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ETHNOMEDICINAL PLANTS USED BY INDIGENUS PEOPLE OF SOME VILLAGES IN TADI BASIN, NUWAKOT DISTRICT, NEPAL

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ABSTRACT

99 species belonging to 57 families, used by the local people of the Tadi basin, Nuwakot District, Nepal are reported based on a field survey. Local people have remarkable detailed knowledge of species identity, characteristics and their specific uses. At present, these traditional knowledge's and practices are disappearing particularly due to unplanned land use change and overexplotation of the species. Some species are under serious threat indicating urgent need of documentation of useful plants with their uses and conservation of their habitats.

INTRODUCTION

The plant resources play a key role in the life and economy of rural people living in and around forests of Nepal. Uses of the various parts of the medicinal plants and their products have made impacts on the livelihood of the local people and also on the rural development. Though some initiatives have taken to conserve some areas including village forests in the form of the community forests and protectecd areas, the study on the distribution and usefulness of the useful species is very fragmentary and mearged (Bhattarai,1989; Manandhar,1991; Joshi *et al* 2003; Joshi, 1991, 1992, 2004; Koppert, 1986). In this context, an attemp has been made to fill up the gaps studying and documenting the useful species and indigenous knowledge regarding the uses of the species by the local people.

STUDY AREAS AND METHODOLOGY

The present ethnobotanical study was carried out in the villages (Chaughada, Ganeshthan, Kabilas, Narjamandap, Panchakanya, Raluka devi, Sundara devi, Samudratar, Balkumari, Gaukhark, Thaprek and Betini) and surrounding areas of the Tadi basin. The study areas possess diverse physical, biological and social characteristics. The terrain is characterized by moderate to steep hill slopes primarily of gneisses, slates, shales, quartzites, limestones, dolamites, phyllites and quartz schist. The river bed is covered by a low level alluvium consisting of bouldery gravel, sand and silt. The climate of the area is temperate and sub-tropical climate with a hot and wet summer and a rather cool and comparatively dry winter. About 82 per cent of the total annual precipitation occurs within 4 summer months (June to September). The study area is endowed with rich and varied vegetation zones with various ecosystems i.e. forests, open shrubs and grasslands, due to its diverse topography and variable climatic condition. Land which is not cultivated consists of open grassland, wooded grassland and secondary forest. In places where the grass is not cut for fodder a densely woodland develops, and often takes the form of a secondary forest dominated by a few large and many small trees. The major trees are *Pinus roxburghii, Schima wallichii, Shorea robusta, Quercus semicarpifolia* and *Q.lanata.* The human pressure on these resources is very heavy. The Tadi basin and surrounding areas are inhabited by different ethnic groups (bhahmin, chhetri, newar, tamang, gurung, damai, kami etc.), with rich in traditional knowledge and practices.

Several field trips in and around the study areas were undertaken during the years 2008 to 2010. Ethnobotanical information was gathered mainly through RRA and open-ended participatory discussions with local informants and by direct observations on the way different plant materials were being collected and used (Joshi and Edington, 1990; Joshi, 2004).The taxonomic identity of the plants was determined with the help of local floras. Voucher specimens are deposited in the Department of Botany, Patan Campus, Tribhuvan University, Nepal and Biodiversity Documentation Center, Environmental Management Action (EMA) Group, Kathmandu, Nepal.

RESULTS AND DISCUSSION

During the field survey, ethnobotanical information of 99 species of plants belonging to 57 families has been collected from various habitats of the study area (Table 1). The data on the medicinally important plants indicate that 30 species were used to treat gastrointestinal disorders, 22 for dermatological illness; 27 for fever, cough, headaches and respiratory ailments, 15 illness of the skeletal and muscular system, 8 for genito-urinary complains, 3 for cardiovascular complaints, 3 for dental problems and 19 for others.

Table 1. Plant species and their traditional medical uses in the Tadi basin and surrounding areas

Species, Family and Nepali name	Habitat	Parts used and Uses
Achyranthes aspera L. (Amaranthaceae) 'Apamarga'	Forest	root juice is taken to cure asthema; stem is used as toothbrush.
Acorus calamus L. Araceae "Bojho"	Mershy places	rhizome is crushed to paste and then applied externally to cure scabies.
Adiantum capillus-veneris L. (Adiantaceae) 'Rani uneu'	Stone crevices and rocky slopes	green leaves are pounded in water and juice is applied to the affected area of skin infection; dried leaf is decocted and then drunk to treat cough and fever.
Adiantum caudatum L. (Adiantaceae) 'Uneu'	Stone crevices and rocky slopes	dried leaf is decocted and then drunk to treat cough and fever.
Aegle marmelos (L.) Correa (Rutaceae) 'Bel'	Forest	decoction of leaves is taken to cure diabetes.
Ageratum conyzoides L. (Asteraceae) 'Ganmane ghaans'	Waste grounds	leaves are crushed and paste is applied on cuts and wounds for rapid healing; plant paste is also applied to cure rheumatic problems.
Allium wallichii Kunth. (Amartllidaceae) 'Banlasun'	Forest	bulb is supposed to be a good appetizer and used to cure indigestion.

Alnus nepalensis D. Don (Betulaceae) 'Uttis'	Exposed slopes, riversides	powdered bark used to treat cuts and burns.
Alternanthera sessilis (L) DC (Amaranthaceae) 'Bhiringi Jhaar'	Forest, scrub, edges of cultivated field	root is pounded in water and the juice is drunk to treat fever and to cure bloody dysentery; plant juice is applied for healing cuts and wounds.
Amaranthus spinosus L. (Amaranthaceae) 'Lunde'	waste open grounds	fresh plant decoction is drunk to check excessive menstrual flow; crushed leaves and roots are applied to the infected parts of skin.
Amaranthus viridis L. (Amaranthaceae) 'Lunde'	edges of the cultivated fields	plant is boiled with water and liquid is given to cure diarrhoea and dysentery.
Artemisia indica Willd. (Asteraceae) 'Titepati'	Forest, scrub, cultivated field	leaf juice is applied in the affected parts to treat skin disease.
Arisaema tortuosum (Wall.) Schott. (Araceae) 'Sarpa ko maikai'	Forest floor, open places	roots are used to kill worms.
Artemisia japonica Thunb. (Asteraceae) 'Titepati'	Forest, scrub, cultivated field	plant power is taken with water to kill roundworms.
Asparagus racemosus Willd. (Liliaceae) 'Kurilo'	Cultivated field	young shoot is cooked and taken as vegetable to recover weakness after long illness.
Azadirachta indica A. Juss. (Meliaceae) 'Neem'	Forest	leaf extract is applied externally on wounds, cuts, boils, blisters and skin diseases; root juice is drunk to cure fever.
Bauhinia variegate L. (Fabaceae) 'Koiralo'	Forest, cultivated field	flowers and floral buds are taken to treat stomach pain and diarrhoea; dried buds boiled with water and filtered liquid is taken orally to reduce blood pressure.
Berberis asiatica Roxb. ex DC (Berberidaceae) 'Chutro'	Forest, open meadow, sunny trail side	decoction of stem used for rheumatism; extract of root used as blood purifier.

Bidens pilosa L. (Asteraceae) 'Kurkur'	Edges of cultivated field, scrubs, wasteland	leaves extract is used to check bleeding as well as for healing of wounds; leaf juice is applied on eye to cure eye trouble.
Boenninghausenia albiflora (Hook.) Reichenb. ex Meisn. (Rutaceae) 'Dampate'	Forest	leaf decoction is drunk to cure fever.
Buddleja asiatica Lour. (Loganaceae) 'Bhimsenpati'	Open place	leaf paste is applied on affected part of skin.
Cannabis sativa L. (Cannabaceae) 'Gaanja, Bhanng'	Open places, wasteland	crushed plant is taken to relieve pain; seed paste is taken to relieve diarrhoa and dysentery.
Cassia occidentalis L. (Fabaceae) 'Thulo tapre'	Forest, open place	seeds are given to cure cough.
Cassia tora L. (Fabaceae) 'Tapre'	Sunny places	seed power is consumed to treat stomach pain and itches; root bark is pounded and paste with albumen of hen's egg is then applied for healing bone facture.
Castanopsis tribuloides (Sm) A. DC (Fagaceae) 'Musure katus'	Forest	bark paste is applied to cure snakebites.
Centella asiatica (L.) Urban (Umbelliferae) 'Ghortapre'	Forest, edges of cultivated field, moist places	crushed leaf and root extract is applied to affected part of the skin, and is also applied to relieve rheumatic pain.
Chenopodium album L. (Chenopodiaceae) 'Bethe'	Waste land, cultivated field, scrub	seeds are chewed to cure abdominal pain; plant juice is taken orally for treatment of pain of joints.
Choerospondias axillaris (Roxb) B.L. Burtt & A. W. Hill (Anacardiaceae) 'Lapsi'	Forest	fruit juice is taken to treat cough and cold; burned seed ash is applied on burns and boils.

Cinnamomum tamala (Buch-Ham) Nees & Eberm. (Lauraceae) 'Tejpat'	Forest	leaves are boiled with jwanu, besar and aduwa and the mixture is used for cough; bark is used for curing piles.
Clematis buchananiana DC (Ranunculaceae) 'Junge lahara'	Forest	leaf paste is applied on blisters and wounds.
Colebrookea oppositifolia Sm. (Labiatae) 'Dhusure'	Forest	infusion of root is given for relieving tonsilites; leaf juice is used in fever and headache; dried leaves are inhaled to cure sinusitis.
Coelogyne coryonbora L. (Orchidaceae) 'Chandigava'	Epiphyte on *Schima* and *Castanopsis* sp., Forest	juice of pseudobulb is applied on cuts, wounds and burns.
Cuscuta reflexa Roxb. (Convolvulaceae) 'Akaashbeli'	Waste land, cultivated field	plant juice is taken to cure jaundice.
Cynodon doctylon (L.) Pers (Poaceae) 'Dubo'	Waste land, forest floor, scrub	plant juice is applied on fresh cuts.
Cyperus rotundus L. (Cyperaceae) 'Mothe'	cultivated fields	root juice is drunk as an anthelmenthic medicine to treat intestinal worms; root tuber paste is given to treat stomach trouble.
Dalbergia sissoo Roxb. ex DC. (Fabaceae) 'Sisau'	Forest, riverbanks	bark is boiled and taken to control high fever; decoction of leaf is applied for gonorrhoea.
Datura metel L (Solanaceae) 'Kalo dhaturo'	waste places	dried old leaf power and ripe seeds are used for treatment of asthma; fruit powder is taken to cure rheumatic fever.
Datura stramonium L. (Solanaceae) 'Seto dhaturo'	Waste land, roadside	leaf juice is mixed with hot oil and applied on affected part to relief muscular pain.

Discorea bulbifera L. (Discoreaceae) 'Githa'	Forest	tuber paste is applied to cure piles.
Drymaria cordata (L) Willd. ex Roemer & Schultes (Caryophyllaceae) 'Abhijaaloo'	Forest	plant paste is applied on forehead to treat headache.
Equisetum debile Roxb. ex Vaucher (Equisetaceae) 'Kurkure'	shady moist place	plants are pounded and paste is then applied in bone facture.
Eupatorium adenophorum Spreng (Asteraceae) 'Banmara'	Shrubby and open dry places	juice of leaves is applied on cuts and wounds.
Euphorbia hirta L. (Euphorbiaceae) 'Dudhijhar'	Forest, Scrub	root paste is applied on boils while milky sap for eye trouble.
Euphorbia royleana Boiss (Euphorbiaceae) 'Shiudi'	Open and dry places	latex is applied in cut to stop bleeding; young leaves juice is applied on earaches.
Eurya cerasifolia (D. Don) Kobuski (Theaceae) 'Sano jhingani'	Forest	juice of leaves is used for treatment of skin disease and stomach disorder.
Ficus benghalensis L. (Moraceae) 'Bar'	Roadsides	latex as medicine for treatment of genitial diseases.
Ficus hispida L.f. (Moraceae) 'Khasreto'	Roadsides, forest	stem bark with decoction of peppers twice a day for treatment of gonarrhea; latex with mustard oil as cure for scabies.
Ficus religiosa L. (Moraceae) 'Pipal'	Roadsides	latex is applied on the affected parts of skin; bark is chewed to treat stomach pain.

Fraxinus floribunda Wall. (Oleaceae) 'Lankure'	Sunny and shady places	bark is boiled with water and the gelatinous paste is then applied for curing body pain.
Gaultheria fragrantissima Wall (Ericaceae) 'Dhasingare'	Forest, shady place	leaves and immature fruit are consumed to treat gastric trouble; oil from seed is used in massaging the body to get relief from pain.
Hedera nepalensis K. Koch. (Araliaceae) 'Dudelaa'	Forest	stems and leaves are crushed and paste the applied on the affected part of skin.
Hypericum cordifolium Choisy (Guttiferae) 'Areto'	Forest, scrub	seeds are used in treatment of internal injuries.
Inula cappa (Buch.-Ham. ex D. Don) DC (Asteraceae) 'Gai tihare'	Forest, scrub	root juice is taken to treat gastritis and indigestion.
Jatropha curcas L. (Euphorbiaceae) 'Sajiwan'	Village hedges, roadsides	twing is used as toothbrush; latex with mustard oil is used to cure skin disease like scabies; latex is also applied on fresh cuts and burned wounds.
Justicia adhatoda L. (Acanthaceae) 'Asuro'	Roadside, edges of cultivated field, scrub	fresh leaves are pounded and the juice is drunk to cure cough, bronchitis and asthma; fresh leaves are crushed and the paste is then applied on the affected part to relieve rheumatic pain.
Juglans regia L. (Juglandaceae) 'Okhar'	Forest	bark decoction is taken as anthelmintic.
Lyonia ovalifolia (Wall.) Drude (Ericaceae) 'Angeri'	Forest	infusion of young leaves is applied for skin diseases.

Maesa chisia Buch.-Ham ex D. Don (Myrsinaceae) 'Bilauni'	Forest	plant juice is applied on the skin to treat ring worm.
Mahonia nepaulensis DC (Berberidaceae) 'Jamanemandro'	Forest	decoction of dry berries is used to cure dysentery.
Magnifera indica L. (Anacardiaceae) 'Anp'	Common on wild and cultivated areas	bark is pounded and the juice is drunk to cure stomach trouble; seed powder is taken with water to treat diarrhoea; ripe fruit is eaten.
Mimosa pudica L. (Fabaceae) 'Lajjabati'	Forest, scrub, open place	root juice is taken for fever and cough.
Mollotus philippensis (Lam.) Mull. (Euphorbiaceae) 'Sindure'; 'Rohini'	Forest, scrub	powder from fruit is used for scabies.
Myrica esculenta Buch.-Ham. ex D. Don (Myricaceae) 'Kaphal'	Forest, cultivated fields	steambark is decocted and the decoction is drunk to treat bronchitis.
Nardostachys grandiflora DC (Valerianaceae) 'Jatamansi'	Forest	rhizome paste is applied to treat piles; root is decocted and decoction is taken to cure fever and cough.
Nephrolepis cordifolia (L.) C. Presl. (Nephrolepidaceae) 'Panisaro', 'Pani amala'	Shady places	water bulbs are taken to cure Leocorrhea.
Ocimum basilicum L. (Labiatae) 'Babari phol'	waste places, under shed and in open places	leaf juice with honey is drunk for treatment of cough and cold; seeds are taken to treat chest pain.
Oroxylum indicum (L.) Kurz (Bignoniaceae) 'Tatelo'	Forest	seed paste is applied on boils.

Osbeckia nepalensis Hook. (Melastomataceae) Late angeri	Forest	leaf decoction is applied on wounds.
Osyris lanceolata Huchstetter & Steudel (Santalaceae) 'Nundhiki'	Forest	infusion of bark and leaves are used to treat swelling and the dislocatied bone.
Permna interrupta Wall. Ex Schauer (Verbenaceae) 'Ginderi'	Forests, scrub	root paste is applied on the affected areas to relieve rheumatic pain; decoction of root is taken to treat stomach disorder.
Persicaria barbata (L) H. Hara (Polygonaceae) 'Pire'	Riverside, moist place, forest	root paste is applied to cure scabies.
Persicaria hydropiper(L) Spach (Polygonaceae) 'Pire jhar'	Common in wet places	root is decocted and the juice is drunk for treatment of removing stone from urinary bladder.
Phragmites karka (Retz.) Trin.ex Steud. (Poaceae) 'Narkat'	Roadside, cultivated field	root paste is applied on the skin of factured bones.
Phyllanthus emblica L. (Euphorbiaceae) 'Amla'	Forest, scrub	bark juice ia taken orally to treat dysentery.
Pinus roxburghii Sargent (Pinaceae) 'Rani salla'	Forest	resin is applied on cuts and boils.
Plantago major L. (Plantaginaceae) 'Isabgol'	Open moist place, roadside	pounded leaves are applied to cuts and wounds.
Prunus cerasoides D. Don (Rosaceae) 'Paiyu'	Forest	leaves for curing bone facture.

Psidium guajava L. (Myrtaceae) 'Amba'	Forest, cultivated field	bark is decocted and the juice is taken to treat stomach pain.
Pteridium aquilinum (L) Kuhn. (Dennstaedtiaceae)	Exposed area, moist places	decoction of rhizome is used for the treatment of spleen.
Punica granatum L. (Punicaceae) 'Anar'	Forest	bark is pounded and infusion is taken to cure stomach trouble.
Pyrus pashia Buch.-Ham. ex D. Don (Rosaceae) 'Mayal'	Open and shady places, forest	ripe fruits are eaten; fruit juice is taken to cure dysentery.
Rhododendron arboreum Smith (Ericaceae) 'Laligurans'	Forest	paste of young leaves are applied on fore-head to get relief from headache.
Ricinus communis L (Euphorbiaceae) 'Adher'	waste ground	oil obtained from the seeds is applied to cure burn wounds, root is used to cure rheumatic pain; decoction of leaves and flower is used in skin infection and to cure lepsory; fruit is used to cure skin disease.
Rubia manjith Roxb. ex Fleming (Rubiaceae) 'Majitho'	Forest, Scrub	dried root power is used as tonic; root is decocted and the decoction is taken to get relief from stomach pain.
Rubus ellipticus Smith (Rosaceae) 'Ainselu'	Open place	young shoot and roots are used for curing fever.
Rubus fockeanus Kurz. (Rosaceae) 'Bhui ainselu'	Forest, open place	root paste is taken dysentery.
Rumex nepalensis Spreng (Polygonaceae) 'Halhale'	Wasteland, roadsides, scrub	crushed leaf extract is applied to cuts and wounds; root paste is applied to scabies
Schima wallichii (DC) Korth. (Theaceae) 'Chilaune'	Forest	bark powder is taken with water for the treatment of gastritis.

Shorea robusta Gaertn. (Dipterocarpaceae) 'Sal'	Forest	stem bark decoction is used to cure dysentery and gastritis.
Solanum nigrum L. (Solanaceae) 'Jungali bihi', 'Kaalo bihi'	open place, wasteland	plant juice is applied to treat wounds.
Solanum xanthocarpum Schrader & Wendl. (Solanaceae) 'Kanthakari'	Wasteland, forest	seeds are chewed to treat tooth problems; fruit is used to cure headache and body pain.
Swertia chirayita (Roxb. ex Fleming) H. Karstrn (Gentianaceae) 'Chiraito'	Forest and open scrub area	leaves and stems are used for curing fever; plant decoction is used as tonic and anthelmintic.
Tamarindus indica L. (Fabaceae) 'Tate amilo'	Forest, cultivated field	leaves are pounded and paste is then applied to treat muscular and rheumatic pain; stem bark decoction with common salt is used to cure colic and indigestion.
Taraxacum officinale F.H. Wigg. (Asteraceae) 'Tukiphool'	Open place, forest	root is pounded and infusion is drunk to cure jaundice and kidney disorder.
Tridax procumbens L. (Asteraceae) 'Kurkure Jhar', 'Putali jhar'	Forest, scrub	plant paste is applied to boils or pimples; plant juice is taken orally to treat fever.
Urena lobata L. (Malvaceae) 'Naalu Kuro'	Forest, scrub	tender leaves are crushed in water and the juice is drunk to treat intestinal worms; fruit is cut into small pieces, then decocted and the decoction drunk to stop diarrhoea; root is chewed to treat cough.
Urtica dioica L. (Urticaceae) 'Sisnu'	Scrub, wasteland, roadside	tender shoot is used as vegetable to cure diabetes.
Zanthoxylum armatum DC (Rutaceae) 'Timur'	Forest	fruits are crushed and taken to cure stomach pain and cough.
Zizyphus incurve Roxb. (Rhamnaceae) 'Hadebayer'	Scrub	bark juice is used to cure diarrhoea.

INDIGENOUS KNOWLEDGE, PRACTICES AND DOCUMENTATION OF THE USEFUL PLANT SPECIES AND PRODUCTS

The studied villages of the Tadi basin are rich in diverse useful species and traditional knowledge system due to cultural and environmental diversity of the area. The people of the villages have developed an unique indigenous knowledge on the uses of existing medicinal plant resources due to constant association with the forest ecosystems. This information is important for the local economic development and the economic upliftment of the local communities. Hence priority should be given to develop a system related to the documentation the useful species and existing traditional knowledge and practices relating to the uses of the plants.

IMPACTS ON LIVELIHOOD OF THE RURAL PEOPLE

The rural people rely on plant resources for their domestic needs and traditional medicine. They collect the useful plants and their parts from various habitats such as forests, scrubs, grasslands, cultivated fields, wetlands and riverbanks and use them following traditional knowledge and practices. At present, these ethnobotanical information is being eroded as a result of unsustainable practices and over-exploitation of natural resources. The loss of traditional knowledge within cultures undergoing rapid change is just as irreversible as the loss of species (Joshi and Joshi, 2000). During the field study it was found that the local people are very eager to take part in the activities related to collection, domestication and sustainable use of resources. Their needs and interest can be used in the ethnobotanical works and help to generate income and benefits.

CONSERVATION OF SPECIES AND PEOPLE PARTICIPATION

The deforestation and habitat destruction due to land use change and over grazing have posing a serious threat to the species. Some of plants such as *Allium wallichii, Coelogyne coryonbora, Nardostachys grandiflora, Zanthoxylum armatum* are under threat. Hence, efforts should be directed to investigate the useful species and their habitats and initiatives should also be taken to the conservation of habitats and sustainable uses involving the local people.

CONCLUSION

Wild plants are widely used in the healthcare practices in the villages of the Tadi basin. The rural people have a rich traditional knowledge system related to utilisation of plant resources in a sustainable manner. But the trend of decline of abundance of some very useful species and unsustainable practices show that action for conservation is urgently needed in this area. Priority should be given to implement conservation activities with integrated approach for sustainable development.

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