**Diversity and Present Status of Medicinal Plants in and around Srinagar Hydroelectric Power Project in Garhwal Himalaya, India: Needs for Conservation**

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**Abstract:** The present study has been carried out in Alaknanda valley around Srinagar Hydroelectric Power Project in Garhwal Himalaya, India, to document the medicinal uses of plants and their status of availability in the area. A total of 102 species belonging to 92 genera and 54 families were recorded from the study area. Out of the documented species 32 were herbs, 27 shrubs, 30 trees and the rest 13 were climbers. Of all the recorded plant species, 26 were abundant, 57 common and 19 uncommon to this area. A list of plant species along with their local names, plant part(s) used and mode of administration in different ailments has been given which can be utilized in the future for technological advancement, economic prosperity and providing employment opportunity to the local people. A management plan for conservation of medicinal plants in the hydroelectric power project area is also suggested.

**Keywords:** Hydroelectric Power Project, Garhwal Himalaya, plant diversity, ethno-medicine, distribution status, conservation.

**1. Introduction**

Ethnobotanical studies typically focus on recording the knowledge of traditional societies in remote places (Hodges and Bennett, 2006). Indigenous people of different parts of the world have a vast knowledge of, and capacity for, developing innovative practices and products from their environment. Indigenous knowledge grows from close interdependence between knowledge, land, environment and other aspects of culture in indigenous societies, and the oral transmission of knowledge in accordance with well understood cultural principles and rules regarding secrecy and sacredness that govern the management of knowledge (Tripathi *et al*., 2000).

The developmental activities, particularly the constructions of hydroelectric power projects are causing a great loss of biodiversity in the Indian Himalaya. Hydroelectric power projects create environmental issues originating from submergence of large area including forest (Samant *et al*., 2007). In order to study the status of plant diversity, the uses of plants made by the natives and the impact of construction of Hydroelectric Power Projects on the diversity, a study was conducted on Srinagar Hydroelectric Power Project (SHPP) being constructed on Alaknanda river in Garhwal Himalaya, India.

The aim of the present study was to evaluate the status and medicinal usage of local plants, to provide safety and efficacy information to people who cannot afford Western prescription alternatives and to conserve the traditional knowledge highlighting sustainable utilization of plant wealth occurring in the area.

The degradation of biodiversity in the Himalayan region has reached dangerously at alarming state (Gupta, 1960; Gaur, 1999). The catchment area of rivers supports a large number of plant species of human use and scientific interest, including highly potential medicinal herbs, these require special attention for conservation (Uniyal, 1968; Gaur *et al*., 1993).

In Garhwal Himalayan region, the plant diversity is declining rapidly due to various anthropogenic activities (Gaur, 1982).The sustainability and efficiency of forest ecosystems being influenced by the hydroelectric power projects in river valleys can be restored through strengthening the knowledge about sustainable plant utilization. Such utilization would be based upon the empirical knowledge of the local people and their perceptions.

Reduction in the number and quality of trees, shrubs and herbs and change in botanic composition of forests are strong indicators of unsustainable use of these renewable natural resources. On account of lack of knowledge and research on these groups of plants, the people of this region are unaware of this wealth of heritage.

**2. Materials and methods**

The study was conducted between 30o 13’ 9”- 30o 14’ 22.2” N latitudes and 78o 45’ 47”- 78o 51’ 58.6” E longitudes covering an area of approximately 100 km2. Regular field study was made in the construction phase of the SHPP during the years 2008 and 2009 for the survey of the vegetation and ethno-medicinal uses. Ethno-medicinal information on plants was collected through interviewing local communities. The informants were medicine-men (Vaidhyas), peasants, shepherds, priests, village headmen and midwives. To determine the authenticity of information collected during field work, repeated verification of data from different informants was done. Thus, only the specific and reliable information, cross-checked with informants has been incorporated in the present study. A structured questionnaire was used to collect data on local plant names, uses, parts used, and mode of preparation and administration. Recorded herbs, shrubs and trees were identified with the help of Garhwal University Herbarium (GUH), local Floras and previous works of Duthie 1906; Osmaston, 1927; Rau, 1961; Naithani, 1984-85 and Gaur, 1999. The plants were divided into categories of abundant, common and uncommon based on their occurrence in the study area.

**3. Results and discussion**

The study revealed 102 medicinal plant species belonging to 54 families in Alaknanda valley around SHPP. The availability status and ethno-medicinal uses of the plant species are presented in (Table 1). Herbs were the primary source of medicines in terms of the number of species (32). The recorded species belong to different life forms, *i.e*., trees (30 species), shrubs (27), and herbs (32) and climbers (13) (Figure1). The families, Asteraceae (9 species), Lamiaceae (7), Caesalpiniaceae (6), Euphorbiaceae (5), Fabaceae (5), Solanaceae (5), and Rutaceae (4), were represented by higher number of species, respectively. *Cassia* (3 species), *Ficus* (3), *Terminalia* (3), *Abrus* (2), *Acacia* (2), *Artemisia* (2), *Bauhinia* (2), *Bidens* (2), *Euphorbia* (2), *Sida* (2) and *Solanum* (2) were the genera with more than one species being used (Table 1). As per plant parts used, maximum (24) species were used as leaves, followed by whole plants and fruits 18 each (Figure 2).

Assessment of various power projects deals mainly with execution and benefit to power related aspects, the actual environmental impact assessments are lacking due to little awareness, or non-availability of experts to consider biodiversity and environment associated inter-related factors. To avail the environmental clearance, project assessments are broadly based on listing of some easily identifiable groups of macrophytes and animals together with some soil or geological features (Garg *et al*., 1995).

The catchment areas of river valley systems were once covered with dense vegetation, from alpine to submontane type, but in the recent past vegetation and associated biodiversity has declined manifold (Gaur, 1999). The present study indicates that the area harbors a high diversity of medicinal plants such as *Azadirachta indica*, *Erythrina variegata*, *Helicteres isora*, *Terminalia* spp*., Barleria cristata*, *Roylea cinerea*, *Berberis asiatica*, *Gloriosa superba*,etc*.* The inhabitants revealed rich presence of many of these species in the area in the past, which has restricted now to certain patches. If immediate steps for their sustainable utilization and conservation are not taken, these species may reach to the status of threatened in the area.

**3.1 Management plan for conservation of medicinal plants in and around SHPP area**

A large number of inhabitants of hill areas depend on plants as plants have been playing a vital role in the socio-economic development of such regions. They are the important source of subsistence, employment and raw material to various domestic uses. Their role in ecological balance, environmental stability, biodiversity conservation, food and health security and sustainable development therefore has been widely recognized. They are the source of various components, e.g., food, fodder, fiber, medicine and a number of other commodities of human requirement. It has been observed that the forest areas in the vicinity of the villages have been degrading at much faster rate than the forests growing far from the village locality. In the present study most of the plant species recorded are commonly distributed, thus requiring least concern, however, the species such as *Berberis asiatica*, *Gloriosa superba*, *Helicteres isora*, *Madhuca longifolia,* *Roylea cinerea*, *Rubia manjith*, *Terminalia bellirica*, *T. chebula*, *Zanthoxylum armatum*, etc., uncommon in their distribution coupled with heavy dependence of local inhabitants, are under threat due to construction of power project.

Thus, there is a need to conserve the plant resources on the ground level for the benefit of human beings and sustainable development of environment. Besides that awareness to the local communities is essential how they can develop suitable techniques for sustainable utilization of plant resources.

The following points are suggested for the conservation of the plant diversity of this area:

1. There should be introduced appropriate technology requiring environmental impact assessment of proposed hydroelectric power projects likely to have significant adverse effects on biological diversity with a view to minimizing such effects and, where appropriate, allowing local communities’ participation in such procedures.
2. New technologies should be developed for the conservation of plant diversity through the combination of indigenous and traditional knowledge with scientific and technical research.
3. Public awareness should be made by field oriented training programmes organized at the local level for community participation in various bioregions delineated for inventorying.
4. Large scale cultivation of economic and medicinal plant species by local communities should be encouraged to minimize the pressure on natural habitats.

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Table 1. Diversity, availability status and indigenous uses of medicinal plant species in and around Srinagar Hydroelectric Power Project in Garhwal Himalaya, India.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Botanical name | Local name | Family | Status\* | Plant parts used and mode of administration |
| **Trees:** |  |  |  |  |
| *Acacia catechu* (L.f.) Willd. | Khair | Mimosaceae | +++ | Decoction of wood and bark is given in cough and inflammations of throat. It is given in diarrhea, and applied on mouth sores. |
| *Acacia nilotica* (L.) Willd*.* | Kikar | Mimosaceae | ++ | Infusion of bark and leaves used in fever, bronchitis, asthma and dysentery. |
| *Aegle marmelos* (L.) Correa | Bel | Rutaceae | +++ | Decoction of root is given in fever, cough and hoarse throat. Fruit pulp useful in diarrhea, dysentery and bronchial inflammation. |
| *Azadirachta indica* A. Juss. | Neem | Meliaceae | + | Bark paste is applied on wounds and in scabies. Decoction of bark is given in the fever. Leaf juice is poured in ear in ear pain. Leaf paste used as antiseptic in skin diseases. |
| *Bauhinia purpurea* L. | Guiral | Caesalpiniaceae | ++ | Bark paste used as a detergent of wounds, cuts and sores. |
| *Bombax ceiba* L*.* | Semal | Bombaceae | ++ | Gum from stem given in diarrhea, dysentery and leucorrhoea. Decoction of fruits is given in suppressed urination. |
| *Cassia fistula* L.  *Citrus aurantifolia* (Christ) Swing  *Erythrina variegata* L.  *Ficus palmata* Forsk. | Amaltas  Kagjee  Mandara  Bedu | Caesalpiniaceae  Rutaceae  Fabaceae  Moraceae | ++  ++  +  ++ | Fruits are given to women to expel the placenta. Fruit pulp is given in asthma, bronchitis and skin diseases.  Leaf decoction inhaled in headache, cold and fever.  Leaf juice is applied on sores. Bark decoction is given in fever. Leaf juice is used in dysentery, intestine worms and suppressed menses.  Fruits are used in digestive disorders. Latex is applied on the pimples. |
| *Ficus benghalensis* L.  *Ficus religiosa* L. | Bargad  Peepal | Moraceae  Moraceae | +  ++ | Infusion of bark is given in diarrhea. Latex is applied on sores and in headache.  Root bark, young shoots and fruit decoction is given in sexual weakness in men. Infusion of bark is given in constipation. |
| *Grewia optiva* J.R.Drummond ex Burret  *Helicteres isora* L.  *Juglans regia* L. | Bheemal  Bhendu  Akhrot | Tiliaceae  Sterculiaceae  Juglandaceae | ++  +  ++ | Fruit is used in digestive troubles. Bark juice is given to women to facilitate delivery. It is also used for wash for sores.  Fruit powder is given in diarrhea and spasmodic pain.  Leaves used as fungicide and insecticide and bark used in bone fractures. |
| *Madhuca longifolia* (Koenig) Mac Bride  *Mallotus philippensis* (Lam.) Muell.-Arg.  *Mangifera indica* L*.*  *Melia azedarach* L*.*  *Moringa oleifera* Lam.  *Ougeinia oojeinensis* (Roxb.) Hochr.  *Phyllanthus emblica* L.  *Premna barbata* Wallich ex Schauer  *Punica granatum* L.  *Pyrus pashia* Buch.-Ham. ex D. Don  *Sapindus mukorossi* Gaertner  *Syzygium cumini* (L.) Skeels  *Terminalia alata* Heyne ex Roth  *Terminalia bellirica* (Gaertn.) Roxb.  *Terminalia chebula* Retz.  **Shrubs:**  *Adhatoda zeylanica* Mendikus  *Artemisia roxburghiana* Wallich ex Besser  *Asparagus adscendens* Buch.-Ham. ex Roxb.  *Barleria cristata* L.  *Berberis asiatica* L.  *Cannabis sativa* L.  *Cassia tora* L.  *Cassia occidentalis* L.  *Cestrum nocturnum* L.  *Colebrookia oppositifolia* J.E. Smith  *Clerodendrum viscosum* Vent.  *Eupatorium adenophorum* Sprengel  *Euphorbia royleana* Boissier  *Jatropha curcas* L.  *Murraya koenigii* (L.) Sprengel  *Nyctanthes arbor-tristis* L.  *Reinwardtia indica* Dumortier  *Rhus parviflora* Roxb.  *Rosa brunonii* Lindley  *Roylea cinerea* (D.Don) Baillon  *Rubus ellipticus* D.Don  *Sida cordifolia* L.  *Urtica dioica* L.  *Woodfordia fruticosa* (L.) Kurz  *Xeromphis spinosa* (Thumb.)Keay  *Zizyphus mauritiana* Lam.  *Zanthoxylum armatum* DC.  **Climbers:**  *Abrus precatorius* L.  *Bauhinia vahlii* Wight & Arn.  *Celastrus paniculatus* Willd.  *Clematis gouriana* Roxb. ex DC*.*  *Cryptolepis buchananii* Roem. ex Schulf.  *Caesalpinia decapetala* (Roth) Alston  *Cuscuta europaea* L.  *Gloriosa superba* L.  *Ipomoea nil* (L.) Roth.  *Momordica charantia* L.  *Rubia manjith* Roxb.ex Fleming  *Tinospora sinensis* (Lour.) Merrill  *Vallaris solanacea* (Roth) Kuntze  **Herbs:**  *Achyranthes aspera* L.  *Anaphalis adnata* Wallich ex DC.  *Ageratum conyzoides* L.  *Ajuga bracteosa* Wallich ex Benth  *Aloe vera* (L.) Burm.f.  *Argemone mexicana* L.  *Artemisia capillaris* Thunb.  *Aster peduncularis* Wallich ex Nees  *Bidens biternata* (Lour.) Merrill & Sherff  *Bidens pilosa* L.  *Boerhavia diffusa* L.  *Chenopodium album* L.  *Cynodon dectylon* (L.) Pers.  *Delphinium danudatum* Wallich ex Hook. f.  *Datura stramonium* L.  *Euphorbia hitra* Linn.  *Geranium occellatum* Cambess.  *Micromeria biflora* Buch.- Ham. ex D.Don  *Mentha arvensis* L.  *Musa paradisiaca* L.  *Ocimum sanctum* L.  *Oxalis corniculata* L.  *Perilla frutescens* (L.) Britton  *Rumex hastatus* D.Don  *Sida cordata* (Burm.F.) Borss. Waalk.  *Solanum erianthum* D.Don  *S. nigrum* L.  *Stellaria media* (L.)Villars  *Trigonella incisa* Benth.  *Tridax procumbens* L.  *Verbascum thapsus* L.  *Viola canescens* Wallich | Mahwa  Ruina  Aam  Daikan  Sunara  Sandan  Aunmla  Gaunta  Darim  Melu  Reetha  Jamun  Asin  Bahera  Heda  Basingu  Kunja  Jhirni  Saundi  Kingod  Bhang  Chakunda  Chakunda  Rat ki rani  Binda  Lojjad  Kharnabakura  Sulla  Jangli Jamal Ghota  Kadi-pata  Har singar  Phiuli  Tungla  Kunja  Karui  Hisalu  Balu  Kandali  Dhola  Maindal  Ber  Timru  Ratti dana  Mallu  Malkanni  Kangulee  Dudhi  Kingri  Aarashbel  Kalihari  Laglu  Karala  Manjith  Geloi  Safed bel  Sajji  Buggla  Kansura  Neelkanthi  Ghrit-kumari  Pili-kateli  Marwa jhirun  Phulyan  Kura  Kummar  Panyaru  Bhethu  Doob  Nirbisi  Datura  Dudhi  Kaphlya  Gorkhopan  Pudina  Kela  Tulsi  Chilmori  Bhangjeera  Almor  Kangi  Kandela  Makoy  Badalu  Jangli methi  Kumra  Akulbeer  Dundivirali | Sapotaceae  Euphorbiaceae  Anacardiaceae  Meliaceae  Moringaceae  Fabaceae  Euphorbiaceae  Verbenaceae  Punicaceae  Rosaceae  Sapindaceae  Myrtaceae  Combretaceae  Combretaceae  Combretaceae  Acanthaceae  Asteraceae  Liliaceae  Acanthaceae  Berberidaceae  Cannabinaceae  Caesalpiniaceae  Caesalpiniaceae  Solanaceae  Lamiaceae  Verbenaceae  Asteraceae  Euphorbiaceae  Euphorbiaceae  Rutaceae  Oleaceae  Linaceae  Anacardiaceae  Rosaceae  Lamiaceae  Rosaceae  Malvaceae  Urticaceae  Lythraceae  Rubiaceae  Rhamnaceae  Rutaceae  Fabaceae  Caesalpiniaceae  Celastraceae  Ranunculaceae  Asclepiadaceae  Caesalpiniaceae  Cuscutaceae  Liliaceae  Convolvulaceae  Cucurbitaceae  Rubiaceae  Menispermaceae  Solanaceae  Amaranthaceae  Asteraceae  Asteraceae  Lamiaceae  Liliaceae  Papaveraceae  Asteraceae  Asteraceae  Asteraceae  Asteraceae  Nyctaginaceae  Chenopodiaceae  Poaceae  Ranunculaceae  Solanaceae  Euphorbiaceae  Geraniaceae  Lamiaceae  Lamiaceae  Musaceae  Lamiaceae  Oxalidaceae  Lamiaceae  Polygonaceae  Malvaceae  Solanaceae  Solanaceae  Caryophyllaceae  Fabaceae  Asteraceae  Scrophulariaceae  Violaceae | +  +++  ++  ++  ++  ++  ++  ++  ++  ++  +  ++  ++  +  +  +++  ++  +++  +  +  +++  ++  ++  +  +++  ++  ++  ++  ++  +++  +  +++  +++  ++  +  ++  +++  +++  ++  ++  ++  +  ++  ++  ++  ++  ++  +++  ++  +  ++  ++  +  +++  ++  ++  ++  +++  +++  +  +++  ++  +++  +++  ++  ++  +++  ++  ++  +++  ++  ++  +  ++  ++  +++  +  +++  +++  ++  ++  +++  +++  ++  ++  ++  ++ | Bark paste is applied on cuts, plaster is applied on fractures, and decoction is applied on sores. Leaf ash is mixed with butter and applied on burns. The flower infusion is given in morning to cure diarrhea. Paste of bark, leaves and flowers is applied in swelling of breasts’.  Bark juice is given to children in diarrhea and dysentery. Paste of fruit powder is applied externally on cuts, wounds. Root and seed paste is applied on sores and skin eruptions.  Leaf juice and seed is given in diarrhea.  Decoction of bark used in gonorrhea, bark paste is applied on skin eruptions. Infusion of heart wood is given in asthma. Leaves, fruits and seeds are useful in skin diseases.  Roots and other parts of tree used in arthritic pain and circulatory disorders. Decoction of bark is given to women to expel the dead foetus. Seed paste is used for soften skin.  Gum used in digestive disorders. Decoction of bark is given in fever and applied externally on sores.  Fruits are used in digestive disorders and fruit juice useful in leucorrhoea. Fruit powder is given in fever.  Plant decoction is given in arthritic pain. Leaves are rubbed on the body in dropsy.  Fruit juice is given in diarrhea and rind of fruit is given with honey in cough and cold.  Ripened fruits are used in digestive disorders. The fruit is crushed with teeth and juice is forced into the eyes of cattle in cataract and injuries.  Fruits soaked in warm water and given as antidote of opium. Root bark is given in cough. Fruit paste is applied on burns.  Bark is given in diarrhea, and dysentery, as gargle used in stomatitis.  Bark used in liver disorders. Decoction of bark is given in diarrhea and leucorrhea. Externally the root pasties applied on cuts and used as a wash for sores.  Fruit powder used in dropsy, asthma, fever, cough and cold. Bark decoction is given in cough and headache.  The dried fruits used in indigestion with honey. Fruit mixed with the ginger juice is taken in loss of appetite.  Root bark is given in fever. Young twigs used for cough and cold. Leaf juice with honey is given in cough and fever. Leaves and roots infusion useful in bronchitis and fever.  Plant extract is given in fever and also used in skin diseases.  Tuberous roots with honey are used in dysentery.  Leaves are crushed, mixed with seeds of black pepper and given orally in dyspepsia.  Stem bark and root juice used in eye afflictions. Infusion of root given in fever.  Leaves boiled with butter are taken in vomiting. Leaf juice poured in ear in ear pain. Leaves are used as an intoxicating agent.  Leaves and seeds are used in skin diseases, cuts, wounds and bone fracture. Leaves and root also used as vermicide.  Leaves used in skin disease. Decoction of roots is given in dropsy. Leaf and root paste useful in piles and ringworms.  Plant extract used as antispasmodic.  Leaf paste applied on cuts and wounds.  Leaf paste is applied externally to remove ectoparasites of cattle. Decoction of leaves is given orally to cure stone.  Crushed leaves applied on cuts and wounds.  Latex is used as an antiseptic on cuts and wounds.  Seed oil is used as anthelminitic and applied externally in arthritis and skin diseases. Over doses of seeds are considered to be poisonous.  Bark, leaves and roots are used as insecticide.  Leaf juice is given in fever, intestinal worms and applied externally on muscular pain.  Leaf juice .is applied on cuts and wounds  Stem ash applied on the abdomen for suppressed urination. Leaf juice is given in cholera  Leaf juice used in cuts, wounds. Dried flower powder used in diarrhea.  Decoction of leaves used in fever and pieces of branches made into bead and garlanded by infants to avoid jaundice.  Root decoction is given in diarrhea. Juice of young shoots and roots is given in stomachache.  Seed powder is given in dyspepsia. Plant juice applied on cuts and in arthritis. Root infusion is given in suppressed urination.  Seed oil used as medicine in sciatica, arthritis and skin ailments.  Dried flowers paste used in cough and sprinkled over the sores. Flower juice is given with honey in dysentery  Fruit pulp is given in dyspepsia. Fruit is given in asthma, cough. Leaf juice is applied in urticaria.  Decoction of root and stem bark powder is given in fever, diarrhoea and to improve digestion.  Leaves and fruits chewed for mouth wash and tooth care. Seed paste is applied on teeth in toothache.  Decoction of roots used for fever and cough. Seed paste is applied as plaster for bone fracture.  Ash of dried leaves is taken in cough.  Seed paste is applied externally on wounds. Seed oil in rheumatic pain and also used in eye diseases.  Leaves poisonous to livestock.  Leaves are poisonous to cattle and leaf powder is externally used in arthritis.  Leaves paste applied on burns and wounds.  Plant extract used in skin diseases.  Powder of tuber used in fever and infusion is believed to facilitate delivery and leaf powder used in skin diseases.  Decoction of seed is given in fever and constipation. Seed paste is applied in urticaria.  Fruit and seed paste is given used in digestive disorders.  Stem used as an antidote to snake bite; roots are used as a tonic; flower extract used in bacillary dysentery.  Stem and leaf juice is given in fever and urinary disorders. Leave extract is given in leprosy.  Milky juice is applied externally on sores, cuts and wounds.  Root infusion is given in fever. Leaf extract is given to women to facilitate delivery. Plant decoction is given in dropsy and bronchitis.  Leaf paste is applied on cuts and wounds.  Root paste is applied on sores, cuts and various skin diseases.  Leaf extract is given in fever. Plant extract used as a tonic.  Fleshy leaf is applied on wound and sore. Plant extract used as stomachic and anthelmintic.  Seeds are narcotic and emetic. Root decoction is used for to kill worms.  Stem and leaf juice is given in fever and constipation. Root power used in stomachache.  Vegetable of leaf is useful at the initial stage of leprosy and leaf juice is applied on wounds and cuts.  Plant extract with honey is given in cough and bronchitis.  Vegetable of the plant useful in skin ailments.  Roots chewed as tonic. Leaf extract used in eye diseases. Plant infusion is given in asthma and bronchitis.  Seed decoction is given to women to expel the dead fetus and to bring the menses in order. Plant paste is applied in arthritis. Leaf paste is applied on worm infected cattle’s sores.  Roots are taken in fever and internal injury.  Root paste is used in toothache.  Leaf paste mixed with turmeric is applied on body swellings and pains. Seed paste applied on sores. Seeds are warmed with mustard oil and used as a massage in arthritis.  Plant used in bronchial infection and asthma. Latex is applied on warts.  Roots are used as an antiseptic. Root extract is given in lever troubles and fever.  Crushed leaves inhaled in cold and sinusitis. Leaf extract with milk is given in gastroenteritis.  Plant extract used in vomiting and indigestion.  Spadix used in cough and cold.  Plant used in fever, cold, cough, colitis, urinary troubles and vomiting.  Leaf juice dropped in cataract and conjunctivitis.  Plant extract or power of dried plant parts used for cold, cough, bronchitis and uterine ailments; leaf paste applied on rheumatic arthritis.  Leaf extract applied on cuts and wounds to check bleeding.  Leaves and root bark used in gonorrhea.  Paste of root, leaf and fruit is applied on cuts, wounds and burns. Root and leaf extract is used in urinary trouble and skin diseases.  Plant extract is given in liver trouble, piles and dysentery. Fruits are useful in diarrhea, fever and eye diseases.  Plant paste is externally applied on burns, wounds and boils.  Vegetable is useful in diabetes.  Plant paste is used to heal wounds and cuts.  Plant extract used in bronchitis and asthma. Seeds are used as sedative.  Decoction of plant useful in fever and bronchitis. Root is used as an emetic. Leaf juice is applied on cuts and wounds. |
|  |  |  |  |  |

**\*** +++ = Abundant, ++ = Common and + = Uncommon