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ETHNOBOTANICAL STUDY IN ASAUDA, KASAR, MANDOTHI AND NUNA MAJRA VILLAGES OF BAHADURGARH TEHSIL OF HARYANA, INDIA

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ABSTRACT

Since the beginning of time, plant resources have met the majority of human needs, particularly those related to health. Due to the intrinsic worth of plants, as well as their uses in the development of contemporary drugs, indigenous knowledge of plants is acknowledged on a global scale. The present study highlights the significance of medicinal plants from four villages i.e., Asauda, Kasar, Mandothi and Nuna majra of Bahadurgarh tehsil of Haryana state. In this study, medicinal plants are documented which are used for the treatment of several ailments by the local people. During the study, twenty-two plants were reported belonged to eighteen families. Information of traditional knowledge was collected with the help of semi-structured questionnaires, interactions with local people and interviews.

Keywords : Ethnobotany, drugs, contemporary, medicinal.

Introduction

The foundation or base of folk medicine in indigenous communities around the world for the prevention and curation of various diseases has been medicinal plants since prehistoric times. (Doughari, 2014; Ogbole *et al.*, 2010; Chisamile *et al.*, 2023). The branch of science known as ethnobotany studies in which the total inhabitants of that area or how members of a community relate to the plants that grow there for cure of diseases (Bhargava, 2023). The information about ethnobotany, concepts, historical context, indigenous knowledge and risks to ethnobotany is provided by ethnobotanical studies (Katara *et al.*, 2023). In order to record and comprehend the traditional knowledge of indigenous people regarding the usage of plants for therapeutic purposes, ethnobotanical studies are a vital component of the field of botany. Generally, ethnobotany is described as a botany method based on anthropology. Archaeological searches in literature, herbarium and field studies are some of the ethnobotanical study techniques that are pertinent to medicinal plants (Sharma and Kumar, 2013). There are various medicinal plants in India that are used in a variety of traditional medical procedures. These herbs have a great potential to offer a direct medicinal benefit, either alone or in combination. Modern medicine is increasingly utilizing therapeutic plants (Bishnoi *et al.*, 2023). Understanding, how indigenous societies use local plants for medical purposes is crucial for encouraging community healthcare initiatives, understanding how biological resources are traditionally used and creating advanced plant-based medications (Bhandary and Chandrashekar, 2014). Regarding their historical context, conceptual rigour and practices as well as their current social

realities and compelling, traditional medicine systems represent a variety of medical traditions (Bhasin, 2007 and Bairagi *et al.*, 2019). Indigenous medicine stated that health routines, methods, information and faith in divine or devotional therapies, manual treatments, physical activity or workout to cure, identify, and avoid disease or preserve health (Mekonnen *et al.*, 2022). In search for contemporary medications derived from naturally occurring medical plant resources, ethnobotanical research is crucial (Idolo *et al.*, 2010; Njoroge *et al.*, 2004; Kumar *et al.*, 2021). For the preservation, development and protection of herbal medicines, traditional ethnobotanical information on medicinal plants is necessary.

Materials and Method

Study Site Description

One of the 21 districts that make up the northern Indian state of Haryana is Jhajjar. The present study was conducted in the four villages, they are Asauda, Kasar, Nuna Majra and Mandothi of Bahadurgarh tehsil, Jhajjar district. Bahadurgarh is generally located in the Jhajjar district of Haryana. It is located in India's northeast and is not too distant from Delhi, the country's capital. Physically, it is situated 206 m above sea level on an alluvial plain. The soil is sandy loam in texture and has varied soil composition. It is situated between 28°43'50' N latitude and 76°55'25' E longitude. Asauda village is located in Jhajjar district. It is few km away from Delhi border. Kasar is a village located in Bahadurgarh tehsil. It is located 29 km to the east of Jhajjar, the district headquarters and 264 km from Chandigarh, the state capital. It is situated at 220m altitude above sea level. Nuna Majra

village is located 23 km from district headquarters in Jhajjar. Mandothi is located 22 km towards east of district headquarters, Jhajjar and 263 km from Chandigarh. Climate of Bahadurgarh city is quite similar to that of Delhi. Extreme

climatic conditions exist there, in summer and winter, with highest summer temperature goes upto 47-48°C in the month of May and June and minimum temperature in winter drops upto 1-2°C, in the month of December and January.



Fig. 1 : Study site map.

Data collection and organization

The collected data is based on medicinal plants that are used to make medications for treating a variety of diseases. Informants were chosen from the study site non-randomly. Data was gathered through interviews with informants and face to face interactions of informants. For the purpose of gathering information from informants, an appropriate semi-structured questionnaire was prepared and used. Informants were chosen based on their recognition as knowledgeable informants with deep knowledge of ethnobotanical herbal plants used for the prevention of human diseases. The participants were chosen from several places such as village panchayat, universities, nurseries, gardens, schools, fields and temples. The information provided by the informants about medicinal plants helpful for their survival and they

never pay to medicines which is obtained from medicinal plants. They are either experienced traditional healers themselves or healing was a heredity, these informants knew how to employ the herbs as medication. The gathered data was categorized into scientific names, common names, family, plant part used, mode of administration and ailments treated. A semi structured questionnaires was prepared for the collection of data about informants and their knowledge about ethnobotanical plants. Questionnaire consists of name, age, sex, occupation, qualification, address, information about herbal plants used for the curation of different illnesses. All informants were very helpful and understanding who helps me in providing crucial knowledge about herbal plants used to cure illnesses during the survey conducted in 2021-2022.

Table 1 : Demographic representation of informants

Sr. No.	Factors	Classification	Number of participants	Percentage
1.	Gender of informants	Male	31	67.3%
		Female	15	32.6%
2.	Age groups	Below 60	30	65.2%
		Above 60	16	34.8%
3.	Educational status	Literate	35	76.08%
		Illiterate	11	23.9%

Results

Socioeconomic background: The forty-six informants who were interviewed had a variety of ethnobotanical knowledge and belongs to various sectors of society. The interviewers were chosen non randomly from a variety of places,

including senior citizens from village panchayat, schools, universities, nurseries, gardens, temples and fields. The majority of interviewers were men and the forty to sixty age range saw the highest participation rates.

Diversity of medicinal plants : The current study enumerated twenty-two ethnobotanical plants belonged to eighteen families. List of ethnobotanical medicinal plants found in four villages i.e., Asauda, Kasar, Nuna majra and Mandothi villages of Bahadurgarh Tehsil are reported in (Table 2). The various types of families having number of plant species (Figure 2). The plant part used for the preparation of remedies. (Figure 3).

Utilization of these traditional plants for the curation of several diseases like fever, cough, cold, abdominal pain, skin diseases, constipation, earache, headache, insect bite, jaundice, gout, eye diseases, diarrhoea, lactation, avoid miscarriage, vomiting, indigestion, anemia, maintain blood pressure, anorexia, etc.

Table 2: List of medicinal plants of the study site.

Sr. No.	Botanical Name	Local Name	Family	Plant part used	Disease treated	Method of administration
1.	<i>Allium cepa</i> L.	Onion	<i>Liliaceae</i>	Bulb, Extracted oil, Leaves	Arthritis Earache Heart failure Nasal bleeding Cough Itching, Heat stroke	Massage with juice of onion and oil of rai. Juice is heated and put in ear. Eat tuber. Put 1-2 drops of juice of leaves in nose. Add a little amount of sugar in 7-10ml onion juice. Eat tuber and massage with juice on the body.
2.	<i>Aloe vera</i> (L.) Burm.f.	Aloe vera	<i>Liliaceae</i>	Leaves and Roots	Swelling and pain in spleen, headache Anemia Abdominal diseases Fever	Sprinkle the turmeric powder on leaves mucilage after heating, tied it. Juice is given. Boil 15-20 gm roots after filtration mix Hing in it. Decoction of roots is given.
3.	<i>Azadirachta indica</i> A. Juss.	Neem	<i>Meliaceae</i>	Flowers, Leaves, Bark, Seeds, Extracted oil	Kill helminths External abscess Cancer Eye diseases Purifies blood Heals wound	Applied oil externally. Applied paste of leaves. Decoction of bark is given. Put juice of flowers and leaves. Decoction of roots is given. Paste of leaves is applied.
4.	<i>Barleria prionitis</i> L.	Kala bansa	<i>Acanthaceae</i>	Leaves	Swelling, goiter Mucous cough Toothache Sperm increase	Paste of leaves is applied. Powder of dried leaves mixed with honey. Juice of leaves is applied. Juice of white flowering plant with cumin seeds is given.
5.	<i>Bauhinia purpurea</i> L.	Kachnar	<i>Fabaceae</i>	Flowers, Bark, Root	Stomatitis (mouth ulcer) Goiter Healing wounds Cough Leucorrhoea	Gargle with the decoction of its bark, Acacia pods, flowers of pomegranate. Applied paste of bark or take powder of bark with saunth powder twice a day. Boil root with rice washed water or maand and tied on wounds. Decoction of flowers is given. Powder of flower is given.
6.	<i>Cannabis sativa</i> L.	Bhang	<i>Cannabinace ae</i>	Leaves, Seeds	Insomnia Diarrhoea Arthritis Asthma	15-20 gm powder is taken with milk twice a day. 100mg powder with half of its part of powder of posat is given twice a day. Massage with seed oil. Powder of leaves is given with black pepper and sugar crystals or mishri.
7.	<i>Catharanthus roseus</i> (L.) G. Don.	Sadabahar	<i>Apocynaceae</i>	Leaves Roots	Throat infection, immunity booster Control blood pressure Diabetes Kidney stone	Decoction of leaves is given. Decoction of roots. Juice of leaves. Boil leaves in water and form decoction.
8.	<i>Cuminum cyminum</i> (L.)	Jeera	<i>Umbelliferae</i>	Seeds	External inflamed painful places, Scorpio poison Diarrhoea Kidney stone White discharge in females, lactation.	Paste of seeds is applied. After roasting, powder is formed and is given with honey. Cumin powder is given along with mishri. Cumin seeds is taken alone or with jaggery.
9.	<i>Eucalyptus globulus</i> Labill.	Safeda	<i>Myrtaceae</i>	Exudate, Oil, Leaves	Rheumatism Tuberculosis, whooping cough, headache	Massage with oil. Its steam of leaves is inhaled or oil is smelled.

					Worm diseases Diarrhoea	Oil is used. Exudate is mixed with water and given.
10.	<i>Ficus bengalensis</i> L.	Banyan	Moraceae	Root, Leaves, Exudate, Bark, Bud	Itching Ear discharge Toothache For conceiving in women Bloody diarrhoea Gonorrhoea	Boil leaves in water and when some of the mixture is left add some mustard oil and boil again and after cool down applied it on skin. Add few drops of mustard oil in exudate of banyan tree. Exudate is applied. Powder of bark is taken with lassi. Boil bud in water and add some ghee in it, when one fourth portion is left then cool it and add honey and sugar in it. Powder of roots is taken with water.
11.	<i>Hibiscus rosa-sinensis</i> L.	China rose	Malvaceae	Flower, Leaves	Dandruff Contraceptive purposes Diarrhoea Gonorrhoea	Juice of flower is boiled with sesame oil, when one fourth part is left, then massage with it. Powder of flowers is mixed with jaggery. Juice of leaves is given. Grind the petals of flowers in water and filtrate it, then add mishri in it and given orally twice a day.
12.	<i>Lagenaria siceraria</i> (Molina) Standl.	Bottle gourd or lauki	Cucurbitaceae	Leaves, Fruit, Oil	Dental problems, Diabetes Goiter Arthritis Cough Leucorrhoea	Gargle with its juice. Juice of fruit is given. Oil is used. Massage with fruit oil. Powder of fruit marrow is taken with nose. Mixed sugar and honey in fruit powder and form laddu.
13.	<i>Mangifera indica</i> L.	Mango	Anacardiaceae	Bark, Leaves, Flowers, Fruits, Seed marrow	External bleeding Sunstroke, inflammation, wounds Vomiting Worms Anemia Blood leucorrhoea Typhoid	Powder of bark, flower, leaf and seed marrow are applied externally. Cooked raw fruit on low flame and applied on skin. Juice of leaves is given. Powder of seed marrow is used. Ripe fruits are given. Seed marrow is used. Decoction of mango blossom (Baur) is given.
14.	<i>Nerium indicum</i> Mill.	Kaner or Indian oleander	Apocynaceae	Root, Leaves, Flower	Leprosy, Ulcers Headache Joint pain Itching	Applied paste of root. Paste of plant's flower and fruit of <i>Phyllanthus emblica</i> and applied on forehead. Mix powder of leaves in mustard oil and massage with it. Boil leaves of plant in clove oil and applied on skin.
15.	<i>Ocimum sanctum</i> L.	Basil or tulsi	Labiatae	Leaves	Earache Remove head lice Diarrhoea Cough Cold predominant fever, cold Rashes on skin	Put juice of leaves in ear. Massage with oil of leaves. Powder of leaves with powder of cumin seeds with honey is given. Juice of leaves and ginger with honey is given. Decoction of leaves and clove is given and prepare tea by adding tulsi leaves, elaichi, clove and ginger. Apply leaves oil.
16.	<i>Ricinus communis</i> L.	Arhand	Euphorbiaceae	Root, leaves, seed, oil	Arthritis Skin diseases Snake bite Menstruation problems	Crushed the seeds and applied on swelling portion and crushed the leaves of plant and Mehandi and applied the paste on pain area and massage with oil. Decoction of roots is given. Juice of leaves is given. Heat the plant leaves and tied on stomach.

17.	<i>Rosa centifolia</i> L.	Rose	<i>Rosaceae</i>	Flower	Gastric ulcers, Hypersweat Inflammation of eyelid, Fever, Heals wound	Juice of flower (Gulab jal) is applied on ulcers and applied on skin to remove foul odour of sweating. Applied paste of flower. Gulkand is given. Applied paste of flower.
18.	<i>Saccharum officinarum</i> L.	Sugarcane	<i>Poaceae</i>	Root, Stem	Throat disease, Cough, Indigestion, Increase lactation, Jaundice	Boil the juice of sugarcane stem and gargle with it. Juice of ginger with jaggery is given. Cumin seeds with jaggery is given. Decoction of roots is used. Drink fresh juice.
19.	<i>Salmalia malabarica</i> Schott & Endl.	Silk cotton tree or semal	<i>Bombacaceae</i>	Roots, Flowers, Fruits and Thorns.	Bleeding, Clear face complexion, Asthma, Kidney colic, Weakness, White and bloody discharge in females and blood bile.	Juice of flowers or powder are applied. Crushed the thorns of Semal in milk and applying it on the face. Powder of roots mixed with ginger powder and black pepper powder is given. Powder or decoction of raw fruits is given. Powder of flowers mixed with honey and desi ghee is given. Powder of roots is given with milk or water.
20.	<i>Syzygium aromaticum</i> (Linn.) Merr. & Per.	Laung (clove)	<i>Myrtaceae</i>	Floret, Oil	Headache, Toothache, Arthritis, Acidity, Cough, Fever	Paste of floret is applied. Oil is soaked in cotton and kept pressed in cavity, it kills the worms and calms the colic. Massage with oil. Powder of clove, saunth, ajwain, sendha salt with jaggery is given. After roasting the floret taken with honey. Powder of clove and long pepper is taken twice a day.
21.	<i>Syzygium cumini</i> (L.) Skeels.	Jamun	<i>Myrtaceae</i>	Fruit, Leaves, Bark	Chronic and bloody diarrhoea, Diabetes, Burns, Typhoid fever, Vomiting	Powder of berries kernels and decoction of bark is given. Eat leaves and fruit. Fruit vinegar mixed with sesame oil is applied. Vinegar of berries with sesame oil is soaked on the cloth and put it on forehead to avoid anger and irritation. Eat leaves.
22.	<i>Terminalia arjuna</i> Roxb.	Arjun	<i>Combretaceae</i>	Bark and Leaves	Decrease cholesterol, Earache, Women's bleeding and white discharge, Fractures	Decoction of bark is given. Put juice of leaves in ear. Boil powder of bark in milk, when one fourth of liquid is left then add mishri and taken thrice a times in a day. Applied paste of bark or powder is consumed with milk.

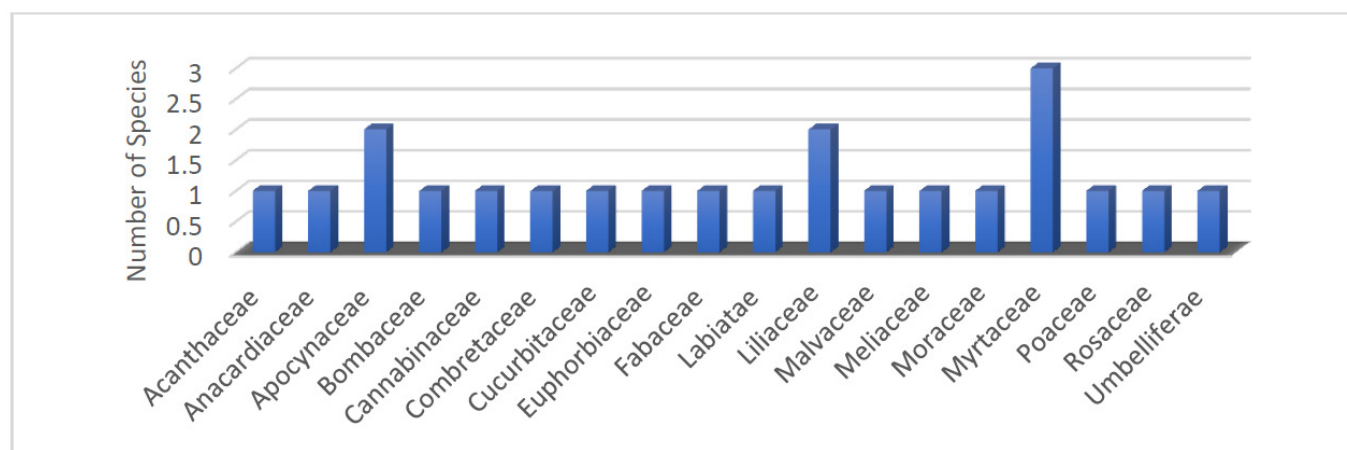


Fig. 2 : Distribution of families of ethnobotanical plants from study site.

Myrtaceae was dominant and achieved the highest rank among families with three species followed by *Apocynaceae* and *Liliaceae* having two species while rest of other families such as *Acanthaceae*, *Anacardiaceae*, *Bombacaceae*,

Cannabinaceae, *Combretaceae*, *Cucurbitaceae*, *Euphorbiaceae*, *Fabaceae*, *Labiatae*, *Malvaceae*, *Meliaceae*, *Moraceae*, *Poaceae*, *Rosaceae* and *Umbelliferae* having one species each.

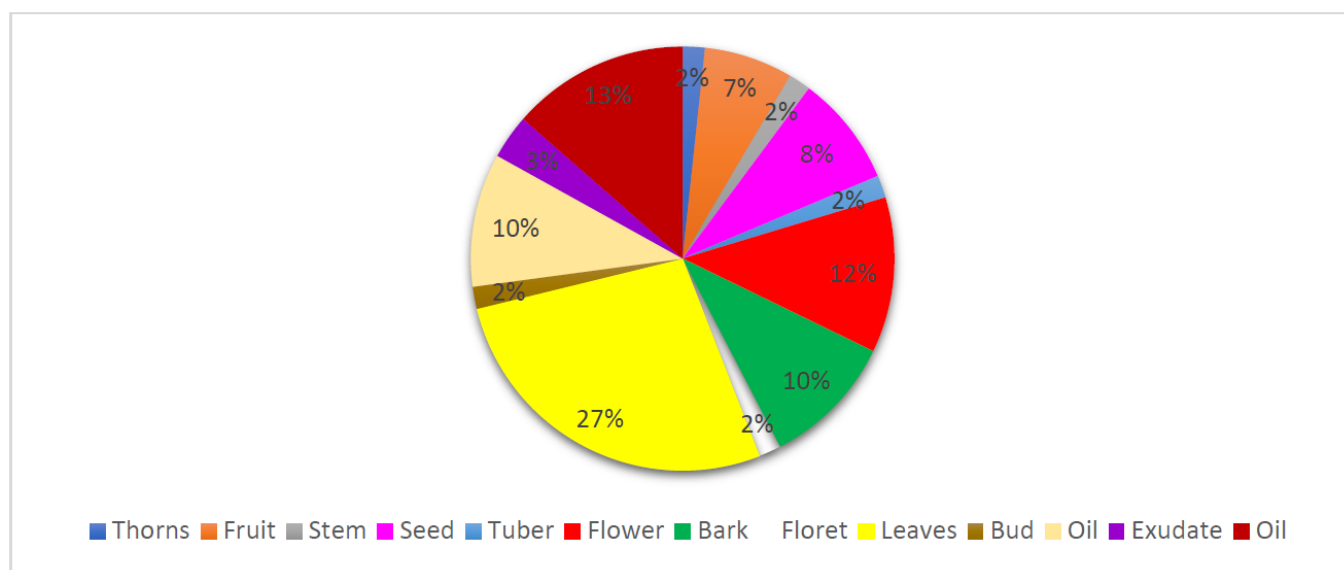


Fig. 3 : The plant part used for medicinal applications.

Plant part such as tuber, stem, bud, fruit, flower, thorns, bark, root, seeds, leaves are used for the preparation of natural remedies. These were either used alone or in conjunction with other plants. The most favored method of administration was oral applications. Various types of plant parts were used for medical applications shown in (Figure 3). The highly represented part of plant was leaves (16), followed by roots (8), flowers (7), bark and oil (6 each), seed (5), fruit (4), exudate (2), stem, bud, floret, thorns, tuber (1 each).

Discussion

Due to the significance of these plants for local environment or the unjustified exploitation of some species, ethnobotanical studies frequently take ecological elements of their traditional uses into account. In order to achieve biological conservation, ethnobotany can unite the know-how of indigenous population and scientific understanding. (Silveira and Boylan, 2023; Pei *et al.*, 2020). The current study covers the four villages of Bahadurgarh tehsil. A total twenty-two medicinal plants belonged to eighteen families were enumerated which were used by the indigenous people for the curation of several illnesses. The current study reported with plant species alphabetically arranged with their botanical names which is followed by local name, family, plant part used and their detailed uses. Medical practitioners, hakims, vaidyas, teachers and other local peoples belonged to different sectors who have the accurate knowledge about herbal plants employed for the treatment of human's ailments. *Myrtaceae* was dominant with three species followed by *Apocynaceae* and *Liliaceae* having two species each while rest of other families having one species each. The maximum used part of plant was leaves (16 species) which is followed by roots (8 species), flowers (7 species), bark and oil (6 species each), seed (5 species), fruit (4 species), exudate (2 species), stem, bud, floret, thorns, tuber

(1 species each). Reported plants in this study were used for the curation of different diseases such as cough, itching, heart failure, heat stroke, arthritis, diarrhea, typhoid, jaundice, decrease cholesterol, fractures, heals wound, earache, eye disease, weakness, diabetes, kidney colic, blood bile, nasal bleeding, increase lactation, headache, toothache, vomiting, menstrual problems, fever, acidity, asthma, throat diseases, abdominal diseases, etc. *Aloe vera*, *Eucalyptus globulus*, *Nerium indicum*, *Syzygium aromaticum* were used to cure headache. There were eight plant species i.e., *Allium cepa*, *Barleria prionitis*, *Bauhinia purpurea*, *Eucalyptus globulus*, *Lagenaria siceraria*, *Ocimum sanctum*, *Saccharum officinarum*, *Syzygium aromaticum* used for the treatment of cough. *Barleria prionitis*, *Ficus bengalensis*, *Syzygium aromaticum* are used for the relieving of toothache. The present study for the treatment of toothache was analogous to the study done by Kumar (2014). *Cannabis sativa*, *Cuminum cyminum*, *Eucalyptus globulus*, *Ficus bengalensis*, *Hibiscus rosa sinensis*, *Ocimum sanctum*, *Syzygium cumini* were used for the treatment of diarrhea. Medicinal properties of *Allium cepa* was found to be similar as suggested by Kumar *et al.*, 2010.

Conclusion

Although ethnobotany is not the only way to find novel medicines or the only place to find conservation models, it does represent a body of knowledge that is based on extensive knowledge of both subjects. The historical connections or cultural links between humans, environment, and the species they support have long been used to spread knowledge and protect species. This study highlights the diversity of the local flora, showing how plants are still valued as a viable alternative to contemporary medical techniques and highlights the benefits of plants for the region's villages. The study recommends for the use of medicinal plants in conservation and development initiatives

and emphasizes the potential for these local herbal plants to improve rural livelihood and community resilience. The outcome of the recent study reveals that the strong demand for herbs in the pharmaceutical companies and for local therapy is the reason for their high market value. To meet the demands of our generations' present and future needs, sustainable usage of medicinal plants is crucial. However, the government is making considerable efforts in this direction. Traditional knowledge has enormous potential and opportunities to improve the socioeconomic status of the local population and the growth engine of any country including a role to play in livelihood improvement, but it needs more attention so that it can be conserved before it is lost with death. Therefore, it is essential to transform this traditional knowledge into a well-planned medicinal plant industry since, when used economically, it can be a multi-billion dollar enterprise.

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