

## Ethno-Botanical Assessment of The Prevailing Phytodiversity in Dumka District

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### ABSTRACT

Dumka district of the Jharkhand state, is the abode of mainly two tribal communities i.e. the Santals and the Paharias, including a few other communities like *Mahalis*, *Bhumij*, *Oraons*, *Karmalis*, *Kumhars*, etc. These tribes belong to Proto-Australoids or Austro-Asiatic language family. They are well acquainted to their surrounding phyto-diversity. They have learnt to utilize every possible forest products to meet their daily requirements. Thus, unknowingly and gradually, they have converted these advantageous taxa into invaluable bio-resources. But slowly, due to numerous factors like, habitat loss, deforestations, modernization etc. this traditional knowledge is losing ground along with these communities. Hence, there is an urgent need of safeguarding both these communities & their precious knowledge. The present paper highlights an ethno-botanical assessment of a total of fifty-eight (58) genera and sixty (60) invaluable plants species belonging to thirty-one (31) families. These are documented under 12 different categories based on the folklore claims of these people for their sustenance. It will also pave the path of further researches and sustainable development of these communities and the concerned bio-resources.

**Key Words:** -Indigenous communities, traditional knowledge, ethno-botanical assessment.

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### INTRODUCTION

Dumka district is the reservoir of a rich phyto-diversity, which is mainly blanketed on the hilly areas, being drained by the rivers like Gaura, Gumani, Kajhia, Bansloi etc. According to the census 2011, the total area covered under forest is about 120763 acres or 48305.42 ha. of the district along with 43.23% tribal population among total population. The ethnic communities mainly the *Santals* and the *Paharias* along with few other communities like *Mahalis*, *Bhumij*, *Oraons*, *Karmalis*, *Kumhars*, etc. reside in this region. These communities have treasured a rich traditional knowledge, gifted to them from their ancestors. Their ancestors have gained this knowledge by applying trial and error method. Progressively, they have not only learnt to

utilize these species but also to maintain their availability in their natural habitats along with conserving them for their future generations too.

Unfortunately, this precious knowledge of these communities which came down from their ancestors verbally, without any proper records is losing ground due to numerous facts like, the gradual modernization of these ethnic communities, extinction of valuable wild and domestic varieties of plant resources due to deforestation, the unwillingness of these people to share their knowledge with common people, absence of proper documentation of their utilizations, etc. Hence both, the security of these forests, sheltering invaluable plant species in their natural habitats and these tribal communities with their precious knowledge, are in

urgent need of proper maintenance.

Many ethno-botanical studies (Pei Shang-Ji, 2001<sup>15</sup>; Rao, 1996<sup>16</sup>; Borthakur and Gogoi, 1994<sup>3</sup>; Jain, 1991<sup>11</sup>) have also showed that inventory preparations of the indigenous knowledge through ethno-botanical studies are important for the conservation as well as sustainable utilization of the bio-resources. The paper is an endeavour towards this prospect.

## MATERIALS AND METHODS

Thorough and intensive field work was conducted in the villages and randomly selected blocks (Kathikund, Shikaripara, Gopikandar, Raneshwar, Dumka, Maharo and Jama) of the Dumka district. For this very purpose semi-structured questionnaires were prepared. Ethnic and knowledgeable, herbal medicinal practitioners were interviewed several times. At the same time, field visits were also undertaken along with the villagers in the local markets called *Haats* or *Hatias*. Following the first hand data given by these people, a total of 60 species of ethno-botanical plants were collected and properly tagged with their local names, from this area. Collected plants were processed and herbarium specimens were prepared following standard

herbarium techniques (Jain and Rao, 1977<sup>10</sup>) and identified consulting available literatures (Haines, 1921-1925<sup>9</sup>; Kirtikar & Basu, 1935<sup>12</sup>; Anonymous, 1948-1976<sup>1</sup>; Chopra *et al.* 1956<sup>5</sup>, 1969<sup>6</sup>; Maheshwari & Singh, 1965<sup>13</sup> and Nayaret *al.*, 1989<sup>14</sup>). The specimens have been deposited in the herbarium of Department of Botany, Sido Kanhu Murmu University, Dumka.

## OBSERVATIONS

Different invaluable plant species are ethno-botanically observed which have been classified under 12 different categories of their utilizations. These include a total of fifty-eight (58) genera and sixty (60) species belonging to thirty-one (31) families of the angiosperms. The plant species have been enumerated in the alphabetical order along with their families classified as per the Bentham and Hooker's (1862-1883) systems of plant classification. Nomenclature update of the specimens is based on the Angiosperm Phylogeny Group classification III (APG III, 2009<sup>2</sup>). These plants are enumerated below in **Table 1**, along with their Family, Local names and Indigenous/Tribal mode of use.

Table. 1 Enumeration of different categories of plant species studied in this district are:

1. Cereals					
Sl. No.	Scientific Name [Voucher specimen No.]	Family	Local Name	Parts Used	Indigenous/Tribal mode of use
1.	<i>Avena sativa</i> L. [AD-246]	Poaceae	Jau	Grains, Whole Plant	Grains are consumed by the humans. The whole plant is used as fodder for the cattle.
2.	<i>Echinochloa colona</i> (L.) Link. [AD/SLB-693]	Poaceae	Sawa, Sawank	Whole plants, Tender leaves and Grains	The grains are ground into flour and eaten as porridge. Young plants and shoots are consumed as leafy vegetables.
3.	<i>Pennisetum glaucum</i> (Burm.) Stapf. & Hubbard. [AD/SLB-602]	Poaceae	Bajra	Grains, Whole Plant	Important food for these poor, particularly in cold weather because of its heating properties. Grain flour is used in making

					bread. Grains are eaten after parching (Bhunja, lahi) green ears are also roasted and eaten. The crop has enormous yield for forage. The straw is used for thatching and as fuel. Fermented beverage from
4.	<i>Zea mays</i> L.[AD-336]	Poaceae	Jonar, Bhutta	Grains, Whole Plant	Maize flour is used similar to that of wheat. Eaten as popcorns after roasting parched grains. Tender cobs are eaten as vegetables. Plant is also used as fuel after drying.
<b>2. Cereals</b>					
5.	<i>Cajanuscajan</i> (L.) Millsp.[AD/ SLB -106]	Fabaceae	Arhar	Seeds, Leaves, Whole Plant	Primarily grown as a grain crop for seeds, which is used as pulses. Stems are used as firewood after drying. It also fixes free atmospheric nitrogen to the soil. Ethno medicinally, paste of the seeds and leaves are applied warm as a poultice over breast to induce milk secretion in humans.
6.	<i>Dolichos lablab</i> L. [AD-304]	Fabaceae	Shim, Sem	Seeds, Pods	Unripe seeds and pods are eaten as vegetable while seeds are also used as pulses along with <i>Barbatti</i> .
7.	<i>Lens culinaris</i> Medik. [AD-598]	Fabaceae	Masoor	Seeds	Fresh and green seeds are also eaten raw. While the dried seeds are eaten after cooking as soups & pulses.
8.	<i>Macrotylomauniflorum</i> (Lam.) Verdc. [AD-267]	Fabaceae	Kurthi	Seeds	Whole seeds are consumed as sprouts or as whole meal. Ethno-medicinally also, it is used to treat kidney stones.
9.	<i>Phaseolus vulgaris</i> L.[AD-584]	Fabaceae	Barbatti	Seeds, Pods,	The seeds are consumed as pulses. The young pods are also used as vegetable.

3. Vegetables					
10.	<i>Alocasiamacrorrhiza</i> (L.) G.Don. [AD/SLB -101]	Araceae	Man- Suran	Leaves, Petioles, Corms.	The underground stems (corms) are edible. These are only safe to eat after lengthy cooking, which breaks down the irritating crystals of calcium oxalate. The lower part of the petioles are also cooked and eaten to improve eyesight. Leaves are eaten as leafy vegetables. Ethno-medicinally, the crushed stems are applied to swelling of throat in cattle.
11.	<i>Basella alba</i> (L.) Stewart. [AD/SLB--233]	Basellaceae	Poi	Stems, Leaves, fruits.	The leaves & stem is cooked and eaten as leafy vegetable. The fruit sap is used for colouring food. Ethno-medicinally, leaves juice is used as a remedy of constipation.
12.	<i>Cocciniagrandis</i> (L.) Voigt. [AD/SLB--207]	Cucurbitaceae	Kundri, Telakucha	Fruits	Fruits are consumed as vegetable.
13.	<i>Ficus racemosa</i> L. [AD-388]	Moraceae	Jaggi dumur	Leaves, Fruits.	Leaves are used as fodder for cattle. The iron rich fruits are eaten as vegetable.
14.	<i>Leucascephalotes</i> (Koenig ex Roth) Spreng [AD/SLB--219]	Lamiaceae	Dhurpi	Stems, Leaves	The green leaves & tender stems are eaten as wild leafy vegetable. It is also dried and preserved for scarce period. Dried leaves are boiled along with <i>Mar</i> (Rice Starch) locally named <i>Mar Jhor</i> .
15	<i>Neolamarckiacadamba</i> (Roxb) Bosser.[AD-270]	Rubiaceae	Kadam	Bark, Wood, Fruit	Inflorescence receptacle is edible. Fruit is eaten either raw or cooked.
4. Spices					
16.	<i>Cinnamomum tamala</i> Fr. Nees. [AD-384]	Lauraceae	Tejpat	Leaves	The leaves are often sold in markets, used mainly in dishes for flavour, as spice & condiments. Leaves are used in <i>karha</i> for the treatment of bronchitis.

17.	<i>Coriandrum sativum</i> L. [AD-120]	Apiaceae	Dhaniya	Leaves, Seeds	The fruits and leaves are aromatic and used as a flavouring agent. The fruits are used extensively in preparation of curry powder, pickles, sauces etc. The fresh leaves are used in salads, chutney in vegetables.
18.	<i>Murrayakoenigii</i> (L.) Spreng. [AD/ SLB -341]	Rutaceae	Kathnim	Leaves	The leaves are used to add flavour in making curries and soups.
19.	<i>Zinziberofficinale</i> Roscoe [AD- 127]	Zingiberaceae	Ada, Adrak.	Rhizomes	The rhizomes are also used as spice, These are very good appetizer and help in improving appetite. Juice extracted from the underground rhizomes is mixed with honey and given after delivery to strengthen the abdominal muscles.
<b>5. Fruits</b>					
20	<i>Achras zapota</i> L. [AD/ SLB -291]	Sapotaceae	Sapatu	Fruits (Fleshy berries)	The yellowish-brown flesh is very sweet. The milky juice is rich in carbohydrates and vitamins.
21	<i>Annona squamosa</i> L. [AD-156]	Annonaceae	Sharifa	Fruit (Pulpy sweetcarpels)	The edible pulp is juicy white or cream-yellow in colour with sweet flesh.
22	<i>Artocarpus heterophyllus</i> Lamk.[AD-373]	Moraceae	Kanthal, Kanther	Fruits (Fleshy petals)	Ripened fruits are eaten fresh. While they are also preserved in syrup. Seeds are eaten after roasting or boiling. Unripe fruits are used as vegetable, pickles (Das and Bondya, 2016 <sup>7</sup> ).
23	<i>Artocarpus lacucha</i> Buch.-Ham.[AD-692]	Moraceae	Barhar, Dahu	Fruits (Fleshy syncarp)	Raw fruits are used in the preparation of pickles and in vinegar. The ripened fruits are consumed fresh as well after cooking.

24	<i>Carissa carandas</i> L. [AD-251]	Apocynaceae	Karaunda	Fruits (Pulp of the drupes)	Ripe & unripe fruits are edible. Used in making pickles and jellies.
25	<i>Ziziphus mauritiana</i> Lamk. [AD-397]	Rhamnaceae	Ber	Fruits (Fleshy drupes)	The fruits are eaten fresh, dried or preserved.
<b>6. Timber Yielding</b>					
26	<i>Dalbergia latifolia</i> Roxb. [AD/ SLB -261]	Fabaceae	Pahari sisoo	Wood	The timber yields a valuable furniture wood. The wood is also used for cabinet work, making furniture, cart-wheels & other wooden implements.
27	<i>Gmelina arborea</i> Roxb. [AD-322]	Verbenaceae	Gambhar	Wood	Wood is used for various purpose like making furniture, musical instrument etc.
28	<i>Senegalia catechu</i> (L. f.) P. J. H. Hurter & Mabb. [AD/SLB—234]	Fabaceae	Khair, Kattha	Wood	Used for making house ports, agriculture implements, oil & sugarcane crusher, plough, furniture, stocks & felloes of wheels, tool handles etc. Wood yields <i>katha</i> used with <i>betel</i> & also in medicines. It is also used for tanning, printing & dyeing.
29	<i>Shorea robusta</i> Roxb. [AD-342]	Diptero- carpaceae	Serjom, Sal	Leaves, Wood	Wood is used chiefly for making railway sleepers & for construction work. Leaves are used for preparing meal plates & bowl like articles for serving food.
30	<i>Vachellia nilotica</i> (L.) P. J. H. Hurter & Mabb. [AD/ SLB -288]	Fabaceae	Babool, Kikar	Leaves, Pods, Wood	The timber is hard, durable & extensively used for making wheel, well curbs & fuel. The green pods, young shoots & leaves form an excellent fodder.
<b>7. Plants used in making Baskets and Brooms</b>					
31	<i>Chrysopogon aciculatus</i> Retz.) Trin. [AD- 355]	Poaceae	Chorkanta	Whole plants	Used in making baskets and brooms.

32	<i>Dendrocalamusrtictus</i> (Roxb.) Nees[AD/ SLB -163]	Poaceae	LathiBans	Whole plant, Culms, roots, leaves	Used in making baskets of different shapes and sizes, mats, umbrella, caps, winnowing trays (sups), fans, <i>dibni, kumni, chatka</i> , musical instruments etc.Young and tender sprouts are cooked as <i>Sandhana</i> .
33	<i>Ichnocarpusfrutescens</i> (L.) R.Br.- [AD-690]	Apocynaceae	Syamlata, Kali Dudhi	Stems	These are used to make durable ropes for tying. Also used to make baskets and fish nets.
34	<i>Phoenix sylvestris</i> (L.) Roxb.[AD/ SLB -399]	Arecaceae	Khejur	Leaves	The leaves are good source of fibres and are used for making ropes, baskets, brooms and cordage.
<b>8. Ethno-Medicinal Plants</b>					
35	<i>Achyranthesaspera</i> L. [AD-560]	Amaranthaceae	Latjira, Chirchiri, Chipchirit	Roots, seeds, whole plant	The oral administration of the decoction of the whole plant increases urinary output and is also considered effective in the treatment of kidney stones.
36	<i>Adhatodavasica</i> Nees. [AD/ SLB -547]	Acanthaceae	Bakas, Machraka	Leaves	Leaves are soaked in water over-night, then that water is taken in empty stomach in the morning for 3-5 days to cure dry cough.
37	<i>Aeschynomeneaspera</i> L. [AD-601]	Fabaceae	Shola	Leaves, Young Shoots	Dried young shoot powder with half tea spoon powdered candy is given to increase the consistency of semen; local herbalists also use it for treating urinary troubles. <i>Shola</i> craft is a famous art made of these soft stems.
38	<i>Agave americana</i> Roxb. [AD-283]	Agavaceae	Kong	Leaves sap	An infusion of finely chopped fresh leaves, about 2 gms, taken daily along with a cup of water, purifies blood. Sap of leaves used internally for wound healing and curing inflammations.

39	<i>Clerodendrum viscosum</i> Vent. [AD/SLB-197]	Verbenaceae	Bhant, Ghanto	Leaves, Roots	Juice of fresh leaves is given for the removal of <i>Ascaris</i> from intestinal infestation. Poultice of leaves & root is applied externally to tumours.
40	<i>Diospyros melanoxylon</i> Roxb. [AD-394]	Ebenaceae	Kend, Terej, Kendu, Tend	Bark, Leaves, Flowers	Dried flowers are used in urinary & skin troubles. Leaves are used for wrapping <i>bidis</i> . The plants also produce edible sweet fruits.
41	<i>Elephantopus scaber</i> L. [AD/SLB -164]	Asteraceae	Mayur jhunti	Roots, Leaves	Roots are used to arrest vomiting. Powder of the roots along with pepper is applied to cure toothache. Leaves are also used for curing eczema & ulcers. These roots are also used for preparing local drink <i>Handia</i> .
42	<i>Helicteres isora</i> L. [AD/SLB -319]	Malvaceae	Maror phali, Jonkaphal Aintha	Fruits	Fruits are used to cure intestinal complaints, such as diarrhea, chronic dysentery, flatulence, improving appetite especially in infants.
43	<i>Tinospora cordifolia</i> (Willd.) Miers. [AD-369]	Menispermaceae	Giloi	Whole plant	The fresh juice of the roots is very much effective in treating urinary problems (Das and Bondya, 2015 <sup>8</sup> ).

#### 9. Oil Yielding

44	<i>Guizotia abyssinica</i> (L.f.) Cass. [AD/SLB -310]	Asteraceae	Sirguja, Ramtil	Seeds	The oil is edible and is used for cooking. The oil cakes are used as fodder.
45	<i>Linum usitatissimum</i> L. [AD-317]	Linaceae	Mosina, Alsi, tisi	Seeds	It is used in manufacture of soft soaps.
46	<i>Madhuca longifolia</i> (J. Koenig) Macbr. [AD/SLB -626]	Sapotaceae	Mahuwa, Matkam	Flowers, seeds, Bark, Wood	Oil is extracted from seeds which is eaten & also used for soap making. The corollas of flowers are eaten raw or cooked & a spirit is distilled from them.
47	<i>Ricinus communis</i> L. [AD-390]	Euphorbiaceae	Arand, Bherenda	Seeds	It is used in the manufacture of transparent soap, textile soaps, aromatics, varnishes, and paints.



48	<i>Sesamum indicum</i> L. [AD-259]	Pedaliaceae	Til	Seeds	The oil is edible and is used for cooking. It is also used in the manufacture of soap, cosmetics and hair oils.
<b>10. Plants considered Sacred</b>					
49	<i>Aegle marmelos</i> L. [AD/ SLB -548]	Rutaceae	Sinjo, Lohagasi	Leaves, Fruits	Leaves and fruits are used to worship lord Shiva. Ethno-medicinally, fresh leaves are chewed to relieve cough.
50	<i>Ficus benghalensis</i> L. [AD/ SLB -566]	Moraceae	Bar, Bargad	Whole Plant	Fruits are eaten in time of scarcity. The young shoots & leaves are made to feed cattle, goat. Considered to be the shelter of deities.
51	<i>Haldinia cordifolia</i> (Roxb.) Ridsd. [AD-330]	Rubiaceae	Karam, Haldu	Whole Plant	The plant is used in the festival of "Karma" of the Santhals.
52	<i>Phyllanthus emblica</i> L. [AD-343]	Euphorbiaceae	Amla, Aonla	Fruits	Juice of fruits is largely used by local people as a cure for cough and inflammation of eyes. Believed to be born from Lord Brahma's love tears.
<b>11. Plants used for making dyes</b>					
53	<i>Areca catechu</i> L. [AD-349]	Arecaceae	Supari	Nut	Copper red colour is obtained from the nuts.
54	<i>Butea monosperma</i> Lamk. [AD-256]	Fabaceae	Palas, Murup, Morud	Leaves, Flowers	The flowers give a yellow/orange dye. The leaves are used for fodder & manure. Meal plates are prepared from their leaves used chiefly on festive occasions.
55	<i>Clitoria ternatea</i> L. [AD/ SLB -302]	Fabaceae	Aparajita	Flowers	Blue colour is obtained from the flowers.
56	<i>Curcuma longa</i> L. [AD/ SLB -113]	Zingiberaceae	Haldi	Rhizomes	Yellow-Red colour is obtained from the rhizomes.
57	<i>Terminalia bellerica</i> (Gaertn.) Roxb. [AD-286]	Combretaceae	Bahera	Fruits	Black colour is obtained from the fruits.
<b>12. Plants used in touch therapy</b>					
58	<i>Calamus latifolius</i> Roxb. [AD/ SLB-246]	Arecaceae	Ghorua	Branches	The delicate branches are coiled around neck against leprosy.

59	<i>Calotropis gigantea</i> (L.) R.Br. ex Ait. [AD/ SLB-312]	Apocynaceae	Akwani	Leaves, Fruits	A few leaves are stitched together to form a leafy cap, which is kept on head of the patient to alleviate fever.
60	<i>Ichnocarpus frutescens</i> (L.) R.Br. [AD-690]	Apocynaceae	Syamlata, Kali-Dudhi	Roots	The roots are tied on the arms to induce sleep.
61	<i>Tribulus terrestris</i> L. [AD/SLB-368]	Zygophyllaceae	Gokhru Kanta	Fruits	After making hole in the fruit, it is attached to the ear lobe opposite to the affected part to relieve hemicrania (severe headache).

## DISCUSSIONS AND CONCLUSIONS

These communities have a wide range of utilizations of the prevailing phyto-diversity, as food, construction materials, medicines, fodder, fuel, cultural activities, dye yielding, oil yielding, etc. Though these plant species are not grown at a large scale, but are important for the subsistence and economy of these ethnic communities. These species are poorly documented and neglected from the mainstream research and developmental activities. Alongside their commercial potential, many of the underused crops also provide important environmental services, as they are adapted to marginal soil and climate conditions.

Their cultural beliefs also relate the bio-resources and the surrounding ecosystem of which they are a part. For them these bio-resources not only provide them economic security but are also powerful link to their ancestors. They celebrate different festivals relating the phenology of the plant species like, *Sohrai, Karma, Ero, Baha, Iri-Gundlinawai, Fhalar* etc. These religious and cultural associations of these bio-resources are more deep rooted than mere their materialistic uses. These cultural dimensions are the vital approaches of sustainable utilization and conservation of these bio-resources (Bondya, *et.al.* 2015<sup>4</sup>).

Article 8(j) of Convention on Biological Diversity (CBD) signed at Rio de Janeiro, Brazil in 1992, provides instructions for respecting, protecting and

rewarding the Knowledge, Innovations and Practices (KIP) of the local communities. So, efforts should be made to recognize IPR (Intellectual Property Rights) of these ethnic communities, to sustainably utilize their precious knowledge and conserve this for our future generation (Borathakur & Gogoi, 1994<sup>3</sup>).

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