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Deepak Upadhyay
Ph.D. Research Scholar IIRS, Dehradun, Uttarakhand, India.

Correspondence
Deepak Upadhyay
Ph.D. Research Scholar IIRS, Dehradun, Uttarakhand, India.

Ethnobotanicaly useful plants of Katarniaghat Wildlife Sanctuary, Uttar Pradesh, India

Deepak Upadhyay

Abstract
An ethnobotanical survey was carried out to collect information about the traditionally useful plants of Katarniaghat wildlife Sanctuary, Uttar Pradesh, India. This paper deals with the medicinal and economically important plants found in the study area. The study was conducted in the five ranges of Katarniaghat *viz.* Katarniaghat, Nishangara, Murtiha, Kakraha and Motipur. Elder and local people who have the knowledge on the various uses of medicinally and economically important plants in the forest and used for different purposes were interviewed. A total of 60 plants belonging to 53 genera and 30 families were reported in the study.

Keywords: Traditional knowledge, Medicinal plants, Katarniaghat

1. Introduction
India has a great medicinal plant diversity with their proper uses since ancient time (Upadhyay *et al*., 2013; Mehra *et al*., 2014; Bajpai *et al*., 2016) [22, 16, 6] because of its unique geography and climate (Bajpai *et al*., 2014; Bajpai *et al*., 2015a) [5, 4]. About 60% plants used for medicinal uses are of Indian origin (Samant *et al*., 1998) [20]. As far as Uttar Pradesh is concerned, most of the floristic diversity is represented by Terai and Vindyan region (Anonymous, 2005) [1]. Out of these two, Terai region has a great plant diversity due its favourable climate and edge effect (Bajpai *et al*., 2012a; Bajpai *et al*., 2012b, Bajpai *et al*., 2015b) [3, 2, 7]. It is also a native place of ethenic Tharu tribe, which are living here from a very long time and using the plant wealth of the region for different ways (Singh *et al*., 2012) [21]. Katarniaghat wildlife sanctuary is a good representative of Terai region and situated in Bahraich district along the Indo-Nepal border between latitude 28° 6' to 28° 24' N and longitude 81° 24' to 81°19' E (Figure 1). The Sanctuary was established on 31st May 1976 and in 1987, it was brought under the purview of the 'Project Tiger', and together with the Kishanpur Wildlife Sanctuary and the Dudhwa National Park it forms the Dudhwa Tiger Reserve. It has six forest divisions namely, Katarniaghat, Dharampur, Nishangara, Murtiha, Kakraha and Motipur. Dense forest is located in four divisions Katarnia, Nishangara, Murthia & Dharmpur of core zone while rest two (Kakraha and Motipur) are situated in the buffer zone of the Sanctuary. Katarniaghat is connected across the border to Bardila National Park in Nepal. Girwa & Kodiala Rivers which join together and are later known as Ghaghra, traverse the sanctuary. The Katerniaghat Forests provide strategic connectivity between tiger habitats of Dudhwa and Kishanpur in India and the Bardia National Park in Nepal. Its fragile Terai ecosystem comprises a mesmerizing mosaic of Sal and Teak forests, lush grasslands, steaming swamps and wetlands (Bajpai *et al*., 2012a) [3]. The study area has tropical moist deciduous type of climate with major vegetation types (Champion and Seth, 1968) [8]. Assessment and documentation of plant species used for ethnobotanical purposes was the main aim of the present study.

2. Material and Method
Field trip of Katarniaghat wild life sanctuary was arranged in 2011-2012. Four places was visited and information was gathered about the ethno botanical uses from the local people of different ages randomly following Jain (1995). Discussions were held and personal interview was also carried out in the local community. About some local informants were randomly

selected and interviewed about there knowledge concerning the common names of plants, their usage and preparation. During field trips, species were identified on the field itself and those species digital photographs and herbarium specimens were collected whose doubt name identification was difficult. The specimens were pressed and dried according to herbarium techniques (Jain and Rao, 1977) [11] and identified using relevant literature (Duthie, 1903; Panigrahi *et al*., 1969; Saini, 2005a; Saini, 2005b; Maliya and Datt, 2010; Kumar *et al*., 2011; Chaudhary *et al*., 2014; Kumar *et al*., 2015) [10, 17, 18, 19, 15, 13, 9, 14].

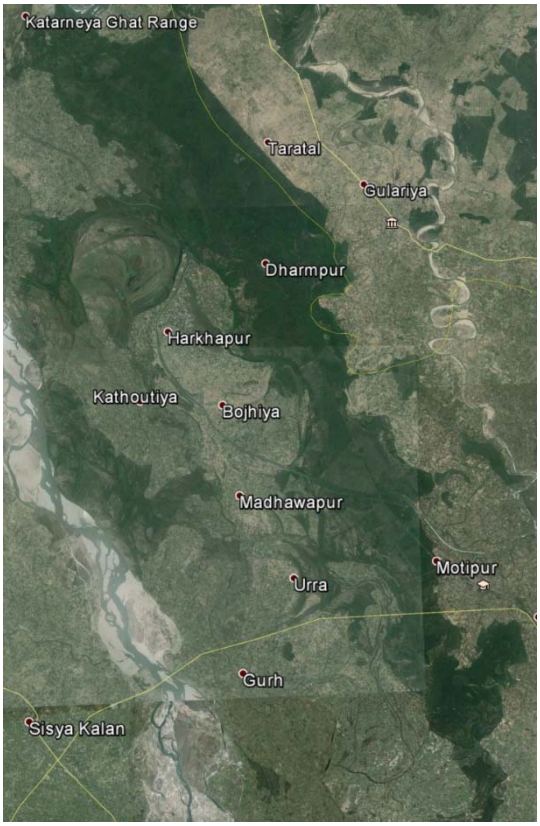

Fig 1: Locationa map of Katarniaghat wildlife Sanctuary.

3. Results and Conclusion

The study reveals that 60 plants of 53 genera belonging to 30 families have been ethnobotanicaly utilized in Katerniaghat wildlife sanctuary. Maximum 8 species of family Poaceae have been utilized by local people followed by Fabaceae, Moraceae, Combretaceae and Apocynaceae etc. The botanical names, families, common names, habit and ethnobotanicaly uses of the plant species has been provided in table 1.

Table 1: List of plants used for ethnobotanical purposes along with their family, common name and habit.

S. No.	Scientific name	Family	Common Name	Habit	Uses
1	*Acacia nilotica* (L.) Delile	Fabaceae	Kikar	Tree	Agricultural instruments formation; Fodder; Pods for poultry
2	*Adhatoda vasica* Nees	Acanthaceae	Arusa	Shrub	Leaf juice for chronic and acute cough; Smoke of dried leaved for asthma
3	*Adina cordifolia* (Roxb.) Hook. f. ex Brandis	Rubiaceae	Haldu	Tree	The juice of the plant to kill worms in sores; An infusion of the roots is used in the treatment of diarrhoea and dysentery
4	*Aegle marmelos* (L.) Corrêa	Rutaceae	Bel	Tree	Fruit eaten raw or into marmalades, jams, jellies & drinks; Young leaves & shoots cooked as a vegetable; Decoction of the astringent unripe fruit, combined with fennel & ginger is prescribed in cases of haemorrhoids
5	*Albizia procera* (Roxb.) Benth.	Fabaceae	Safed siris	Tree	Fire wood; Wood for construction, furniture, carts & carriages, cane crushers, carvings, boats & oars, rice pounders; Fodder; Bark for stomachache
6	*Arundo donax* L.	Poaceae	Nal	Grass	Make fishing rods & walking sticks; Root is diaphoretic, diuretic, emollient

					and galactofuge; Brooms are made from the terminal panicles
7	*Azadirachta indica* A. Juss.	Meliaceae	Neem	Tree	Cooked young leaves & flowers; Every part of the plant is used medicinally; Timber wood
8	*Bambusa arundinaceae* (Retz.) Willd.	Poaceae	Kata bans	Grass	Young shoots as food; Fodder; Ointment from the root for cirrhosis & hard tumors
9	*Bauhinia variegata* L.	Fabaceae	Kachnar	Tree	Young leaves, Flowers & flower buds are eaten, Boiled fruit are eaten as a vegetable or pickled; Bark juice is used in the treatment of amoebic dysentery, diarrhoea; Dried buds for piles, dysentery, diarrhoea & worms; Flower juice for diarrhoea, dysentery & other stomach disorders; Root as antidote for snake poison; Root decoction for dyspepsia
10	*Bombax ceiba* L.	Malvaceae	Semal	Tree	Cooked Flower buds, flowers & young leaves are eten; Rosted ripe seeds are eaten; Roots for cholera, tubercular fistula, coughs, urinary complaints, nocturnal pollution, abdominal pain; Bark for cholera
11	*Buchanania lanzan* Spreng.	Anacardiaceae	Chironji	Tree	Seed raw or cooked are eten; Bark is used in tanning
12	*Calamus tenuis* Roxb.	Arecaceae	Baiet	Climber	Cooked young shoot & Roasted fruit are eten; Plant making basket etc.
13	*Calotropis procera* (Aiton) W. T. Aiton	Apocynaceae	Aak, madar	Shrub	Bark infusion powder for leprosy & elephantiasis; Roots to treat snakebites; Leaves for asthma; Latex for ringworm, guinea worm blisters, scorpion stings, venereal sores & ophthalmic disorders
14	*Cannabis sativa* L.	Cannabaceae	Bhang	Shrub	Cooked & row seed are eten; Cannabis for anthrax, asthma, blood poisoning, bronchitis, burns, catarrh, childbirth, convulsions, coughs, cystitis, delirium, depression, diarrhoea, dysentery, dysmenorrhoea, epilepsy, fever, gonorrhoea, gout, inflammation, insomnia, jaundice, lockjaw, malaria, mania, menorrhagia, migraine, morphine withdrawal, neuralgia, palsy, rheumatism, scalds, snakebite, swellings, tetanus, toothache, uterine prolapse & whooping cough; Fiber for making ropes
15	*Carissa opaca* Stapf ex Haines	Apocynaceae	Karaunda	Tree	Fruits edible; Leaf decoction for fever, diarrhoea, and earache; Roots for stomachic, vermifuge & itchesgrown
16	*Cassia fistula* L.	Fabaceae	Amaltas	Tree	Flowers are edible; Pods for malaria, blood poisoning, anthrax, diabetes and dysentery; Bark or leaves for skin problems; Root decoction to purify wounds & ulcers; Roots for fevers
17	*Cassia tora* L.	Fabaceae	Panwar	Shrub	Cooked seeds are eten; Leaves for ringworm & skin diseases; Stems for mats & fences
18	*Cissampelos pareira* L.	Menispermacaeae	Parai bel	Climber	A water-ethanol extract of the rhizomes reduced the growth and multiplication rate of stomach tumours in a dose-dependent manner; Juice form macerated leaves and stem is mixed with a little water and used as an anti-conjunctivitis or as a treatment for sore eyes; Tribal people in India use the plant to prevent pregnancy
19	*Clerodendrum viscosum* Vent.	Lamiaceae	Katu	Shrub	Bark has been chewed as a substitute for areca nuts

20	*Cuscuta reflexa* Roxb.	Convolvulaceae	Amarbel	Epiphyte	Stems for bilious disorders; Whole plant for fevers, body pains & itchy skin; Plant juice mixed juice of Saccharum officinarum for jaundice
21	*Cynodon dactylon* (L.) Pers.	Poaceae	Doob	Grass	A cooling drink is made from the leaves; Whole plant decoction for anasarca, anuria, calculus, cancer, carbuncles, convulsions, cough, cramps, cystitis, diarrhea, dropsy, dysentery, epilepsy, headache, hemorrhage, hypertension, hysteria, insanity, kidneys, laxative, measles, rubella, snakebite, sores, stomach aches, stones, tumours, urogenital disorders, warts & wounds; Crushed leaves are applied on minor wounds as styptic to stop bleeding
22	*Dalbergia sissoo* Roxb. ex DC.	Fabaceae	Shisham	Tree	Leaves as fodder; Powdered wood, leaves & seed oil for skin diseases; Leaves are used as stimulant & to treat gonorrhoea & wounds; Tmber wood
23	*Dendrocalamus strictus* (Roxb.) Nees	Poaceae	Bans	Grass	Young stems are cooked as vegetable; Hut preparation
24	*Dendrophthoe falcata* (L. f.) Ettingsh.	Loranthaceae	Banda	Epiphyte	Plant is used to treat various respiratory problems such as asthma & pulmonary tuberculosis
25	*Desmodium oojeinense* (Roxb.) H. Ohashi	Fabaceae	Sannan	Tree	Root juice with powder two black pepper fruits is taken in cases of eye trouble; Bark against fevers; Bark paste is applied on cuts & wounds; Bark fibres for making rope; Fuel wood
26	*Diospyros tomentosa* Roxb.	Ebenaceae	Tendu	Tree	Raw fruits are edible; Leaves used for wrapping bidis; Timber wood
27	*Ehretia laevis* Roxb.	Boraginaceae	Chamror	Tree	Fire wood; Fresh root decoction for syphilis; Stem bark decoction for diphtheria
28	*Emblica officinalis* Gaertn.	Phyllanthaceae	Aola	Tree	Raw or cooked fruits are edible; Leaf extracts inhibit leukocytes & platelets activity in human
29	*Ficus benghalensis* L.	Moraceae	Bargad	Tree	Ripe fruit is edible; Leaves for dysentery & diarrhoe; Milky latex is applied to treat toothache, bruises, painful areas, rheumatic joints & lumbago; Aerial roots for temporary binding material
30	*Ficus racemosa* L.	Moraceae	Guler	Tree	Raw or cooked fruits are edible; Leaves in the treatment of diarrhoea; Fruit in haematuria, menorrhagia & haemoptysis
31	*Ficus religiosa* L.	Moraceae	Peepal	Tree	Leaves & twigs are alterative, antidote, aphrodisiac, astringent, antigonorrhoeal & laxative; Bark infusion is drunk as an antidiabetic
32	*Flacourtia indica* (Burm. f.) Merr.	Salicaceae	Kattiya	Tree	Fruit for jams & jellies making; Leaves are used as a tonic, an expectorant & for asthma, pain relief, gynaecological complaints, hydrocele, pneumonia & intestinal worms; Leaves as antidote for snake bites
33	*Glycosmis pentaphylla* (Retz.) DC.	Rutaceae	Gutru	Shrub	Raw fruit is edible; Leaf & stem bark extracts have healing effect upon damaged liver tissue; Plant for diarrhoea, coughs, rheumatism, anaemia & jaundice; Root decoction for facial inflammation
34	*Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult.	Poaceae	Kumariya	Grass	Plant fibre for making coarse mats & for thatching
35	*Holarrhena antidysenterica* (G. Don) Wall. ex A. DC.	Apocynaceae	Kurra	Tree	Bark & leaves used externally for scabies, boils, ulcers & haemorrhoids;

					Leaves pounded in water are used in stomach-ache; Fruit juice to treat cough
36	*Ichnocarpus frutescens* (L.) W. T. Aiton.	Apocynaceae	Dudhi	Climber	Plants for making basket; Roots are used as alterative, antidysentric, antipyretic, demulcent, diaphoretic, diuretic, hypoglycemic & tonic; Also beneficial in anorexia, leucorrhea, skin diseases, syphilis & urinary calculi
37	*Lannea coromandelica* (Houtt.) Merr.	Anacardiaceae	Zhingan	Tree	Bark powder is used as flavouring; Bark & leaves are used as medicine; Plant is also grown as a hedge
38	*Lantana camera* L.	Verbenaceae	Raimuniya	Shrub	Ripe black fruits are edible especially by children as snack; Bark decoction for fevers; Plant is also used as fire wood
39	*Madhuca indica* J. F. Gmel.	Sapotaceae	Mahua	Tree	Dried flowers mixed with Jaggery and fermented to prepare local whiskey named "*Daru*"
40	*Mallotus philippensis* (Lam.) Müll. Arg.	Euphorbiaceae	Rohini	Tree	Fruits & bark are used to treat stomach ulcers & tapeworm; Leaf decoction for diarrhoea
41	*Melia azedarach* L.	Meliaceae	Bakain	Tree	Aqueous extract reduces the intensity of asthmatic attacks; Flowers & leaves as poultice to treat neuralgia & nervous headache
42	*Morus alba* L.	Moraceae	Shatut	Tree	Raw fruits are edible; Bark is anthelmintic & purgative and used to expel tape worms
43	*Murraya koenigii* (L.) Spreng.	Rutaceae	Kathneem	Shrub	Cooked leaves are edible; Leaves also used internally to treat constipation, colic & diarrhoea; Bark paste is applied for bites of poisonous insects & other animals
44	*Oroxylum indicum* (L.) Vent.	Bignoniaceae	Soana	Tree	Young leaves & flowers are edible; Seeds & bark are used for alleviating body pain especially during fevers; Bark juice is taken internally to treat diarrhoea & dysentery; Fuel wood
45	*Phragmites karka* (Retz.) Trin. ex Steud.	Poaceae	Narkul	Grass	Cooked young shoots are edible; Stems as fuel; Stems also used for coarse hats, mats & hurdles weaving
46	*Saccharum munja* Roxb.	Poaceae	Munj	Grass	Used as pasture for grazing animals; Cut and dried as hay
47	*Saccharum spontaneum* L.	Poaceae	Kaans	Grass	Plant for making basket; Pant is also a source of thatching material
48	*Schleichera oleosa* (Lour.) Oken	Sapindaceae	Kusum	Tree	Ripe fruit is eaten raw; Powdered seeds applied on wounds & ulcers of cattle to remove maggots; Timber & fire wood
49	*Shorea robusta* C. F. Gaertn.	Dipterocarpaceae	Sal, saku	Tree	Roasted seeds are edible; Resin is used for dysentery, gonorrhoea, boils & toothaches; Leaf juice to treat dysentery; Seed oil to treat skin diseases; Timber wood
50	*Syzygium cumini* (L.) Skeels	Myrtaceae	Jamun	Tree	Fruits are edible; Leaves & bark are used to control blood pressure; Bark is used as gargle to strengthen gums, treat mouth ulcers etc; Roots for epilepsy; Branches are used to whiten the teeth
51	*Tectona grandis* L. f.	Verbenaceae	Sagwan	Tree	Root oil is used to treat eczema, ringworms & inflammation; Bark is used as astringent in the treatment of bronchitis; Leaves are used for packing food products in the markets; Timber wood
52	*Terminalia alata* B. Heyne ex Roth	Combretaceae	Asna	Tree	Bark in the treatment of diarrhoea; Bark juice is applied externally on cuts & wounds
53	*Terminalia arjuna* (Roxb. ex DC.) Wight & Arn.	Combretaceae	Arjun	Tree	Bark decoction with milk is used as beverage
54	*Terminalia bellirica*	Combretaceae	Bahera	Tree	Seeds are edible; Fruit lotion for sore

	(Gaertn.) Roxb.				eyes; Fruit is used internally principally in digestive & respiratory problems
55	*Terminalis chebula* Retz.	Combretaceae	Harar	Tree	Component of Trifala
56	*Toona ciliata* M. Roem.	Meliaceae	Toon	Tree	Bark is used to treat chronic dysentery & wounds
57	*Trewia nudiflora* L.	Euphorbiaceae	Gutail	Tree	Plant is used to remove swellings, bile & phlegm; Root decoction to relieve flatulence, gout & rheumatic afflictions
58	*Typha angustata* Bory & Chaub.	Typhaceae	Pater	Grass	Raw or cooked roots are edible; Stems & leaves arre used to make a good thatch, paper, mats, chairs, hats etc.
59	*Ziziphus mauritiana* Lam.	Rhamnaceae	Jhar beri	Tree	Fruit is eaten raw or preserved; Pounded roots are added to drinking water and used to treat indigestion; Fire wood
60	*Ziziphus xylopyrus* (Retz.) Willd.	Rhamnaceae	Kath ber	Tree	Fruits are edible

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