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**Full Length Research Article**

Impact of Tourism on Medicinal Plant Diversity of Jorsha, Futiyari and Patloi Dam of Purulia, West Bengal, India.

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ABSTRACT

An investigation was conducted in Jorsha, Kushtuka, Maysaradi forest and village areas around Jorsha, Futiyari & Patloi Dam to record medicinal plant diversity and their use by local people. Proper use of medicinal plants depends on indigenous knowledge. It is a treasure trove of unwritten and oral knowledge that is passed down from generation to generation, in Purulia district, West Bengal. In these areas around 39 plant species distributed in 36 genera, under 24 families, this is in an eco-degradation process. Although our study revealed that there is rich biodiversity, traditional local knowledge about herbal medicines and the use of resources but it is true that plant diversity is in threatened position here. The main reason is increasing load of human activities in these areas, which damaging the environment and degrading the ecosystem directly. Due to growth of tourism in all this regions, the level of environmental pollution has increased especially plastic pollution. However, no special initiative has been taken by the government to clean up the garbage in all these areas. Therefore the current study challenged to generate traditional knowledge and suggest to make a motto "Save the Environment". We also need to conserve these valuable plants which are now on the verge of destruction, due to urbanization, tourism etc.

Introduction

Purulia is the westernmost district of West Bengal, India. Purulia district belongs to the grand old rock of the world. The district is under the latitude 23°42'-22°43'N and longitude 86°54'-85°49'E with an area of 6259 sq. km. under Chotonagpur plateau. Purulia is especially known for its medicinal plant diversity.

The local peoples and villagers of this district are use various plants in medicinal purposes. Rich traditional verbal knowledge has been passed down from generation to generation & it is reflected in their lifestyle and behaviors as they have a symbolic relationship with their natural habitat. Presence of various endangered medicinal plant species can be observed in Purulia district. The abundance of medicinal plant can also be seen in the Dam (irrigation scheme) areas of Purulia, which are surrounded by many small villages. Jorsha, Futiyari and Patloi Dams are one of them. These Dams are mainly famous as picnic spot or tourist spot. Depending on these dams, cultivation is done in the surrounding villages but these irrigation schemes & medicinal plants around them are getting damaged day by day. One of the

reasons behind this is growing population and urbanization. However, the main reason for the destruction of these Dams and Medicinal plants are tourism. Tourists come to visit these areas & create a lot of garbage like Plastic bags, thermocol items, packets of cakes or biscuits etc. All these substances cause soil and water pollution from falling on the ground & water body for long time. Many of tourists steal or damage the plants with malicious intent, which is one of the reasons for decline in medicinal plant diversity in this area.

Our study mainly focus on the medicinal plant diversity of these areas and knowing their actual uses from local peoples; we also want to put administrations focus on plants conservation in these areas and appealing for create appropriate infrastructure for tourists through law. Only then can we restrict pollution and save biodiversity.

Materials and methods**Study area**

Study area falls under particular three blocks of Purulia District, West Bengal. The investigation was conducted in Jorsha, Futiyari & Patloi Dam (Irrigation Scheme) areas which are mainly surrounded by Jorisha, Kalabani, Kushtuka villages and Maysaradi Forest. These places fall under Kashipur, Manbazar-1 and Purulia-2 blocks respectively. These areas are rich of medicinal plant diversity which is degraded due to tourism. Winter to monsoon season was taken to account and study field of these areas because at this time more tourists came here and plant vegetation is more visible.

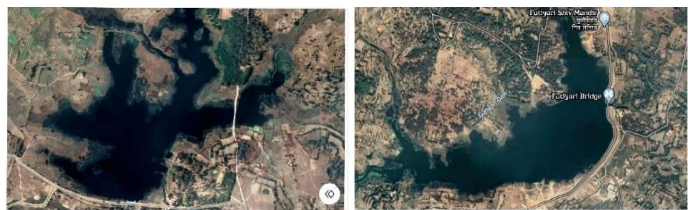


Fig 1:- Jorsha Dam (Satellite View)

Fig 2:- Futiyari Dam (Satellite View)



Fig 3:- Patloi Dam (Satellite View)

The study was conducted around areas of Jorsha, Futiyari and Patloi Dam (Irrigation Scheme) to record medicinal plant diversity and their use by local people and how the plant diversity was reduced and dams are polluted by tourists. The

study period was between January to August, 2020. Survey starts in January with significant lower temperature 10-12°C and 15-26°C during February month. Due to the lockdown for the Pandemic (COVID-19) Novel Coronavirus, there was a gap of three months (March, April, May). When unlock was started then we resume the survey from mid June to August end. This post-summer to rainy season time (June to August), the temperature vary between 35-40°C. The moisture content fluctuates between 12-16% in winter and 51-62% during post-summer to monsoon season. Regular visit have been made by us, students of Botany department of Sidho-Kanho-Birsha University, Purulia, West Bengal. Photographs were taken, flora & monographs & literature taken to identify the plants. The studies mainly focused on identifying the medicinal plants and their actual uses from local people and create attention to administrators for conserve these plants and reduce water pollution in these areas.

Result & Discussion

Our present study shows a total of 39 plant species under 36 genera and 24 families. Here highest frequency of species were found in Acanthaceae(5) family. Four species each in Fabaceae & Lamiaceae family. Some plant species are rare; some of them have high medicinal value as well as high economical strength by yield as timber and fruit. According to local people, there was a lot of plant diversity in all these areas in the past. Which is decreasing day by day? Due to the high number of tourists visiting these areas in January-February, the level of pollution has been noticed to be higher. Lots of plastics and plastic like products were found to be scattered here and there. Many easy growing shrubs are found here with crucial medicinal value. Herbaceous vegetation was little but they also have significant medicinal property.

Table 1. Selected Medicinal Plants with their Proper use by Local Peoples

S No.	Scientific Name	Family	Local Name	Medicinal use by Local Peoples
1.	<i>Lagascea mollis</i> Cav	Asteraceae	Jharwad	Leaf paste is prepared and applied over the wounds will help to cure.
2.	<i>Breynia retusa</i>	Phyllanthaceae	Chitki, Jirul.	Roots are used in treatment of cough. The leaves juice is used in skin inflammation.
3.	<i>Jatropha gossypifolia</i>	Euphorbiaceae	Lal bherenda	Stem sap use to stop bleeding and itching of cuts and scratches.
4.	<i>Barleria cristata</i>	Acanthaceae	Jhinti	The plant seeds used as an antitode of snake bites.
5.	<i>Martyni aannua</i> L.	Martyniaceae	Bagnakh	Seeds are used in treatment of body sores.
6.	<i>Gloriosa superb</i> (L.)	Colchicaceae	LanguliLata	Tuber paste used to treat leprosy; tubers also used as an emetic to induce vomiting as a means of removing toxins from the body.
7.	<i>Sesamum radiatum</i>	Pedaliaceae	Til	Fresh leafy stem juice use as antitode for scorpion stings; the boiled extract of leaves and roots are used in alopecia treatment.
8.	<i>Asparagus racemosus</i>	Liliaceae	Satamul	Root decoction use to cure dysentery.
9.	<i>Azadirachta indica</i>	Meliaceae	Neem	Leaf juice and petal use for leprosy, bloody nose treatment and any kind of skin infection and liver problems.
10.	<i>Butea monosperma</i>	Fabaceae	Palash	Boiled leaves used in removal of pimples, seeds are used in convulsions and skin diseases.
11.	<i>Terminalia arjuna</i>	Combretaceae	Arjun	Boil bark use to cure liver disorder.
12.	<i>Acacia nilotica</i>	Mimosaceae	Babla	Crushed bark use in treatment of Malaria and juice of leaf used in treatment of sore caused by

13.	<i>Nymphaea nouchali</i> Burm.	Nymphaeaceae	Paddo	water. Use of this flower or its extracts can help regulate irregular periods and ease menstruation cramps.
14.	<i>Acacia auriculiformis</i> A. Cunn. ex Benth.	Fabaceae	Sonajhuri	An infusion of the bark has been used to treat rheumatism.
15.	<i>Catharanthus pusillus</i> (Murray) G. Don	Apocynaceae	Sadabahar	Extracts prepared from the leaves have been applied externally as antiseptic agents for the healing of wounds, to relieve the effect of wasp stings; against hemorrhage, skin rash and as a mouth wash to treat toothache.
16.	<i>Utricularia gibba</i> L.	Lentibulariaceae	Gihbbajhangi	Whole plant use to treat urinary disorder.
17.	<i>Vitex negundo</i> L.	Lamiaceae	Nisinda	Leaves are smeared with mustard oil, Luke warmed and applies on the muscular pain area to reduce pain.
18.	<i>Solanum virginianum</i> L.	Solanaceae	Rambaigum	Root decoction use in pox prevention.
19.	<i>Afrohybanthus enneaspermus</i> (L.) Flicker	Violaceae	Munbora	The whole plant is used as a general tonic for pregnant women. Dried leaf powder used to treat asthma.
20.	<i>Scorpiurus muricatus</i> L.	Fabaceae		The seeds have been used in the treatment of scorpion bites.
21.	<i>Clerodendrum indicum</i> (L.)	Lamiaceae	Bharangi	The dried leaves are smoked like cigarette to relieve asthma.
22.	<i>Buchanania cochinchinensis</i> (Lour.) M.R. Almeida	Anacardiaceae	Piyal	Fruits are used in treatment of cough. Flower use in treatment of urine infection.
23.	<i>Vallisneria spiralis</i> (L.) Kuntze	Apocynaceae	Ramsar	Latex of the plant use to cure ringworm and other skin infections.
24.	<i>Cleistanthus collinus</i> (Roxb.)	Phyllanthaceae	Karlajun	Stem bark use to treat skin infection and any type of skin disease.
25.	<i>Andrographis paniculata</i>	Acanthaceae	Kalmegh	Crushed leaf juice is use in malaria treatment.
26.	<i>Vitex peduncularis</i> Wall. ex Schauer	Lamiaceae	Bhadu	The whole plant use as a febrifuge.
27.	<i>Justicia adhatoda</i> L.	Acanthaceae	Basak	A decoction of the leaves used as an herbal treatment for cough and other symptoms of colds.
28.	<i>Commelina benghalensis</i> L.	Commelinaceae	Dholpata	Decoction of the root is used for the relief of stomach disorders. The leaves are mauled and soaked in warm water and then the solution is drunk to treat diarrhoea.
29.	<i>Pergularia daemia</i> (Forsk.) Chiov.	Apocynaceae	Latabakanda	Root decoction is taken to treat venereal diseases, arthritis, muscular pain, asthma and rheumatism.
30.	<i>Cocculus hirsutus</i> (L.) W. Theob.	Menispermaceae	Huyer	Leave decoction is drunk to remedy female sterility.
31.	<i>Tephrosia purpurea</i> (L.) Pers.	Fabaceae	Bon nil	Decoction of the fruit is given as a treatment against intestinal worms.
32.	<i>Dicliptera paniculata</i> (Forssk.) I. Darbysh.	Acanthaceae	NakBhanga	It serves as antidote of snake bite.
33.	<i>Melochia corchorifolia</i> L.	Malvaceae	Bon-pat	Decoction of the leaves and roots is used internally to treat dysentery, and a decoction of the leaves to stop vomiting.
34.	<i>Rhinacanthus nasutus</i> (L.) Kurz	Acanthaceae	Juipana	The roots and leaves are applied externally as a remedy for certain skin disorders such as ringworm, eczema, scurf and herpes
35.	<i>Terminalia crenulata</i>	Combretaceae	Atana	Stem bark decoction use to treatment women in anemia.
36.	<i>Spathodea campanulata</i>	Bignoniaceae	RudraPalash	The unopened flower buds contain a sweet, watery liquid that is considered to be tonic.
37.	<i>Helicteres isora</i> L.	Malvaceae	Antamora	The root juice use in treatment of stomach trouble and snake bite. The stem bark also use to treat dysentery and diarrhoea.
38.	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Ghalghase	The juice of the plant is used in the treatment of fevers, coughs and colds. The bruised leaves are

39. *Spermacoce articularis* L.

Rubiaceae

Guthar

considered to be active against bites of poisonous insects and snakes.

The seeds are considered cooling and demulcent, and are given in the treatment of diarrhoea and dysentery.

(Source: References 1-30)



Fig 4 :- *Jatropha gossypifolia*



Fig 5 :- *Barleriacristata*



Fig 6 :- *Martynia annua*



Fig 7 :- *Gloriosa superba*



Fig 8 :- *Sesamum radiatum*



Fig 9 :- *Acacia nilotica*



Fig 10 :- Jorsha Dam.



Fig 11 :- *Butea monosperma*



Fig 12 :- *Nymphaea nouchali*



Fig 13 :- *Acacia auriculiformis*



Fig 14 :- *Catharanthus pusillus*



Fig 15 :- *Afrohybanthus enneaspermus*



Fig 16 :- *Scorpiurus muricatus*



Fig 17 :- Futiyari Dam



Fig 18 :-*Commelinabenghalensis*



Fig 19 :-*Rhinacanthusnasutus*

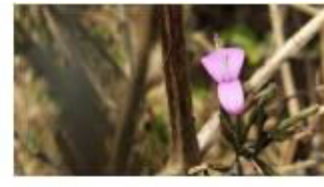


Fig 20 :- *Diclipterapaniculata*



Fig 21 :-*Tephrosiapurpurea*



Fig 22 :-*Spathodeacampanulata*



Fig 23 :- *Spermacocearticularis*



Fig 24 :- Patloi Dam



Fig 25 :- Pollution in Patloi Dam



Fig 26 :- Pollution in Futiyari Dam



Fig 27 :- Pollution in Jorsha Dam

Conclusion

Like other areas of Purulia district, Jorsha, Futiyari and Patloi dam areas have also witnessed an abundance of medicinal plants. The above mentioned plant species are main vegetation in those areas, all of them has high medicinal value, some of them are unique and endangered species. In addition to the medicinal value of all these plants, there are also a large number of commercial values. Many of local people use these plants as

medicine, food or as a means of earning money. Though our study revealed that there is rich biodiversity, traditional local knowledge about herbal medicines and the use of resources but it is true that plant diversity is in threatened position here. The main reason is increasing load of human activities in these areas, which damaging the environment and degrading the ecosystem directly. According to some local villagers, there was a lot more plant species in all these areas in the past, which is decreasing

day by day. We have noticed that the level of plastic pollution in these regions is higher in January-February month than other times of the year. However, the level of pollution was lower in this year after the month of March due to lockdown period. Many of tourists steal or damage the plants with malicious intent, this is the main reason behind plant diversity loss in these areas. By this study we want to put administrations focus on plants conservation in these areas and appealing to create appropriate infrastructure for tourists through law. Only then we can restrict pollution and save biodiversity. On the other hand we must take care and spread awareness to conserve this plants and make a moto "Save the Environment".

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