Ethnomedicinal Values of Weeds in Kanchanpur District, Far-Western Nepal

Man Dev Bhatt, Yagya Prasad Adhikari and Ripu Mardhan Kunwar

Research

Abstract

Background: Far-Western Terai Region of Nepal is a large source of floral diversity. Most of the plants are medicinal and available as wild or weeds. Weeds are unwanted plants and competing with crop plants for common resources (water, mineral nutrients, space, and light) and reduce the yield of wanted plants. However, the weeds and their medicinal properties were scarcely documented. The aim of the present study was to explore the diversity of commonly used weeds of Kanchanpur district, to be precise on cataloguing the indigenous knowledge how local weeds are managed and utilized by local people.

Methods: The study district is border to India at southwestern part of the country. The information of weeds and their medicinal uses was collected by using semi-structured questionnaires in which participatory rural appraisal (PRA) and rapid rural appraisal (RRA) tools were used. The quantitative data were analyzed by use value (UV), informant consensus factor (ICF), Fidelity Level (FL), and Relative Frequency of Citation (RFC).

Results: A total of 108 weed species were recorded under 44 families as medicinal to treat different ailments. Among them, 79 species were dicotyledons, 25 monocotyledons (19 grasses and 6 sedges species) and 4 pteridophytes. The composition of species to their respective families showed the highest (12%) occurrence by families Poaceae and Asteraceae with first rank and the lowest (1%) occurrence by families Alismataceae and Typhaceae with sixth rank category. Weed species were being used as similar to other plant species used for ethnobotany, however the use as ethnomedicinal was remarkable. The medicinal use of weeds with the highest Informant Consensus Factor (ICF) (0.75) was for fever and in palpitation of heart and the lowest ICF (0.45) for paralysis and arthritis. The Use Value (UV) and Relative Frequency of Citation (RFC) were used to demonstrate that which weeds could be further used for pharmacological study and advancement of drug discovery.

Conclusions: The finding proved the significance of weeds as medicine so there is a dire need to create awareness among the people for conservation and sustainable use of these weeds. Although weeds are undesirable plants, but they have high medicinal values, thus their controlled cultivation might be necessary as extensive cultivation may have bad impact on normal crops. The information of weed species and their use to treat various ailments must be explored, preserved, documented, and transferred from generation to generation.

Keywords: Ethnomedicine, Indigenous knowledge, Kanchanpur, Nepal, Weeds.

Correspondence

Man Dev Bhatt[1], Yagya Prasad Adhikari[2*] and Ripu Mardhan Kunwar[3]

[1]Siddhanath Science Campus, Tribhuvan University, Mahendranagar, Nepal
[2]University of Bayreuth, Universitätsstr. 30, 95447 Bayreuth, Germany
[3]Ethnobotanical Society of Nepal, Kathmandu, Nepal

[*]Corresponding Author: Yagya.Adhikari@uni-bayreuth.de

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Background

Jethrotull (1731) was the first person to use the word weed in this sense in literature in his famous writing on 'Horse Hoeing Husbandry'. This meaning of weed does not identify a particular portion of plant kingdom. Weeds are unwanted and undesirable plants, which interfere the utilization of land and water resources and thus adversely affect human welfare (Rao 1983). Weeds are understood as plants that are successful in human-disturbed habitats. Weeds are those plants which are being harmful and burden the agricultural operations, increase labours, add impact the cultivation and reduce the crop yields (Sen 2000). Out of 30,000 plant species identified as weeds, 350 are noxious and about 80 are known to reduce crop yield (Matsunaka 1970, De Datta 1977, Smith *et al.* 1977, Barrett & Seaman 1980, Holm *et al.* 1991, Sauerborn 1999, Bhatt *et al.* 2004). The first record of ecological and floristic survey of weed in Nepal was done by Numata (1965) in eastern part of Nepal and by Chaudhary (1968) in southern part of Nepal. Similarly, Bhatt *et al.* (2007) listed 61 weed species from paddy fields of Mahendranagar, Far-western Nepal. There are other reports of some common weeds as well as aquatic weeds in Nepal, which are mostly based on various crop fields (Chaudhary 1971, Dangol *et al.* 1988, Ranjit & Bhattarai 1988, Thapa & Jha 2004). Moody (1986) made a review of limited published information dealing with weeds or weed control in Nepal and listed 207 species belonging to 51 families.

Ethnomedicine and their traditional knowledge is a good illustration of poor communities living in the remote areas, fighting even incurable diseases through the traditional methods and even for their livestock through these traditional herbal medicines (Raut *et al.* 2012). In India, Pattnaik and Mohapatra (2010) reported that the interior areas of Koraput district, plants become the only source of medicine because lack of modern facilities and remoteness. Today, according to the World Health Organization (WHO), as many as 80% of the world's people depends on traditional medicine and in India, 65% of the population in the rural areas use Ayurveda medicinal plant to help meet their primary healthcare needs (WHO 2002). Similarly, Dobhal *et al.* (2006) reported 18 weeds are of medicinal importance and used against many diseases in north west Garhwal Himalayas of Uttaranchal, India.

However, it is interesting to recite a fundamental concept of weeds: Can a single species be a weed as well as an useful plant? Ethnobotanical studies in Bolivia (Bentley *et al* .2005) illustrate the multiple roles of weeds. The same plant can be a weed in one place and a beneficial plant in another (Zimdahl 2018). Baral *et al.* (2017) highlighted the ethnobotany of weeds of Panchase area, Kaski district. Bhatt & Kunwar (2020) documented ethnobotany of some weeds of Kanchanpur district. In our previous study, we reported the ethnobotanical uses of different plants species, and some weed were also found to be used for medicinal purposes. Thus, in this study, we performed extensive survey focused specially on weeds. The use of weeds for a medicinal purpose is immemorial like other medicinal plants for treating various diseases since long (Zimdahl 2018).

Different parts of the weeds are used for different medicinal purposes by the local peoples through various modes of application to cure different diseases. Crude drugs are prepared from the weeds in the form of infusion, decoction, extraction, paste, and powder. Therefore, knowledge on weed is essential for development of both economically and environmentally acceptable management systems (Bhowmik 1997). In this study, we studied the composition of weed species and documented the indigenous knowledge of weed ethnomedicine possessed by different ethnic groups in Kanchanpur district, Far-western Nepal.

Materials and Methods

Study area

Two field surveys were carried out in 2018 and 2019. A total of 100 respondents from seven municipalities (Bheemdatt, Bedkot, Belauri, Krishnapur, Mahakali, Punarbas and Shuklaphanta) and two rural municipalities (Beldandi and Laljhadi) of Kanchanpur district of Far-western Nepal were interviewed. Kanchanpurdistrict, 28^{o} 38''-29^{o} 28'' N latitudes and 80^{o} 03''-80^{o} 33'' E longitudelies at tropical lowland zone and ranges between the altitude 176 and 1,528 meters above sea level (m asl) (Figure 1). Due to the lowland type of feature and poor drainage, water logging in the fields is a major problem, promoting weeds (Bhatt & Kunwar 2020).

Ethnobotanical study and Quantitative analysis

The 100 respondents included farmers, traditional healers (Vaidyas), and elder persons and their age ranged from 30-80 years. The plant species referred to be useful by respondents were collected, pressed, dried, mounted and preserved based on standard methods as given by (Forman & Bridson 1989). Before preservation all the collected vouchers were examined and identified with the help of literature (Hooker 1872, Hara *et al.* 1978, 1982, Hara & Williams 1979, Grierson & Long 1983, Press *et al.*2000). Furthermore, the species were confirmed by comparing with herbarium specimens deposited at KATH (National Herbarium and Plant Laboratories, Godawari, Lalitpur, Nepal), TUCH (Tribhuvan University Herbarium, Department of

Botany, Kirtipur, Kathmandu), and Department of Botany, Siddhanath Science Campus, Mahendranagar. All voucher specimens were deposited at Department of Botany, Siddhanath Science Campus, Mahendranagar. Scientific name of plants and their families were verified with referring to the plant list (http://www.theplantlist.org/).

Information about vernacular name of the weed and parts used to treat the specific disease were collected through questionnaires and interviews (Kunwar *et al.* 2019). The parts of plants were ordered into various categories root, stem, leaf, and flower and following data analysis was conducted

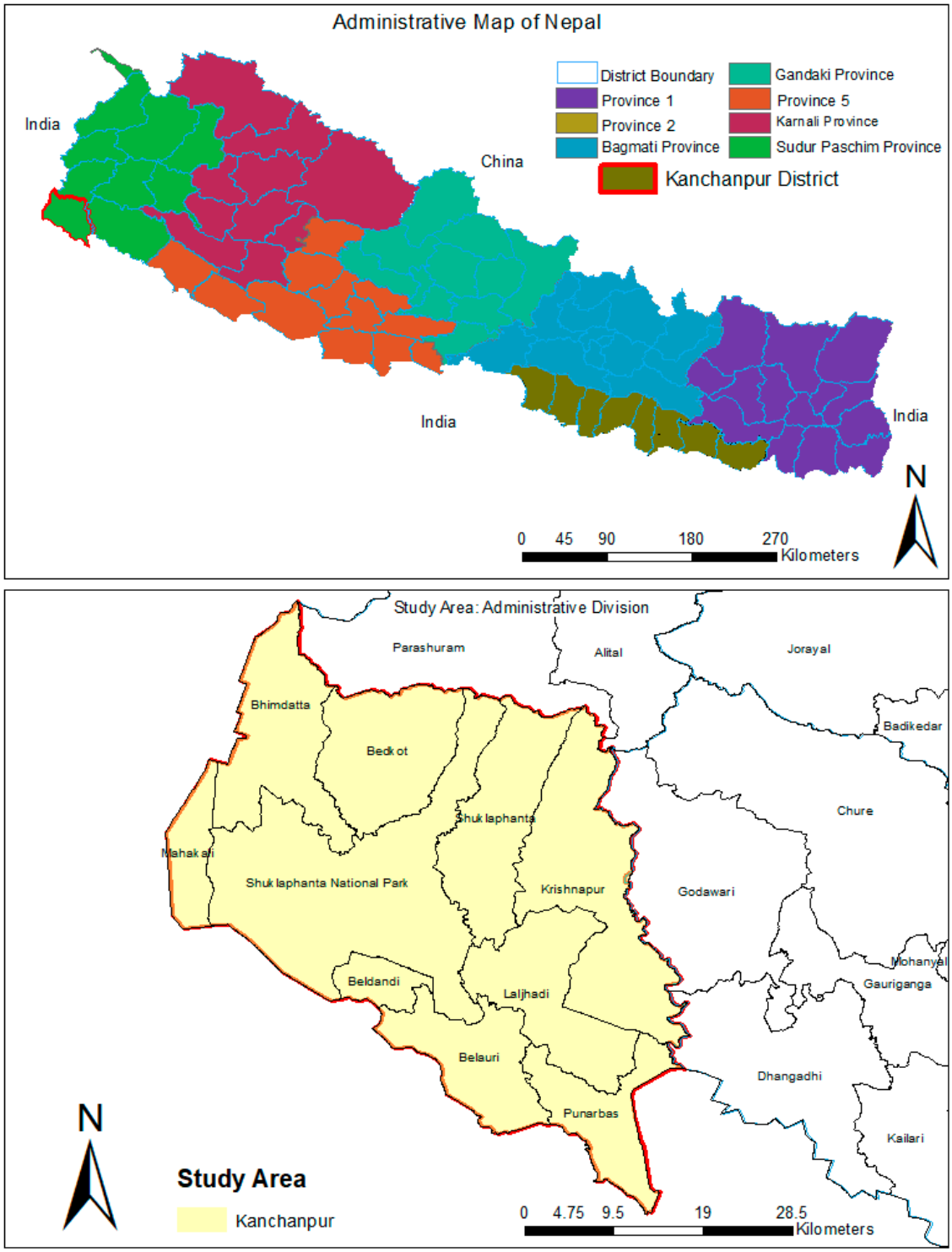

Figure 1. Map of Nepal showing Kanchanpur District

Use Value (UV)
Use Value (UV) was determining the relative importance of given species collected from the area. It was calculated by following formula used by Rehman *et al.* (2020).

$$UV = \sum U/N,$$

In this formula, U refers to the number of citations per specific plant and N represents the number of informants.

Informant Consensus Factor (ICF)
Information of related homogeneity mixture of disease category obtained from informants was by following formula used by Rehman *et al.* (2020).

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

Where, Nur describes the number of use citations from informants for a particular plant-use category and Nt represents the number of species or taxa utilized by all the informants for that specific plant use category. ICF had range between 0 to 1, where ICF value 1 indicated highest level of informant consent and 0 was the lowest value.

Fidelity Level (FL)
The fidelity level was used to search out the important advance species related to medicines as per Rehman *et al.* (2020).

$$FL (\%) = Np/N\times 100$$

Where, Np for the number of species that is present in specific category. For accurate sum consumption for species symbol N was used.

Relative Frequency of Citation (RFC)
RFC was calculated by following formula Rehman *et al.* (2020).

$$RFC= RC/N.$$

In this formula, FC was the number of informants for the use of that species and the N represents the total number of informants in the survey.

Results

A total 108 species of weeds under 44 families were recorded. Of the families, Asteraceae and Poaceae each possessed 13 species followed by Fabaceae (6) species, Cyperaceae (5) species, Scrophulariaceae (5) species, Amaranthaceae, Malvaceae and Eupherbiaceae (5) species each, Leguminosae (4) species, Acanthaceae, Lamiaceae, Commelinaceae (3) species each and, Convolvulaceae, Polygonaceae, Pteridaceae, Solanaceae (2) species each and the remaining families (27) had one species each (Table 1). Out of the 108 species, 79 species were Dicotyledons, 25 Monocotyledons (19 grasses and 6 sedges species) and 4 pteridophytes (Table 2). The dominance of family were dicots 34 (77.27%), monocot 7 (15.91%) and pteridophytes 4 (6.82%) (Table 2).

In the present study a total of 15 species are reported as world's worst weeds like *Ageratum conyzoides, Amaranthus viridus, Commelina benghalensis, Cyanodon dactylon, Cyperus rotundus, Cyprus difformis, Digitaria ciliaris, Echinochola colona, Echinochola crus-galli, Eclipta prostrata, Elusine indica, Fimbristylis dichotoma, Lantana camara, Marsilea minuta, Parthenium hysterophorus,* as per Holm (1991) in the study area (Table 1).

Medicinal values of weeds
All weed species reported in this study are being used in different medicinal uses, revealed that weeds are equally worth in local medicine. Different parts of the weeds such as whole plant, leaves, stem, and leaves, leaves and fruit, leaves and root, flower, root, leaves and flower and fruit, seeds, etc. are used for different medicinal purposes. Leaves only were frequently used (34.25 %), followed by whole plant (31.48 %), stem and leaves 11.11 %, leaves and fruits 5.55 %, leaves and roots 6.48 %, root 5.55 %, flowers, and fruits, 1.85%, seeds 2.77 % (Figure 2). Crude drugs were prepared from the weeds in the form of infusion, decoction, extraction, paste, powder, etc.

Pharmacological and derivative analysis
Weeds having highest use value (UV) and Relative Frequency of Citation (RFC) value were reported by maximum number of people in the study area (Table 1). The Use Value Index determined the relative importance of species in a population as described by Vendruscolo & Mentz (2006) and Rehman *et al.* (2020). In the RFC of the explored weeds for pharmacological study and can help in drug improvement to cure many diseases. *Eclipta prostrata* is both World's worst weed (Holm *et al.* 1991) and dominant weeds in the study area, was found with the highest used value (0.75). It is used to treat snake bite because it produces anti-bacterial and antioxidant activities. Similarly, the leaves of *Centella asiatica* was found to treat urinary troubles, skin diseases and headache having the highest RFC (0.86) in the study area.

Table 1. List of weed species, local uses, methods of use and part used in the Kanchanpur district of Far-western Nepal.

Weed species	Family	Local names	Voucher no.	UV	RFC	Local uses	Form of use	Part used
Hemigraphis hirta (Vahl) T. Anderson	Acanthaceae	Ban pan	Aca-161	0.39	0.37	Decoction is given for the treatments of ureterolithiasis, shigellosis, and mouth ulcer.	Oral use	Leaves
Hygrophila auriculata (Schumach) Heine	Acanthaceae	Paanikaande	Aca-162	0.44	0.41	The whole plant, but particularly the roots, is said to have diuretic properties. It is used especially in the treatment of blennorrhea, hydropsy and anuria, as well as catarrh, stomachache	Oral use	Whole plant
Justicia adhatoda L.	Acanthaceae	Honey jhar	Aca-165	0.72	0.83	Cure respiratory problems, cough, bronchitis, asthma, jaundice, diabetes, leprosy, tuberculosis problems and frequent thirst.	Internal use	Whole plant
Sagittaria guayensis Kunth	Alismataceae	Nilo Jaluke	Ali-203	0.32	0.24	They are rich sources of starch and carbohydrates.	Internal use	Leaves
Achyranthes aspera L.	Amaranthaceae	Apamarg	Ama-101	0.65	0.85	Asthma, toothache, coughs.	Oral use	Whole plant
Alternanthera sessilis (L.) DC. !	Amaranthaceae	Jibrepaate	Ama-105	0.66	0.70	Plant paste is used in wounds, venereal disease, and menstrual disorder.	External use	Whole plant
Amaranthus spinosus L.	Amaranthaceae	Banlunde	Ama-107	0.61	0.60	Used internal bleeding, diarrhea, excessive menstruation, snake bites, boils, stomach disorders, mouth ulcer and gonorrhea.	Oral use	Stem and leaves
Amaranthus viridus L. *	Amaranthaceae	Lunde	Ama-108	0.61	0.55	Urinary tract infections Malaria and snake bites.	Oral use	Stem and Leaves
Chenopodium album L.	Amaranthaceae	Bethae	Ama-120	0.66	0.80	Urinary disorders, hepatic, cure gastric and treat constipation, diarrhea, and headache.	Internal use	Leaves
Centella asiatica (L.) Urban	Apiaceae	Ghodtaapre	Api-117	0.69	0.86	Plant juice is considered a tonic and used in urinary troubles, skin diseases and headache.	Oral use	Leaves
Calotropis procera (Aiton) Dryand.	Apocynaceae	Aakha	Apo-115	0.73	0.82	Respiratory problems, body pain and heal wounds, snake bite.	External use	Leaves
Asparagus racemosus Willd.	Asparagaceae	Kurilo	Asp-110	0.72	0.80	Used in constipation, stomach ulcers, fluid retention, pain, anxiety, cancer, diarrhoea, bronchitis, tuberculosis, and diabetes.	Oral use	Whole plant
Ageratum conyzoides L. *!	Asteraceae	Gandhe jhar	Ast-103	0.53	0.64	Plant juice is applied in cuts, wounds to stop bleeding and as antiseptic.	External use	Whole plant

Bidens pilosa L.	Asteraceae	Kuro	Ast-111	0.44	0.75	Antibacterial, anti-dysenteric, anti-inflammatory, antimicrobial, antimalarial, and diuretic.	Internal use	Leaves
Caesulia axillaris Roxb.	Asteraceae	Thuk jhar	Ast-114	0.31	0.25	Antioxidant, antimicrobial, anti-inflammatory and wound healing.	Oral use	Leaves
Eclipta prostrata L.[*!]	Asteraceae	Bhringiraj	Ast-143	0.75	0.83	Used to curing snake bite. Act as anti-bacterial and antioxidant.	Internal use	Whole plant
Erigeron canadensis L.	Asteraceae	Horseweed	Ast-148	0.42	0.36	Treat sore throat and dysentery, relieving rhinitis, cause sneezing.	Oral use	Leaves
Eupatorium adinophorum Spereng.	Asteraceae	Kalo banmara	Ast-150	0.44	0.53	It is used traditional medicines as antimicrobial, antiseptic, blood coagulant, analgesic, antipyretic and induced sleep enhancer	Oral use	Whole plant
Gnaphalium affine D.Don	Asteraceae	Boki jhar	Ast-159	0.31	0.22	A decoction is used in the treatment of influenza, sore throat, rheumatoid arthralgia, traumatic injuries, leucorrhea.	Oral use	Whole plant
Parthenium hysterophorus L. [*!]	Asteraceae	Kurjay ghans	Ast-190	0.42	0.44	The Whole plant is bitter and strong-scented, reckoned tonic, stimulating and anti-hysteric.	Oral use	Whole plant
Sonchus asper (L.) Hill	Asteraceae	Kanday ghans	Ast-213	0.65	0.67	Antimicrobial activity and antidote for insect bites. cure wounds and boils.	External use	Leaves
Sonchus oleraceus (L.) L	Asteraceae	Dudhi ghans	Ast-214	0.48	0.56	Anti-inflammatory, antipyretic, antibacterial, anti-fungal and antioxidant properties. Relieve body pain.	Oral use	Leaves
Spilanthes paniculata Wall. ex DC.	Asteraceae	Gorakhpan	Ast-215	0.67	0.65	The decoction of the plant is used to dress wounds, toothache, and affections of the gums.	External use	Leaves and flower
Tridax procumbents L.	Asteraceae	Daisy ghans	Ast-216	0.41	0.39	Wound healing, anticoagulant, antifungal, insect repellent, skin diseases, liver disorders, gastritis, and boils.	Oral use	Leaves
Xanthium strumarium L.	Asteraceae	Thulokuro	Ast-222	0.37	0.29	Useful for skin treatment and have anti-inflammatory, and antibacterial properties.	External use	Leaves and fruit
Nasturtium officinale R. Br.	Brassicaceae	Pani ghans	Bra-186	0.37	0.35	Useful to cure asthma, bronchitis, cough, and fever.	Internal use	Stem and leaves
Opuntia robusta J.C. Wendl.	Cactaceae	Seuda	Cac-188	0.43	0.36	Useful for the treatment of diabetes, cardiac and renal diseases. Useful for maintaining health and mental strength.	Oral use	Whole plant
Cannabis sativa L.	Cannabaceae	Bhang	Can-116	0.66	0.85	Diarrhea, constipation, snake bite.	External use	Whole plant

Commelina benghalensis Blume*	Commelinaceae	Kane jhar	Com-124	0.35	0.27	Plant is bitter, useful in leprosy, paste of plant is applied to treat burns.	External use	Whole plant
Commelina paludosa Blume	Commelinaceae	Kane jhar	Com-125	0.35	0.32	Extract of leaves used in dysentery.	Internal use	Leaves
Murdania nudiflora (L.) Brenan	Commelinaceae	Masino Kane	Com-185	0.36	0.32	It is used often as an external poultice for wounds, sores and burns.	External use	Leaves
Convolvulus arvensis L.	Convolvulaceae	Petunia jhar	Con-126	0.39	0.48	Cure urinary tract infections and ulcers.	Internal use	Root
Evolvulus nummularis (L.) L.	Convolvulaceae	Balu jhar	Con-153	0.44	0.49	It is used as brain tonic, epilepsy, duodenal ulcers, astringent and anti-dysenteric.	Oral use	Stem and leaves
Cyperus corymbosus Rottb.	Cyperaceae	Mothe	Cyp-129	0.43	0.35	Its straight culm used for making a kind of rough mat, tuber used as a tonic and stimulant	External use	Whole plant
Cyperus difformis L.*!	Cyperaceae	Dalla Mothe	Cyp-130	0.36	0.26	Competes with the rice plants for nutrients, water and light. Occasionally the plant is eaten by cattle.	Internal use	Whole plant
Cyperus rotundus L.*!	Cyperaceae	Mothe	Cyp-135	0.55	0.66	Infusion of tuber and roots is given in indigestion, diarrhea, dysentery, vomiting, fever, cholera, and stomach-ache.	Oral use	Root
Eleocharisatropurpurea (Retz.) Presl. !	Cyperaceae	Suire	Cyp-144	0.33	0.32	High allelopathic potential.	External use	Leaves
Fimbristylis dichotoma (L.) Vahl*	Cyperaceae	Mothe	Cyp-154	0.16	0.09	The culms are used to make inferior matting and encourage hair growth.	External use	Seed
Eriocaulon cinereum R. BR.	Eriocaulaceae	Sano Mothe	Eri-149	0.19	0.13	Used as diuretic, febrifuge and juice is used for ophthalmia.	Oral use	Leaves
Euphobia hirta L.	Euphorbiaceae	Dudhe jhar	Eup-151	0.74	0.76	Milky juice is applied in cut wounds, skin diseases and boils.	External use	Whole plant
*Euphorbia parviflora*L.	Euphorbiaceae	Dudhe jhar	Eup-152	0.54	0.52	Plant extract given in diarrhea, dysentery, bronchial problems, fever, earache, and snake bites	Oral use	Whole plant
Phyllanthus urinaria L.	Euphorbiaceae	Bhuiamala	Eup-193	0.42	0.51	Excellent diuretic, juice of leaves is an appetizer.	Oral use	Leaves and fruit
Phyllanthus varigatus G. Frost	Euphorbiaceae	Bhuiamala	Eup-194	0.44	0.39	Excellent diuretic, juice of leaves is an appetizer.	Oral use	Leaves and fruit
Ricinus communis L.	Euphorbiaceae	Castor oil plant	Eup-198	0.66	0.57	Used to cure rheumatic pain, joint pain, constipation, headache, nervous disorders and para lysis. Have antioxidant and antimicrobial properties.	Oral use	Leaves and fruit
Lathyrus aphaca L.	Fabaceae	Matar ghans	Fab-167	0.39	0.44	Useful to cure snake bite.	Internal use	Leaves

Medicago polymorpha L.	Fabaceae	Toothedbarr	Fab-178	0.41	0.33	Has anti-fungal, antibacterial, antimicrobial, and anti-inflammatory properties. Cure kidney, intestinal and bladder infections.	Internal use	Whole plant
Medicago sativa L.	Fabaceae	Kosheghans	Fab-179	0.50	0.47	Enhance metabolism and increase milk production in livestock.	Internal use	Stem and leaves
Melilotus indicus (L.) All.	Fabaceae	Methighans	Fab-180	0.47	0.39	Cure swellings, diarrhea and bowl complaints. Useful for the treatment of intestinal problems.	Internal use	Leaves
Senna occidentalis (L.) Link	Fabaceae	Coffee weed	Fab-206	0.47	0.44	Used as tonic, diuretic, stomachic, rheumatism, fevers, and venereal diseases.	Internal use	Whole plant
Vicia sativa L.	Fabaceae	Kurkosay ghans	Fab-221	0.44	0.36	Useful as emollient, anti-inflammatory and antioxidant properties.	External use	Leaves
Geranium dalmaticum (Beck) Rech.f.	Geraniaceae	Dhaniya jhar	Ger-158	0.42	0.40	Cure internal wounds, swellings, inflammations, tumor and bleeding.	Oral use	Stem and leaves
Ajuga integrifolia Buch.-Ham.	Lamiaceae	Amilej har	Lam-104	0.41	0.35	A bitter astringent given in fevers. It is credited as astringent, stimulant, and tonic.	Oral use	Leaves
Clerodendrumviscosum Vent.	Lamiaceae	Bhant	Lam-123	0.43	0.40	Antioxidant, anthelmintic, anti-snake venom, analgesic, wound healing and anti-inflammatory.	Internal use	Leaves and root
Ocimum basilicum L.	Lamiaceae	Tulasi	Lam-187	0.65	0.56	Have antimicrobial, antibacterial, and wound healing properties. Cure urinary tract infections, fever, cough, pneumonia, asthma, and skin problems.	Oral use	Whole plant
Alysicarpus vaginalis (L.) DC.	Leguminosae	Chandre Ghas	Leg-106	0.39	0.45	Decoction of the roots is used as a treatment against coughs.	Oral use	Root
Mimosa pudica L.	Leguminosae	Lajjawati	Leg-181	0.52	0.58	Juice of the plant is used in jaundice, fever and diarrhea.	Oral use	Roots and leaves
Senna tora (L.) Roxb.	Leguminosae	Chakramarda	Leg-207	0.46	0.47	Seed paste is used in the treatment of ringworm and itching.	Oral use	Seed
Trifolium repens L.	Leguminosae	Charighans	Leg-217	0.42	0.51	Cure diabetes and skin diseases.	Oral use	Leaves
*Corchorus tridens*L.	Malvaceae	Koshe jhar	Mal-127	0.56	0.47	The cooked leaves are mucilaginous and used to soothe irritated tissues.	Internal use	Leaves
Malva parviflora L.	Malvaceae	Cheese weed	Mal-175	0.43	0.53	Have antimicrobial, antibacterial, and anti-inflammatory properties.	Oral use	Leaves
Sida acuta Brum. f.	Malvaceae	Balu jhar	Mal-209	0.46	0.49	Root and stem paste is applied externally to take out pus from boils.	External use	Whole plant
Sida cordifolia L.	Malvaceae	Balu jhar	Mal-210	0.51	0.48	External use in infected parts.	External use	Whole plant

Sida rhombifolia L	Malvaceae	Balu jhar	Mal-211	0.48	0.43	Roots used in rheumatism.	External use	Whole plant
Marsilea quadrifolia L.*	Marsileaceae	Chaupatay	Mar-176	0.45	0.41	Juice of leaves is diuretic and febrifuge and used to treat snakebite,	Internal use	Leaves
Mollugo pentaphylla L.	Molluginaceae	Trayaman	Mol-182	0.38	0.35	The plant is antipyretic, antiseptic, appetizer, laxative, and stomachic.	Oral use	Whole plant
Morus alba L.	Moraceae	Kimu	Mor-184	0.49	0.54	Useful for treatment of hepatitis.	Oral use	Leaves
Boerhavia diffusa L.	Nyctaginaceae	Purnarnava	Nyc-112	0.73	0.74	Kidney problems, snake bites, and helpful in curing cough, abdominal pain, and tumors.	Oral use	Roots and leaves
Ludwigia perennis L. !	Onagraceae	Lwang jhar	Ona-174	0.43	0.51	Decoction and juice of the plant is used as therapeutic.	Internal use	Leaves and root
Oxalis corniculata L.	Oxalidaceae	Chariamilo	Oxa-189	0.48	0.41	Plant juice used in pimples, cut wounds, diarrhea, and dysentery.	Oral use	Leaves and root
Fumaria indica (Hausskn.) Pugsley	Papaveraceae	Dhukure	Pap-157	0.44	0.39	Used in pains, fever, liver problems and diarrhea. Control vomiting and joint swellings.	Oral use	Leaves
Ceropteris thalictroides (L.) A. Brongu	Parkeriaceae	Dhaniya jhar	Par-118	0.40	0.44	Both the leaves and the roots are used as a poultice against skin complaints.	External use	Leaves and root
Piper longum L.	Piperaceae	Pipla	Pip-195	0.71	0.82	Useful in cough cold and bronchitis, fruit juice is used as necrotic and appetizer.	Oral use	Whole plant
Veronica persica Poir.	Plantaginaceae	Bird eye	Pla-220	0.49	0.41	Cure hemorrhoids, rheumatism, kidney, and stomach problems. Have anti-inflammatory, antioxidant, and antifungal properties.	External use	Stem and leaves
Brachiaria ramosa (L.) Stapf.	Poaceae	Likhebanso	Poa-113	0.29	0.19	Grown as to provide ground cover, stabilize the soil, reclaim polluted soils, and minimize toxicity.	External use	Leaves
Chloris radiata (L.) Sw.	Poaceae	Finger	Poa-121	0.31	0.15	Used in skin disease.	External use	Whole plant
Chrysopogan aciculatus (Retz.) Trin.	Poaceae	Kuro	Poa-122	0.42	0.48	Paste is given at early morning in empty stomach to cure stomach-ache and gastric disorder.	Oral use	Root
Cynodon dactylon (L.) Pers. *!	Poaceae	Dubo	Poa-128	0.52	0.51	Useful as blood purifier, anti-diabetic effect, and control nose bleeds, vomiting.	External use	Stem and leaves
Dactyloctenium aegypticum (L.) Gaertn.	Poaceae	Makure jhar	Poa-137	0.15	0.10	Antimicrobial and antipyretic properties. Useful for curing diarrhea and asthma.	Oral use	Seed
Digitaria sanguinalis (L.) Scop.*	Poaceae	Sanobanso	Poa-139	0.22	0.13	A decoction of the plant is used in the treatment of gonorrhea.	Oral use	Leaves
Echinochloa colona (L.) Link*!	Poaceae	Sawa	Poa-141	0.38	0.29	Used in spleen and hemorrhage problems.	Oral use	Leaves and fruit

Echinochloa glabrescens Munro ex Hook. f. *!	Poaceae	Gauresawa	Poa-142	0.38	0.31	Used as a tonic, remedy for treating carbuncles, hemorrhages.	Internal use	Leaves and fruit
Eleusine indica (L.) P.Beauv*	Poaceae	Kode jhar	Poa-145	0.26	0.15	Useful for curing gynecological problems, liver disorders, febrifuge and blood dysentery.	Oral use	Whole plant
Imperata cylindrica (L.) P. Raeusch. !	Poaceae	Siru	Poa-163	0.55	0.56	Root juice used in body pain, diarrhea, dysentery, fever, and indigestion.	Oral use	Root
Phalaris minor Retz.	Poaceae	Bunchgrass	Poa-192	0.18	0.12	It is use as fodder for animals, but its leaves are also used to control respiratory problems	Internal use	Leaves
Saccharum munja Roxb.	Poaceae	Durmula	Poa-202	0.46	0.44	Medicinal herb used in birth control.	External use	Leaves
Setaria pumila (Poir.) Roem. & Schultes.	Poaceae	Bhaalebanso	Poa-208	0.29	0.16	Useful for curing skin diseases.	Oral use	Leaves
Persicaria barbata (L.) Hara	Polygonaceae	Nalighans	Pol-191	0.37	0.32	Used in pains of colic, dysentery and cholera, scabies and externally to wounds.	External and internal use	Whole plant
Rumex crispus L.	Polygonaceae	Amiloghans	Pol- 201	0.43	0.51	Useful for curing enema, Antimicrobial, antioxidant and anti-inflammatory activity.	Internal use	Leaves
Monocharia hastata (L.) Solms.*	Pontederiaceae	Nilo Jaluke	Pon-183	0.33	0.27	Cure boils, gastritis, hepatopathy and as laxative	Oral use	Leaves
Portulica oleracea L.	Portulaceae	Nundhiki	Por-196	0.54	0.61	Useful for the treatment of wounds, fever, ulcer, skin problems and abnormal uterine bleeding. Have antimicrobial and antioxidant properties.	External use	Stem and leaves
Anagallis arvensis L.	Primulaceae	Phulighans	Pri-109	0.41	0.36	Wound healing and antioxidant properties.	External use	Whole plant
Adiantum capillus-veneris L.	Pteridaceae	Fern	Pte-102	0.39	0.30	Antimicrobial activity.	Oral use	Whole plant
Cheilanthes tenuifolia (Burm. f.) Sw.	Pteridaceae	Fern	Pte-119	0.31	0.32	The rhizome and roots are used as general tonic, anthelminthic for asthma.	Oral use	Root
Ranunculus sceleratus L.	Ranunculaceae	Jaldhaniya	Ran-197	0.31	0.29	Wound healing, blood circulation by removing blood stasis. Cure cough, cold and malaria. Treat heart, liver and gall bladder diseases and snake bite.	Internal use	Stem and leaves
Zizyphus mauritiana Lam.	Rhamnaceae	Bayar	Rha-223	0.44	0.56	Ripe fruits are edible and good for indigestion, constipation, and stomach problems.	Oral use	Fruit
Rosa alba L.	Rosaceae	Gulab	Ros-199	0.45	0.49	Flower used as cooling medicine in fever and in palpitation of heart.	Oral use	Flower

Hedyotis corymbosa (L.) Lam.	Rubiaceae	Majithe jhar	Rub-160	0.17	0.08	It is active against appendicitis, hepatitis, pneumonia, urinary infection, snake bite, treat skin sores, ulcers, sore throat, bronchitis.	Oral use	Whole plant
Lindernia ciliata (Colsm.) Pennell	Scrophulariaceae	Aare jhar	Scr-169	0.33	0.17	The sap from the crushed leaves is given to the children for proper growth and development	Oral use	Leaves
Lindernia oppositifolia (L.) Mukerjee[!]	Scrophulariaceae	Koshe jhar	Scr-170	0.29	0.21	Used as to treat dysentery and intestinal problems.	Oral use	Stem and leaves
Lindernia procumbens (Krock.) Borbas[!]	Scrophulariaceae	Pitamari jhar	Scr-171	0.30	0.22	It is used as a remedy for gonorrhea, dysentery, intestinal problems.	Oral use	Stem and leaves
Mecardonia procumbens (Miller) Small	Scrophulariaceae	Malati jhar	Scr-177	0.38	0.34	The plant is used to heal all kinds of wounds.	External use	Whole plant
Scorpia dulcis L.	Scrophulariaceae	Sano banso	Scr-205	0.32	0.16	Used in digestive problems, pulmonary conditions, fever, skin disorders, hypertension, diarrhea, dysentery, insect bites, anemia, and diabetes.	Internal use	Leaves
Datura metel L.	Solanaceae	Bhokaray	Sol-138	0.67	0.76	Curing paralysis, relieve snake bite and cure arthritis and antimicrobial properties.	Oral use	Leaves
Solanum nigrum L.	Solanaceae	Kali kunyo	Sol-212	0.53	0.65	Prevent respiratory, hepatic, and stomach problems. Cure eye problems, fever, piles, and diabetes, jaundice. Have antimicrobial, antioxidant, anticancer and anti-inflammatory activities.	Oral use	Whole plant
Typha angustifolia L.	Typhaceae	Nalighans	Typ-218	0.39	0.33	Useful for wound healing, have antimicrobial and anti-inflammatory properties.	Oral use	Leaves
Lantana camara L.[*]	Verbenaceae	Banmara	Ver-166	0.66	0.46	Useful as anti-pyretic, antimicrobial, and anti-mutagenic.	Internal use	Whole plant
Lippia nodiflora (L.) Rich	Verbenaceae	Kurkure	Ver-173	0.54	0.46	The plant is antibacterial, astringent, and diuretic.	Internal use	Leaves and root
Verbena officinalis L.	Verbenaceae	Ban lunday	Ver-219	0.39	0.35	rheumatic arthritis, epilepsy and convulsions also have antioxidant property.	Internal use	Leaves

[*]World's worst weed (Holm et al. 1991) and [!] Dominant weeds in the study area

Table 2. Floristic analysis of ethnomedicinal weed species in Kanchanpur district (the values in parentheses are percentage of total).

Plant group	Family	Genera	Species
Dicotyledons	34 (77.27)	70 (74.47)	79 (73.15)
Monocotyledons	7 (15.91)	21 (22.34)	25 (23.15)
Pteridophytes	3 (6.82)	3 (3.19)	4 (3.70)
Total	44 (100)	94 (100)	108 (100)

Table 3. Composition of genera and species to their respective family's index.

Family	Number of genera	Number of species	Species %	Ranking of the family
Asteraceae	13	13	12.03	1
Poaceae	12	13	12.03	1
Fabaceae	5	6	5.55	2
Amaranthaceae	4	5	4.62	2
Cyperaceae	3	5	4.62	2
Euphorbiaceae	3	5	4.62	2
Malvaceae	3	5	4.62	2
Scrophulariaceae	3	5	4.62	2
Leguminosae	4	4	3.7	3
Acanthaceae	3	3	2.77	4
Commelinaceae	2	3	2.77	4
Lamiaceae	3	3	2.77	4
Convolvulaceae	2	2	1.85	5
Polygonaceae	2	2	1.85	5
Pteridaceae	1	2	1.85	5
Solanaceae	2	2	1.85	5
Alismataceae	1	1	0.92	6
Apiaceae	1	1	0.92	6
Apocynaceae* to Typhaceae	1	1	0.92	6

*Apocynaceae, Asparagaceae, Brassicaceae, Cactaceae, Cannabaceae, Eriocaulaceae, Geraniaceae, Marsileaceae, Molluginaceae, Moraceae, Nyctaginaceae, Onagraceae, Oxalidaceae, Papaveraceae, Parkeriaceae, Piperaceae, Plantaginaceae, Pontederiaceae, Portulaceae, Primulaceae, Ranunculaceae, Rhamnaceae, Rosaceae, Rubiaceae, Typhaceae

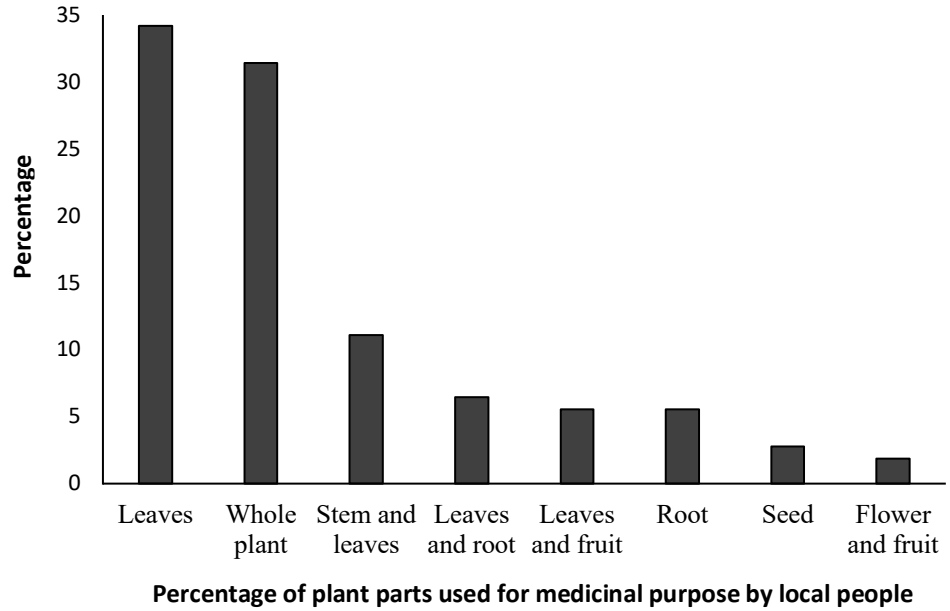

Figure 2. Percentage of plant parts used for medicinal purpose by local people.

The Fidelity Level (FL) of 34 important weeds ranged from 51-95 %. *Centella asiatica* (Apiaceae) had 95% FL value against Urinary troubles, skin diseases and headache, respectively. Lowest FL value against internal wounds, swellings, inflammations, tumor, and bleeding *Senna tora* (Leguminosae) had 51%.

The important uses of weeds were as follows: *Achyranthes aspera*, *Centella asiatica*, *Cannabis sativa, Piper longum* used to cure asthma, toothache, diarrhea, constipation, snake bite cough, urinary troubles, skin diseases and headache, diarrhea, constipation, snake bite and cough cold and bronchitis, necrotic and appetizer and *Eclipta prostrata* species used as antimicrobial, antibacterial activity. *Rumex crispus* species used to treat edema. Antimicrobial, antioxidant and anti-inflammatory activity and *Solanum nigrum* species used as respiratory disease, hepatic and stomach problems, eye problems, fever, piles and diabetes, jaundice (Table 4).

Informant Consensus Factor (ICF)

Informant Consensus Factor (ICF) is given in Table 5 which showed ICF values based upon the uses of weeds in various disease (Figure 3). The highest ICF by disease category reported in study area was 0.75 as medicine in fever and in palpitation of heart and lowest was 0.45 as medicine of paralysis and arthritis.

Table 4: Fidelity Level (FL) value of most reported medicinal weeds.

Scientific Name	Local name	Major ailment	Fidelity level (FL) %
Centella asiatica (L.) Urban	Ghodtaapre	Urinary troubles, skin diseases and headache.	95
Achyranthes aspera L.	Apamarg	Asthma, toothache, cough.	91
Cannabis sativa L.	Bhang	Diarrhea, constipation, snake bite.	90
Asparagus racemosus Willd.	Kurilo	Constipation, stomach ulcers, cancer, diarrhea, bronchitis, tuberculosis and diabetes.	89
Eclipta prostrata L.	Bhringiraj	Snake bite and act as anti-bacterial and antioxidant.	88
Piper longum L.	Pipla	Cough cold and bronchitis, necrotic and appetizer.	88
Calotropis procera (Aiton) Dryand.	Aakha	Respiratory problems, body pain and snake bite.	87
Justicia adhatoda L.	Honey jhar	Respiratory problems, cough, bronchitis, asthma, jaundice, diabetes, leprosy, tuberculosis problems.	86
Chenopodium album L.	Bethae	Urinary disorders, hepatic, cure gastric and treat constipation, diarrhea and headache.	86
Datura metel L.	Bhokaray	Paralysis, relieve snake bite, arthritis and antimicrobial properties.	84
Euphorbia hirta L.	Dudhi jhar	Skin diseases and boils.	82
Boerhavia diffusa L.	Punernava	Kidney problems, snake bite, cough, abdominal pain and tumors.	81
Spilanthes paniculata Wall. ex DC.	Gorakhpan	Toothache and affections of the gums.	75
Bidens pilosa L.	Kuro	Antibacterial, antidysentery, anti-inflammatory, antimicrobial, antimalarial, and diuretic.	73
Alternanthera sessilis (L.) DC.	Jibrepaate	Venereal disease, and menstrual disorder.	72
Sonchus asper (L.) Hill	Kanday ghans	Antimicrobial activity and antidote for insect bites.	71
Ocimum basilicum L.	Tulasi	Urinary tract infections, fever, cough, pneumonia, asthma and skin problems.	71
Mimosa pudica L.	Lajjawati	Jaundice, fever and diarrhea.	69
Ageratum conyzoides L.	Gandhe jhar	Bleeding	67
Cyperus rotundus L.	Mothe	Indigestion, diarrhea, dysentery, vomiting, fever, cholera and stomachache.	66
Portulca oleracea L.	Nundhiki	Fever, ulcer, skin problems and abnormal uterine bleeding.	65

Ricinus communis L.	Castor oil plant	Rheumatic pain, joint pain, constipation, headache, nervous disorders and para lysis.	65
Solanum nigrum L.	Kali kunyo	Respiratory disease, hepatic and stomach problems, eye problems, fever, piles and diabetes, jaundice.	63
Phyllanthus urinaria L.	Bhuiamala	Appetizer.	59
Ludwigia perennis L.	Lwang jhar	Therapeutic.	58
Amaranthus spinosus L.	Lunde	Internal bleeding, diarrhea, excessive menstruation, snake bites, boils, stomach disorders, mouth ulcer and, gonorrhea.	56
Rosa alba L.	Gulab	Fever and in palpitation of heart.	55
Euphorbia parviflora L.	Dudhe jhar	Diarrhea, dysentery, bronchial problems, fever, earache, and snake bites	53
Rumex crispus L.	Amilo ghans	Edema .Antimicrobial, antioxidant and anti-inflammatory activity.	53
Cynodon dactylon (L.) Pers.	Dubo	Diabetes, bleeding, vomiting.	52
Lantana camara L.	Banmara	Anti-pyretic, antimicrobial and anti-mutagenic.	52
Amaranthus viridus L.	Banlunde	Urinary tract infections Malaria and snake bites.	51
Trifolium repens L.	Charighans	Diabetes and skin diseases.	51
Senna tora (L.) Roxb.	Chakramarda	Ringworm and itching.	51

Table 5. Informant Consensus Factor (ICF) by disease category reported in study area

Disease category	No. of use reports (Nur)	No. of species used (Nt)	Nur-Nt	Nur-1	ICF
Cooling medicine in fever and in palpitation of heart.	48	13	35	47	0.75
Eye problems, fever, piles, jaundice.	36	11	25	35	0.71
Blood purifier, anti-diabetic effect and control nose bleeds, vomiting.	36	12	24	35	0.69
Urinary troubles, skin diseases and headache.	44	15	29	43	0.67
Indigestion, diarrhea, dysentery, vomiting, fever, cholera and stomachache.	46	16	30	45	0.67
Hepatic, cure gastric, constipation	51	18	33	50	0.66
Kidney problems, abdominal pain and tumors.	39	14	25	38	0.66
Respiratory problems, body pain, rheumatic pain, joint pain.	61	22	39	60	0.65
Ringworm and itching.	33	13	20	32	0.63
Venereal disease, pneumonia and menstrual disorder.	62	24	38	61	0.62
Blennorrhea, hydropsy and anuria, as well as catarrh, stomachache, malaria.	22	9	13	21	0.62
Asthma, toothache, cough, jaundice, leprosy.	67	21	46	66	0.60
Internal bleeding, excessive menstruation, stomach disorders, mouth ulcer and, gonorrhea.	69	29	40	68	0.59
Diarrhea, constipation, snake bite.	32	14	18	31	0.58
External poultice for wounds, sores and burns.	73	31	42	72	0.58
Constipation, stomach ulcers, cancer, bronchitis, tuberculosis and diabetes.	45	20	25	44	0.57
Cough cold and bronchitis, necrotic and appetizer.	55	26	29	54	0.54
Antioxidant, Anti-inflammatory	80	39	41	79	0.52
Antibacterial, anti-dysenteric, antimicrobial, antimalarial, and diuretic.	82	43	39	81	0.48
Paralysis, arthritis.	21	12	9	20	0.45

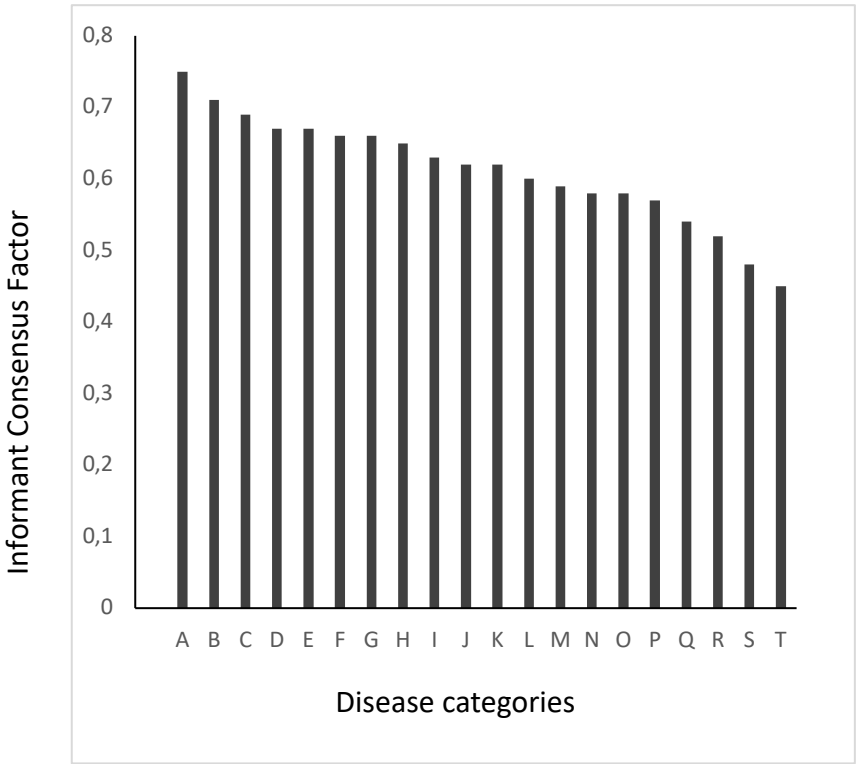

Figure 3. Informant Consensus Factor (ICF) by disease category; Alphabets represent following disease categories

A: Cooling medicine in fever and in palpitation of heart
B: Eye problems, fever, piles, jaundice
C: Blood purifier, anti-diabetic effect, and control nose bleeds, vomiting
D: Urinary troubles, skin diseases and headache
E: Indigestion, diarrhea, dysentery, vomiting, fever, cholera, and stomachache
F: Hepatic, cure gastric, and constipation
G: Kidney problems, abdominal pain, and tumors
H: Respiratory problems, body pain, rheumatic pain, and joint pain
I: Ringworm and itching
J: Venereal disease, pneumonia and menstrual disorder
K: Blennorrhea, hydropsy and anuria, catarrh, stomachache, and malaria
L: Asthma, toothache, cough, jaundice, and leprosy
M: Internal bleeding, excessive menstruation, stomach disorders, mouth ulcer, and gonorrhea
N: Diarrhea, constipation, snake bite
O: External poultice for wounds, sores, and burns
P: Constipation, stomach ulcers, cancer, bronchitis, tuberculosis, and diabetes
Q: Cough cold and bronchitis, necrotic, and appetizer
R: Antioxidant and Anti-inflammatory
S: Antibacterial, anti-dysenteric, antimicrobial, antimalarial, and diuretic
T: Paralysis and arthritis

Discussion

We reported 108 plant species as medicinal, which was about 75% of the total recorded flora of the site. Dhami (2008) reported 105 ethnomedicinal plant species in Kanchanpur district. People of Kanchanpur district use different plants and their parts in various purposes for their daily life. The use of all weed species reported in this study indicated that local people value the plants irrespective to their origin and nativity. Use of weeds *Eclipta prostrata, Calotropis procera* revealed that these introduced weeds are now widely used in lowland Terai. The use of these species for food, fodder, wood, medicine, oil, fiber, aroma, and ornamental value, could be traced back to centuries ago.

Ranjit (1998) estimated that losses in yield due to weeds vary from 17-47% in low land areas and 14 to 93% in upland areas of agricultural system. Weeds create serious problems in agricultural system because they increase the cost of labour and reduce productivity of grains (Hobbs *et al.* 1996).The major weeds of study areas were *Ageratum conyzoides, Alternanthera sessilis, Cynodon dactylon, Echinochloa colona, Echinochola crus-galli, Eclipta prostrata, Eleocharis atropurpurea, Fimbristylis*

miliacea, Ischaemum rugosum, Lindernia oppositifolia, Lindernia procumbens, Ludwigia perennis, Schoenoplectus juncoides, Sagittaria guayensis, Cyperus difformis in the paddy fields of Far-western, Nepal (Bhatt & Singh 2010).

Kanchanpur district was dense forested area until 1950 but with the increase in human population, immigration from the hilly districts and their associated disturbances, it was degraded and converted into agricultural land and settlement area initially by the Tharu tribes (Bhattarai *et al*. 2019). After the settlements of different ethnic groups, and far reach to allopathic treatments due to lack of development activities and poverty most of the settlement categories of human population depends on plants in different purposes as well as ethnomedicine especially weeds due to their availability and convenience.

Of the world's worst weeds, currently *Ageratina adenophora* is widespread in the open and land-linked border with India makes easy to enter this plant in Nepal via India through commercial routes, and easily contaminated with agriculture, horticulture, forestry, and pasture seeds (Tiwari *et al.* 2005). *Parthenium hysterophorus* was introduced in Nepal via India about 2 decades ago and has spread rapidly along roadsides, fallow lands, and agricultural lands. Its tiny seeds are contaminated with cereal and other agriculture lands. It was first appeared accidentally in the Indian Botanical Garden, Calcutta during 1810-1814 (Sharma & Pandey 1984). Similarly, *Ageratium conyzoides* is commonly found in various habitats such as fallow lands, forests, agriculture, and pastures. The dense stands of this plant may reduce the population of native flora. The plant is introduced in Nepal long time ago via India and is established in warm parts. *Lantana camara* has been established in Nepal via the plains of north-east India. Probably in India it was introduced as a hedge plant because it is quite difficult to penetrate and is very decorative (Tiwari *et al.* 2005).

Our findings revealed that elderly people, healers, and Vaidyas (or Guruwas) have been using many plant species to treat various diseases although they were less conscious about the documentation of ethnomedicinal folklore and conservation of medicinal plants. Traditional medical knowledge is at risk of being lost in the study area because youth are less interested on traditional medicines (Dhami 2008, Subedi 2019) and the sharing of traditional ethnomedicinal knowledge through restrained oral process and informal learning such as apprenticeship. Folk knowledge of local community in the study area noted that there are many plants considered as weeds, but they all are considered and used as useful in to cure several types of diseases. Kanchanpur district is bounded by Churia rang and most of the areas are waterlogged with fertile soil. The area is main source of grain production especially in the western belt of Nepal. Agricultural system is proper habitat for weed species because they up take nutrients earlier than the crops and most approachable to everyone.

Their reports were frequently mentioned by Vaidyas, Guruwas and elders. They claimed the efficacy of these weeds to cure many diseases using folk knowledge in different parts of district especially where allopathic treatment is not possible due to economic crisis among different ethnic groups. Present findings were consistent with the earlier research findings that the flora identified in the study area has high medicinal value. *Achyranthes aspera* is useful to cure asthma, toothache, cough, and skin diseases. *Centella asiatica* for the treatment of urinary troubles, skin diseases and headache; *Alternanthera sessilis* paste in wounds, venereal disease, menstrual disorder, and dysentery, etc. are important ones.

During this study, it was noted that *Rumex crispus* (Polygonaceae) is considered for having antimicrobial, antioxidant, and anti-inflammatory activity which in accordance with earlier findings by Akkol *et al.* (2011). *Boerhavia diffusa* (Nyctaginaceae) is used in Kidney problems, snakebite, cough, abdominal pain, and tumors and *Calotropis procera* has respiratory problems, body pain and snake bite, anti-diarrhea and anti-inflammatory activity is agreed with the finding of Kumar & Basu (1994). *Asparagus racemosus* is used in constipation, stomach ulcers, cancer, diarrhea, bronchitis, and diabetes (Dhami 2008) and Singh (2014) in Palpa district of Nepal.

Rehman *et al.* (2020) reported the most common medicinal plant in Pakistan was *Cannabis sativa* (UV=0.98) but in the present finding we found *Eclipta prostrata* (0.75) as popular medicinal plant. *E. prostrata* has long been used in funeral ceremony in Nepal since it has been considered as highly medicinal. This shows that the rubrics of weed ethnobotany dated back to centuries. The use of *C. procera* in wedding ceremony is also historic. The top three weed species based on UV are *Eclipta prostrata* (0.75), *Euphobia hirta* (0.74) and *Calotropis procera* (0.73). Similarly, the highest FL value was for *Centella asiatica* (95%) and lowest for *Senna tora*. The high FL value showed the use of a particular weed by the local people to treat a specific disease (Padmavathi *et al.* 2005).

We reported the use of *Datura metel* (Solanaceae) for paralysis, snake bite, and arthritis but the species is useful for herbicidal purpose and veterinary purpose in India (Khan *et al.* 2014). Different parts of the weeds like whole plant, leaves, stem, and leaves, leaves and fruit, leaves and root, flower, root, leaves and flower and fruit, seeds, etc. were used for different medicinal purposes by the local peoples through various modes of application to cure different diseases like infusion, decoction, extraction, paste, powder, etc. we found that most of the selected species are frequently used as particular disease because of the generation chain, no side effect, 100% rate of disease recovery, easily available, less costly, toxic molecules for defense frequent abundance, degree of knowledge, etc. Most of the area of the district is used in agricultural sector and the area is dependent site for hilly belts because most of the food grains transported from this area to hilly area. Although the area is rich in MAPs diversity but people who are engaged to agriculture they know about all characters of weeds due to their dependence. Most of the weeds are used as fodder. We found that weeds are used as ethnomedicine due to common abundance, Traditional sequence of parental generation, safe for uses, cost effective, poverty, far reach effect of allopathic treatment, large number of Guruwas/ Vaidhyas in the study areas, most of the people are interested to use weeds as ethnomedicine. The frequent use of leaves of plants as a traditional medicine strategy (WHO 2014-2023) in the district depends up on inherited use pattern passed from their ancestors, from one generation to another.

Conclusions

From the present study it was concluded that the area of Kanchanpur district, Far-western Nepal is rich source of important wild medicinal plants that are considered as weeds by agricultural personal but on the other hand, these are also used to cure severe diseases traditionally. The common theme among the peoples in any area is that weeds are undesirable plants, and it has been neglected by the researcher to document and collect the information about these plants. The finding proved the significance of weeds as medicine so there is need to create awareness among the people for use of these weeds in upcoming generations.

Declarations

List of Abbreviation: Not applicable

Ethics approval and consent to participate: Permission for data collection was obtained from the chairpersons of Bheemdatt, Bedkot, Belauri, Krishnapur, Mahakali, Punarbas and Shuklaphanta municipalities and two rural municipalities (Beldandi and Laljhadi) and oral consents to make the interviews were obtained from local informants. No further ethics approval was required.

Consent for publication: Not applicable.

Availability of data and materials: All relevant data are within the manuscript.

Competing interests: The authors declare that they have no competing interest among them.

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Authors' contribution: MDB and RMK conceptualized the work. MDB and RMK did the preliminary work, semi-structured interviews, plant collection, and data generation. MDB, YPA, and RMK did the data analysis, verification, and authorization. MDB and RMK, and YPA wrote, revised, and edited the manuscript.

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