Original Article

Ethnobotanical Study of Wild Edible Plants in Pyuthan District

Sangam Patna, Dipika Parajulee[1], Ganesh Subedi[2], Bhuwan Giri[3]

Agriculture and Forestry University, [1]Nepal Polytechnic Institute, Purbanchal University, Chitwan, Nepal, [2]D.D. College, Hemvati Nandan Bahuguna Garhwal University, Central University, [3]Institute of Media, Management, Technology College, Hemvati Nandan Bahuguna Garhwal University, Central University, Dehradun, Uttarakhand, India

Abstract

Objectives: Wild edible plants (WEPs) are those plants that are not domesticated and often neglected but have nutritional and medicinal value and can be used as a good source of diet. The study discusses and depicts the availability of WEPs, their taxonomical categories, species richness, distribution, preference, and their threat in the Gaumukhi area. **Methodology:** Data were collected from 60 randomly selected WEP consumers of Puja and Khung village using a semi-structured interview schedule. The study showed that 37 different species of wild plants are frequently used by respondents. It was found that the majority of the WEPs used were trees followed by herbs and shrubs. **Results:** Regarding the plant parts used, most of the respondents (54%) use WEPs in the form of vegetables followed by raw fruits (28%) users. The study revealed that the majority of WEP's consumers (39%) were from other caste categories such as Giri, Puri, and Malla followed by Dalits (36%). Research indicated that most of the WEPs were collected from the forest area having an altitude of (1300–1500) masl. The major threat to WEPs was fuel wood collection followed by uncontrolled fire. **Conclusions:** Study preference of WEPs among the respondents showed that Polystichum squarrosum (Daude) was the highly preferred one followed by Diplazium esculentum (Neuro) and Dendrocalamus hamiltoni (Tama).

Keywords: Ethnicity, Gaumukhi, habitat, threat, wild edible plants

Introduction

Nepal, being a small country, occupying just 0.1% of the global area is rich in its biodiversity, both in plant and animal diversity and cultural diversity.[1] The country is bestowed with climatic variation and unique geography which provides diversified topography. The ecologically rich environment and the multi-ethnic population is a unique and attractive attribute of the country. Biodiversity and cultural diversity come together as we know; different ethnic groups depend on biodiversity for their food security. Nepal is rich in wild edible plants (WEPs) growing in different ecosystems and such plants along with their wild relatives enrich the genetic diversity in the country.

About 1500 species of plants found in Nepal are considered to be useful.[2] Out of these, 651 species are economically useful including 440 species as wild food plants. A total of 394 wild plants are recorded to be in use in different purposes such as vegetables (246 spp), fruits (125 spp), pickle (44 spp), jam (11 spp), spices and condiments (10 spp), oil (6 spp) and other uses.[3] During food scarcity, people from both urban and rural communities highly dependent on natural habitats to gather edible fruits and vegetables.[4] Although many agricultural societies depend on conventional crop plants, the tradition of eating WEPs has not been completely abandoned.[5] Gathering the indigenous edible plants for both, self-consumption and sales, are usually common in Nepal in most of the rural communities.

WEPs are those plant species that are not domesticated but are available through natural habitation and are used as food.[6] They are the source of nutrients, medicine, fuel, fodder, and spices. Furthermore, its fresh, aromatic taste, pollution-free growing environment, and strong vitality are favorable for people to utilize the WEPs.[7] Even though the world is modernized, there are still poor and marginalized populations in the rural areas who are highly dependent on WEPs. These neglected groups of food plants can absolutely contribute their part in ensuring food security, increasing agricultural diversification, income generation, and poverty reduction.[8] In many developing countries, millions of

Access this article online

Quick Response Code:

Website: www.matrixscipharma.org

DOI: 10.4103/mtsp.mtsp_7_21

Address for correspondence: Dr. Sangam Patna, Agriculture and Forestry University, Chitwan, Nepal. E-mail: pantasangam116@gmail.com

How to cite this article: Patna S, Parajulee D, Subedi G, Giri B. Ethnobotanical study of wild edible plants in Pyuthan district. Matrix Sci Pharma 2022;6:62-7.

Received: 02-Aug-2021 **Accepted:** 27-Oct-2022 **Available Online:** 08-Feb-2023

people do not have enough food supply to meet their requirements and in such cases, rural communities depend on wild resources to meet their need of food.[9] Rural area people not only use wild plants as their source of food and medicine but also help in its conservation. WEP is used as a staple food for indigenous people, complementary food for nonindigenous people, and offers alternative cash-generating sources.[10] Household harvesting of wild plants and value addition to it can boost rural employment and bring profit to local communities.[11]

Despite being important to food security and livelihood, these plants are still in wild forms. Many valuable wild plants are familiar to certain groups and communities but unnoticed and unknown by others as they are in a wild state. Furthermore, the rapid reduction in the usage of wild plants and reliance on processed food makes it crucial to have information on the status of WEP. The information and utilization of WEP is majorly confined to local people so many scientists are interested to understand and disseminate it on various platforms. Many researches and studies were focused on wild edible fruit plants and some research were on WEPs in various other districts such as Palpa and Rupandehi.[12,13] No research has been found to be studied on WEP in Pyuthan district. This paper has attempted to compile and analyze the information on WEPs along with their plant parts, uses, the local and scientific names which are available, utilized, and unutilized in the Pyuthan district.

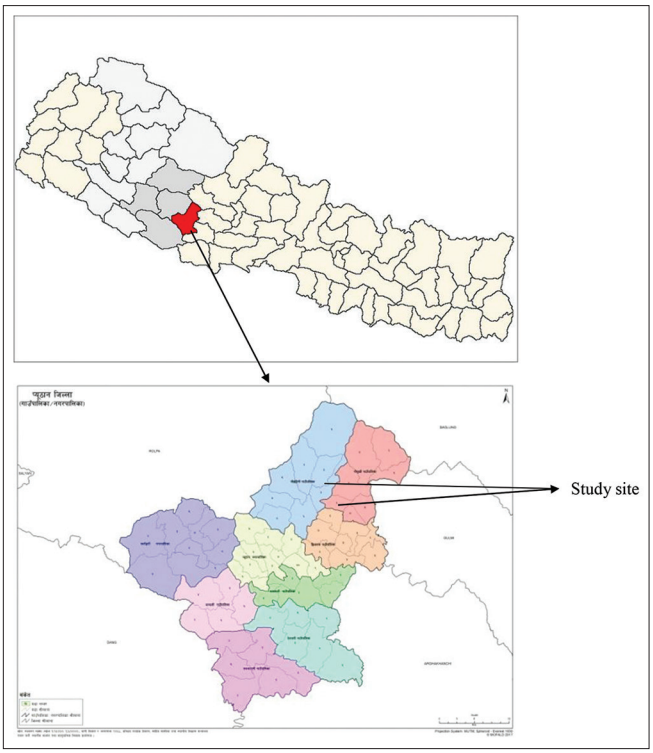

Figure 1: Map Pyuthan district

Methodology

Study site

Pyuthan district was selected purposively for the study site as it is well known as the home of various indigenous wild plants for a long time. The study was carried out in Ward no. 5 (Khung) and ward no. 4 (Puja) of Gaumukhi Rural municipality in Pyuthan, Nepal. As shown in Figure 1. The reason behind the selection is that people around those areas mostly depend on wild plants as a source of their living. Among the consumers, 30 sampling population from each ward was selected randomly using simple random sampling techniques.

Ethnobotanical survey

Before conducting the ethnobotanical survey in both the village, we had a meeting with the leader of the village explaining our research objective. After getting verbal consent from the authority figure, the survey was conducted on the villages, and the respondents were categorized based on ethnic group. A total of 60 informants were interviewed and asked the 5W + H questions (viz., what, who, why, when, where, and how the respondents are utilizing the WEPs) to gain information on local name, usage, availability, species richness, threats, and opportunities of WEP. The informants freely stated their information and knowledge regarding the WEP available in the study area without being interfered.

Research instrument and design

The pretested interview schedule was used to collect primary information. In addition, one focus group discussion and two key informant interviews were performed. Furthermore, secondary data were collected from various relevant journals, literature, and publications of different organizations. After data collection, it was thoroughly checked, coded, and entered for analysis.

Data analysis

After the data collection process, it was analyzed using both quantitative and qualitative analytical tools. Microsoft Excel sheet was used to organize the collected ethnobotanical data. The collected data were thoroughly checked, tabulated, and analyzed by SPSS software and R Studio (SPSS software, IBM, Malaysia Sdn Bhd, Petaling Jaya, Selangor, Malaysia and R Studio, Possit Software, Northern Ave, Boston.).

Preference ranking was performed by Henry Garrett ranking method to analyze the most popular WEPs based on the respondent's daily consumption. The percent position of each rank was obtained by the formula and then converted to the score from the table given by Henry Garrett.

$$\text{Percentage position} = \frac{(100(Rij - 0.5)}{Nj}$$

where,

R_{ij} = Rank given for i^{th} item j^{th} individual

N_j = Number of items ranked by j^{th} individual

Results and Discussions

List of wild edible plant with its local name, English name, and scientific name

The local people of the study area mentioned about availability of various wild fruits, vegetables, and medicinal plants in the

study area. Table 1 and Table 2 shows the list of local edible plants along with their English name and the scientific name which are majorly available and utilized by the respondents of the study area.

Table 1: Name of wild edible plants available in study area

Local name	English name	Scientific name
Neuro	Fiddlehead fern	*Diplazium esculentum*
Tama	Tufted bamboo	*Dendrocalamus hamiltonii*
Sisnu	Stinging nettle	*Nasturtium officinale*
Pudina	Mint	*Mentha* Spp.
Silam	Perilla	*Perilla frutescens*
Gurjo	Heart leaved moonseed	*Tinospora cordifolia*
Ghodtapre		*Centella asiatica*
Jaluka	Hitchhiker elephant ear	*Remusatia vivipara*
Simesaag	Water cress	*Nasturtium microphyllum*
Daude	Basket fern	*Polystichum squarrosum*
Khanayo	Drooping fig	*Ficus semicordata*
Kabro	Java fig	*Ficus lacor*
Koiralo	Mountain ebony	*Bauhinia variegata*
Aiselu	Raspberry	*Rubus ellipticus*
Chutro	Rasanjan	*Berberis aristata*
Teeju	Coromandel ebony	*Diospyros melanoxylon*
Harro	Chebulic myrobalan	*Terminalia chebula*
Barro	Baheda	*Terminalia bellirica*
Chiuri	Nepal butter tree	*Diploknema butyracea*
Bidaulo	Cluster fig	*Ficus racemosa*
Timilo	Common fig	*Ficus carica*
Bhakimlo	Macassar kernels	*Brucea javanica* L.*merr*
Ghanggaru	Nepalese firethorn	*Pyracantha crenulata*
Sil-timur	Mountain pepper	*Litsea citrale*
Kaulo	Fragrant bay tree	*Persea odoratissima*
Ban keraa	Wild banana	*Musa balbisiana*
Ban tarul	Wild edible yam	*Dioscorea bulbifera* L.
Mayal	Wild pear	*Pyrus pyraster*
Bhui kafal	False strawberry	*Duchesnea indica*
Bhyakur	Deltoid kam	*Dioscora nepalensis*
Amaro	Wild mango	*Spondias pinnata*
Kade Dhania	Wild Coriander	*Eryngium foetidum*
Paiyu	Wild cherry	*Prunus napaulensis*
Salleu chyau	Wild mushroom	*Amanita chepangiana*
Bagale chyau	Wild mushroom	*Schizophyllum commune*
Phutuki	Wild mushroom	*Scleroderma texense*
Gobre chyau	Parasol mushroom	*Macrolepiota procera*
Jhari chyau	Deceiver mushroom	*Laccaria laccata*

Table 2: Preference of wild edible plants

WEP species	Average score	Ranking
Polystichum squarrosum (Daude)	64.5	I
Diplazium esculentum (Neuro)	60	II
Dendrocalamus hamiltonii (Tama)	46.4	III
Nasturtium officinale (Sisnu)	37.6	IV
Nasturtium microphyllum (Simesaag)	35.6	V

WEP: Wild edible plant

Taxonomical categories of wild edible plant

Figure 2 shows the categories of the WEPs that are available in the study site. According to the study, out of total wild plants mentioned by the 60 respondents, 27 (45%) were trees followed by 16 (26%) herbs, 13 (22%) shrubs, and 4 (7%) climbers.

Plant parts used as food

As shown in Figure 3, WEPs are used in various forms by the people in the study area. Figure 2 shows that majority of

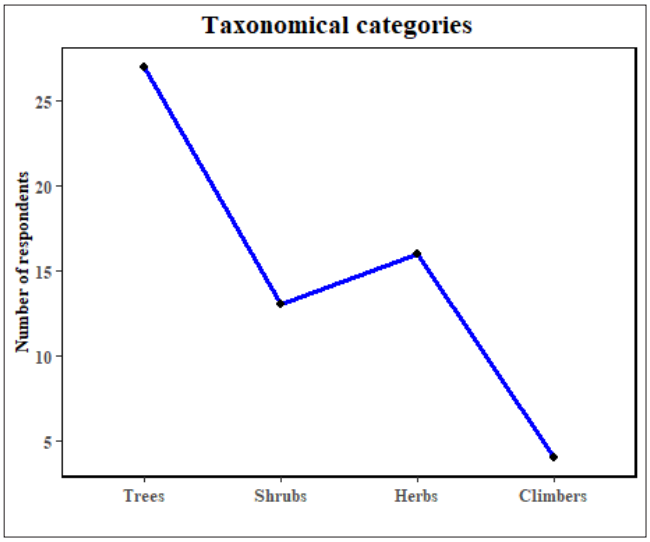

Figure 2: Taxonomical categories of WEPs. WEPs: Wild edible plants

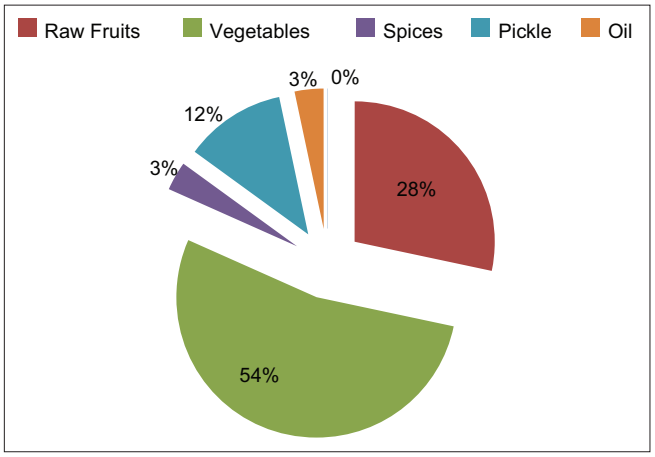

Figure 3: Parts of plants used as food

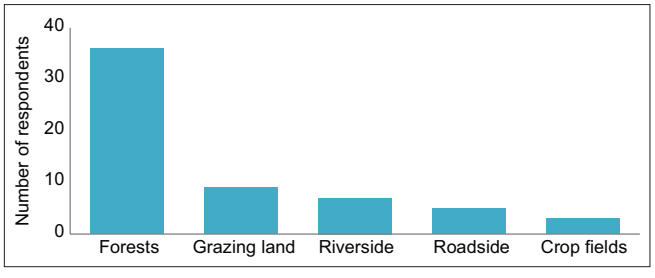

Figure 4: Distribution of WEPs. WEPs: Wild edible plants

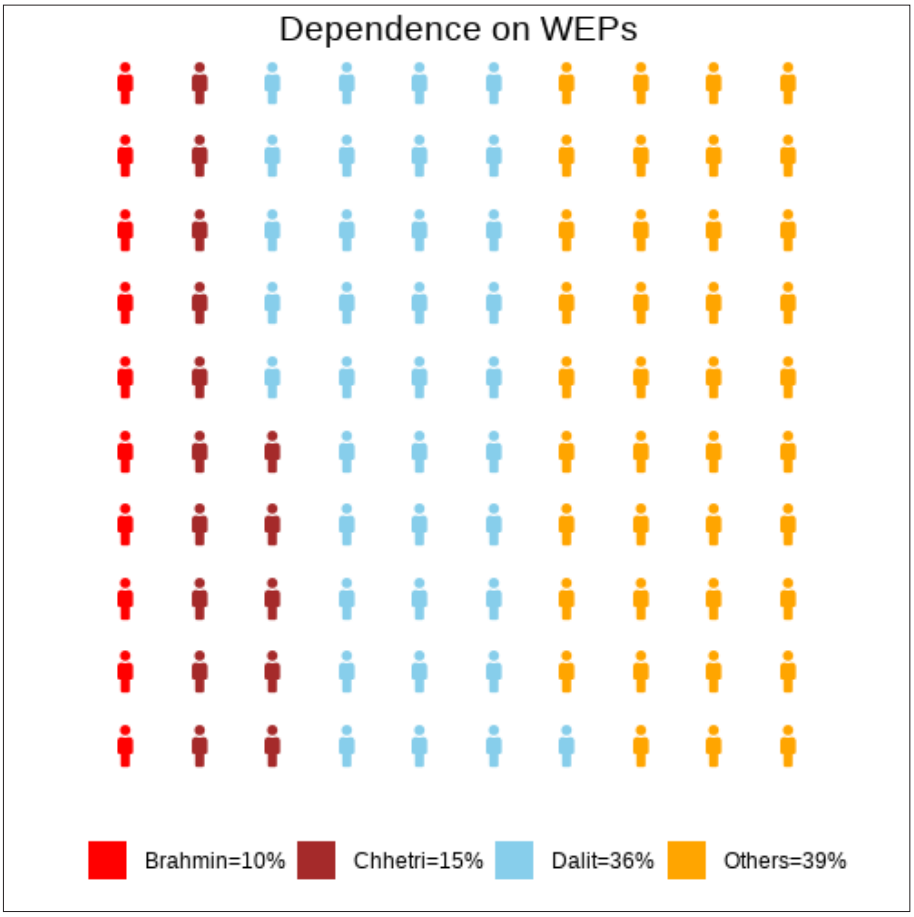

Figure 5: Dependence on WEPs based on ethnicity. WEPs: Wild edible plants

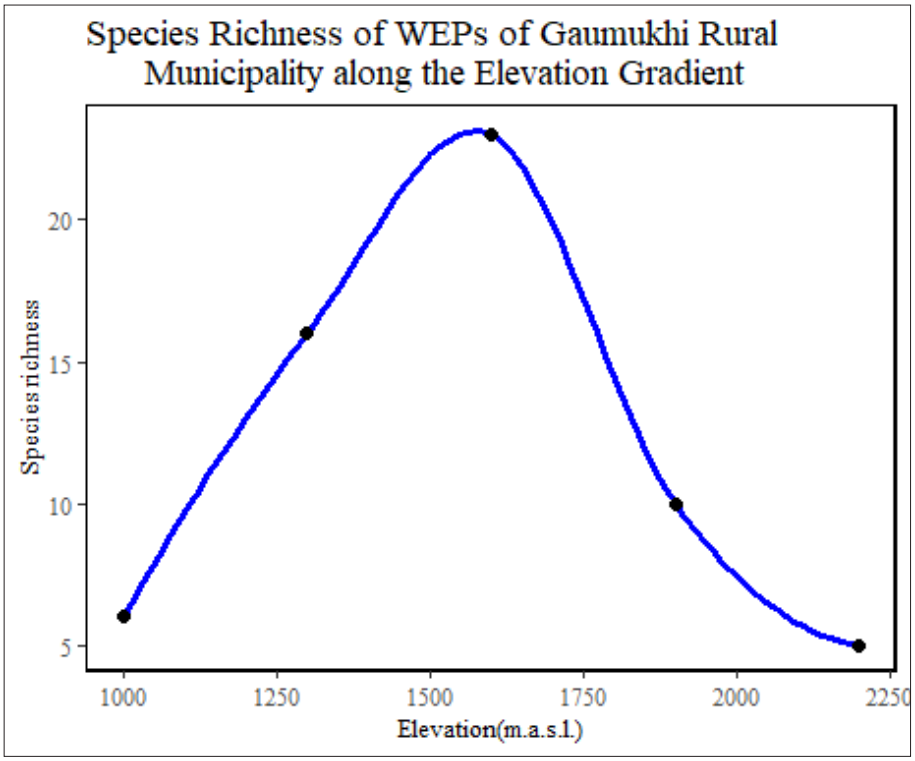

Figure 6: Species richness along the elevation gradient

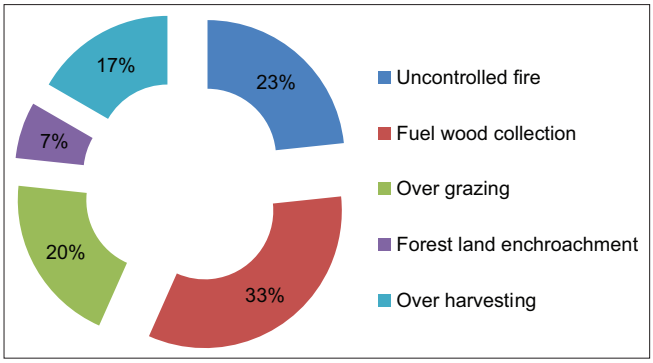

Figure 7: Threats to WEPs. WEPs: Wild edible plants

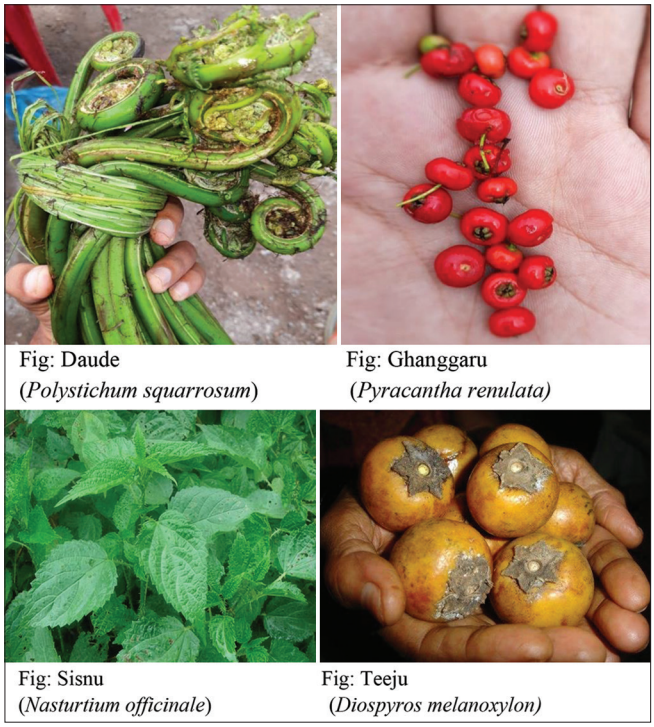

Figure 8: Preference of wild edible plants

the WEPs (WEP) are used in the form of vegetables (54%) followed by raw fruits (28%), pickle (12%), oil (3%), and spices (3%).

Distribution of wild edible plant in different habitat

Research shows that, mostly, the respondents collect WEPs from (60%) forest area followed by (15%) grazing land, (12%) riverside, (8%) roadside, and (5%) crop fields [Figure 4].

Dependence on wild edible plants based on ethnicity

The respondents were categorized into four major ethnic groups – Brahmin, Chhetri, Dalits, and Others. The others category in the study area includes Giri and Puri. Figure 5 shows the findings of the study made to know and understand the dependence of respondents on WEPs on the basis of their ethnicity. The others category (39%) was found to depend more on wild plants comparing to Dalits (36%), Chhetri (15%), and Brahmin (10%).

Species richness of wild edible plant along the elevation gradient

On studying the species richness of WEPs in the Gaumukhi area, the highest diversity of the plants was found in the altitude range of (1300–1500) masl and the lowest diversity of the plants was found at the altitude of 2250 masl. Figure 6 shows the result of this study-species richness of wild plants along with its elevation gradient. It is in line with the research paper[14] conducted in Arghakhachi district of Nepal.

Threat to wild edible plants

On studying the several threats to WEPs available in study area, research shows that fuel wood collection was found to be the major problem to conserve the wild plants followed by uncontrolled fire and problem of over grazing [Figure 7].

Preference of wild edible plant in study area

Based on daily consumption by the respondents of study area, the preference of WEP is ranked by Henry Garrett ranking method [Figure 8]. Among the different crops listed by respondents, Daude ranked first followed by Neuro, Tama, Sisnu, and Simesaag.

Conclusions

Most of the wild plants available in the study area were found to be edible. The objective of our study was to understand and record the local knowledge on indigenous plants which are available in the Gaumukhi area of the Pyuthan district. The study was focused to promote the neglected plants which have high value in terms of nutrients and medicine. The result of our research survey shows that the WEP is not only a good source of nutrients and food to local communities but also, can be used as means of income generation by the local population. The study highlights the ethnicity of the people in the study area and their dependence on wild plants. The study revealed information about edibility, natural habitat, and plant parts used as food. These multi-valued plants are in threat by causes such as fuel wood collection, uncontrolled fire, overgrazing, forest land encroachment, and overharvesting. Conservation and sustainable management of these resources could be a great contribution to local communities as well as biodiversity. Encouraging the youth of communities rather than consulting elders for the information and knowledge on wild plants could be helpful to conserve these valuable resources. The study we made on ethnobotanical research on wild plants from different ethnic groups located in the study area could be the key data to promote the importance of WEPs and conservation of cultural traditional value among the youngsters. The wild plants, if conserved, could turn into a profitable crop and also contribute to the sustainable use of natural resources by safeguarding the endangered species.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Nepali BR, Skartveit J, Baniya CB. Interpolated altitudinal species richness in Arghakhachi district of Nepal; 2020. Available from: https://www.nepjol.info/index.php/JIST/article/view/29447. [Last accessed on 2021 Apr 15].
2. Dangol DR, Maharjan KL, Maharjan SK, Acharya AK. Wild Edible Plants of Nepal; Conservation and Utilization of Agricultural Plant Genetic Resources in Nepal; 2017.
3. Gautam RS, Shrestha SJ, Shrestha I. Wild Edible fruits of Nepal; 2020.
4. Bhatia H, Sharma YP, Manhas RK, Kumar K. Traditionally used wild edible plants of district Udhampur, J&K, India. J Ethnobiol Ethnomed 2018;14:73.
5. Balemie K, Kebebew F. Ethnobotanical Study of Wild Edible Plants in Derashe and Kucha Districts, South Ethiopia; 2006. Available from: https://ethnobiomed.biomedcentral.com/articles/10.1186/1746-4269-2-53#Abs1. [Last accessed on 2020 Jan 23].
6. Acharya KP, Acharya R. Eating From the Wild: Indigenous Knowledge on Wild Edible Plants in Parroha VDC of Rupandehi District, Central Nepal. Int J Soc For 2010;3:24-48.
7. Lockett CT, Calvert CC, Grivetti LE. Energy and micronutrient composition of dietary and medicinal wild plants consumed during drought. Study of rural Fulani, northeastern Nigeria. Int J Food Sci Nutr 2000;51:195-208.
8. Ashagre M, Asfaw Z, Kelbessa E. Ethnobotanical study of wild edible plants in Burji District, Segan Area Zone of Southern Nations, Nationalities and Peoples Region (SNNPR), Ethiopia. J Ethnobiol Ethnomed 2016;12:32.
9. Mahato RB. Wild Edible Fruits of Palpa District, West Nepal; 2014.
10. Manandhar NP. Plants and People of Nepal. USA: Timber Press Portland Oregon; 2002.
11. Manandhar NP. Wild edible plants of Nepal. Thapathali, Kathmandu. Bull Dep Med Plants 1982.
12. MoFSC. National Biodiversity Stratgey and action plan 2014-2020, Ministry of Forests and Soil Conservation. Singhadurbar, Kathmandu, Nepal: Government of Nepal; 2014.
13. Uprety Y, Poudel RC, Shrestha KK, Rajbhandary S, Tiwari NN, Shrestha UB, *et al.* Diversity of use and local knowledge of wild edible plant resources in Nepal. J Ethnobiol Ethnomed 2012;8:16.
14. Cao Y, Li R, Zhou S, Song L, Quan R, Hu H. Ethnobotanical study on wild edible plants used by three trans-boundary ethnic groups in Jiangcheng County, Pu'er, Southwest China. J Ethnobiol Ethnomed 2020;16:66.