



EATING FROM THE WILD: INDIGENOUS KNOWLEDGE ON WILD EDIBLE PLANTS IN PARROHA VDC OF RUPANDEHI DISTRICT, CENTRAL NEPAL

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Abstract

People in different parts of Nepal depend on plants and plant parts to fulfill their daily needs and have developed unique knowledge of their utilization. The communities have a rich knowledge of wild edible plants (WEPs). However, there have been very few studies on the documentation of WEPs which play an important role in survival of many ethnic groups in Nepal. This study aims to document information about WEPs of Parroha VDC in the Rupandehi district of Nepal. Information on the use of WEPs was collected in March-April 2007 and June-July 2008 by focus group discussions. Altogether 67 plant species belonging to 41 families and 57 genera were recorded as being used as a source of fruit, vegetables, pickle (achaar) or nectar of which, 51 species have single use, whereas 16 species have two or more uses. The majority of the species and trees (43%) and mushrooms represent the least (4%). The majority of plants and plant parts are used when fresh. Mainly low socio-economic status (SES) people are involved in collecting these resources and this traditional knowledge is declining as the younger generation shows less interest in using WEPs. The WEPs were used as supplements to food but information on the nutritional values and possible toxic effects are not known. Therefore, research in this field is necessary as this finding may help to counter the needs of people during a scarcity of food stuffs.

Keywords: *sustainable utilization, wild edible plants, Parroha VDC, Nepal.*

Introduction

Indigenous people living in particular areas depend on the use of wild plants or plant parts to fulfill their needs and often have considerable

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knowledge on their uses. The people generally depend on nearby forest areas to supply their needs. The biological resources are used in many ways: such as timber, fuelwood, food, wild vegetables, spices, wild fruits, and often important medicines. Among them, WEPs play a major role in supplying food for poor communities in many rural parts of the world (Sundriyal et al. 2003). Wild plants, aside from being used by poor communities, are commonly used today as a supplement for healthy diets in even the most developed regions of the world (Redzic 2006). Approximately 75,000 species of plants world-wide are believed to be edible (Walters & Hamilton 1993). Over the centuries, people have been dependent on this resource for their subsistence as they are efficient and cheap sources of several important micronutrients (Ali & Tsou 1997). It has even been suggested that wild food plants are nutritionally superior to some of the cultivated ones (Burlingame 2000). However, these plant resources and their indigenous use are in danger of being lost in areas where environmental and cultural transformations have led to changes in feeding practices. Many indigenous communities abandon or change their traditional customs and thereby lose their plant knowledge over time (Benz et al. 2000; Byg & Balslev 2001; Ladio & Lozada 2003). Changes in land-use due to urbanization and habitat destruction, as well as the slash and burn system of traditional farming with its associated shifting cultivation, have been causing forest destruction and degradation.

In Nepal, settlement programs for the landless people in the forest areas of the Terai districts created high population pressure in this region and caused the conversion of large forest areas into agricultural land (Chaudhary 1998). These activities have threatened indigenous plants, and the indigenous knowledge about the plant resources is in danger of being lost as both indigenous practices and biological resources are diminishing because of habitat destruction and a disinterest among the younger generation (Acharya & Acharya 2009).

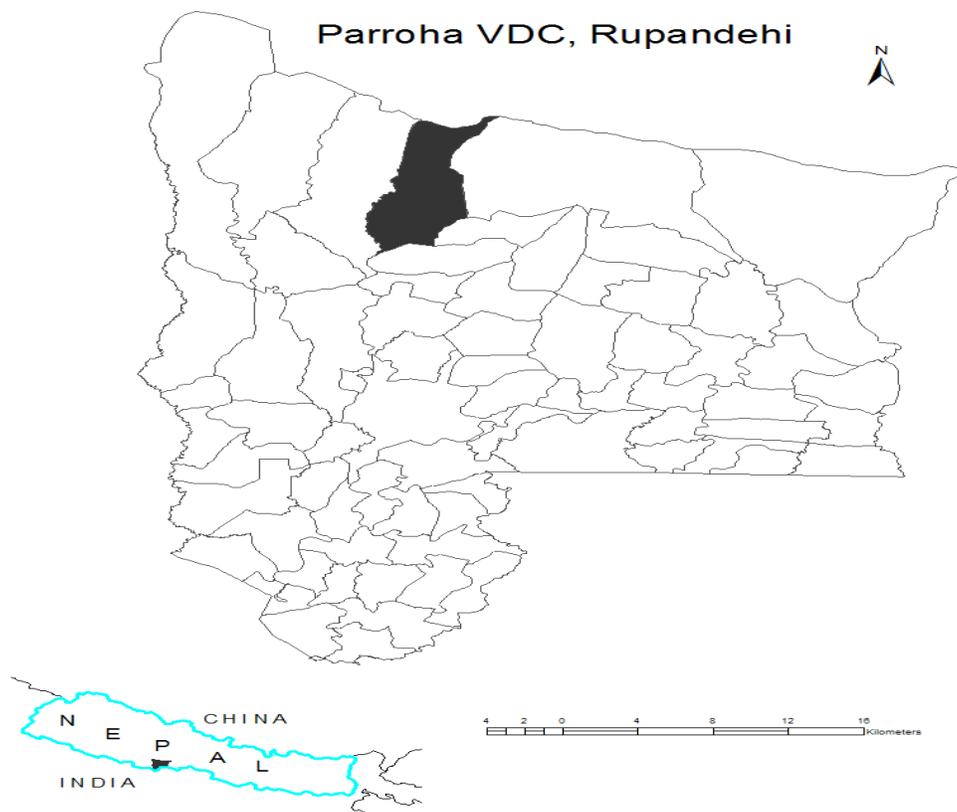
In Parroha VDC, instead of cultivation, indigenous communities with low socioeconomic status collect WEPs to supplement their daily requirements. There have been previous studies on WEPs in different parts of Nepal (e.g. Regmi 1979; Bajracharya 1979; Shrestha 1983; Siwakoti et al. 1997; Maden & Dhakal 1998; Bajracharya 1999; Manandhar 2002; Gurung 2003; Bhattarai et al. 2009), but none have been done on the WEPs of Parroha VDC of Rupandehi district. The systematic documentation of indigenous knowledge regarding the identity and use of wild foods by rural communities is now an urgent need (Manandhar 2002) because both indigenous knowledge and the biological resources diminishing with habitat destruction and a disinterest among the younger generation (Acharya & Acharya 2009). We here attempt to document traditional knowledge on the utilization of wild edible plants in Parroha VDC of Rupandehi district.

Materials and Methods

Study Area

Parroha VDC is located in Rupandehi district of central Nepal (Figure 1), between 27°20' to 27°45'N latitude and 83°10' to 83°30'E longitude. It is part of the Terai region of Nepal and covers a total area of 73196.1 ha², of which, about 73% area is agricultural land, urban areas, and roads, 23% forest, and the remaining 4% water resources (Anonymous 2007). Our research was conducted in Parroha VDC and people of this region depend on Parroha Community Forest (PCF) for their daily needs. PCF covers an area of 633 ha. The total population of VDC is about 20,000, of which about one fourth are Tharus (CBS 2002). The altitude of the district ranges from 100 m to 500 m a.s.l. The forest is mainly dominated by Sal (*Shorea robusta*) with its associated species like Saj (*Terminalia alata*), Banjhi (*Anogeissus latifolia*), etc. The climate of the area is typically tropical dominated by the south-east monsoon. A hot climate generally prevails throughout the year except in the short winter. The temperature ranges from an average of 7°C in winter to an average of 45°C during summer.

Figure 1. Map of the Study Area



Field Study and Data Analysis

The study was conducted in March-April 2007 and June-July of 2008. Information on WEPs was collected by focus group discussion and interviewing key informants of the community. Altogether, nine focus group discussions were organized in each ward of a VDC. Focus group discussions are claimed to generate insight information of less known things than more common survey techniques (Rennie and Singh 1996). Also, we are interested in an inventory of all WEPs known and their use in village rather than in depth individual informants' knowledge. Each focus group discussion composed of key informants and other knowledgeable villagers. Number of participants in each focus group discussion ranged between 43 to 67. Out of total 486 participants, about 71% were male (345 participants) and about 29% were female (141 participants). During first session in each focus group discussion, we asked participants to enumerate all wild plants they know and are edible (Cotton 1996). Plants were listed with common names. List of all plants were compiled in one and repetitions were omitted. Some of the plants were listed with one or more common names which were corrected during field trip. All species listed in the list were collected during field trips. Some of the collected specimens were identified in the field, whereas others were identified with the help of standard literature (Polunin & Stainton 1984, Stainton 1997, Manandhar 2002) and with cross-checking the specimens deposited at Tribhuvan University Central Herbarium (TUCH), Kirtipur. The nomenclature of the identified species and their family names follows Press et al. (2000). Collected voucher specimens are deposited at TUCH. Nomenclature of species is frequently changing. Some of the synonyms of the species were later corrected after visiting the checklist web page of Royal Botanical Garden, Kew (Royal Botanical Garden, Kew 2009).

The distribution range of the species is based on published literature (e.g. Press et al. 2000; Manandhar 2002). To find the elevation where maximum species richness of these species is found, we used interpolation method (see Acharya et al. 2009). We used R_{2.9.1} (R Development Core Team 2009) for scatter plot and graphical representations.

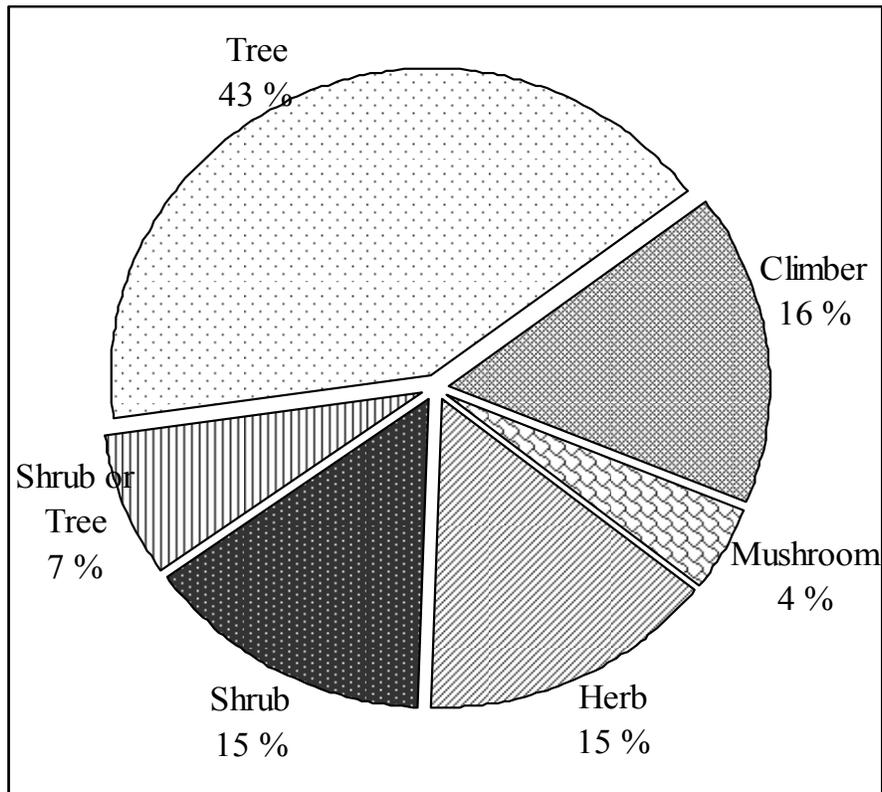
Results

Species Composition and Distribution

A total of 67 WEPs (angiosperms and mushrooms) are documented. These 67 species belong to 41 families under 57 genera. Among the 41 families documented, the Leguminosae represented the highest number of species (eight species) followed by Moraceae (six species). A list of plant species along with their scientific name, family name, herbarium voucher number, local names, and uses is given in Table 1 (see Appendices). As the majority of people are Tharus, the ethnic name of the plants is also included in

parentheses in Table 1. Out of 67 WEPs, the majority of the species are trees (43%) followed by climbers (16%), herbs and shrubs (each with 15%), and mushrooms represent the least (4%) (Figure 2).

Figure 2. Different Life Forms of Wild Edible Plants



The regional distribution of these species ranged 100 to 3200 m a.s.l. along the elevation gradient of the Nepal Himalaya. Among these, very few species (6%) are found to be limited only in central Nepal (C). The majority of species (60%) are found in all three regions (WCE) followed by 17% in east and central Nepal (EC), and 11% in west and central Nepal (WC). Although our study area lies in central Nepal, 3% of the total species are recorded from east (E) and west (W) Nepal only (Figure 3). Maximum richness of these species is found at an elevation of 800 m a.s.l. (Figure 4).

Figure 3. Proportional Phyto-Geographical Distribution of WEPs in Nepal Himalaya (E: Eastern Nepal; C: Central Nepal; W: Western Nepal)

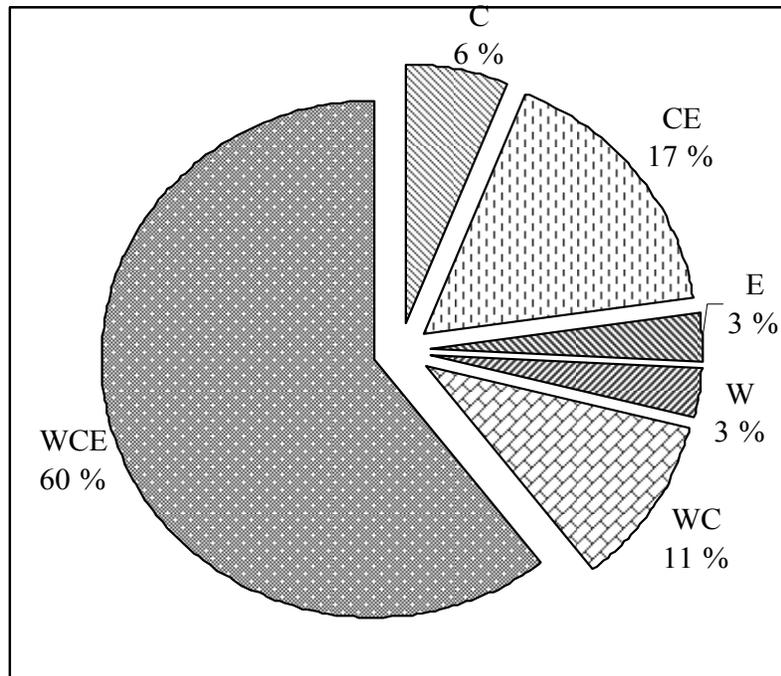
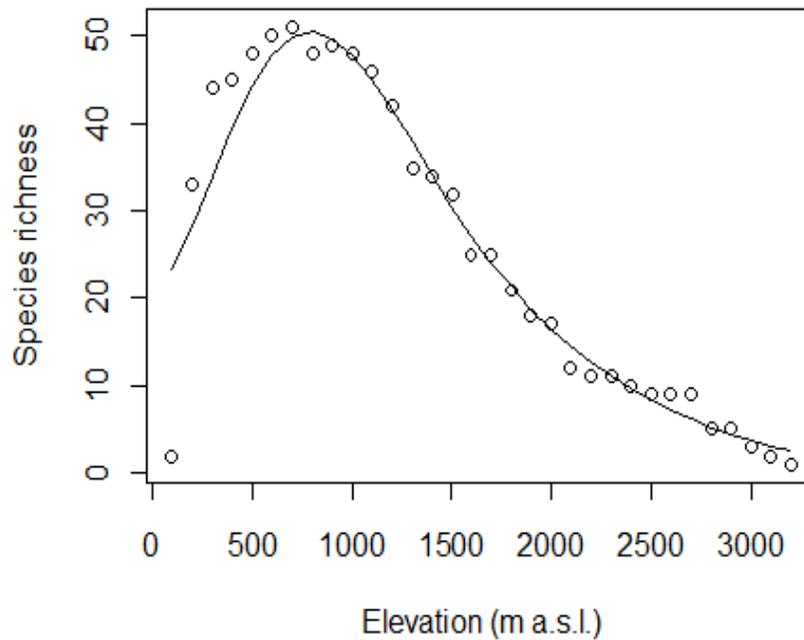


Figure 4. Species Richness of WEPs of Parroha VDC along the Elevation Gradient in the Nepal Himalaya



Uses of Plant Resources

From the detailed results (see Table 1), one can gain insight into the richness of WEPs in Parroha VDC, Rupandehi district of central Nepal. Collected WEPs can be grouped into five fundamental categories: fruits (unripe/ripe), vegetables, pickle, nectar, and miscellaneous uses (see Table 2). Fruits (unripe/ripe) dominate the usage category. In total, fruits of 33 wild species are used to eat either unripe or ripe. The majority of these fruits are used after they are ripe (fruits of 23 species) rather than when they are unripe (fruits of 6 species). Some fruits are eaten as they are whereas some fruits are eaten roasted (fruits of 5 plants) (see Table 1). Twenty-two species documented are used as vegetables (Table 2). Most often, fruits, young shoots, leaves, whole plant, flowers, bulbs and combs, and young vegetative parts are used as vegetables. Fruits are most commonly used (seven plants), followed by young shoots (six plants), leaves and whole plants each of three plants, flowers and bulbs and combs each of two plants and young vegetative parts of one plant (see Table 1). Leaves, buds and flowers, and fruits from 12 species of plants are used most frequently to make pickle (see Table 2). Out of 67 total species collected, 51 species have a single use whereas 16 species have two or more uses (see Table 1).

Discussion

Species Composition and Distribution Pattern

The majority of the species identified in our study areas are trees (43%) followed by climbers (16%) and mushrooms were the minority (4%) (Figure 2). The plant species have a range between 100 and 3200 m a.s.l. along the elevation gradient in the Nepal Himalaya with maximum richness at an elevation of 800 m a.s.l. (Figure 4). Majority of plant species (about 60% of the total plant species) are distributed in all regions within the elevational limit from east to west (Figure 3). The wider distribution ranges of the species above the range of our study area (100-500 m a.s.l.) indicate that the species are adapted to this natural environment.

Plants Used as Fruits (Unripe/Ripe)

The usage of WEPs is widespread in many parts of the world and is an important food source for many rural poor people of Nepal. People in our study consume wild fruits in large amounts because of their low cost and easy availability. Majority of fruits are consumed in ripe stage (fruits of 23 plant species) followed by unripe (fruits of six species) and roasted (fruits of five species). A few fruits are marketed commercially to benefit their economic status, including *Phyllanthus emblica*, *Syzygium cumini*, *Tamarindus indica*, and *Terminalia bellirica*. Fruit of *P. emblica* is believed to be a major source of vitamin C (ascorbic acid) which is used for the treatment of several disorders

such as common cold, scurvy, heart diseases, etc. (Manandhar 2002). Although local people eat fruit of *Semecarpus anacardium*, it is sometimes allergic to some people (Barceloux 2008).

Plants Used as Vegetables

Vegetables play a crucial role with respect to meeting nutritional needs in remote areas of Nepal. Vegetables are eaten most often with rice or another cereal. People in Parroha VDC not only consume vegetables from their gardens, but also from wild plants. Most of the vegetables are used as fresh vegetables. Very rarely, some of them are dried and stored for future purposes. During our study it was found that mostly the low socio-economic status (SES) women are involved in collecting wild plants for vegetables. The collection is mostly done whilst also collecting firewood. The economic status of the collector, work load, traditional education, and time availability affect how much is harvested. Although cultivated vegetable production is encouraged, local garden produce is often insufficient to meet the demand for vegetables throughout the year. It has been suggested that wild vegetables are nutritionally superior to some of the cultivated ones (Burlingame 2000).

Fruits of some species such as *Xeromphis uliginosa*, *Xeromphis spinosa*, *Terminalia chebula* are used as vegetables. People used to collect mushrooms such as *Pleurotus* sp., *Morchella* sp., *Ganoderma* sp., but mushrooms collected from the forest can be poisonous. The ability to recognize the wild edible species is very subjective and depends upon the experience of the collector. In many rural areas of Nepal, mushroom poisoning is often a serious problem and every year lethal poisoning is reported (Adhikari 2000; Christensen et al. 2008). When we discussed this issue with the local population, it is mostly the older people who are aware of this problem. According to them, to prevent mushroom poisoning, they boil the mushrooms for 4-5 minutes first, remove the water and then cook with onions, garlic and *timur*.

Plants Used to Make Pickle (Achaar)

In Nepalese culture, *achaar* refers to a hot, sour, and often spicy sauce which is served with a meal. Whole plants, stems, flowers, leaves, and fruits are used to make *achaar* by local inhabitants of Parroha VDC. People sometimes use fresh plants and plant parts or sometimes cook these parts to prepare *achaar*. For example, leaves of *Antidesma montanum* var. *montanum* and *Mentha spicata*, vegetative parts of *Oxalis corniculata*, tendrils of *Dryopteris cochleata*, flowers of *Desmodium oojeinense*, buds of *Ficus lacor*, and buds and flowers of *Bauhinia variegata* are used fresh to prepare pickle. Unripe fruit of *Mangnifera indica*, *Phyllanthus emblica*, and *Tamarindus indica* and young shoots of *Dendrocalamus hamiltonii* are preserved for future use.

To prepare *achaar* from fresh ingredients, the fresh parts of plant or whole plant is mashed using a stone slab. The mashed item is then mixed with salt, chili, spices and vinegar according to taste. If the pickle is to be stored for long term use, then cooked ingredients are used. For example, fruits of *M. indica*, and *P. emblica* are sliced and dried in sunlight, then fried in oil and put in plastic or glass bottles for storage. To store long term, the sliced pieces are completely submerged in oil in the bottles. To prepare dry pickle from *P. emblica*, the sliced pieces are boiled for 3-4 minutes and salt and chili are mixed in and stored in bottles. With *T. indica*, the whole pod is dried in sunlight and stored for further use. This can also be used for souring other pickles.

Plants Used for Nectar

Children from the study area preferred the nectar from the flowers of *Diploknema butyracea* and *Woodfordia fruticosa*. During our field visit, we also tested the nectar which is jelly-like and sweet in taste.

Plants Used for Miscellaneous Uses

People in the study area use nine species for miscellaneous uses such as for tobacco, to make liquor, as a flavouring agent, and to make vegetable oil. For example, *Kattha* - a chemical composition extracted from the bark of *Acacia catechu* - is used in *Paan* which is a kind of addictive substance. People in Parroha VDC mix a paste or powder of *Boehmeria rugulosa* with rice flour to prepare *Sel-Roti* - a typical Nepali ring bread generally used during festivals. Seeds of *Cannabis sativa* are used as a drug and during the *Mahashivaratri* festival. This festival generally falls during February - March. The fruits are mixed on typical food items *Laddu*, *Peda*, and *Sarbat*. Powder of *Curucma aromatica* is used in vegetable dishes as turmeric. Mature seeds of *Spatholobus parviflorus* are used to make vegetable oil. Leaves of *Dioscorea deltoidea* are used to make the covering of a locally made cigarette commonly called *bindi*.

Conservation and Sustainable Management

There is still a paucity of quantitative data on the use of WEPs. The ethnic communities in Nepal are rich in traditional traditional knowledge due to long term association with forests. This valuable informations needs to be documented before it disappears (Acharya & Acharya 2009; Acharya & Acharya 2010). Therefore, it is strongly recommended to promote the documentation of indigenous uses, and traditional knowledge and practices, using quantitative methods. Furthermore, for long run practices and strategies for sustainable living should be followed. People in present study area lack practices of sustainable harvesting. When asked about how much can be harvested, most respondents responded that they harvest optimal

quantity what is needed and very few respondents were aware of sustainable harvesting and conservation of WEPs. In many rural areas of Nepal, poisoning by consumption of wild plants is very high (Adhikari 2000; Christensen et al. 2008). So, study on possible side effects of wild plants is necessary. Research related to chemical screening should also be initiated to analyse the chemical contents of WEPs and the implications on health, food and plant products. When talked to the younger generation about use of WEPs, they show less interest in collecting these wild plants. Disinterest of younger generational may create knowledge gap and valuable information on use of WEPs which their forefathers and fathers have may be lost. So, systematic documentation of indigenous knowledge and biological resources is urgent need (Acharya & Acharya 2009).

It is generally believed that local communities are more likely to support conservation initiatives if they receive direct benefits from them (McNeely 1995). This concept has been successful in some of the conservation initiatives, including even broad-scale conservation activities in Nepal. In addition to dietary benefits, wild plant resources can be linked to the preservation of biodiversity and alleviation of poverty. Wild edible plants can play an important role in establishing the better livelihoods by providing an improved diet in terms of nutritional value and supplementing the food needs of poorer households.

Conclusion

This study contributes to the information on knowledge of WEPs used by people of Parroha VDC, Rupandehi district, Nepal. Focus group discussion resulted a list of 67 plant species and their different use. Majority of the plants are consumed as substitutes of food. But information on the nutritional values and possible toxic effects of these plants are not known. Therefore, the information presented here might be helpful for further studies on nutritional values and possible effects. Furthermore, more attention should be given on sustainable management and sustainable harvesting of WEPs.

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Appendices

Table 1. List of plant species used for food value in Parroha VDC, Rupandehi district with their local name, habitat and geographical distribution in Nepal Himalaya

SN	Plant Species	Local Name	Geographical Distribution	Altitudinal Distribution	Habitat	Uses
1	<i>Acacia catechu</i> (L.f.) Wild. (LEGUMINOSAE) Voucher RA414	Khayar	WCE	200-1400	T	<i>Kattha</i> (a chemical composition extracted from the bark of a tree is used in <i>Paan</i> (a kind of addictive substance))
2	<i>Aegle marmelos</i> (L.) Corrêa (RUTACEAE) Voucher RA315	Bel	WCE	600-1100	T	Ripe fruits are eaten fresh
3	<i>Antidesma montanum</i> var. <i>montanum</i> . (PHYLLANTHACEAE) Voucher RA387	Archal/ Dakhi (Th)	E	300-700	S	Leaves are sour in taste and used to make pickle
4	<i>Ardisia macrocarpa</i> Wall. (MYRSINACEAE) Voucher RA445	Damma- rai	CE	1500-2400	S	Ripe fruits are eaten fresh
5	<i>Ardisia solanacea</i> Roxb. (MYRSINACEAE) Voucher RA408	Bakle	WCE	200-1100	S or T	Ripe fruits are eaten fresh
6	<i>Asparagus racemosus</i> Wild. (ASPARAGACEAE) Voucher RA323	Kurilo/ Santa- war (Th)	CE	150-2100	C	Boiled tuber when consumed enhances lactation in women and cattle. Young shoots are used as vegetable.

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7	<i>Bauhinia vahlii</i> Wight & Arn. (LEGUMINOSAE) Voucher RA417	Bharlo/ Mahu- raen (Th)	WCE	200- 1300	C	Roasted seeds are eaten
8	<i>Bauhinia variegata</i> L. (LEGUMINOSAE) Voucher RA371	Koiralo/ Koilara (Th)	WCE	150- 1900	T	Buds and flowers are used to make pickle. Young tender shoots are used as vegetables
9	<i>Boehmeria rugulosa</i> Wedd. (URTICACEAE) Voucher RA437	Githi	WCE	300- 1700	H	Bark paste / powder is mixed with rice flour to prepare <i>Sel-Roti</i>
10	<i>Bombax ceiba</i> L. (BOMBACACEAE) Voucher RA328	Simal	CE	200-900	T	Flowers are used as vegetables and seeds are eaten raw or roasted
11	<i>Bridelia retusa</i> (L.) A.Juss. (PHYLLANTHACEAE) Voucher RA 325	Gayo/ Jhaijhu- wa (Th)	WCE	150- 1200	S or T	Ripe fruits are eaten fresh
12	<i>Buchanania latifolia</i> Roxb. (ANACARDIACEAE) Voucher RA324	Piyari/ Pyaruwa (Th)	WC	150- 2000	T	Fruits are sweet and sour mostly eaten by children, also used to make local liquor.
13	<i>Butea buteiformis</i> (Voigt) Grievson (LEGUMINOSAE) Voucher RA403	Bhujetro	WCE	300- 2000	S	Roasted seeds are eaten
14	<i>Callicarpa macrophylla</i> Vahl (LAMIACEAE) Voucher RA391	Dahigola (Th)	WCE	300- 1500	S or T	Ripe fruits are eaten fresh
15	<i>Cannabis sativa</i> L. (CANNABACEAE) Voucher RA401	Ganja	WCE	200- 2700	S or T	Dried leaves & seeds are mixed on <i>Laddu</i> , <i>Peda</i> , and <i>Sarbat</i> and are eaten on the occasion of

						<i>Mahashivaratri</i>
16	<i>Capparis zeylanica</i> L. (CAPPARACEAE) Voucher RA467	Karalawa (Th)	C	150	S	Young fruits are eaten as vegetables
17	<i>Ceropegia pubescens</i> Wall. (ASCLEPIADACEAE) Voucher RA469	Bansimi / Bansem (Th)	CE	900-2700	C	Young beans are used as vegetables
18	<i>Cleistocalyx operculatus</i> (Roxb.) Murr. & Perry (MYRTACEAE) Voucher RA431	Bhadrejammuno / Tenuwa (Th)	WC	200-1400	T	Ripe fruits are eaten fresh
19	<i>Commelina benghalensis</i> L. (COMMELINACEAE) Voucher RA365	Kanesag / Kermuw (Th)	WCE	900-1800	H	Young vegetative parts are used as vegetables
20	<i>Colocasia fallax</i> Schott (ARACEAE) Voucher RA388	Ghueya (Th)	C	400-2000	H	Leaves and combs are used as vegetables
21	<i>Cheilocostus speciosus</i> (J. König) C. Specht (COSTACEAE) Voucher RA423	Larkaiya	WCE	400-700	H	Young shoots are used as vegetables
22	<i>Curcuma aromatica</i> Salisb. (ZINGIBERACEAE) Voucher RA422	Banhaledo	CE	700-1100	H	The powder of rhizome is used in vegetables as turmeric
23	<i>Dendrocalamus hamiltonii</i> Nees & Arn ex Munro (GRAMINEAE) Voucher RA428	Bans	WCE	1000-2000	Bamboo	Young shoots popularly known as <i>Tama</i> are used as vegetables and to make pickle
24	<i>Desmodium oojinense</i> (Roxb.) H. Ohashi (LEGUMINOSAE) Voucher RA421	Sadhan / Panan (Th)	C	1200-1300	T	Flower is used to make pickle

25	<i>Dioscorea bulbifera</i> L. (DIOSCOREACEAE) Voucher RA373	Bantarul	WCE	150-2100	C	Boiled bulbs are eaten and are also used as vegetables
26	<i>Dioscorea deltoidea</i> Wall. ex Griseb. (DIOSCOREACEAE) Voucher RA308	Vyakur/Aruwa (Th)	WCE	450-3100	C	Ripe fruits are eaten. The leaf is used for making <i>Bindi</i> (cigarette)
27	<i>Diplocyclos palmatus</i> (L.) C. Jeffery (CUCURBITACEAE) Voucher RA367	Bankarella	WCE	200-1500	C	Fruits are used as vegetables
28	<i>Diploknema butyracea</i> (Roxb.) H. J. Lam (SAPOTACEAE) Voucher RA409	Chiuri	CE	200-1500	T	Nectar from flowers is drunk and ripe fruits are eaten fresh.
29	<i>Dryopteris cochleata</i> (Ham. ex K.Kon) C. Chr. (DRYOPTERIDACEAE) Voucher RA325	Niuro/Kochiya (Th)	WC	1400-3000	H	Tender leaves are used as vegetables and to make pickle
30	<i>Ensete glaucum</i> (Roxb.) Cheesman (MUSACEAE) Voucher RA407	Bankera	WCE	150-1800	S	Young fruits are used as vegetables
31	<i>Ficus benghalensis</i> L. (MORACEAE) Voucher RA330	Bar/Bargat (Th)	WCE	500-1200	T	Ripe fruits are eaten fresh
32	<i>Ficus lacor</i> Buch.-Ham. (MORACEAE) Voucher RA412	Kabro/Pakad (Th)	WC	500	T	Young buds and leaves are used to make pickle and ripe fruits are eaten fresh
33	<i>Ficus racemosa</i> L. (MORACEAE) Voucher RA415	Gullar (Th)	WC	300-1000	T	Ripe fruits are eaten fresh

34	<i>Ficus religiosa</i> L. (MORACEAE) Voucher RA413	Pipal/ Pipar (Th)	WCE	150- 1500	T	Ripe fruits are eaten fresh
35	<i>Ficus palmata</i> Forsk. (MORACEAE) Voucher RA416	Bedulo	W	600- 2700	T	Ripe fruits are eaten fresh
36	<i>Ficus semicordata</i> Buch.-Ham. Ex Sm. (MORACEAE) Voucher RA351	Khani- yo/ Khurhu (Th)	WCE	200- 1700	T	Ripe fruits are eaten fresh
37	<i>Ganoderma</i> sp. (GANODERMA- TACEAE) Voucher RA453	Chyau	WCE	70-1700	M	Plant is used as a vegetable
38	<i>Indigofera atropurpurea</i> Buch.-Ham.ex Hornem (LEGUMINOSAE) Voucher RA438	Sakhi- no/ Jhimiliya (Th)	WCE	700- 3200	S	Flowers are used as vegetables and to make pickle
39	<i>Leea macrophylla</i> Roxb.ex Hornem (LEEACEAE) Voucher RA456	Galeno	C	150- 1700	S	Ripe fruits are eaten fresh
40	<i>Mangnifera indica</i> L. (ANACARDIA- CEAE) Voucher RA442	Aanp/ Aam (Th)	WCE	300-700	T	Ripe fruit is eaten whereas unripe fruit is used to make pickle
41	<i>Mentha spicata</i> L. (LAMIACEAE) Voucher RA310	Pudina	WC	1800- 2700	H	Leaves are used to make pickle popularly known <i>Chatani</i>
42	<i>Morchella</i> sp. (MORCHELLA- CEAE) Voucher RA374	Guchi- chyau	WC		M	Plant is used as a vegetable
43	<i>Murraya koenigii</i> (L.) Spreng. (RUTACEAE) Voucher RA350	Bokejanu no/ Ban- neem (Th)	WCE	150- 1450	T	Leaves are used as flavouring agent in curry and pulses
44	<i>Neonauclea</i>	Kadam	CE	290-800	T	Ripe fruits are

	<i>purpurea</i> (Roxb.) Merr. (RUBIACEAE) Voucher RA382					eaten fresh
45	<i>Oxalis corniculata</i> L. (OXALIDACEAE) Voucher RA311	Charia- milo	WCE	300- 2900	H	Vegetative parts are used to make pickle
46	<i>Phoenix loureiroi</i> Kunth (ARECACEAE) Voucher RA394	Thakal/ Khajur (Th)	WCE	150-900	T	The pith of stem and ripe fruits are eaten fresh
47	<i>Phyllanthus emblica</i> L. (EUPHORBIA- CEAE) Voucher RA353	Amala	WCE	150- 1400	T	Fruits are eaten unripe and also used to make pickle
48	<i>Piper longum</i> L. (PIPERACEAE) Voucher RA341	Pipla	WCE	200-800	C	Fruits are used as spices
49	<i>Pisidium gujava</i> L. (MYRTACEAE) Voucher 433	Belauti/ Amrut (Th)	WCE	450- 1200	T	Ripe fruits are eaten fresh
50	<i>Pleurotus</i> sp. (PLEUROTACEAE) Voucher RA426	Chyau			M	Plant is used as a vegetable
51	<i>Reinwartia indica</i> Dumort. (LINACEAE) Voucher RA402	Pyauli	WCE	300- 2300	S	Young leaves are used as vegetables
52	<i>Schleichera oleosa</i> (Lour.) Oken (SAPINDACEAE) Voucher RA396	Kusum/ Kosam (Th)	WCE	200-300	T	Green fruit with yellow inside is sour and is eaten.
53	<i>Semecarpus anacardium</i> L.f. (ANACARDIA- CEAE) Voucher RA335	Bhalayo /Bhela (Th)	WCE	150- 1200	T	Ripe fruit is eaten but may also be allergic to some.
54	<i>Shorea robusta</i> Gaertn. (DIPTEROCARPA- CEAE)	Sal/Sa- khuwa (Th)	WCE	150- 1500	T	Boiled and roasted seeds are eaten with salt

	Voucher RA418					
55	<i>Smilax ovalifolia</i> Roxb.ex D.Don (SMILACEAE) Voucher RA447	Hana (Th)	CE	200- 1000	C	Tender shoots and leaves are used as vegetables and fruits are eaten unripe
56	<i>Solanum nigrum</i> L. (SOLANACEAE) Voucher RA411	Bulbul (Th)	WCE	900- 2900	H	Ripe fruits are eaten fresh
57	<i>Spatholobus parviflorus</i> (Roxb.) Kuntze (LEGUMINOSAE) Voucher RA377	Bhemila hara (Th)	WCE	200- 2000	C	Mature seeds can be used to make vegetable oil
58	<i>Syzygium cumini</i> (L.) Skeels (MYRTACEAE) Voucher RA392	Jamun/ Jamuwa (Th)	WCE	300- 1200	T	Ripe fruits are eaten fresh
59	<i>Tamarindus indica</i> L. (LEGUMINOSAE) Voucher RA434	Imili	CE	200-400	T	Fleshy fruit pulp is eaten or pickled
60	<i>Terminalia bellirica</i> (Gaertn.) Roxb. (COMBRETA- CEAE) Voucher RA348	Barro	CE	300- 1100	T	Roasted or unripe cotyledons of fruits are eaten
61	<i>Terminalia chebula</i> Retz. (COMBRETA- CEAE) Voucher RA347	Harro	CE	150- 1100	T	Fruits are eaten as vegetables
62	<i>Trichosanthes dioica</i> Roxb. (CUCURBITA- CEAE) Voucher RA451	Chathail (Th)	WCE	600	C	Fruits are eaten unripe
63	<i>Woodfordia fruticosa</i> (L.) Kurz. (LYTHRACEAE) Voucher RA304	Dhaya- ro/Dha- watha (Th)	WCE	200- 1800	S	Children like nectar from its flower

64	<i>Xeromphis spinosa</i> (Thunb.) Keay (RUBIACEAE) Voucher RA439	Maidalo/Main (Th)	WCE	100-1200	S or T	Young fruits are used as vegetables
65	<i>Xeromphis uliginosa</i> (Retz.) Maheshw. (RUBIACEAE) Voucher RA404	Pidar/Pedar (Th)	W		T	Fruits are used as vegetables
66	<i>Zehneria indica</i> (Lour.) Keraudren (CUCURBITACEAE) Voucher RA464	Golkakri/Dudur (Th)	E	300-1700	C	Ripe fruits are eaten fresh
67	<i>Zizyphus mauritiana</i> Lam. (RHAMNACEAE) Voucher RA383	Bayar	WCE	200-1200	S	Ripe fruits are eaten fresh

Notes: WCE, W = West, C = Central, E = East, H = Herb, S = Shrub, T = Tree, C = Climber, M = Mushroom, Th in parenthesis is Local name by Tharu community.

Table 2. Usage of WEPs by the People of Parroha VDC, Rupandehi District.

SN	Uses	Species
1	Fruits (Unripe/Ripe)	<i>Aegle marmelos, Ardisia macrocarpa, Ardisia solanacea, Bauhinia vahlii, Bridelia retusa, Buchanania latifolia, Butea buteiformis, Callicarpa macrophylla, Cleistocalyx operculatus, Dioscorea deltoidea, Ficus benghalensis, Ficus lacor, Ficus racemosa, Ficus religiosa, Ficus palmate, Ficus semicordata, Leea macrophylla, Mangnifera indica, Neonauclea purpurea, Phoenix loureiroi, Phyllanthus emblica, Pisidium gujava, Schleicheria oleosa, Semecarpus anacardium, Shorea robusta, Smilax ovalifolia, Solanum nigrum, Syzygium cumini, Tamarindus indica, Terminalia bellirica, Trichosanthes dioica, Zehneria indica, Zizyphus mauritiana</i>
2	Vegetable	<i>Asparagus racemosus, Bauhinia variegata, Bombax ceiba, Capparis zeylanica, Ceropogia pubescens, Commelina benghalensis, Colocasia fallax, Cheilocostus speciosus,</i>

		<i>Dendrocalamus hamiltonii</i> , <i>Dioscorea bulbifera</i> , <i>Diplocyclos palmatus</i> , <i>Dryopteris cochleata</i> , <i>Ensete glaucum</i> , <i>Ganoderma</i> sp., <i>Indigofera atropurpurea</i> , <i>Morchella</i> sp., <i>Pleurotus</i> sp., <i>Reinwartia indica</i> , <i>Smilax ovalifolia</i> , <i>Terminalia chebula</i> , <i>Xeromphis spinosa</i> , <i>Xeromphis uliginosa</i>
3	Pickle (<i>achaar</i>)	<i>Antidesma montanum</i> var. <i>montanum</i> , <i>Bauhinia variegata</i> , <i>Dendrocalamus hamiltonii</i> , <i>Desmodium oojeinense</i> , <i>Dryopteris cochleata</i> , <i>Ficus lacor</i> , <i>Indigofera atropurpurea</i> , <i>Mangnifera indica</i> , <i>Mentha spicata</i> , <i>Oxalis corniculata</i> , <i>Phyllanthus emblica</i> , <i>Tamarindus indica</i>
4	Nectar from flower	<i>Diploknema butyracea</i> , <i>Woodfordia fruticosa</i>
5	Miscellaneous uses	<i>Acacia catechu</i> , <i>Boehmeria rugulosa</i> , <i>Buchanania latifolia</i> , <i>Cannabis sativa</i> , <i>Curucma aromatica</i> , <i>Dioscorea deltoidea</i> , <i>Murraya koenigii</i> , <i>Piper longum</i> , <i>Spatholobus parviflorus</i>