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 of 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, 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 Bhatt1, Yagya Prasad Adhikari2* and Ripu Mardhan Kunwar3

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 & Bhattacharai 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 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, Punbaras and Shukaphanta) and two rural municipalities (Beldandi and Laljhadi) of Kanchanpur district of Far-western Nepal were interviewed. Kanchanpur district, 28° 38”-29° 28” N latitudes and 80° 03”-80° 33” E longitudes 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

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).

\[ UV = \Sigma \frac{U}{N} \]

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).

\[ ICF = \frac{N_r - N_t}{N_r - 1} \]

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).

\[ FL(\%) = \frac{N_p}{N} \times 100 \]

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).

\[ RFC = \frac{RC}{N} \]

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 Euphorbiaceae (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 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 viridis, Commelina benghalensis, Cyanodon dactylon, Cyperus rotundus, Cyprus difformis, Digitaria ciliaris, Echinocloa colona, Echinochola crus-galli, Eclipta prostrata, Elusine indica, Fimbrystilis 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 biliodrheah, hydropsy and anuria, as well as catarh, 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 gonorrhoea. | 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* (Alton) Dryand. | Apocynaceae  | Aakha       | Apo-115     | 0.73 | 0.82 | Respiratory problems, body pain and heal wounds, snake bite.               | External use | Leaves    |
| *Asparagus racemosus* Wild.       | 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 |
| Plant Name                  | Family    | Part Used | Use     | Quantity | Action                                                                 |
|----------------------------|-----------|-----------|---------|----------|------------------------------------------------------------------------|
| Bidens pilosa L.           | Asteraceae| Kuro      | Ast-111 | 0.44     | Antibacterial, anti-dysenteric, anti-inflammatory, antimicrobial, antimalarial, and diuretic. |
| Caesulia axillaris Roxb.    | Asteraceae| Thuk jhar | Ast-114 | 0.31     | Antioxidant, antimicrobial, anti-inflammatory and wound healing.        |
| Eclipta prostrata L.       | Asteraceae| Bhringiraj| Ast-143 | 0.75     | Used to curing snake bite. Act as antibacterial and antioxidant.       |
| Erigeron canadensis L.     | Asteraceae| Horseweed | Ast-148 | 0.42     | Treat sore throat and dysentery, relieving rhinitis, cause sneezing.   |
| Eupatorium adinophorum     | Asteraceae| Kalo banmara| Ast-150 | 0.44     | It is used traditional medicines as antimicrobial, antiseptic, blood coagulant, analgesic, antipyretic and induced sleep enhancer |
| Gnaphalium affine D.Don    | Asteraceae| Boki jhar | Ast-159 | 0.31     | A decoction is used in the treatment of influenza, sore throat, rheumatoid arthralgia, traumatic injuries, leucorrhoea. |
| Parthenium hysterophorus L.| Asteraceae| Kurjay ghans| Ast-190 | 0.42     | The Whole plant is bitter and strong-scented, reckoned tonic, stimulating and anti-hysteric. |
| Sonchus asper (L.) Hill    | Asteraceae| Kanday ghans| Ast-213 | 0.65     | Antimicrobial activity and antidote for insect bites. cure wounds and boils. |
| Sonchus oleraceus (L.) L.  | Asteraceae| Dudhi ghans| Ast-214 | 0.48     | Anti-inflammatory, antipyretic, antibacterial, anti-fungal and antioxidant properties. Relieve body pain. |
| Spilanthes paniculata Wall.| Asteraceae| Gorakhpan  | Ast-215 | 0.67     | The decoction of the plant is used to dress wounds, toothache, and affections of the gums. |
| Tridax procumbents L.      | Asteraceae| Daisy ghans| Ast-216 | 0.41     | Wound healing, anticoagulant, antifungal, insect repellent, skin diseases, liver disorders, gastritis, and boils. |
| Xanthium strumarium L.     | Asteraceae| Thulokuro  | Ast-222 | 0.37     | Useful for skin treatment and have anti-inflammatory, and antibacterial properties. |
| Nasturtium officinale R. Br.| Brassicaceae| Pani ghans| Bra-186 | 0.37     | Useful to cure asthma, bronchitis, cough, and fever.                   |
| Opuntia robusta J.C. Wendl.| Cactaceae| Seuda      | Cac-188 | 0.43     | Useful for the treatment of diabetes, cardiac and renal diseases. Useful for maintaining health and mental strength. |
| Cannabis sativa L.         | Cannabaceae| Bhang     | Can-116 | 0.66     | Diarrhea, constipation, snake bite.                                    |
| Species                          | Family            | Common Name | Code | Leaves | Root | Oral Use                                                                 |
|---------------------------------|-------------------|-------------|------|--------|------|--------------------------------------------------------------------------|
| *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. |
| *Commelina paludosa* Blume      | Commelinaceae     | Kane jhar   | Com-125 | 0.35   | 0.32 | Extract of leaves used in dysentery.                                    |
| *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.     |
| *Convolvulus arvensis* L.       | Convolvulaceae    | Petunia jhar| Con-126 | 0.39   | 0.48 | Cure urinary tract infections and ulcers.                                |
| *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. |
| *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. |
| *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. |
| *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. |
| *Eleocharis atropurpurea* (Retz.) Presl. | Cyperaceae | Suire       | Cyp-144 | 0.33   | 0.32 | High allelopathic potential.                                             |
| *Fimbristylis dichotoma* (L.) Vahl | Cyperaceae        | Mothe       | Cyp-154 | 0.16   | 0.09 | The culms are used to make inferior matting and encourage hair growth.    |
| *Eriocaulon cinereum* R. BR.    | Eriocaulaceae     | Sano Mothe  | Eri-149 | 0.19   | 0.13 | Used as diuretic, febrifuge and juice is used for ophthalmia.             |
| *Euphorbia hirta* L.            | Euphorbiaceae     | Dudhe jhar  | Eup-151 | 0.74   | 0.76 | Milky juice is applied in cut wounds, skin diseases and boils.           |
| *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 |
| *Phyllanthus uninaria* L.       | Euphorbiaceae     | Bhuiamala   | Eup-193 | 0.42   | 0.51 | Excellent diuretic, juice of leaves is an appetizer.                     |
| *Phyllanthus varigatus* G. Frost | Euphorbiaceae     | Bhuiamala   | Eup-194 | 0.44   | 0.39 | Excellent diuretic, juice of leaves is an appetizer.                     |
| *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. |
| *Lathyrus aphaca* L.            | Fabaceae          | Matar ghans | Fab-167 | 0.39   | 0.44 | Useful to cure snake bite.                                              |
| **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 bowel 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 inflamed 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 |
| Name                                | FAMILY   | Common Name | Code | Code | Use                        | Plant Part   |
|-------------------------------------|----------|-------------|------|------|----------------------------|--------------|
| Sida rhombifolia L                  | Malvaceae| Balu jhar   | Mal-211 | 0.48 | Roots used in rheumatism. | External use |
| Marsilea quadrifolia L.             | Marsileaceae | Chaupatay | Mar-176 | 0.45 | Juice of leaves is diuretic and febrifuge and used to treat snakebite. | Internal use, Leaves |
| Mollugo pentaphylla L.              | Molluginaceae | Trayaman | Mol-182 | 0.38 | The plant is antipyretic, antiseptic, appetizer, laxative, and stomachic. | Oral use, Whole plant |
| Morus alba L.                       | Moraceae | Kimu        | Mor-184 | 0.49 | Useful for treatment of hepatitis. | Oral use, Leaves |
| Boerhavia diffusa L.                | Nyctaginaceae | Purnarnava | Nyc-112 | 0.73 | 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 | Decoction and juice of the plant is used as therapeutic. | Internal use, Leaves and root |
| Oxalis corniculata L.               | Oxalidaceae | Chariamilo | Oxa-189 | 0.48 | 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 | Used in pains, fever, liver problems and diarrhea. Control vomiting and joint swellings. | Oral use, Leaves |
| Ceropertis thalictroides (L.) A. Brongu | Parkeriaceae | Dhaniya jhar | Par-118 | 0.40 | 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 | 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 | 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 | 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 | Used in skin disease. | External use, Whole plant |
| Chrysopogan aciculatus (Retz.) Trin. | Poaceae | Kuro        | Poa-122 | 0.42 | 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 | 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 | Antimicrobial and antipyretic properties. Useful for curing diarrhea and asthma. | Oral use, Seed |
| Digitaria sanguinalis (L.) Scop.    | Poaceae   | Sanobanso   | Poa-139 | 0.22 | 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 | Used in spleen and hemorrhage problems. | Oral use, Leaves and fruit |
| Species                        | Family               | Common Name | Local Name | ID | Uses                                                                 | Internal Use | External Use                                      |
|-------------------------------|----------------------|-------------|------------|----|----------------------------------------------------------------------|--------------|---------------------------------------------------|
| Echinochloa glabrescens       | Poaceae              | Gauresawa   | Poa-142    | 0.38 | 0.31 Used as a tonic, remedy for treating carbundes, 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 dyssentery. | Oral use     | Whole plant                                       |
| Imperata cylindrica (L.) P.    | 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              | Duraula     | Poa-202    | 0.46 | 0.44 Medicinal herb used in birth control.                           | Oral use     | Leaves                                            |
| Setaria pumila (Poir.) Roem.   | 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 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                                            |
| Monochoria hastata (L.)        | 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.) | Pteridaceae      | Fern    | Pte-119    | 0.31 | 0.32 The rhizome and roots are used as general tonic, anthelminthic for asthma. | Oral use     | Root                                              |
| Ranunculus seleratus 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                                            |
| Common Name                      | Family               | Local Name | Code | GC | GC | Uses                                                                                   | Use |
|---------------------------------|----------------------|------------|------|----|----|----------------------------------------------------------------------------------------|-----|
| *Hedyotis corymbosa* (L.) Lam.  | Rubiaceae            | Majthe 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 bano  | 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                     |
| Alismatraceae| 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, Portulacaceae, 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, antioxidant and anti-inflammatory activity. *Rumex crispus* species used to treat edema. *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. | Kunilo | 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* (Alton) 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, antisyentery, 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. | Lajawati | 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 |
| Plant Name                      | Common Name               | Uses                                                                 |
|--------------------------------|---------------------------|----------------------------------------------------------------------|
| Ricinus communis L.             | Castor oil plant          | Rheumatic pain, joint pain, constipation, headache, nervous disorders and paralysis. |
| Solanum nigrum L.               | Kali kunyo                | Respiratory disease, hepatic and stomach problems, eye problems, fever, piles and diabetes, jaundice. |
| Phyllanthus urinaria L.          | Bhuiamala                 | Appetizer.                                                           |
| Ludwigia perennis L.            | Lwang jhar                | Therapeutic.                                                         |
| Amaranthus spinosus L.           | Lunde                     | Internal bleeding, diarrhea, excessive menstruation, snake bites, boils, stomach disorders, mouth ulcer and, gonorrhea. |
| Rosa alba L.                    | Gulab                     | Fever and in palpitation of heart.                                  |
| Euphorbia parviflora L.         | Dudhe jhar                | Diarrhea, dysentery, bronchial problems, fever, earache, and snake bites. |
| Ludwigia perennis L.            | Lwan ghar                 | Therapeutic.                                                         |
| Lantana camara L.               | Banmara                   | Anti-pyretic, antimicrobial and anti-mutagenic.                      |
| Trifolium repens L.             | Charighans                | Diabetes and skin diseases.                                         |
| Senna tora (L.) Roxb.           | Chakramarda               | Ringworm and itching.                                               |

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|
| Blennorrhrea, 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: Venerreal 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
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 ethnomedical 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 ethnomedical 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 range 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 hercicidal 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 Bheemdat, Bedkot, Belauri, Krishnapur, Mahakali, Punarbas and Shuklapahanta municipalities and two rural municipalities (Beldandi and Lajjhadi) 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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