothupi, F. M., & Shackleton, C. M. (2025). Traditional knowledge and consumption of wild edible plants in rural households, Limpopo Province, South Africa. *Journal of Ethnobiology and Ethnomedicine*, 21(1), 23.
- Ogoye-Ndegwa, C. (2003). Traditional gathering of wild vegetables among the Luo of western Kenya. *Ecology of Food and Nutrition*, 42(1), 69–89.
- Ojelel, S., Mucunguzi, P., Katuura, E., Kakudidi, E. K., Namaganda, M., & Kalema, J. (2019). Wild edible plants used by communities in and around selected forest reserves of Teso-Karamoja region, Uganda. *Journal of Ethnobiology and Ethnomedicine*, 15(1), 3.
- Paudel, M. (2015). *Medical ethnobiology and indigenous knowledge system found in Raji group of Nepal* (Doctoral dissertation, Tribhuvan University). Tribhuvan University Central Library.
- Pawera, L., Khomsan, A., Zuhud, E. A. M., Hunter, D., Ickowitz, A., & Polesny, Z. (2020). Wild food plants and trends in their use: From knowledge and perceptions to drivers of change in West Sumatra, Indonesia. *Foods*, 9(9), 1240. <https://doi.org/10.3390/foods9091240>
- Phillips, O., Gentry, A. H., Reynel, C., Wilkin, P., & Gálvez-Durand, C. B. (1994). Quantitative ethnobotany and Amazonian conservation. *Conservation Biology*, 8(1), 225–248. <https://doi.org/10.1111/j.1523-1739.1994.00225.x>

- Powell, B., Bhatt, I. D., Mucioki, M., Rana, S., Rawat, S., & Kerr, R. B. (2023). The need to include wild foods in climate change adaptation strategies. *Current Opinion in Environmental Sustainability*, 63, 101302.
- Poudel, M., & Singh, N. B. (2016). Teaching (with) medical ethnobiology: Indigenous knowledge system found in Raji people of western Nepal. *International Journal of Multidisciplinary Perspectives in Higher Education*, 1(1), 47–62.
- Press, J. R., Shrestha, K. K., & Sutton, D. A. (2000). Annotated checklist of the flowering plants of Nepal. London: The Natural History Museum.
- Rahayu, Y. Y. S., Dwiartama, A., Sujarwo, W., Rosleine, D., & Irsyam, A. S. D. (2024). Exploring wild edible plants in West Java, Indonesia: Ethnobotanical assessment, use trends, and potential for improved nutrition. *Research Square*. <https://doi.org/10.21203/rs.3.rs-4327834/v1>
- Ray, A., Ray, R., & Sreevidya, E. (2020). How many wild edible plants do we eat—their diversity, use, and implications for sustainable food systems: An exploratory analysis in India. *Frontiers in Sustainable Food Systems*, 4, 56. <https://doi.org/10.3389/fsufs.2020.00056>
- Rumicha, T. D., Belew, S., Hasen, G., Teka, T. A., & Forsido, S. F. (2025). Food, feed, and phytochemical uses of wild edible plants: A systematic review. *Food Science & Nutrition*, 13(6), e70454.
- Samkaria, S., & Kumari, P. (2025). Wild edible flowers of Indian Himalayan region, their traditional uses and potential health benefits: A way forward for food and nutritional security. *Plant Foods for Human Nutrition*, 80(1), 60.
- Semenya, S. S., & Potgieter, M. J. (2014). Bapedi traditional healers in the Limpopo Province, South Africa: Their socio-cultural profile and traditional healing practice. *Journal of Ethnobiology and Ethnomedicine*, 10, Article 4.
- Shad, A. A., Shah, H. U., & Bakht, J. (2013). Ethnobotanical assessment and nutritive potential of wild food plants. *The Journal of Animal and Plant Sciences*, 23(1), 92–97.
- Shah, S. H. A., Shah, G. M., Rehman, S., Ali, N., Alam, J., Waheed, F., ... Hussain, W. (2025). Ethnobotanical study of wild edible plants traditionally used by the inhabitants of Lalku Valley, District Swat, Pakistan. *Ethnobotany Research and Applications*, 30, 1–22.
- Shaheen, S., Ahmad, M., & Haroon, N. (2017). Edible wild plants: A solution to overcome food insecurity. In *Edible wild plants: An alternative approach to food security* (pp. 41–57). Springer International Publishing.
- Shirsat, R., & Koche, D. (2024). Wild edible plants (WEPs): A review on their importance, possible threats, and conservation. In *Contemporary research and perspectives in biological science* (pp. 97–115). BP International.
- Shirsat, R., Jagtap, T., Sirsat, A., Rathod, S., & Koche, D. (2023). Current scenario of wild edible plants (WEPs), their importance, possible threats, and conservation: A mini review. *Journal of Agriculture and Ecology Research International*, 24(5), 18–27.
- Suardi, A. B., Syamsuardi, S., Mukhtar, E., & Nurainas, N. (2023). The diversity and traditional knowledge of wild edible fruits in Bengkulu, Indonesia. *Ethnobotany Research and Applications*, 25, 1–17.
- Tadesse, D., Masresha, G., Lulekal, E., & Alemu, A. (2025). Ethnobotanical study of wild edible plants in Metema and Quara districts, Northwestern Ethiopia. *Journal of Ethnobiology and Ethnomedicine*, 21(1), 7.
- Thapa, L. B., Dhakal, T. M., & Chaudhary, R. (2014). Wild edible plants used by endangered and indigenous Raji tribe in western Nepal. *International Journal of Applied Sciences and Biotechnology*, 2(3), 243–252.

- Thapa, L. B., Dhakal, T. M., & Jha, S. K. (2019). Traditional method of disease classification and identification of medicinal plants and mushrooms by Raji ethnic people in western Nepal. *Botanica Orientalis: Journal of Plant Science*, 13, 22–28.
- Trotter, R. T., & Logan, M. H. (1986). Informant consensus: A new approach for identifying potentially effective medicinal plants. In N. L. Etkin (Ed.), *Plants in indigenous medicine and diet* (pp. 91–112). Bedford Hills.
- Ulian, T., Diaz-Granados, M., Pironon, S., et al. (2020). Unlocking plant resources to support food security and promote sustainable agriculture. *Plants, People, Planet*, 2, 421–445. <https://doi.org/10.1002/ppp3.10145>
- Uprety, Y., Poudel, R. C., Shrestha, K. K., Rajbhandary, S., Tiwari, N. N., Shrestha, U. B., & Asselin, H. (2012). Diversity of use and local knowledge of wild edible plant resources in Nepal. *Journal of Ethnobiology and Ethnomedicine*, 8, 16.
- Valdes, B., Kozuharova, E., & Stoycheva, C. (2025). A review of edible wild plants recently introduced into cultivation in Spain and their health benefits. *International Journal of Plant Biology*, 16(1), 5.
- Wambugu, P. W., & Henry, R. (2022). Supporting in situ conservation of the genetic diversity of crop wild relatives using genomic technologies. *Molecular Ecology*, 31(8), 2207–2222.
- Yumkham, S. D., Chakpram, L., Salam, S., Bhattacharya, M. K., & Singh, P. K. (2017). Edible ferns and fern-allies of North East India: A study on potential wild vegetables. *Genetic Resources and Crop Evolution*, 64(3), 467–477. <https://doi.org/10.1007/s10722-016-038>