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# Medicinal plants and sustainable livelihood in Pauri district of Garhwal Himalaya, Uttarakhand, India.

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**Abstract:** The present study was conducted in the Thalisain block of Pauri Garhwal to document the medicinal plants used by the local communities. 53 plant species distributed in 38 families were documented. Of the total plant species 49% were herbs, 26% trees, 23% shrubs and 2% climbers. 16 different plant parts were used by local communities for different ailments. Medicinal plants were widely used by major sections of the community against common colds, cough, skin diseases, snake bite, fever, joint pains, bronchitis etc. Women and local healers called vaids have a vital role in environmental management due to traditional knowledge and use of plants as medicine with undocumented knowledge. It has been observed as one of the best option of sustainable livelihoods for the residents of the area.

**Key words**: Medicinal Plants; Local Communities; Sustainable Livelihood

## Introduction

Himalaya, one of the richest hot spots of biodiversity in the world, offers immense opportunities in various fields of biological domains and associated patterns of sustainable life support systems (Gaur, 2004). Indian Himalaya harbors 8644 plant species. Of which, 1748 species are known as medicinal plants and maximum species have been reported around up to 1800 m altitudinal range (Singh and Hajra, 1996; Kala *et al.,* 2006). The residents of Garhwal in Uttarakhand state specially women and local healers have a vital role in environmental management of medicinal plants due to traditional knowledge. Medicinal plants were widely used by major sections of the community, whether directly as folk remedies or the medicaments of the different indigenous system as well as in modern medicine (Kala *et al.,* 2004; Rawat and Jalal, 2011).

It is certainly a valuable and sustainable knowledge system developed over generations by local communities of the area. The local healers residing in the rural areas of the Garhwal Himalaya play a vital role in knowing the medicinal properties of the various plant species with undocumented knowledge hence, their knowledge must be considered as an essential component for sustainable livelihoods of the area. Failure to document this indigenous knowledge would represent a tremendous economic and scientific loss to mankind (Uniyal and Shiva, 2005). Medicinal plants constitute the base of health care systems in many societies. The recovery of the knowledge and practices associated with these plant resources are part of an important strategy linked to the conservation of biodiversity, the discovery of new medicines and increasing of the quality of life of poor rural communities (Almeida *et al.,* 2006). Ethnobotanical studies of medicinal plants have taken many paths, sometimes testing hypotheses of use and knowledge (Garcia *et al.,* 2005, Vandebroek *et al.,* 2004) or sometimes describing the use of plants in given cultural contexts (Gazzaneo *et al.,* 2005). Documentation of such practices is required in view of gradual disappearance of this knowledge in new generations. Therefore, an attempt has been made to record the significance of indigenous knowledge and sustainable development by various communities of Pauri district of Garhwal Himalaya.

## Material and Methods

The present study was carried out between 30°23' -31°25' N Latitudes and 79°02' - 79°36'E Longitudes with altitudinal range of 1600 to 3000 amsl in Thalisain block of Pauri Garhwal district of Uttarakhand which have unique topography, habitats, communities, richness and floral and faunal species, climate and soil supporting diverse ecosystem. Survey was conducted in 30 different villages and categorized into 3 groups i.e. Bagwadi (Bagwadi, Rauli, Bhainswada,Sadauree, Maroda, Ghuree, Rangaun, Kuneth, Byasee, Bungidhar); Kainure (Kainure, Kapraulee, Musatee, Mahrewa, Jaluu, Bajwad, Einthee, Randola, Jakhola, Jhindolee) and Chaurekhaal (Chaurekhaal, Kaphald, Gangaun, Pokhree, Paphdiyana, Balseem, Jhadpanee, Nainidhar tok, Hansuree, Bheeda) in Thalisain block of Pauri Garhwal (Figure 1). Local healers and resource persons mainly women, using medicinal plants for curing of various diseases were interviewed for documenting the information. To develop a data base on medicinal plants, all possible information has been collected after conducting extensive field visits in the area. The present study was conducted during 2010-2012 by stratified random sampling method from 250 households in 30 above mentioned villages. The following steps were undertaken: i) Various field visits were made in the above mentioned villages and women of every household or the elder person of a family were interviewed through questionnaire ii) Commonly traditionally useful plants were collected, iii) In order to verify the identity of plant species mentioned by

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the respondents, field visits were undertaken with the respondents or any other person of his family who is aware about the concerned species, iv) In case of medicinal plant species, the respondents were also asked about the plant parts used and the local uses of medicinal plant species selected by them as the priority species, v) The plants used by traditional healers were identified with the help of taxonomist and later verified with the help of officials of forest department in the region of the study area, vi) The identified species were classified according to their local name, habit, family, different parts used medicinally and the disease treated.

**Figure 1:** Location map of the study area

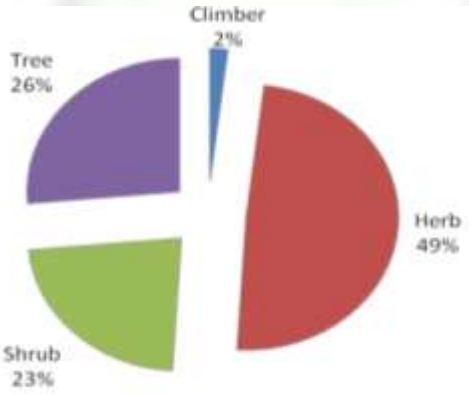


**Figure 2:** Showing percentage of different habit of plants

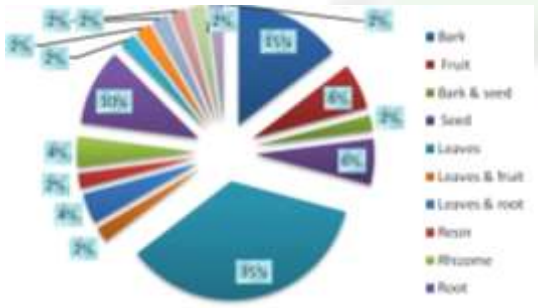

**Figure 3:** Different plant parts used in different ailments

## Results and discussion

Fifty-three plant species distributed in 41 families were documented (Table 1) that was used in treating various ailments the local communities of Thalisain block of Pauri Garhwal district. Of the total plant species 49% were herbs, 26% trees, 23% shrubs and 2% climber (Figure 2). Maximum medicinally important plant species were recorded on an elevational range of 1200 m to 2800 m. 16 different plant parts were used by local communities for different ailments (Figure 3). In most of cases single plant species is used for medicine but sometimes more than one plant species is used for treatment of single disease. Some plants were used in more than one form of remedies. The indigenous treatment is mainly focused on ailments like cough and cold, skin diseases, fever, dysentery, headache, snake bite, joint pain etc. *Ajuga macrosperma*, *Arisaema concinnum, Asparagus adscendens, Bacopa monnieri, Cyanoglossum zeylanicum, Fagopyrum tataricum, Viburnum cotnifolium, Zanthoxylum armatum*, *Rumex nepalensis*, *Cinnamomum tamala*, *Zingiber officinale*, *Cannabis sativa* and *Berberis asiatica* were the preferred medicinal plant species (Table 1). The findings of this study indicate that people of the region evolved the mechanism of utility of various resources based on its availability. The availability of medicinal plants as a part of the surrounding natural vegetation and the knowledge of these plants acquired traditionally helped these people to collect process and trade them. Due to rapid socioeconomic and cultural changes in many communities the traditional knowledge vanishing in this part of the Himalaya. Due to this the documentation of this knowledge's valuable both for the communities and their future generations and for scientific consideration of wider uses of the knowledge.

## Conclusion

The traditional system of medicine is an integral part of Garhwal Himalayan people living in the remote areas where the modern system medical treatment has failed to reach and flourish. These herbal medicines which have a high diversity of medicinal plants that are still poorly studied cured the sufferer of synthetic drugs and proved their remarkable curative properties. Beside this Participation of public and private associations in management and utilization of medicinal plants in sustainable approach is indispensable to contest human pressures on these valuable natural resources. Thus the ethno medicinal system needs to be exhaustively studied and used for the economic regeneration of the local people.

**Table 1:** List of ethnomedicinal plants of Thalisain, Pauri Garhwal district

| Botanical Name | Locale Name | Elevation (M) | Habit | Family | Uses |
|---|---|---|---|---|---|
| *Aesculus indica* | Kanor | 2300 | T | Hippocastanaceae | Seeds are used in rheumatic pain |
| *Ajuga macrosperma* | Bhugu | 2000 | H | Lamiaceae | Leaf extract used in malarial fever and tonic |
| *Arabis pterosperma* | Tilma | 2000 | H | Brassicaceae | Leaves used in burns |
| *Arisaema concinnum* | Meen | 2400 | H | Araceae | Berries applied as antidote in snake bite |
| *Artemisia capillaris* | Jhirum | 1600 | H | Araceae | Leaves taken as bitter tonic for worms |
| *Asparagus adscendens* | kairu | 1800 | S | Liliaceae | Tuber given in dysuria, diabetes and dysentery |
| *Bacopa monnieri* | Bhrami | 1600 | H | Scrophulariaceae | Leaves are used in liver complaints and rheumatic pain |
| *Barleria cristata* | Kala bans | 1700 | H | Acanthaceae | Roots and leaves used in wound swelling, seeds as antidote to snake bike |
| *Berberis asiatica* | Kilmoda | 1900 | S | Berberideceae | Bark used in curing of skin disease, malaria, piles, m alaria and eye diseases |
| *Cannabis sativa* | Bhang | 1600 | H | Cannabaceae | Leaves and seeds are used in headache, healing of wounds and cuts |
| *Carissa opeca* | Karonda | 1600 | S | Apocynaceae | Leaves and roots in fever |
| *Cinamomum tamla* | Dalchini | 1600 | T | Lauraceae | Bark used in dyspepsia and throat irritation |
| *Celtis australis* | Khairik | 1600 | T | Ulmaceae | Bark past for pimples and joint pain |
| *Cedrus deodara* | Diar | 2100 | T | Pinaceae | Aqueous paste of bark used in bowel complaints, piles and wood oil used in arthritis |
| *Chirita bifolia* | Karaiti | 2500 | H | Gesneriaceae | Leaf extract used in fever |
| *Cyanoglossum zeylanicum* | Andahuli | 2800 | H | Boraginaceae | Leaves used in bronchitis and asthma |
| *Cyanodon dactylon* | Dub | 1800 | H | Poaceae | Roots used in fever and injury |
| *Datura stramonium* | Datura | 1700 | H | Solanaceae | Powder of leaves and fruit used in bronchial asthma |
| *Emilia sonchifolia* | Dudhi | 2000 | H | Asteraceae | Leaf juice used in eye inflammation |
| *Euphorbia prolifera* | Chaounpolu | 1600 | H | Euphorbiaceae | Decoction of roots given in constipation |
| *Euonymus tingens* | Bhambele | 2700 | T | Celastraceae | Bark paste used in eye diseases |
| *Fagopyrum tataricum* | Phaparo | 2800 | H | Polygonaceae | Decoction of seed given in colic pain |
| *Gallium asperuloides* | Kur | 2600 | H | Rubiaceae | Leaves used as astringent |
| *Grewia optiva* | Bhimal | 1600 | T | Tiliaceae | Leaves used as a paste which is applied to cure joint pain |
| *Hedychium accuminitum* | Ban haldi | 2200 | H | Zingerberaceae | Rhizome is used in dyspepsia, snake bite, inflammation |
| *Jasminum humile* | Surmarhi | 2700 | S | Oleaceae | Whole plant used in skin, blood and heart diseases |
| *Juglans regia* | Akhrot | 1800 | T | Juglandaceae | Bark is used as toothache |
| *Lantana camara* | Kure | 2000 | H | Verbenaceae | Leaves are used as germicide and for skin ailments |
| *Lindenbergia indica* | Phiunl | 2000 | H | Scrophulariaceae | Leaves used in bronchitis, poultice applied on wounds and cuts |
| *Malus baccata* | Mohl | 2400 | T | Rosaceae | Fruit juice given in dysentery |
| *Mentha piperita* | Podina | 1800 | H | Lamiaceae | Leaves used in indigestion malarial fever |
| *Myrica esculenta* | Kafal | 1800 | T | Myricaceae | Fruit refreshing drinks |
| *Neolitsea pallens* | Bilaru | 2000 | S | Lauraceae | Oil from fruit used in scabies and eczema |
| *Ocimum tenuiflorum* | Tulsi | 2100 | H | Lamiaceae | Leaves used in fever, cough and cold |
| *Pinus roxburghi* | Chir | 1600 | T | Pinaceae | The green needle is grinded and extracted sap is taken to increase urine flow |
| *Pinus wallichiana* | Chilla | 2500 | T | Pinaceae | Resin applied on rheumatic pain |
| *Polygala crotalariodes* | Mardoin | 2200 | H | Polygalaceae | Roots paste applied as an antidote to snake bite |
| *Prinsepia utilis* | Bhekal | 1700 | S | Rosaceae | Root and seed oil used in debility and arthritis, root is given in bloody dysentry |
| *Quercus leucotrichophora* | Banj | 1800 | T | Fagaceae | Seeds used in urinary disorder |
| *Quercus semecarpifolia* | Khashu | 2400 | T | Fagaceae | Seeds used in scabies |
| *Rhamnus virgatus* | Chentulee | 2400 | S | Rhamnaceae | Bark paste applied on eczema and ringworm |
| *Rhododendron arboreum* | Buras | 1600 | T | Ericaceae | Roots used in ulcer, jaundice and fever |
| *Rumex nepalensis* | jangli palak | 2000 | H | Polygonaceae | Root paste applied on boils, pimples and ringworm |
| *Smilax aspera* | kukurdar | 2200 | C | Smilacaceae | Roots diuretic and diaphoretic, root paste used in rheumatic arthritis |
| *Solidago virgaurea* | Pinja phool | 1200 | H | Asteraceae | Leaf juice given in kidney troubles |
| *Solanum nigrum* | Makai | 2500 | H | Solanaceae | Fruit extract used in liver, piles, dysentry and eye ailments |
| *Solanum incanum* | Banbhatuja | 1600 | S | Solanaceae | Leaves used in skin diseases |
| *Swertia ciliata* | Chiryata | 2200 | H | Gentianaceae | Leaves and stem used in malarial fever |
| *Urtica dioica* | Bichhu buti | 2000 | S | Urticaceae | Leaves and root used in Bodyache, jaundice, antiseptic |
| *Viburnum cotnifolium* | Guya | 2800 | S | Caprifoliaceae | Bark used in hepatic and digestive problem |
| *Vitex negundo* | Siwaien | 2000 | S | Verbenaceae | Leaves and fruit used in rheumatism and arthitis |
| *Zanthoxylum armatum* | Timru | 2000 | S | Rutaceae | Bark and seeds used in toothache, tooth decay |
| *Zingiber officinale* | Adrak | 1700 | H | Zingerberaceae | Rhizome used in headache, toothache, cough |

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