ETHNOPHARMACOLOGICAL SURVEY OF KANGRA DISTRICT, HIMACHAL PRADESH

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ABSTRACT: Ethnobotanical pharmacopoeia is confidently used in disease intervention and there is need for documentation and preservation of traditional medical knowledge to bolster the discovery of novel drugs. This research was carried out among the ethnic groups (Gaddi & Gujjars) in Kangra district, Himachal Pradesh of India. Twenty-six (26) plant species of ethno pharmacological importance were gathered and documented throughout study period (January 2011 - March 2012). These medicinal plants were distributed among 26 genera and 18 families. Analysis of the growth forms of these medicinal plants revealed that herbs constituted the largest numbers or proportion with 12 species followed by shrubs and trees. The documented ethno medicinal plants were mostly used to cure kidney stone, skin disease, paralysis, stomach disorders, spermatorrhoea and fire burns. Indigenous knowledge, botanical diversity and ethno pharmacopoeia practices were recorded from Kangra District. The botanical resources were found to be under threat due to several anthropogenic and natural factors. Disappearance of traditional medical skills was evident in the study area and this prompts for design of linguistic, anthropological and ethnographic methods in the context of ethno pharmacology to document the indigenous knowledge so as to minimize the eminent fragmentation and biodiversity loss.

Keywords: Medicinal plants, Gaddi, Indian Western Himalaya, Himachal Pradesh, Kangra.

INTRODUCTION:

Dependence of humans on plants and plant products for his survival to be continues till today from time immemorial. The traditional life style in India is based on the secrets of herbal medicines and silent relationship with nature. The origin of traditional knowledge is deep rooted in tribal people's age-old experimentation. This traditional knowledge is unique to a given society, the importance of which cannot be neglected. Their life style evolved as customs and value oriented traditions.

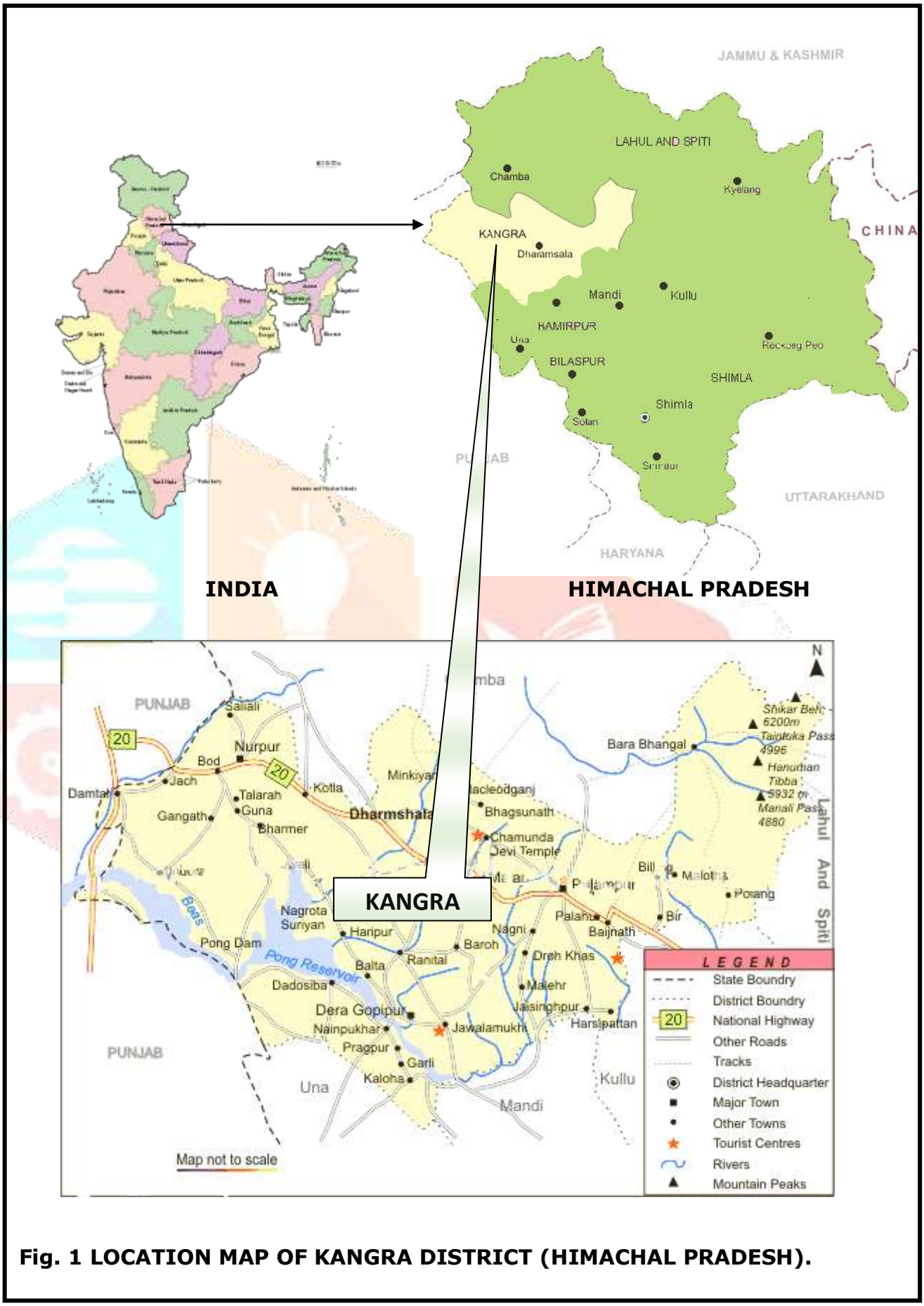

Fig. 1 LOCATION MAP OF KANGRA DISTRICT (HIMACHAL PRADESH).

These tradition, knowledge and relationship with nature now form the core of interdisciplinary science known as Ethnobotany. Ethnobotany broadly means, all aspects of direct relationship of plants with man, according to Cotton (1996) it's the study of all forms of vegetation used by aborigines. Man has been using flora and fauna since time of his emergence on this planet. He gained the knowledge of useful and harmful plants. This knowledge becomes an integral part of his culture. Studies in archaeology, paleobotany and ethnography revealed the close relationship between plants and man.

In India 2000-1000 BC, Rig-Veda and Athar-Veda mentions about the uses of plants. Since then man knows the importance of plants. Ethnobotany is a rapidly expanding science. In last three decades, it has been considerably expanded, both in its concepts and scope. Beginning with the study of plants used by tribal's for food, medicine and shelter, now it includes studies like conservational practices of tribal's, ethnopharmacology, ethnopharmacognosy, ethnomusicology and ethnogynaecology etc.

MATERIALS AND METHODS:

Location and extent: The present Kangra district came into existence on the 1st September, 1972 consequent upon the reorganization of districts by the government of Himachal Pradesh. The district lies between $31^0\,40'$ to $32^0\,25'$ longitude and $75^0\,35'$ to $77^0\,05'$ latitude and is bounded on the south-west by Una district, on the north-west by district Gurdaspur of Punjab state, on the north by Lahaul Spiti and Chamba districts and on the east by Kullu and Mandi districts. While on the south it touches Hamirpur district. The elevation generally varies from 500 m to 5500 m above mean sea level. According to the Surveyor-General of India, the area of the district is 5,739 square kilometers. In terms of area, the district constitutes 10.31 % of the state area and ranks 4th among the districts (Fig. 01).

Ranges and Valleys: The district is criss-crossed by mountain ranges enclosing broad to narrow valleys. Dhauladhar which looks like a big giant in a sitting posture stretches out with fertile valley of Palampur and Kangra in front and is the most important mountain range in the district. Dhauladhar range starts from the right bank of the river Beas and forms boundary of the district with Kullu district at a distant point below Sarui Pass. Thereafter, the range passes through Bhangal area above Kangra and Palampur valley covering Bara Bhangal ridge. This is about 6,000 m above mean sea level and thereafter runs parallel to another mountain range known as

Hathidhar which forms boundary between Chamba and Kangra district of the state. The Dhauladhar range cuts Bhangal area into two halves. The northern half is called Bara Bhangal and the southern half as Chotta Bhangal. To the north is Lahaul and the Mani-Mahesh range of Chamba district is located to the west. When the snow melts, the long base slopes of the mountains which surround Bara Bhangal on the three sides support splendid grazing areas and postures for sheep and goats. General appearances of Chotta Bhangal are wild. The range above Bir is known as Bir Bhangal, which is the prettiest part of Kangra district. Dhauladhar range enclose famous places like Dharamshala, Naddi, Mcleodganj, Triund, Kunnal Pathri, Dharamkot, Bhagsunag, Kareri village, Rawa village, Himani Chamunda, Bandla, Guna Devi, Kandwari and Utrala, etc. The area is a treasure hunt for naturalist's trekkers and the hunters alike. Trekking routes via passes like Triund to Laka Jot via Inderhara pass (4300 m), Kareri village to Lama Lake via Minkiani Jot (3600 m), Bir Khas to Bara Bhangal via Thamsar Jot.

Kangra district lies in the Shivalik and the lesser Himalayan zone and its topography is well defined by a series of almost parallel hill ranges which rise in height towards north-east. The striking feature of the lesser Himalayas is its altitudinal variation. The altitude generally varies between 400 m to 4,000 m and the higher reaches of the hill ranges remain snow covered perpetually. This area is the cradle for miraculous medicinal plants. The area between the Beas River which forms the southern boundary of the district and Chakki stream at the southeast is extensively cultivated.

General Climate: The most crucial factor determining the climate in the district is its altitude. It not only influences the temperature but also has a definite influence on the rainfall. The low-lying valley areas below 600 meters are characterized by a hot and moist tropical climate. At 2000 meters, the climate is cooling temperate in hills. Between 2000 m and 4500 m it is cold temperate and covered with deep snow during the winter months i.e. December to February. During the winter, there is snow fall, hail storm and rain due to western disturbances. So, the lower areas are too cold because of the lashing cold winds from the mountain ranges of Dhauladhar and Hathidhar. The places lying at higher altitude are too wet in the rainy season and Dharamshala is the head quarter of the district. This is rainiest place with 3400 mm rain fall per annum. During the summer i.e. March to June months in the valleys and southern parts of the district, the days are extremely hot and sultry. During the monsoon i.e. July to September periods

the landscape became lust green and the small water channels in the beds of hill streams begin to swell. The springs which dry up during the hot summers are replenished.

CULTURAL HERITAGE AND TRIBES

The study area is chiefly inhabited by a large population of tribal and non-tribal people including Gaddi, Gujjar, Dhogari, Labana, Bhangali, Sipi, Nath, Rajput and Brahmin etc. Generally, the tribal people of Gaddi and Gujjar are mainly traditional communities depend on wild plants for food, medicine, construction material, fuel and nearly for all their other material cultures.

Gaddis:

Gaddi of Himachal Pradesh represent one of the most primitive tribes of Kangra inhabiting in north eastern part of the district, especially the hilly tracks of Dharamshala, Shahpur, Nagari, Palampur, Bajnath, Lot, Krot, etc. Gaddis of Himachal are world famous. The word '*Gaddi*' is a generic name and major groups are Brahmins, Rajputs, Khatris, Thakur and Rathis (Fig. 02). These groups are scattered over Bharmour tehsil of Chamba district and Kangra district (Sharma, 1998; Uniyal *et al*., 2005).

The word Gaddi means a shepherd. As a nomadic tribe, the Gaddis spend half of the year in their villages cultivating their field and the remaining half is spent in migration searching for grass and fodder for their herd and seeking seasonal employment for themselves(Fig. 03). The religion of Gaddis is 'HINDUISM'. They are Shiva and Lord Shiva is the principal God of the Gaddis but also propitiates their duties and spirits by sacrificing sheep and goats. Gaddi Brahmins are traditional priests and served in a number of social functions.

Gujjars: The origin of the Gujjars is still shrouded in mystery but the majority of the scholars and historical record reveal that their ancestors had migrated from central Asia to India during the sixth century. Gujjars are supposed to be the descendants of 'Huns' of Gujjars. The Hindu Gujjars of Himachal trace their origin from Yashoda, mother of Lord Krishna. The Hindu Gujjars are found mostly in the low altitudes and plain areas of Kangra district (Fig. 04).

Ethno-botanical Surveys:

Field surveys were undertaken across the various tribal dominated areas during 2009 to 2012. Starting from lower elevation i.e. Shahpur, Dharamshala, Palampur, Bir, Baijnath, Barot, Jai Singhpur, Kahanphat, Khundiabari, Kangra and moving upto the higher elevation i.e. Chotta and Bara Bhangal, Kreri, Naddi, Rakh, Krot, Himani Chamunda, Shalli, Kandwari, Gwal-tikker

and upto different passes and Jot of the Dhauladhar region, which increases the importance of the valley for the people devoted to indigenous system of medicine.

Interviews of Tribal People and Vaidyas:

Semi-structured questionnaire survey was conducted among selected tribal communities and vaidyas with a view to document the knowledge on the use of medicinal plants, the preparation of various medical formulations and way of their consumption. Information was also gathered on the local name of medicinal plants, plants part used in treatment and ailments being cured by the use of ethno-medicinal plants. Field visits were made with selected tribal people who have a sound knowledge of hilly areas and medicinal plants used in the locality. A total of 43 informants were included in the interview list where 35 of these were male and 08 were female. All the interviews of local inhabitants, tribal people and vaidyas having knowledge about medicinal plants, only 27 provided required information regarding the use of specific plants, preparation of medical formulation made and identification of medicinal plants. Since there is a common belief among the indigenous people that if any secret regarding therapeutic value is revealed to anyone outside their own clan, the efficacy of plant will vanish, or it is the specific permission given only to their next generation or to a specific person of their choice. Qualitative information so gathered was verified by cross-examination with different tribal people and vaidyas.

RESULT AND CONCLUSION:

The traditional healers and old village people have a sound knowledge related to medicinal uses of plants around them. Traditional herbal medicines used by different communities in this region play an important role in alleviating different diseases. They are safe, effective and inexpensive. In the interior areas of Kangra district plants become the only source of medicine. However, information on the uses of plants as traditional medicines has not been documented well from in these areas of Kangra district. The people of these communities, particularly the rural folk and old aged people have long been using plants for their various ailments (Singh, 2008) (Fig. 05). With the recent development undergoing in this region the people of this region specially the rural folks gained access to modern health care facilities, but still the rural folk at large prefer to stay with their traditional herbal medication due to the easy availability, cost effectiveness and efficacy of the traditional way of healing using medicinal plants (Rao, 1996). The climatic conditions prevailing in the region maintains an ideal habitat for

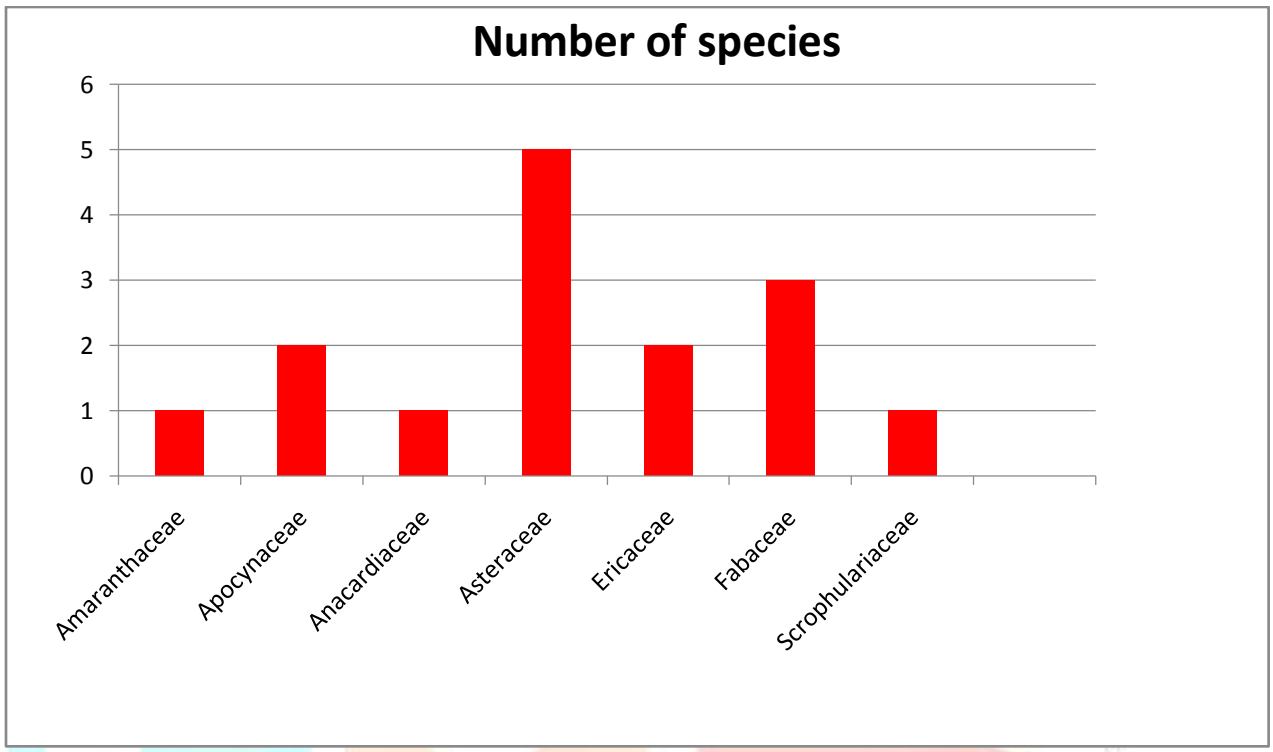

Fig. 08-Dominant families with number of species

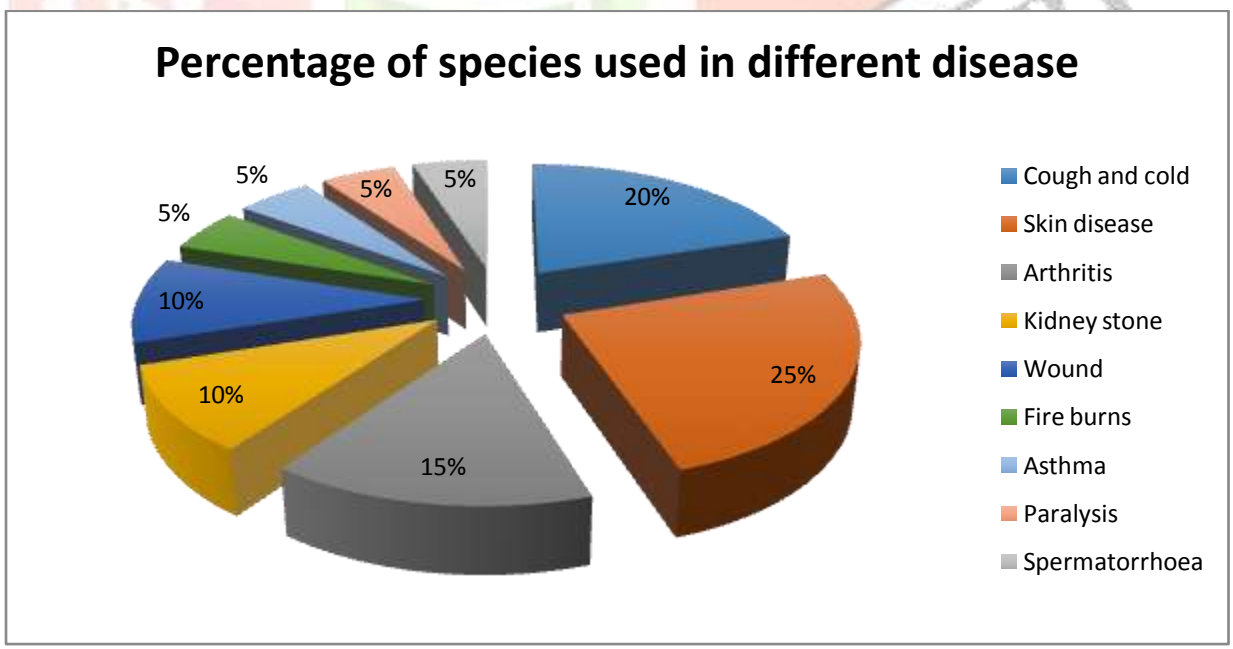

Fig. 09-Percentage of species used in different disease

the natural growth of variety of medicinal plants and herbs. These are the sources which provide raw materials for pharmaceutical and phytochemical industry.

However, in district Kangra, a large amount of knowledge occupied by various traditional herbal healers on the medicinal plants is not yet documented. The present work has envisaged the documentation of various herbal formulations by traditional herbal healers and vaidyas of Kangra. The study revealed that overall, 26 species of plants were collected and identified from different locations of study area, belonging to 26 genera and 18 families (Fig. 06, 07).

Ethnobotanical research can provide a wealth of information regarding both past and present relationships between plants and the traditional societies. Investigations into traditional use of local flora have demonstrated the existence of extensive local knowledge of not only about the physical and chemical properties of many plant species, but also the phenological and in near future (Steege *et al*., 2000; Golding and Smith, 2001; Hedenas *et al*., 2002). During the second half of the 20th century species extinction rates reached an almost unprecedented level in Earth's history (Frankham, 2003). So conservation of species and propagation of plants using tissue culture techniques and conventional methods to allow for their transplantation into natural habitats and niche areas of the species will be an important step towards their conservation. It is considered to be the prime priority in order to minimize rates of global biodiversity loss (Sajem *et al*., 2008). During the course of present study it was observed that local communities not only use these plants but also care for their conservation and protection; thus contributing towards sustainable development (Fig. 08, 09).

Taking into account all the above stated determinants the aim of the present study has been justified in making assessment of the traditionally used medicinal plants and also conserving and revitalizing the traditional beliefs, so that age old culture is not lost and open new vistas for the researchers to carryout in-depth phytochemical and pharmacological investigations. The studies have been made in order to record the shift and change in the ethnomedicinal uses of the plants in the last ten decades. In order to study it, various regions of the Kangra district were regularly visited during (January 2011 - March 2012).

Traditional healers have a rich knowledge on medicinal plants that is however disappearing due to rapid pace of socio-economic changes, modernization and technological

developments. To date, no exhaustive studies on ethnomedicinal plants had been done in the Kangra district of Himachal Pradesh state.

One interesting aspect of their ethnomedicinal uses is the smoke of a plant to cure the chicken pox and to bath the children with some plants is the role assigned to some superstitious practices in treating human-beings. For example smoke of seeds and flowers of *Verbascum thapsus* spread over the body to cure chicken pox and bathing of children with the roots of *Asparagus filicinus* to prevent communicable diseases is the manner in which plants are used in curing the diseases of human without administering the medicine is interesting. Plants like Ghuggi (*Saussurea gossypiphora*) and Baan (*Pleurospermum candollei*) are regarded highly sacred and keep them at home as an omen of prosperity and also used their smoke (*Dhuni*) in driving away the evil spirits and ghostly instincts affecting especially small kids is also interesting.

Human's factors are the major threats to the medicinal plants in particular in the study area. As suggested by most informants, in the area, the bio-resources along with the rich indigenous knowledge system are depleting so fast due to various anthropogenic activities and rapid urbanization. Despite a rather poor knowledge of diagnosis, still people accurately diagnose the diseases and compare favorably with modern medical practices. The trend of using medicinal plant species is more in upper age in both genders as compared to younger age class.

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Table 1.

List of medicinal plants used in the study area of District Kangra (H.P.)

Botanical Name	**Botanical Family**	**Part of the plant used**	**Folk name**	**Medicinal use (preparation and administration)**
Achyranthes aspera Linn.	Amaranthaceae	Whole plant	Puthkanda	**Kidney stone:** About 20 ml decoction of whole plant is consumed for ten days in morning and evening to remove stone from kidney.
Mangifera indica Linn.	Anacardiaceae	Seed	Aam, Amb	**Arthritis:** Mango seeds are powdered and used for preparing a recipe called '*halwa'* along with desi ghee and sugar. This is consumed for 2-3 times in a week for one month in winter to cure arthritis.
Pleurospermum candollei (DC.) Benth. ex C.B.Clarke	Apiaceae	Root	Baan	**Asthma:** Dry aerial parts decoction is also consumed twice a day (morning and evening) for few days to cure asthma. **Cuts and wounds:** Dry aerial parts powder is sprinkled on deep cuts and wounds.

Holarrhena antidysenterica Wall. ex DC.	Apocynaceae	Dry bark	Kutaja, Indrajau	**Spermatorrhoea and leucorrhoea:** Fresh or dry bark is crushed and kept in earthen pot water overnight. Next day separate the solution from bark and 50 ml solution is consumed empty stomach in morning for few days to cure spermatorrhoea and leucorrhoea.
Carissa opaca Stapf. ex Haines.	Apocynaceae	Sap	Garna	**Skin diseases:** Fresh stick of plant is put inside the fire and when stick's other end start oozing out the sap, applied on the infected organ. It is said that it is very useful in old skin disease.
Pistacia khinjuk Stocks.	Anacardiaceae	Gall	Kakarsingi	**Asthma and Cough:** Gall is changed into ash on hot coal. This ash is mixed in honey and consumed in cough and asthma. Gall ash is also consumed to cure cough and bronchitis in small children.
Asclepias curassavica Linn.	Asclepiadaceae	Leaves	Kaaka-tundi	**Skin diseases:** Fresh leaves are ground to paste and this paste is applied externally on burnt skin or other skin diseases of the body.

Achillea millefolium Linn.	Asteraceae	Leaves	Gurbini	**Cough and cold:** Fresh leaves are crushed and boiled in 200 ml water and when 1/3 water left, it is consumed in the cough and cold.
Arctium lappa Linn.	Asteraceae	Roots	Jungli Kuth	**Skin diseases:** Roots are ground to paste and this paste applied externally in skin diseases.
Centratherum anthelminticum Kuntze.	Asteraceae	Seed	Brahmjiri	**Digestive problems:** Roasted seeds are consumed with jaggary to cure stomachache, acidity and gastric problems twice a day (morning and evening).
Lactuca lessertiana DC.	Asteraceae	Aerial Parts	Neelma-buti	**Cough:** Juice of aerial parts is consumed in small quantity (2-3 gm) to cure cough in children.
Tanacetum longifolium Wall.ex DC.	Asteraceae	Leaves	Akarkar	**Stomachache:** Fresh leaves are crushed and 2-5 ml juice is consumed orally to cure stomachache.
Impatiens balsamina Linn.	Balsaminaceae	Leaves	Tiyur, Gulmahndi	**Skin diseases and wounds:** Leaves are crushed and applied on the wounds between toes, foot fingers especially in the rainy season due to working in the paddy field. This paste is also useful in other skin diseases.

Betula utilis D.Don.	Betulaceae	Leaves and bark	Bhojpatra, Bhuj, Bhuraj	**Eczema:** Fresh leaves paste is applied externally in eczema. **Cough and cold:** Dried stem bark smoke is inhale through nose for few seconds for 2-3 days to cure cough and cold.
Sedum adenotrichum Wall. ex Edgew.	Crassulaceae	Leaves	Thaplein and Sapdotri	**Tonsils and wounds:** Fresh leaves are crushed with 2-3 seeds of Kali-mirch (*Piper nigrum*) and applied on wounds. This paste is also applied on tonsils in throat or tonsils type poison produced anywhere in body. This paste removes the tonsils in the form of pus.
Gaultheria trichophylla Royle.	Ericaceae	Leaves	Thaple	**Fire burns:** Fresh or dry leaves are ground with curd and paste is applied externally on burning parts of the body.
Rhododendron lepidotum Wall. ex D. Don.	Ericaceae	Leaves	Ubtan andTalisha	**Cold and cough:** Fresh or dry leaves decoction is consumed in the form of tea to cure cough and cold.

Abrus precatorius Linn.	Fabaceae	Seeds	Chdenu	**Headache:** Dry seeds are ground with the seeds of Pataji (*Putranjiva roxburghii*), Sonth (*Zinziber officinale*) and prepare a paste in water. This paste is applied externally on forehead in headache.
Dolichos uniflorus Lank.	Fabaceae	Seeds	Kulath	**Kidney stones:** Decoction of seeds is consumed to dissolve the kidney stones.
Ougeinia oojeinensis (Roxb.) Hochr.	Fabaceae	Gum	Sannan	**Oral diseases:** Gum of the plant is crushed to powder. This powder is used as paste in mouth to cure mouth ulcers and gum problems.
Geranium nepalense Sweet.	Geraniaceae	Root	Laljari and Ratanjot	**Toothache:** Dry root or fresh root piece is put inside the cavity of aching teeth. **Skin diseases:** Root paste is applied externally in different skin diseases like rashes, pimples, skin allergy, boils and chronic wound.
Didymocarpus pedicellata R. Br.	Gesneriaceae	Leaves	Musa-Karni	**Paralysis and arthritis:** Dry leaves are grind in linseed oil and this paste massage on body in paralysis. Decoction of leaves is also consumed to cure arthritis.

Aesculus indica Colebr. ex Cambess.	Hippocastanaceae	Fruit	Kanor, Goon	**Leucorrhoea:** Fruits are crushed and paste kept in water of earthen pot, exchange with fresh water in every morning for seven days to remove bitterness of the paste. Dried paste is consumed in small quantity as '*halwa*' a local dish to cure leucorrhoea.
Iris hookeriana R. C. Foster.	Iridaceae	Root	Karkra	**Arthritis:** Very small quantity of dry or fresh root crushed in mustard oil (*Brassica campestris*) and massages the joints in arthritis. This paste is also applied externally on boils.
Asparagus filicinus Buch. Ham.	Liliaceae	Root	Sanspor and Sanspan	**Vitality and strength:** Roots powder is consumed with milk to improve vitality and strength. Roots powder bath is also used to prevent communicable diseases in small children.
Verbascum thapsus Linn.	Scrophulariaceae	Seeds	Ban-tambaku and Naula-da-Lingna	**Chickenpox:** Dry seeds are burnt on red hot coal and these seeds emitted fumes called as '*Dhuni*' gives to the person suffering from chickenpox locally called it '*drashal*'.

Fig. 02. Gaddi tribal people.

Fig. 03. Tribal people house.

Fig. 04. Tribal people temporary shelter at high altitude. Fig. 05. Collected medicinal plants.

Fig. 06 *Iris hookeriana* R. C. Foster.

Fig. 07. *Lactuca lessertiana* D C.