

REPORT ON FLORAL DIVERSITY

(2024 - 2025)



Study on Floral Diversity of Mahanadi River areas in Cuttack, Angul and Nayagarh Districts, Odisha



Ambika Prasad Research Foundation, Odisha

A Report
on
"Study on Floral Diversity of Mahanadi River
areas in Cuttack, Angul and Nayagarh
Districts, Odisha"



Submitted to

PCCF (Principal Chief Conservator of Forests) & HoFF

and

PCCF (Wildlife) & Chief Wildlife Warden
Forest, Environment and Climate Change Department
Government of Odisha, Bhubaneswar
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SUMMARY

The Mahanadi River, a major lifeline of East-Central India, flows through ecologically diverse zones from the highlands of Chhattisgarh to the coastal plains of Odisha, supporting rich biodiversity. A study conducted from Naraj to Narsighpur documented 476 plant species belonging to 104 families and 363 genera. Among them, Fabaceae, Poaceae, and Cyperaceae are the most dominant families. The flora includes a variety of growth forms such as herbs, trees, climbers, shrubs, grasses, aquatic herbs, palms, and ferns. This diversity supports a wide array of faunal species through crucial ecological interactions like pollination, seed dispersal, and herbivory. Tribal communities play a vital role in preserving traditional knowledge, using many plants for food and medicinal purposes for treating diverse diseases and disorders.

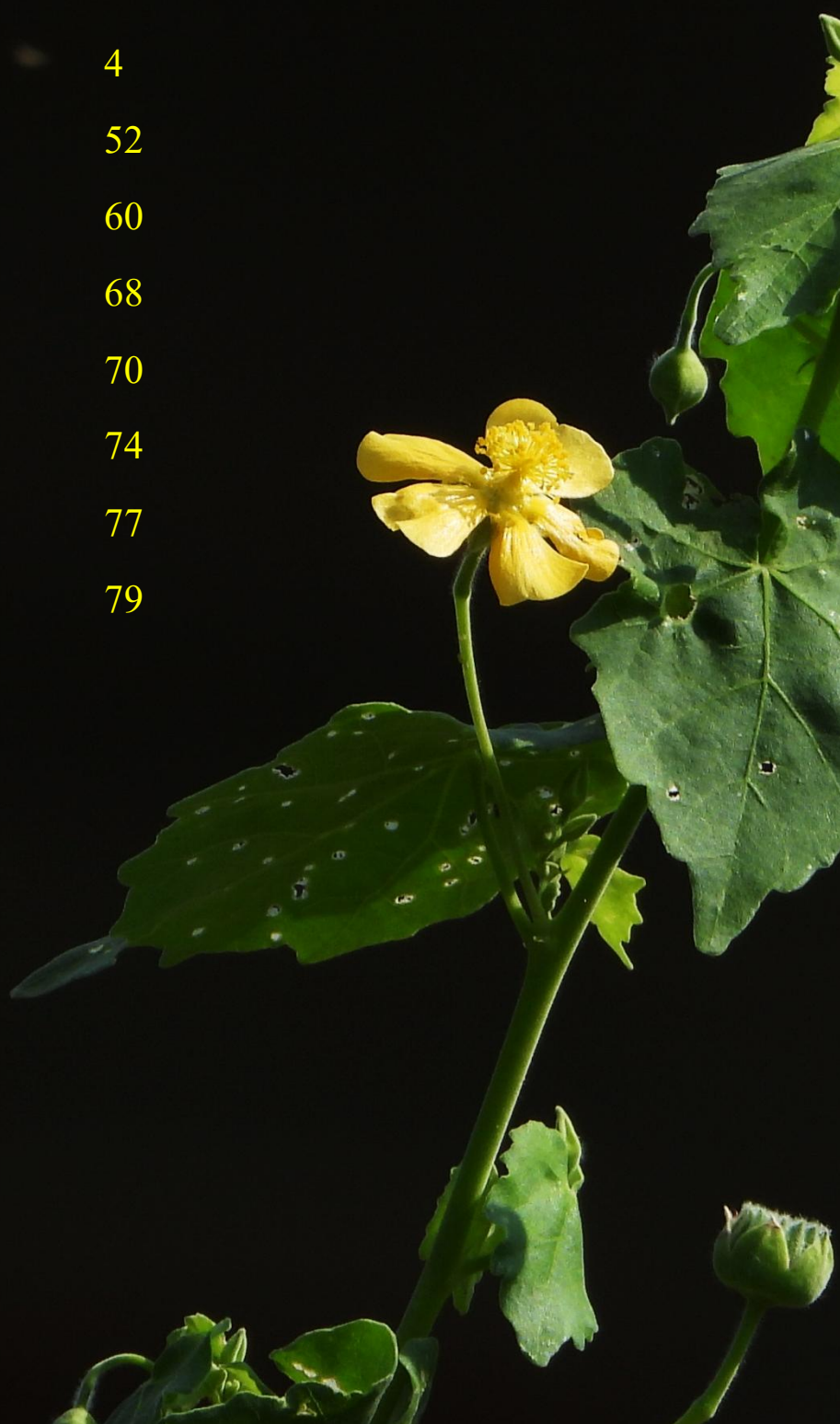
Key ecological interactions along the river include pollination by insects and birds (e.g., sunbirds and butterflies), and seed dispersal by birds and mammals. Aquatic plants such as *Vallisneria* and *Hydrilla* support fish, turtles, and water birds. Sacred groves along the river act as important habitats. These culturally protected patches conserve medicinal and rare plant species, offer breeding grounds for wildlife, prevent soil erosion, and enhance water retention. They also preserve traditional ecological knowledge among tribal communities, who utilize various plants for medicinal, nutritional, and cultural purposes.

However, the Mahanadi ecosystem faces severe threats. Pollution from industries, untreated sewage, and agricultural runoff degrades water quality. Deforestation in catchment areas causes erosion and sedimentation. Invasive species like *Lantana camara* and *Chromolaena odorata* outcompete native vegetation. Climate change further disrupts ecosystems through rainfall and temperature. To prevent biodiversity loss and maintain ecological balance, urgent conservation efforts involving local communities, policymakers, and environmental organizations are essential. Restoration of sacred groves, pollution control, and habitat protection are critical for sustaining the river's health.

The present study contributes a significant finding to the flora of Odisha, documenting *Lindernia tamilnadensis* as a new record from the Mahanadi River areas, thereby expanding the known distribution of this species and enriching the region's botanical diversity.

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INTRODUCTION

The Mahanadi River holds immense significance in the state of Odisha, India. Originating from the Chhattisgarh region, it flows through the eastern part of the Indian peninsula, traversing through the state of Odisha before finally merging into the Bay of Bengal. The river serves as a lifeline for millions of people, supporting diverse ecosystems, agriculture, and livelihoods along its course. It enters Odisha near the town of Sambalpur and meanders through various districts, including Cuttack and Nayagarh, before reaching the coast. Along its journey, the river forms numerous tributaries, distributaries, and floodplains, enriching the surrounding landscape and fostering agricultural productivity. The Mahanadi River basin shows rich floral diversity, comprising a wide variety of plant species adapted to its riparian habitats. Some communities along the Mahanadi River in these districts include: Kandha Tribe, Munda Tribe, Saura Tribe, Gond Tribe, Bhuyan Tribe etc. These tribal communities along the Mahanadi River have unique socio-cultural identities and traditional knowledge systems that are closely tied to the river and its surrounding natural environment. They often rely on the river for fishing, irrigation, and other livelihood activities, and their cultural practices reflect a deep reverence for the natural world. These communities residing along the Mahanadi River in Cuttack and Nayagarh districts possess rich traditional knowledge related to the flora of the region. They can identify various plants with medicinal properties and their uses in treating common ailments and diseases, various wild edible fruits, leafy vegetables and tubers found in the vicinity of the Mahanadi River. Certain plants and trees along the Mahanadi River hold cultural and spiritual significance for tribal communities. Overall, the traditional knowledge related to flora along the Mahanadi River reflects the deep connection between indigenous communities and their natural environment. This knowledge not only contributes to their livelihoods and well-being but also holds valuable insights for conservation and sustainable management of the riverine ecosystem. Efforts to document the flora and its indigenous practices can enhance the resilience and sustainability of both the communities and the river ecosystem. Understanding and preserving the intricate relationship between the river, its biodiversity, and local communities are essential for ensuring the river's continued ecological health and the well-being of the people dependent on it.

AREA COVERED

The survey was conducted along a specific stretch of the Mahanadi River, starting from Naraj, a locality near Cuttack, to Narsinghpur, Athagrh Forest Division, Odisha (Figure 1).

Floral Diversity Documentation: Survey was carried out along the riverbanks, and surrounding areas to enlist the various plant species. Identification was based on morphological characteristics, and specimens were collected for further analysis and for Herbarium preparation. The survey documented a wide range of plant species, including medicinal herbs, shrubs, trees, and aquatic plants. The area is home to several important species that contribute to the ecological health of the region.

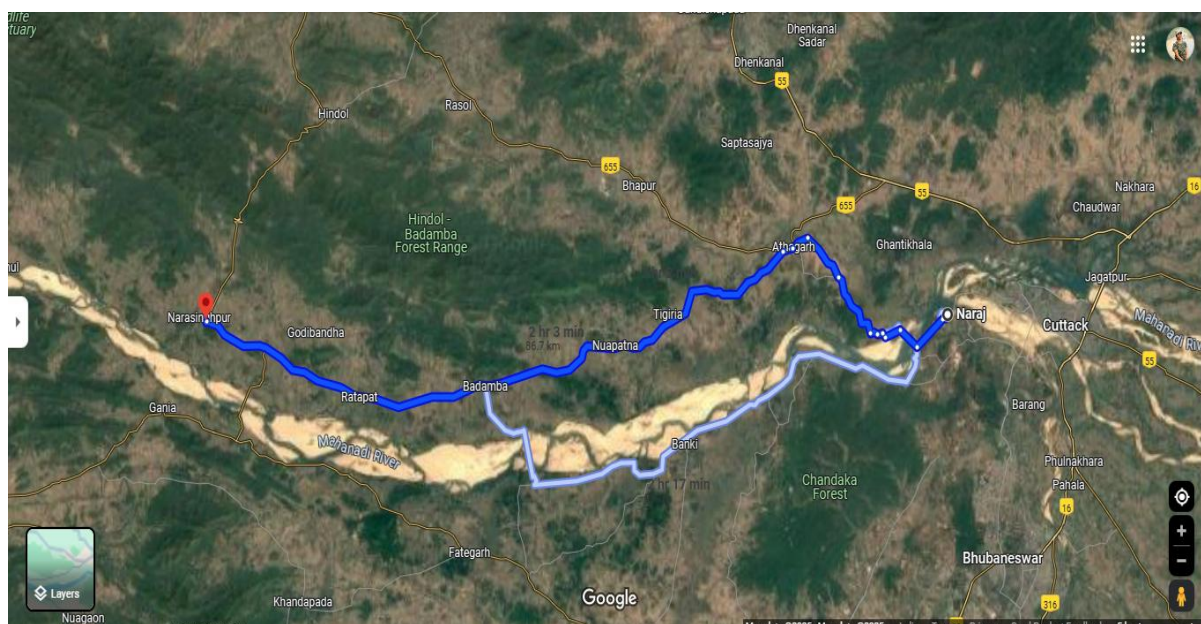


Figure 1: From Naraj to Narsinghpur

Ethnobotanical survey: Semi-structured interviews and discussions were conducted with local communities to document their knowledge and use of the native plant species. This included understanding medicinal, food, cultural, and economic uses of the plants.

The study highlighted the rich floral diversity of the Mahanadi River region in the study areas and the valuable ethnobotanical knowledge held by the local communities. This information is crucial for conservation efforts and sustainable management of the region's natural resources.



Mahanadi River

PLANT ENUMERATION

Mahanadi River, one of the major rivers of East-Central India, flows through diverse ecological zones - from the highlands of Chhattisgarh to the coastal plains of Odisha and supports a rich variety of plant life. The plant diversity near the Mahanadi River includes a mix of forest, wetland, riparian, and agricultural species.

The present report provides a detailed documentation of the plant diversity near the Mahanadi River areas from Naraj to Narsighpur, encompassing a total of 476 plant species that belong to 362 genera and 104 families (Table 1). This remarkable diversity reflects the rich and varied ecological conditions present in the area. Among the documented families, Fabaceae exhibits the highest species diversity, with 55 species. The Poaceae family is represented by 52 species, while Cyperaceae, Acanthaceae, Apocynaceae, and Rubiaceae show 20, 19, 19, and 17 species, respectively (Figure 2).

The recorded flora encompasses a diverse array of growth forms, with 153 herbaceous species. The region also supports 101 tree species, 74 climbers, 54 shrubs and 52 species of grasses, which provide essential habitat and food sources for numerous faunal species. Additionally, 12 small trees, 10 ferns, 9 climbing shrubs, 6 aquatic herbs, and 3 palm species add to the layered structure of the vegetation (Figure 3).

Persicaria glabra



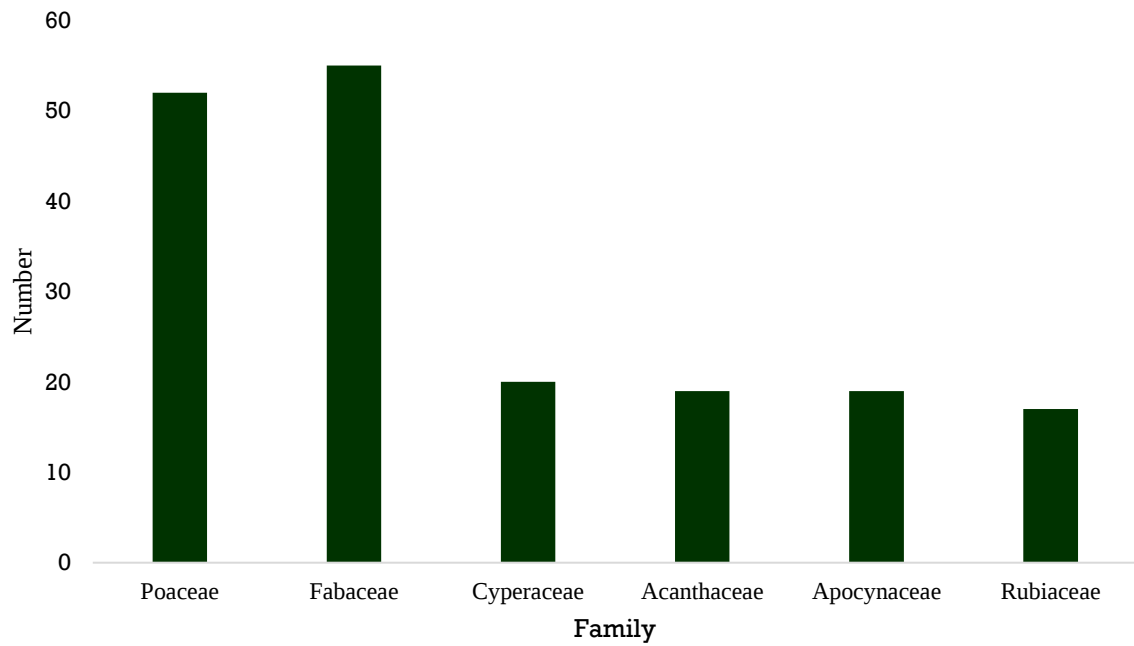


Figure 2: Dominant plant families found in the Mahanadi River areas

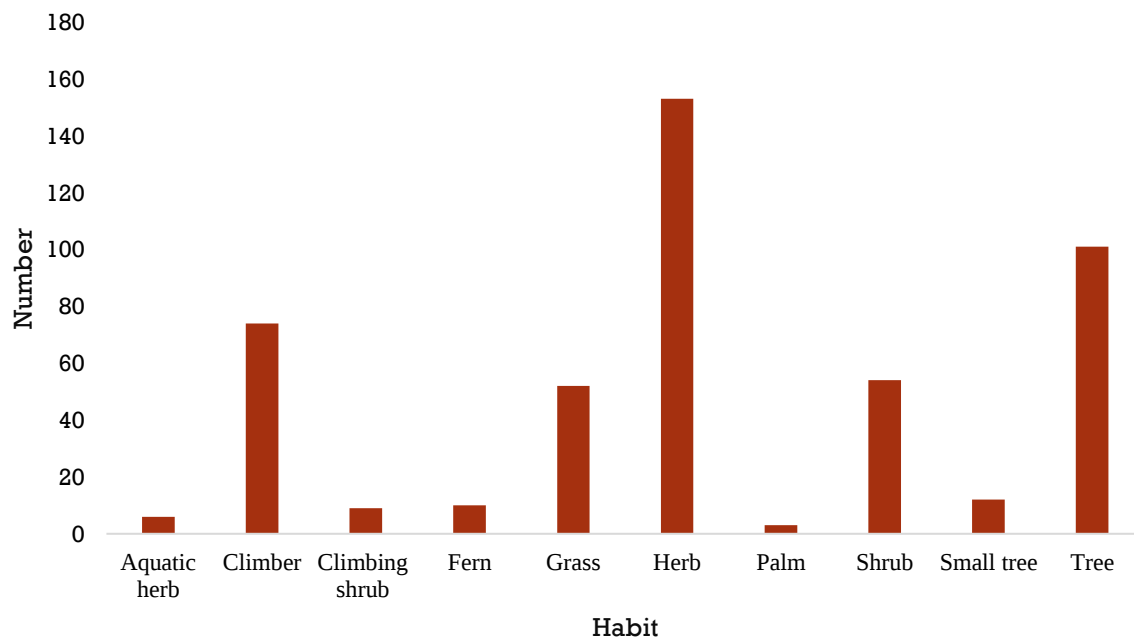


Figure 3: Diversity of plant habits in the Mahanadi River areas

Table 1: Plant diversity near Mahanadi River Areas

Plant Name	Local Name	Family	Habit
<i>Abildgaardia ovata</i> (Burm.f.) Kral	-	Cyperaceae	Herb
<i>Abrus precatorius</i> L.	Kaincha	Fabaceae	Climber
<i>Abutilon indicum</i> (L.) Sweet	Pedi pedika	Malvaceae	Shrub
<i>Acacia auriculiformis</i> A.Cunn. ex Benth.	Acacia	Fabaceae	Tree
<i>Acacia mangium</i> Willd.	Acacia	Fabaceae	Tree
<i>Acampe praemorsa</i> (Roxb.) Blatt. & McCann	Madang/ Rasna	Orchidaceae	Herb
<i>Achyranthes aspera</i> L.	Apamarga	Amaranthaceae	Herb
<i>Acmella paniculata</i> (Wall. ex DC.) R.K.Jansen	Akarkara	Asteraceae	Herb
<i>Acmella uliginosa</i> (Sw.) Cass.	Akarkara	Asteraceae	Herb
<i>Adenosma indiana</i> (Lour.) Merr.	Rasnajodi	Plantaginaceae	Herb
<i>Adiantum incisum</i> Forssk.	-	Pteridaceae	Fern
<i>Adiantum philippense</i> L.	Dodhari	Pteridaceae	Fern
<i>Adina cordifolia</i> (Roxb.) Brandis	Kuruma	Rubiaceae	Tree
<i>Aegle marmelos</i> (L.) Corrêa	Bela	Rutaceae	Tree
<i>Aeschynomene americana</i> L.	Sola	Fabaceae	Herb
<i>Aeschynomene aspera</i> L.	Sola	Fabaceae	Shrub
<i>Aeschynomene indica</i> L.	Pani sola	Fabaceae	Shrub
<i>Aganosma heynei</i> (Spreng.) I.M.Turner (Figure 4)	Banamalati	Apocynaceae	Climber
<i>Ageratum conyzoides</i> L.	Pokasunga	Asteraceae	Herb

<i>Ailanthus excelsa</i> Roxb.	Maha nimba	Simaroubaceae	Tree
<i>Alangium salviifolium</i> (L.f.) Wangerin	Ankula	Cornaceae	Tree
<i>Albizia lebbeck</i> (L.) Benth.	Dhala sirisa	Fabaceae	Herb
<i>Albizia procera</i> (Roxb.) Benth.	Dhala sirisa	Fabaceae	Tree
<i>Allmania nodiflora</i> (L.) R.Br. ex Wight	Aathara saga	Amaranthaceae	Herb
<i>Allophylus serratus</i> (Roxb.) Kurz	Pattana	Sapindaceae	Shrub
<i>Alloterosia cimicina</i> (L.) Stapf	Badaborati ghasa	Poaceae	Grass
<i>Alocasia macrorrhizos</i> (L.) G.Don	Manna	Araceae	Herb
<i>Alstonia scholaris</i> (L.) R.Br.	Chatian	Apocynaceae	Tree
<i>Alternanthera philoxeroides</i> (Mart.) Griseb.	Madaranga	Euphorbiaceae	Herb
<i>Alternanthera sessilis</i> (L.) DC.	Madaranga	Amaranthaceae	Herb
<i>Amaranthus viridis</i> L.	Kosala saga	Amaranthaceae	Herb
<i>Ampelocissus latifolia</i> (Roxb.) Planch. (Figure 5)	Bana angur	Vitaceae	Climber
<i>Anacardium occidentale</i> L.	Kaju	Anacardiaceae	Tree
<i>Anamirta cocculus</i> (L.) Wight & Arn.	Kalabati nai	Menispermaceae	Climber
<i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees	Bhuin nimba	Acanthaceae	Herb
<i>Anisomeles indica</i> (L.) Kuntze	Bhutamari	Lamiaceae	Shrub
<i>Annona reticulata</i> L.	Ram phala	Annonaceae	Tree
<i>Annona squamosa</i> L.	Aata	Annonaceae	Tree

<i>Anogeissus acuminata</i> (Roxb. ex DC.) Wall. ex Guill. & Perr.	Fasi	Combretaceae	Tree
<i>Antigonon leptopus</i> Hook. & Arn.	Snehalata	Polygonaceae	Climber
<i>Apluda mutica</i> L. (Figure 6)	Mugar ghasa	Poaceae	Grass
<i>Ardisia solanacea</i> Roxb.	Hada kankali/ Asadhia	Primulaceae	Shrub
<i>Argemone mexicana</i> L.	Satyanasi	Papaveraceae	Herb
<i>Argyreia nervosa</i> (Burm.f.) Bojer (Figure 7)	Brudhhataraka	Convolvulaceae	Climber
<i>Aristida setacea</i> Retz.	Jhadu ghasa	Poaceae	Grass
<i>Aristolochia indica</i> L.	Nagaairi	Aristolochiaceae	Climber
<i>Artocarpus heterophyllus</i> Lam.	Panasa	Moraceae	Tree
<i>Atalantia monophylla</i> DC.	Kantikapali/ Narguni	Rutaceae	Small tree
<i>Averrhoa carambola</i> L.	Karamanga	Oxalidaceae	Tree
<i>Axonopus compressus</i> (Sw.) P.Beauv.	Kachuri ghasa	Poaceae	Grass
<i>Azadirachta indica</i> A.Juss.	Nimba	Meliaceae	Tree
<i>Azolla pinnata</i> R.Br.	-	Salviniaceae	Fern
<i>Bacopa monnieri</i> (L.) Wettst. (Figure 8)	Brahmi	Plantaginaceae	Herb
<i>Bambusa bambos</i> (L.) Voss	Kanta baunsa	Poaceae	Grass
<i>Bambusa tulda</i> Roxb.	Baunsa	Poaceae	Grass
<i>Barleria prionitis</i> L.	Daskeranta	Acanthaceae	Shrub
<i>Barleria strigosa</i> Willd. (Figure 11)	Banamali	Acanthaceae	Shrub

<i>Barringtonia acutangula</i> (L.) Gaertn. (Figure 9)	Hinjala	Lecythidaceae	Tree
<i>Bauhinia acuminata</i> L.	Kanchana	Fabaceae	Shrub
<i>Bauhinia purpurea</i> L.	Kuler / Singh ala	Fabaceae	Tree
<i>Benkara malabarica</i> (Lam.) Tirveng. (Figure 12)	Firika koli	Rubiaceae	Small tree
<i>Bergera koenigii</i> L.	Bhrusanga patra	Rutaceae	Tree
<i>Bergia ammannioides</i> Roxb.	Bajramuli	Elatinaceae	Herb
<i>Bixa orellana</i> L.	Sinduri	Bixaceae	Small Tree
<i>Blepharis maderaspatensis</i> (L.) B.Heyne ex Roth	Kantabrahmani	Acanthaceae	Herb
<i>Blumea stricta</i> (DC.) Anderb. & Bengtson	-	Asteraceae	Herb
<i>Bonnaya antipoda</i> (L.) Druce	-	Linderniaceae	Herb
<i>Bonnaya ciliata</i> (Colsm.) Spreng.	Khetkura	Linderniaceae	Herb
<i>Bonnaya oppositifolia</i> (Retz.) Spreng.	-	Linderniaceae	Herb
<i>Borassus flabellifer</i> L.	Tala	Arecaceae	Palm
<i>Bothriochloa bladhii</i> (Retz.) S.T.Blake	Gandha bena	Poaceae	Grass
<i>Bothriochloa pertusa</i> (L.) A.Camuse	Basana	Poaceae	Grass
<i>Bougainvillea spectabilis</i> Willd.	Kagaja phula	Nyctaginaceae	Climbing shrub
<i>Breynia vitis-idaea</i> (Burm.f.) C.E.C.Fisch. (Figure 10)	Jhajangi	Phyllanthaceae	Shrub
<i>Bridelia retusa</i> (L.) A.Juss.	Kasi	Phyllanthaceae	Tree

<i>Bulbostylis barbata</i> (Rottb.) C.B.Clarke	-	Cyperaceae	Herb
<i>Butea monosperma</i> (Lam.) Kuntze	Palash	Fabaceae	Tree
<i>Caesalpinia pulcherrima</i> (L.) Sw.	Purai phula	Fabaceae	Shrub
<i>Cajanus scarabaeoides</i> (L.) Thouars	Ban koltha	Fabaceae	Climber
<i>Calamus latifolius</i> Roxb.	Beta	Arecaceae	Palm
<i>Calotropis gigantea</i> (L.) W.T.Aiton	Arakha	Apocynaceae	Shrub
<i>Camonea umbellata</i> (L.) A.R.Simões & Staples	Pani nai	Convolvulaceae	Climber
<i>Canna indica</i> L.	Kena	Cannaceae	Shrub
<i>Cannabis sativa</i> L.	Ganjei	Cannabaceae	Shrub
<i>Canscora heteroclita</i> (L.) Gilg	-	Gentianaceae	Herb
<i>Capparis brevispina</i> DC.	Asadhua	Capparaceae	Climber
<i>Capparis zeylanica</i> L.	Asadhua	Capparaceae	Climber
<i>Cardiospermum halicacabum</i> L. (Figure 13)	Phutka	Sapindaceae	Climber
<i>Carissa spinarum</i> L.	Ankhu-koli	Apocynaceae	Shrub
<i>Cascabela thevetia</i> (L.) Lippold	Kaniara	Apocynaceae	Tree
<i>Cassia fistula</i> L.	Sunari	Fabaceae	Tree
<i>Cassytha filiformis</i> L.	Nirmuli	Lauraceae	Climber
<i>Catharanthus roseus</i> (L.) G.Don	Sadabihari	Apocynaceae	Herb

<i>Causonis trifolia</i> (L.) Mabb. & J.Wen	Amala lata	Vitaceae	Climber
<i>Cayratia pedata</i> (Lam.) Juss. ex Gagnep.	Pita potala	Vitaceae	Climber
<i>Ceiba pentandra</i> (L.) Gaertn.	Katha simili	Malvaceae	Tree
<i>Ceratopteris thalictroides</i> (L.) Brongn.	Pani saag	Pteridaceae	Fern
<i>Chamaecrista mimosoides</i> (L.) Greene (Figure 14)	Patwa ghasa	Fabaceae	Herb
<i>Chloris barbata</i> Sw.	Gajalekha	Poaceae	Grass
<i>Christella parasitica</i> (L.) H.Lév.	-	Thelypteridaceae	Fern
<i>Chrysopogon aciculatus</i> (Retz.) Trin.	Guguchia	Poaceae	Grass
<i>Chrysopogon zizanioides</i> (L.) Roberty	Bena	Poaceae	Grass
<i>Cipadessa baccifera</i> (Roxb. ex Roth) Miq.	Nahalbeli	Meliaceae	Small tree
<i>Cissampelos pareira</i> L. (Figure 15)	Akanabindhi	Menispermaceae	Climber
<i>Cissus quadrangularis</i> L.		Vitaceae	Climber
<i>Cissus repanda</i> (Wight & Arn.) Vahl	Pan bel	Vitaceae	Climber
<i>Cissus vitiginea</i> L.	Jangli-angur	Vitaceae	Climber
<i>Cleistanthus collinus</i> (Roxb.) Benth. ex Hook.f.	Karada	Phyllanthaceae	Tree
<i>Cleistanthus monoicus</i> (Lour.) Müll.Arg.	Chotakasi	Phyllanthaceae	Tree
<i>Cleome rutidosperma</i> DC.	Ranga sorisha	Cleomaceae	Herb

<i>Cleome viscosa</i> L.	Bana sorisa	Cleomaceae	Herb
<i>Clerodendrum infortunatum</i> L.	Buhasin	Lamiaceae	Shrub
<i>Clitoria ternatea</i> L.	Aparajita	Fabaceae	Climber
<i>Coccinia grandis</i> (L.) Voigt	Bana kunduri	Cucurbitaceae	Climber
<i>Cocculus hirsutus</i> (L.) W.Theob.	Musakani	Menispermaceae	Climber
<i>Cocos nucifera</i> L.	Nadia	Arecaceae	Palm
<i>Coix lacryma-jobi</i> L. (Figure 16)	Gadgada	Poaceae	Grass
<i>Coleus strobilifer</i> (Roxb.) A.J.Paton	Bennia	Lamiaceae	Herb
<i>Colocasia esculenta</i> (L.) Schott	Saru	Araceae	Herb
<i>Combretum indicum</i> (L.) DeFilipps	Madhumalati	Combretaceae	Climber
<i>Combretum roxburghii</i> Spreng. (Figure 17)	Atundi	Combretaceae	Climber
<i>Commelina benghalensis</i> L.	Kana	Commelinaceae	Herb
<i>Commelina erecta</i> L.	Kana	Commelinaceae	Herb
<i>Commelina paludosa</i> Blume	Bada kana	Commelinaceae	Herb
<i>Cordia obliqua</i> (Ruiz & Pav.) Kunth (Figure 18)	Bacha	Boraginaceae	Tree
<i>Crateva religiosa</i> G.Forst.	Baruna	Capparaceae	Tree
<i>Crinum asiaticum</i> L.	Arisa gacha	Amaryllidaceae	Herb
<i>Crotalaria albida</i> B.Heyne ex Roth	Kaknasha	Fabaceae	Herb
<i>Crotalaria pallida</i> Aiton	Junjunka	Fabaceae	Shrub
<i>Crotalaria retusa</i> L.	Junjunka	Fabaceae	Shrub
<i>Croton bonplandianus</i> Baill.	Gandha tulasi	Euphorbiaceae	Herb

<i>Cryptolepis buchananii</i> R.Br. ex Roem. & Schult.	Dudhi nai	Apocynaceae	Climber
<i>Cucumis maderaspatanus</i> L.	Pahadi kakharu	Cucurbitaceae	Climber
<i>Cucumis melo</i> L.	Bing dimbu	Cucurbitaceae	Climber
<i>Curcuma longa</i> L.	Haladi	Zingiberaceae	Herb
<i>Cuscuta reflexa</i> Decne.	Nirmuli	Convolvulaceae	Climber
<i>Cynodon dactylon</i> (L.) Pers.	Duba ghasa	Poaceae	Grass
<i>Cyperus articulatus</i> L.	-	Cyperaceae	Herb
<i>Cyperus brevifolius</i> (Rottb.) Hassk.	-	Cyperaceae	Herb
<i>Cyperus compactus</i> Retz.	-	Cyperaceae	Herb
<i>Cyperus compressus</i> L.	Chancha	Cyperaceae	Herb
<i>Cyperus cuspidatus</i> Kunth	-	Cyperaceae	Herb
<i>Cyperus difformis</i> L.	Suneli	Cyperaceae	Herb
<i>Cyperus diffuses</i> Vahl	-	Cyperaceae	Herb
<i>Cyperus haspan</i> L.	-	Cyperaceae	Herb
<i>Cyperus iria</i> L.	Suanti	Cyperaceae	Herb
<i>Cyperus mindorensis</i> (Steud.) Huygh		Cyperaceae	Herb
<i>Cyperus polystachyos</i> Rottb.	Mutha	Cyperaceae	Herb
<i>Cyperus rotundus</i> L.	Mutha	Cyperaceae	Herb
<i>Cyrtococcum trigonum</i> (Retz.) A.Camus	Chhunchunia ghasa	Poaceae	Grass
<i>Dactyloctenium aegyptium</i> (L.) Willd.	Kukudia	Poaceae	Grass
<i>Dalbergia latifolia</i> Roxb.	Pahadi sisoo	Fabaceae	Tree

<i>Dalbergia rubiginosa</i> Roxb.	Kanchanai	Fabaceae	Climbing shrub
<i>Dalbergia sissoo</i> Roxb. ex DC.	Sissoo	Fabaceae	Tree
<i>Datura metel</i> L.	Datura	Solanaceae	Shrub
<i>Datura stramonium</i> L.	Datura	Solanaceae	Shrub
<i>Delonix regia</i> (Bojer ex Hook.) Raf.	Krushnachuda	Fabaceae	Tree
<i>Dendrocalamus strictus</i> (Roxb.) Nees	Bada baunsa	Poaceae	Grass
<i>Dendrophthoe falcata</i> (L.f.) Ettingsh. (Figure 19)	Malang	Loranthaceae	Shrub
<i>Dentella repens</i> (L.) J.R.Forst. & G.Forst.	Petaphula	Rubiaceae	Herb
<i>Dicliptera paniculata</i> (Forssk.) I.Darbysh.	Kirich	Acanthaceae	Herb
<i>Digitaria abludens</i> (Roem. & Schult.) Veldkamp	Kangua	Poaceae	Grass
<i>Digitaria bicornis</i> (Lam.) Roem. & Schult.	Makurjali ghasa	Poaceae	Grass
<i>Digitaria ciliaris</i> (Retz.) Koeler	Chiri chiri ghasa	Poaceae	Grass
<i>Dillenia indica</i> L.	Oou	Dilleniaceae	Tree
<i>Dinebra chinensis</i> (L.) P.M.Peterson & N.Snow	Bhuru	Poaceae	Grass
<i>Dioscorea bulbifera</i> L.	Pita alu	Dioscoreaceae	Climber
<i>Dioscorea glabra</i> Roxb.	Kanta alu	Dioscoreaceae	Climber
<i>Dioscorea hamiltonii</i> Hook.f.	Suta alu	Dioscoreaceae	Climber

<i>Dioscorea hispida</i> Dennst.	Bainya alu/ Kadaba alu	Dioscoreaceae	Climber
<i>Dioscorea oppositifolia</i> L.	Pani alu	Dioscoreaceae	Climber
<i>Diospyros melanoxylon</i> Roxb.	Kendu	Ebenaceae	Tree
<i>Diospyros montana</i> Roxb.	Halada	Ebenaceae	Tree
<i>Diplocyclos palmatus</i> (L.) C.Jeffrey	Shivlingi	Cucurbitaceae	Climber
<i>Dipteracanthus prostratus</i> (Poir.) Nees (Figure 20)	-	Acanthaceae	Herb
<i>Distimake vitifolius</i> (Burm.f.) Pisuttimarn & Petrongari	PaniNai	Convolvulaceae	Climber
<i>Dolichos trilobus</i> L. (Figure 21)	Bana kolatha	Fabaceae	Climber
<i>Ecbolium viride</i> (Forssk.) Alston (Figure 22)	Iswarajata	Acanthaceae	Shrub
<i>Echinochloa colonum</i> (L.) Link	Suan ghasa	Poaceae	Grass
<i>Ehretia aspera</i> Willd.	Masania	Boraginaceae	Tree
<i>Eleusine indica</i> (L.) Gaertn. (Figure 23)	Nandia	Poaceae	Grass
<i>Emilia sonchifolia</i> (L.) DC.	Sarkara	Asteraceae	Herb
<i>Enydra fluctuans</i> Lour.	Hidmichia saga	Asteraceae	Herb
<i>Eragrostis ciliaris</i> (L.) R.Br.	Dauria	Poaceae	Grass
<i>Eragrostis pilosa</i> (L.) P.Beauv.	Bancha ghasa	Poaceae	Grass
<i>Eragrostis tenella</i> (L.) P.Beauv. ex Roem. & Schult.	-	Poaceae	Grass
<i>Eragrostis unioides</i> (Retz.) Nees ex Steud.	Phurphuri ghasa	Poaceae	Grass
<i>Eriocaulon quinquangulare</i> L.	Phurki	Eriocaulaceae	Herb

<i>Erythrina variegata</i> L.	Paladhua	Fabaceae	Tree
<i>Eucalyptus citriodora</i> Hook.	Eucalyptus	Myrtaceae	Tree
<i>Euphorbia indica</i> Lam.	-	Euphorbiaceae	Herb
<i>Euphorbia tithymaloides</i> L.	-	Euphorbiaceae	Herb
<i>Evolvulus nummularius</i> (L.) L.	Bichamalia	Convolvulaceae	Herb
<i>Exacum pedunculatum</i> L.	-	Gentianaceae	Herb
<i>Ficus benghalensis</i> L.	Bara	Moraceae	Tree
<i>Ficus hispida</i> L.f.	Dimiri	Moraceae	Tree
<i>Ficus racemosa</i> L.	Dimiri	Moraceae	Tree
<i>Ficus religiosa</i> L.	Aswastha	Moraceae	Tree
<i>Ficus tinctoria</i> G.Forst. (Figure 24)	Khadakhadi	Moraceae	Tree
<i>Fimbristylis dichotoma</i> (L.) Vahl	Bada swanli	Cyperaceae	Herb
<i>Fimbristylis miliacea</i> (L.) Vahl	Beruan	Cyperaceae	Herb
<i>Flacourtia indica</i> (Burm.f.) Merr.	Bhaincha	Salicaceae	Small tree
<i>Flueggea virosa</i> (Roxb. ex Willd.) Royle (Figure 25)	Dalsingha	Phyllanthaceae	Small tree
<i>Fuirena umbellata</i> Rottb.	-	Cyperaceae	Herb
<i>Gardenia latifolia</i> Aiton	Gurudu / Giridi	Rubiaceae	Tree
<i>Getonia floribunda</i> Roxb.	Dhonati	Combretaceae	Climber
<i>Glinus oppositifolius</i> (L.) Aug.DC.	Pitasaga	Molluginaceae	Herb
<i>Gliricidia sepium</i> (Jacq.) Kunth	Garamalo	Fabaceae	Tree
<i>Gloriosa superba</i> L.	Agnisikha	Colchicaceae	Climber

<i>Glycosmis pentaphylla</i> (Retz.) DC. (Figure 26)	Chaula dhua	Rutaceae	Shrub
<i>Gmelina arborea</i> Roxb. ex Sm.	Gambhari	Lamiaceae	Tree
<i>Gnaphalium polycaulon</i> Pers.	Paunsia	Asteraceae	Herb
<i>Gomphrena celosioides</i> Mart.	Makhni saag	Amaranthaceae	Herb
<i>Gouania leptostachya</i> DC.	Rakta pichuli	Rhamnaceae	Climber
<i>Grangea madagascariensis</i> Vatke	Kathaphula	Asteraceae	Herb
<i>Grewia serrulata</i> DC.	Mirga chara	Malvaceae	Climbing shrub
<i>Grona triflora</i> (L.) H.Ohashi & K.Ohashi	Kuradia	Fabaceae	Herb
<i>Guilandina bonduc</i> L.	Gila/Katakoleja	Fabaceae	Climbing shrub
<i>Hackelochloa granularis</i> (L.) Kuntze	Tinpali	Poaceae	Grass
<i>Helicteres isora</i> L.	Mudimudika	Malvaceae	Shrub
<i>Heliotropium indicum</i> L.	Hatisunda	Boraginaceae	Herb
<i>Heliotropium ovalifolium</i> Forssk.	Pani hatisundha	Boraginaceae	Herb
<i>Hellenia speciosa</i> (J.Koenig) S.R.Dutta	Gaigendalia	Costaceae	Shrub
<i>Hemidesmus indicus</i> (L.) R.Br.	Anantamula	Apocynaceae	Climber
<i>Heptapleurum venulosum</i> (Wight & Arn.) Seem.	-	Araliaceae	Climber
<i>Heteropogon contortus</i> (L.) P.Beauv. ex Roem. & Schult.	Sinkula	Poaceae	Grass

<i>Hewittia malabarica</i> (L.) Suresh	Pani nai	Convolvulaceae	Climber
<i>Hibiscus cannabinus</i> L.	-	Malvaceae	Shrub
<i>Hiptage benghalensis</i> (L.) Kurz	Baramali	Malpighiaceae	Climber
<i>Holarrhena pubescens</i> Wall. ex G.Don	Kurei	Apocynaceae	Tree
<i>Holoptelea integrifolia</i> (Roxb.) Planch.	Churla	Ulmaceae	Tree
<i>Homonoia riparia</i> Lour.	Pani begunia	Euphorbiaceae	Shrub
<i>Hugonia mystax</i> L. (Figure 27)	Chulijhunka	Linaceae	Shrub
<i>Hydrilla verticillata</i> (L.f.) Royle	Chingudia dal	Hydrocharitaceae	Herb
<i>Hydrolea zeylanica</i> (L.) Vahl	Balluballua	Hydroleaceae	Herb
<i>Hygrophila auriculata</i> (Schumach.) Heine	Janum ala/ Koilekha	Acanthaceae	Herb
<i>Hygrophila difformis</i> (L.f.) Blume	-	Acanthaceae	Herb
<i>Hymenachne amplexicaulis</i> (Rudge) Nees	Jala	Poaceae	Grass
<i>Hymenodictyon orixense</i> (Roxb.) Mabb.	Kansa	Rubiaceae	Tree
<i>Hypericum japonicum</i> Thunb.	-	Hypericaceae	Herb
<i>Ichnocarpus frutescens</i> (L.) W.T.Aiton	Shyma lata	Apocynaceae	Climber
<i>Imperata cylindrica</i> (L.) Raeusch.	Chhana ghasa	Poaceae	Grass
<i>Indigofera hirsuta</i> L.	-	Fabaceae	Subshrub

<i>Indigofera tsiangiana</i> Metcalf	Latahai	Fabaceae	Herb
<i>Ipomoea carnea</i> Jacq.	Amari	Convolvulaceae	Shrub
<i>Ipomoea hederifolia</i> L.	Pani koda	Convolvulaceae	Climber
<i>Ipomoea pes-caprae</i> (L.) R.Br.	Kanchana lata	Convolvulaceae	Climber
<i>Ipomoea pes-tigridis</i> L.	Bilei pada	Convolvulaceae	Climber
<i>Ipomoea triloba</i> L.	Musakani	Convolvulaceae	Climber
<i>Isachne globosa</i> (Thunb.) Kuntze	Dhana ghasa	Poaceae	Grass
<i>Jasminum grandiflorum</i> L.	Chameli	Oleaceae	Climber
<i>Jatropha gossypifolia</i> L.	Baigaba	Euphorbiaceae	Shrub
<i>Justicia adhatoda</i> L.	Basanga	Acanthaceae	Shrub
<i>Justicia gendarussa</i> Burm.f.		Acanthaceae	Shrub
<i>Kalanchoe pinnata</i> (Lam.) Pers.	Amarapoi	Crassulaceae	Subshrub
<i>Kyllinga brevifolia</i> Schult.	-	Cyperaceae	Herb
<i>Kyllinga triceps</i> Rottb.	-	Cyperaceae	Herb
<i>Lagerstroemia parviflora</i> Roxb.	Siddha	Lythraceae	Tree
<i>Lagerstroemia speciosa</i> (L.) Pers.	Patuli	Lythraceae	Tree
<i>Lannea coromandelica</i> (Houtt.) Merr.	Mai	Anacardiaceae	Tree
<i>Lantana camara</i> L.	Putus	Verbenaceae	Shrub
<i>Laportea interrupta</i> (L.) Chew	Ghoda bichuati	Urticaceae	Herb
<i>Lathyrus sativus</i> L.	Chana saga	Fabaceae	Herb
<i>Lawsonia inermis</i> L.	Manjuati	Lythraceae	Small tree
<i>Leersia hexandra</i> Sw.	Jala dhana	Poaceae	Grass

<i>Lepidagathis fasciculata</i> (Retz.) Nees	Rasna	Acanthaceae	Herb
<i>Lepidagathis incurva</i> Buch.-Ham. ex D.Don	Rasna	Acanthaceae	Herb
<i>Leptospron adenanthum</i> (G.Mey.) A.Delgado	PaniPanisimasima	Fabaceae	Climber
<i>Limnophila indica</i> (L.) Druce	Keralata	Plantaginaceae	Herb
<i>Limnophila repens</i> (Benth.) Benth.	Keralata	Plantaginaceae	Herb
<i>Limnophyton obtusifolium</i> (L.) Miq.	Nalkut	Alismataceae	Herb
<i>Limonia acidissima</i> L.	Kaitha	Rutaceae	Tree
<i>Lindernia dubia</i> (L.) Pennell	-	Linderniaceae	Herb
<i>Lindernia procumbens</i> (Krock.) Philcox	-	Linderniaceae	Herb
<i>Lindernia tamilnadensis</i> MG Prasad & Sunojk.	-	Linderniaceae	Herb
<i>Lippia javanica</i> (Burm.f.) Spreng. (Figure 28)	Naga airi	Verbenaceae	Shrub
<i>Lobelia heyneana</i> Schult.	Panimali	Campanulaceae	Herb
<i>Ludwigia adscendens</i> (L.) H.Hara	Dhala datiju	Onagraceae	Herb
<i>Ludwigia perennis</i> L.	Datiju	Onagraceae	Herb
<i>Madhuca longifolia</i> (L.) J.F.Macbr.	Mahula	Sapotaceae	Tree
<i>Magnolia champaca</i> (L.) Baill. ex Pierre	Champa	Magnoliaceae	Tree

<i>Mallotus nudiflorus</i> (L.) Kulju & Welzen	Pani gambhari	Euphorbiaceae	Tree
<i>Mallotus repandus</i> (Rottler) Müll.Arg.	Dankari	Euphorbiaceae	Large shrub
<i>Mangifera indica</i> L.	Amba	Anacardiaceae	Tree
<i>Manilkara zapota</i> (L.) P.Royen	Chiku	Sapotaceae	Tree
<i>Marsilea minuta</i> L.	Sunsunia saga	Marsileaceae	Aquatic herb
<i>Martynia annua</i> L. (Figure 29)	Baghanakhi	Martyniaceae	Shrub
<i>Mecardonia procumbens</i> (Mill.) Small	Badikura	Plantaginaceae	Herb
<i>Melia azedarach</i> L.	Maha nimba	Meliaceae	Tree
<i>Melochia corchorifolia</i> L.	Bana patra	Malvaceae	Herb
<i>Merremia hederacea</i> (Burm.f.) Hallier f.	Bida	Convolvulaceae	Climber
<i>Millettia extensa</i> (Benth.) Benth. ex Baker	Guadhuni	Fabaceae	Climber
<i>Mimosa pudica</i> L.	Lajakuli	Fabaceae	Herb
<i>Mimusops elengi</i> L.	Baula	Sapotaceae	Tree
<i>Mirabilis jalapa</i> L.	4 O' clock plant	Nyctaginaceae	Shrub
<i>Morinda pubescens</i> Sm.	Aachu	Rubiaceae	Tree
<i>Mucuna monosperma</i> Roxb. ex Wight (Figure 30)	Baidanka	Fabaceae	Climber
<i>Mucuna pruriens</i> (L.) DC.	Baidanka	Fabaceae	Climber
<i>Murdannia nudiflora</i> (L.) Brenan	Kanduli	Commelinaceae	Herb
<i>Musa × paradisiaca</i> L.	Kadali	Musaceae	Herb

<i>Myriophyllum tetrandrum</i> Roxb.	-	Haloragaceae	Aquatic herb
<i>Naringi crenulata</i> (Roxb.) Nicolson	Behenta	Rutaceae	Tree
<i>Neolamarckia cadamba</i> (Roxb.) Bosser	Kadamba	Rubiaceae	Tree
<i>Nicoteba betonica</i> (L.) Lindau	Had-pat	Acanthaceae	Herb
<i>Nicotiana tabacum</i> L.	Dhuan patra	Solanaceae	Shrub
<i>Nyctanthes arbor-tristis</i> L.	Gangasiuli	Oleaceae	Tree
<i>Nymphoides hydrophyllum</i> (Lour.) Kuntze	Panisiuli	Menyanthaceae	Aquatic herb
<i>Nymphoides indica</i> (L.) Kuntze	Badapanisiuli	Menyanthaceae	Aquatic herb
<i>Ochna obtusata</i> DC. (Figure 31)	Bhuin champa	Ochnaceae	Small tree
<i>Ocimum americanum</i> L.	Bana tulasi	Lamiaceae	Herb
<i>Ocimum tenuiflorum</i> L.	Tulasi	Lamiaceae	Herb
<i>Olax scandens</i> Roxb. (Figure 32)	Bhadabhadalia/ Bhadali	Oleaceae	Shrub
<i>Oldenlandia corymbosa</i> L.	Ghara podi	Rubiaceae	Herb
<i>Operculina turpethum</i> (L.) Silva Manso	Dudholama	Convolvulaceae	Climber
<i>Oplismenus burmanni</i> (Retz.) P.Beauv.	Kougodia ghasa	Poaceae	Grass
<i>Oplismenus compositus</i> (L.) P.Beauv.	Mohara	Poaceae	Grass
<i>Opuntia stricta</i> (Haw.) Haw.	Nagaphani	Cactaceae	Shrub
<i>Oroxylum indicum</i> (L.) Kurz	Fanfana	Bignoniaceae	Tree

<i>Oryza rufipogon</i> Griff.	Bana dhana	Poaceae	Grass
<i>Ottelia alismoides</i> (L.) Pers.		Hydrocharitaceae	Aquatic herb
<i>Ougeinia oojeinensis</i> (Roxb.) Hochr.	Bandhana	Fabaceae	Tree
<i>Oxystelma esculentum</i> (L.f.) Sm.	Dudhialata	Apocynaceae	Climber
<i>Panicum brevifolium</i> L.	Kaincha ghasa	Poaceae	Grass
<i>Panicum repens</i> L.	Panidal	Poaceae	Grass
<i>Panicum sumatrense</i> Roth	Suan	Poaceae	Grass
<i>Parthenium hysterophorus</i> L.	Nakachana	Asteraceae	Herb
<i>Paspalum distichum</i> L.	Kodo	Poaceae	Grass
<i>Paspalum scrobiculatum</i> L.	Kodo	Poaceae	Grass
<i>Passiflora foetida</i> L.	Bisiripi	Passifloraceae	Climber
<i>Pavetta indica</i> L.	-	Rubiaceae	Shrub
<i>Pavonia zeylonica</i> (L.) Cav.		Malvaceae	Herb
<i>Peltophorum pterocarpum</i> (DC.) Backer ex K.Heyne	Radhachuda	Fabaceae	Tree
<i>Pennisetum pedicellatum</i> Trin.	Madhu chara	Poaceae	Grass
<i>Pergularia daemia</i> (Forssk.) Chiov. (Figure 33)	Uturudi	Apocynaceae	Climber
<i>Perotis indica</i> (L.) Kuntze	Nakka ghasa	Poaceae	Grass
<i>Persicaria barbata</i> (L.) H.Hara	Mad ara	Polygonaceae	Herb
<i>Persicaria glabra</i> (Willd.) M.Gómez	Garara	Polygonaceae	Herb

<i>Phanera roxburghiana</i> (Voigt) Bandyop., Anand Kumar & Chakrab.	Makarokranda	Fabaceae	Tree
<i>Phanera vahlii</i> (Wight & Arn.) Benth.	Siali	Fabaceae	Climber
<i>Phaulopsis imbricata</i> (Forssk.) Sweet	-	Acanthaceae	Herb
<i>Phyla nodiflora</i> (L.) Greene	Gosingi	Verbenaceae	Herb
<i>Phyllanthus acidus</i> (L.) Skeels	Badi amla	Phyllanthaceae	Tree
<i>Phyllanthus emblica</i> L.	Aonla	Phyllanthaceae	Tree
<i>Phyllanthus fraternus</i> G.L.Webster	Bhuin anla	Phyllanthaceae	Herb
<i>Phyllanthus lanceolarius</i> (Roxb.) Müll.Arg.	Bhuin anla	Phyllanthaceae	Tree
<i>Phyllanthus lawii</i> J.Graham	Jhar	Phyllanthaceae	Shrub
<i>Phyllanthus reticulatus</i> Poir.	Janduki	Phyllanthaceae	Scandent shrub
<i>Phyllanthus virgatus</i> G.Forst.	Bhuin aonla	Phyllanthaceae	herb
<i>Physalis angulata</i> L.	Tipai	Solanaceae	Herb
<i>Pigea enneasperma</i> (L.) P.I.Forst.	Madanamastaka	Violaceae	Herb
<i>Pithecellobium dulce</i> (Roxb.) Benth.	Ganga tentuli	Fabaceae	Tree
<i>Plumeria rubra</i> L.	Katha champa	Apocynaceae	Tree
<i>Polygala arvensis</i> Willd.	Meradu	Polygalaceae	Herb
<i>Polygonum plebeium</i> R.Br.	Muthi saga/ Mui ala	Polygonaceae	Herb

<i>Polytrias indica</i> (Houtt.) Veldkamp	Garjan ghasa	Poaceae	Grass
<i>Pongamia pinnata</i> (L.) Pierre	Karanja	Fabaceae	Tree
<i>Pontederia hastata</i> L.	Mirmira	Pontederiaceae	Herb
<i>Portulaca oleracea</i> L.	Pita saga	Portulacaceae	Herb
<i>Portulaca pilosa</i> L.	-	Portulacaceae	Herb
<i>Potamogeton natans</i> L. (Figure 34)	Chardal	Potamogetonaceae	Herb
<i>Premna tomentosa</i> Willd.	Gandhana	Lamiaceae	Tree
<i>Psidium guajava</i> L.	Pijuli	Myrtaceae	Tree
<i>Psydrax dicoccos</i> Gaertn. (Figure 35)	Khakada	Rubiaceae	Tree
<i>Pteris cretica</i> L.	-	Pteridaceae	Fern
<i>Pteris vittata</i> L.	Gunguni	Pteridaceae	Fern
<i>Pterocarpus santalinus</i> L.f.	Rakta chandan	Fabaceae	Tree
<i>Pyrrosia adnascens</i> (Sw.) Ching	-	Polypodiaceae	Fern
<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Patala garuda/ Sarpagandha	Apocynaceae	Shrub
<i>Ricinus communis</i> L.	Jada	Euphorbiaceae	Small tree
<i>Rostellularia quinqueangularis</i> (J.Koenig ex Roxb.) Nees	Nirmala	Acanthaceae	Herb
<i>Rotala densiflora</i> (Roth) Koehne	Painlatkana	Lythraceae	Herb
<i>Rungia pectinata</i> (L.) Nees	Hasa ala / Sakua saga	Acanthaceae	Herb
<i>Saccharum spontaneum</i> L.	Kashatandi	Poaceae	Grass
<i>Sacciolepis indica</i> (L.) Chase	-	Poaceae	Grass

<i>Salvinia cucullata</i> Bory	JalaPhula	Salviniaceae	Fern
<i>Samanea saman</i> (Jacq.) Merr.	Chakunda	Fabaceae	Tree
<i>Saraca asoca</i> (Roxb.) W.J.de Wilde	Asoka	Fabaceae	Tree
<i>Schleichera oleosa</i> (Lour.) Oken	Kusum	Sapindaceae	Tree
<i>Schoenoplectiella articulata</i> (L.) Lye	Gaichira	Cyperaceae	Herb
<i>Scindapsus officinalis</i> (Roxb.) Schott	Gaja pipili	Araceae	Climber
<i>Scoparia dulcis</i> L.	Banaganjei	Plantaginaceae	Herb
<i>Selaginella kraussiana</i> (Kunze) A.Braun	-	Plantaginaceae	Fern
<i>Senegalia pennata</i> (L.) Maslin (Figure 36)	Dantari	Fabaceae	Climbing shrub
<i>Senna occidentalis</i> (L.) Link	Chakunda	Fabaceae	Shrub
<i>Senna siamea</i> (Lam.) H.S.Irwin & Barneby	-	Fabaceae	Tree
<i>Senna tora</i> (L.) Roxb.	Chakunda	Fabaceae	Shrub
<i>Sesamum indicum</i> L. (Figure 37)	Rasi	Pedaliaceae	Herb
<i>Setaria flavida</i> (Retz.) Veldkamp	Juna	Poaceae	Grass
<i>Setaria pumila</i> (Poir.) Roem. & Schult.	Siala languda	Poaceae	Grass
<i>Setaria verticillata</i> (L.) P.Beauv.	Baunsa ghasa	Poaceae	Grass
<i>Shorea robusta</i> C.F.Gaertn.	Sal	Dipterocarpaceae	Tree

<i>Sida acuta</i> Burm.f. (Figure 38)	Bajramuli	Malvaceae	Herb
<i>Sida cordata</i> (Burm.f.) Borss.Waalk.	Bajramuli	Malvaceae	Herb
<i>Sida cordifolia</i> L.	Bajramuli	Malvaceae	Herb
<i>Simarouba glauca</i> DC.	Laxmidaru	Simaroubaceae	Tree
<i>Smilax zeylanica</i> L.	Muturi	Smilacaceae	Climber
<i>Solanum americanum</i> Mill.	Nunununia	Solanaceae	Herb
<i>Solanum nigrum</i> L.	Nunununia	Solanaceae	Herb
<i>Solanum torvum</i> Sw. (Figure 39)	Denga bheji	Solanaceae	Shrub
<i>Solanum viarum</i> Dunal	Katha koli	Solanaceae	Shrub
<i>Solanum virginianum</i> L.	Akaranti	Solanaceae	Herb
<i>Solena amplexicaulis</i> (Lam.) Gandhi	Mitha kunduri	Cucurbitaceae	Climber
<i>Soymida febrifuga</i> (Roxb.) A.Juss.	Rohini	Meliaceae	Tree
<i>Spathodea campanulata</i> P.Beauv.	Turi	Bignoniaceae	Tree
<i>Spermacoce alata</i> Aubl.	-	Rubiaceae	Herb
<i>Spermacoce articularis</i> L.f.	Sanagharapodi	Rubiaceae	Herb
<i>Spermacoce exilis</i> (L.O.Williams) C.D.Adams ex W.C.Burger & C.M.Taylor	Solaganthi	Rubiaceae	Herb
<i>Spermacoce ocymoides</i> Burm.f.	Sana gharapodi	Rubiaceae	Herb
<i>Sphenoclea zeylanica</i> Gaertn.	-	Sphenocleaceae	Herb

<i>Spondias pinnata</i> (L.f.) Kurz	Amda	Anacardiaceae	Tree
<i>Sporobolus diandrus</i> (Retz.) P.Beauv.	Kakarchada	Poaceae	Grass
<i>Stephania japonica</i> (Thunb.) Miers	Akanabindhi	Menispermaceae	Climber
<i>Stephanotis volubilis</i> (L.f.) S.Reuss, Liede & Meve	Dugdhika	Apocynaceae	Climber
<i>Sterculia foetida</i> L.	Katha badam	Malvaceae	Tree
<i>Streblus asper</i> Lour.	Sahada	Moraceae	Small tree
<i>Strobilanthes hirta</i> (Vahl) Blume	-	Acanthaceae	Herb
<i>Strobilanthes pavala</i> (Roxb.) J.R.I.Wood	-	Acanthaceae	Herb
<i>Strychnos nux-vomica</i> L.	Kochila	Loganiaceae	Tree
<i>Syzygium cumini</i> (L.) Skeels	Jamun	Myrtaceae	tree
<i>Tabebuia aurea</i> (Silva Manso) Benth. & Hook.f. ex S.Moore	-	Bignoniaceae	Tree
<i>Tacca leontopetaloides</i> (L.) Kuntze	-	Dioscoreaceae	Herb
<i>Tamarindus indica</i> L.	Tentuli	Fabaceae	Tree
<i>Tamarix ericoides</i> Rottler & Willd.	Pani jhau	Tamaricaceae	Shrub
<i>Tarenna asiatica</i> (L.) Kuntze ex K.Schum.	Kukurchatia	Rubiaceae	Small tree
<i>Tectona grandis</i> L.f.	Saguan	Lamiaceae	Tree
<i>Telosma pallida</i> (Roxb.) Craib	Tokeikundhei phula	Apocynaceae	Climber
<i>Tephrosia purpurea</i> (L.) Pers.	Kolathia	Fabaceae	Herb

<i>Teramnus labialis</i> (L.f.) Spreng.	Mansaparni	Fabaceae	Climber
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Bahada	Combretaceae	Tree
<i>Terminalia catappa</i> L.	Desi badam	Combretaceae	Tree
<i>Terminalia elliptica</i> Willd.	Asana	Combretaceae	Tree
<i>Tiliacora acuminata</i> (Lam.) Miers	Kalajati nai/ Kalibeti	Menispermaceae	Climber
<i>Tinospora cordifolia</i> (Willd.) Hook.f. & Thomson	Guduchi	Menispermaceae	Climber
<i>Tinospora sinensis</i> (Lour.) Merr.	Guduchi	Menispermaceae	Climber
<i>Torenia anagallis</i> (Burm.f.) Wanner, W.R.Barker & Y.S.Liang	-	Linderniaceae	Herb
<i>Torenia crustacea</i> (L.) Cham. & Schltdl. (Figure 40)	Khetkura	Linderniaceae	Herb
<i>Tragia involucrata</i> L. (Figure 41)	Bichhuati	Euphorbiaceae	Herb
<i>Trema orientale</i> (L.) Blume	Jiban	Cannabaceae	Tree
<i>Trianthema portulacastrum</i> L.	Puruni	Aizoaceae	Herb
<i>Tribulus terrestris</i> L.	Gokhura	Zygophyllaceae	Herb
<i>Trichosanthes cucumerina</i> L.	Ban potala	Cucurbitaceae	Climber
<i>Trichosanthes tricuspidata</i> Lour.	Mahakal	Cucurbitaceae	Climber
<i>Tridax procumbens</i> L.	Bisalyakarani	Asteraceae	Herb
<i>Trigastrotheca pentaphylla</i> (L.) Thulin	Pita gohun	Molluginaceae	Herb

<i>Turnera ulmifolia</i> L.	Basanti	Passifloraceae	Shrub
<i>Urena sinuata</i> L.	Chikimiamanji	Malvaceae	Shrub
<i>Urochloa distachyos</i> (L.) T.Q.Nguyen	Dhanri ghasa	Poaceae	Grass
<i>Urochloa mutica</i> (Forssk.) T.Q.Nguyen	Para ghasa	Poaceae	Grass
<i>Urochloa panicoides</i> P.Beauv.	Jalganti	Poaceae	Grass
<i>Utricularia aurea</i> Lour.	Bhaturi dala	Lentibulariaceae	Aquatic herb
<i>Vachellia leucophloea</i> (Roxb.) Maslin, Seigler & Ebinger	Gohira	Fabaceae	Tree
<i>Vallisneria solanacea</i> (Roth ex Roem. & Schult.) Kuntze	Bana kaneri nai	Apocynaceae	Climber
<i>Vallisneria natans</i> (Lour.) H.Hara	-	Hydrocharitaceae	Herb
<i>Vanda tessellata</i> (Roxb.) Hook. ex G.Don	Madang/ Rasna	Orchidaceae	Herb
<i>Ventilago denticulata</i> Willd.	Pichuli	Rhamnaceae	Liana
<i>Veronica anagallis-aquatica</i> L.	-	Plantaginaceae	Herb
<i>Vicia sativa</i> L.	-	Fabaceae	Herb
<i>Vicoa indica</i> (L.) DC.	-	Asteraceae	Herb
<i>Vincetoxicum indicum</i> (Burm.f.) Mabb.	Swasmari	Apocynaceae	Climber
<i>Vitex negundo</i> L.	Negundo	Lamiaceae	Small tree
<i>Vitex pinnata</i> L.	Mudia	Lamiaceae	Tree
<i>Wahlenbergia marginata</i> (Thunb.) A.DC.	-	Campanulaceae	Herb

<i>Wendlandia tinctoria</i> (Roxb.) DC.	Pani kaniyar	Rubiaceae	Tree
<i>Woodfordia fruticosa</i> (L.) Kurz	Dhatiki	Lythraceae	Shrub
<i>Wrightia arborea</i> (Dennst.) Mabb.	Dhala kurei	Apocynaceae	Tree
<i>Xanthium strumarium</i> L.	Chota gokhura	Asteraceae	Shrub
<i>Xenostegia tridentata</i> (L.) D.F.Austin & Staples	-	Convolvulaceae	Climber
<i>Xylia xylocarpa</i> (Roxb.) W.Theob.	Kangada	Fabaceae	Tree
<i>Yamazakia pusilla</i> (Willd.) W.R.Barker, Y.S.Liang & Wannan	-	Linderniaceae	Herb
<i>Yamazakia viscosa</i> (Hornem.) W.R.Barker, Y.S.Liang & Wannan (Figure 42)	-	Linderniaceae	Herb
<i>Zanthoxylum asiaticum</i> (L.) Appelhans, Groppo & J.Wen	Tundapoda	Rutaceae	Scrambling shrub
<i>Zeuxine strateumatica</i> (L.) Schltr. (Figure 43)	-	Orchidaceae	Herb
<i>Ziziphus mauritiana</i> Lam.	Bara koli	Rhamnaceae	Tree
<i>Ziziphus oenopolia</i> (L.) Mill.	Kantei koli	Rhamnaceae	Shrub



Figure 4: *Aganosma heynei*



Figure 5: *Ampelocissus latifolia*



Figure 6: *Apluda mutica*



Figure 7: *Argyreia nervosa*



Figure 8: *Bacopa monnieri*



Figure 9: *Barringtonia acutangula*



Figure 10: *Breyenia vitis-idaea*



Figure 11: *Barleria strigosa*



Figure 12: *Benkara malabarica*



Figure 13: *Cardiospermum halicacabum*



Figure 14: *Chamaecrista mimosoides*



Figure 15: *Cissampelos pareira*



Figure 16: *Coix lacryma-jobi*



Figure 17: *Combretum roxburghii*



Figure 18: *Cordia obliqua*



Figure 19: *Dendrophthoe falcata*



Figure 20: *Dipteracanthus prostrates*



Figure 21: *Dolichos trilobus*



Figure 22: *Ecbolium viride*



Figure 23: *Eleusine indica*



Figure 24: *Ficus tinctoria*



Figure 25: *Flueggea virosa*



Figure 26: *Glycosmis pentaphylla*



Figure 27: *Hugonia mystax*



Figure 28: *Lippia javanica*



Figure 29: *Martynia annua*



Figure 30: *Mucuna monosperma*



Figure 31: *Ochna obtusata*



Figure 32: *Olax scandens*



Figure 33: *Pergularia daemia*



Figure 34: *Potamogeton natans*



Figure 35: *Psydrax dicoccos*

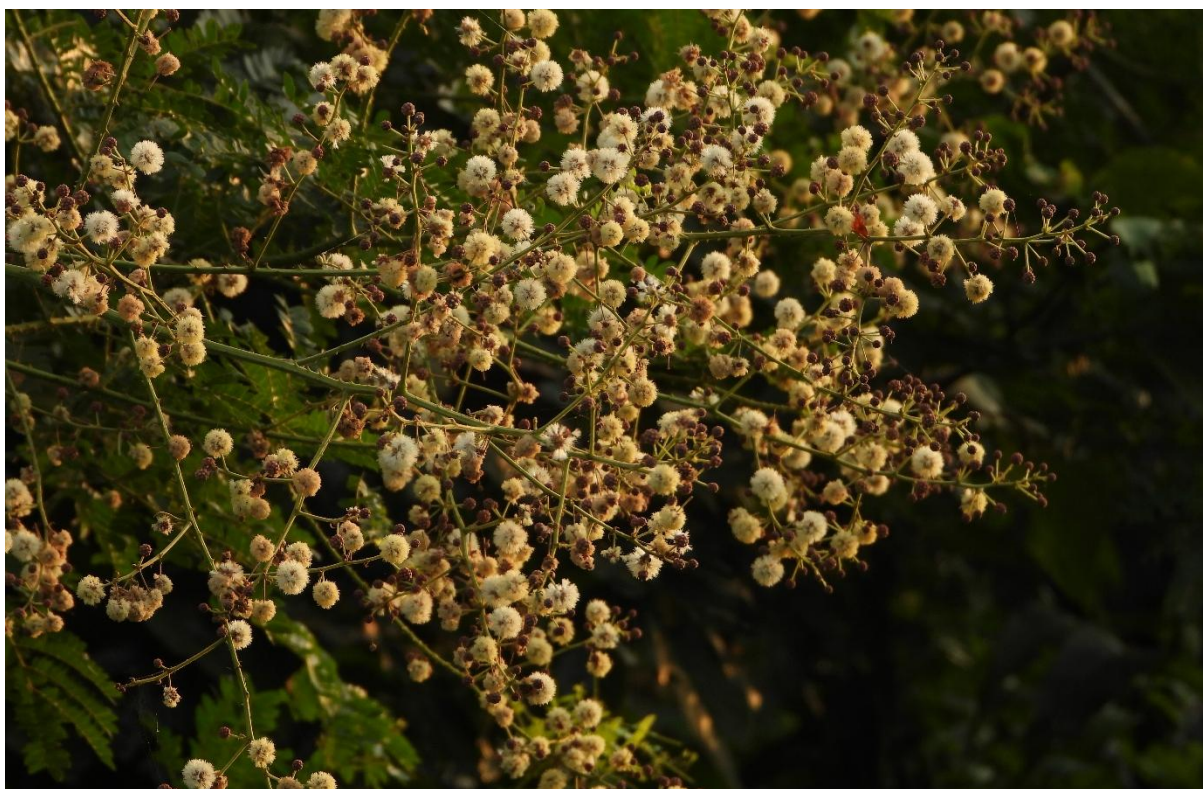


Figure 36: *Senegalia pennata*



Figure 37: *Sesamum indicum*



Figure 38: *Sida acuta*



Figure 39: *Solanum torvum*



Figure 40: *Torenia crustacea*



Figure 41: *Tragia involucrata*



Figure 42: *Yamazakia viscosa*



Figure 43: *Zeuxine strateumatica*

ETHNOBOTANICAL DATA

The diverse tribal population near the Mahanadi River areas played a significant role in conserving the cultural and traditional knowledge. Diverse medicinal plants were used in treating various diseases and disorders. Most plants are used for Skin infections (*Strychnos nux-vomica*, *Argemone Mexicana*), Digestive issues like diarrhea, vomiting, indigestion (*Andrographis paniculata*, *Cyperus rotundus*, *Mangifera indica*, *Careya arborea*, *Holarrhena pubescens*), wound healing (*Tridax procumbens*, *Jatropha gossypifolia*, *Ageratum conyzoides*), pain relief and inflammation (*Alstonia scholaris*, *Sida acuta*). Several plants are traditionally used as natural toothbrushes or for dental problems (*Glycosmis pentaphylla*, *Vitex negundo*, *Moringa oleifera*). In Women's Health & Childcare many plants are used (*Pongamia pinnata*, *Hemidesmus indicus*). For the treatment of malaria and typhoid, plants such as *Nyctanthes arbor-tristis* and *Vitex altissima* are used. Many plant parts, such as fruits, tubers, tender leaves, and seeds, are consumed. Examples include the fruits of *Diospyros melanoxylon*, *Artocarpus lacucha*, and *Ziziphus mauritiana*, as well as tubers of various *Dioscorea* species and seeds of *Xylia xylocarpa* and *Bauhinia vahlii* (roasted or burnt) (Table 2; Plate 1-2).

Table 2: Ethnobotanical data on plants used by tribal communities near Mahanadi River areas

Plant Name	Local Name	Parts used	Location	Uses
<i>Crinum asiaticum</i>	Arisa gacha	Leaves	Naraj	Leaf paste with castor oil is boiled, and utilized for a warm massage at night.
<i>Strychnos nux-vomica</i>	Kochila	Leaves	Naraj	Leaf paste is used in skin infections.
<i>Andrographis paniculata</i>	Bhuin nimba	Leaves	Naraj	Leaves are used to treat diabetes.
<i>Andrographis paniculata</i>	Bhuin nimba	Whole plant	Sanbhuin	Whole plant juice is used to treat vomiting/ indigestion/ itching
<i>Nyctanthes arbor-tristis</i>	Gangasiuli	Leaves	Naraj	7 -9 leaves mixed with black pepper, ginger and honey is taken in empty stomach to treat malaria.

	Gotikhadika		Kainmundia	Leaf paste is used to treat fever.
<i>Zanthoxylum asiaticum</i>	Tunda poda	Leaves	Naraj	Raw leaves chewed on an empty stomach can help treat gastric problems.
<i>Alangium salviifolium</i>	Ankula	Fruits	Nuapatna	Fruits are used to induce cold.
<i>Ricinus communis</i>	Jada	Seed	Sana mundali	Seed oil is used to prevent hair loss.
<i>Portulaca oleracea</i>	Pita saga	Leaves	Sana mundali	Leaves are used as leafy vegetable.
<i>Glycosmis pentaphylla</i>	Chaula dhua	Stem	Sana mundali	Stem is used as tooth brush to treat teeth problems.
<i>Jatropha gossypifolia</i>	Baigaba	Latex	Nuasahi	Latex is used to treat teeth problems.
<i>Azadirachta indica</i>	Neem/ Nimba	Flower bud	Bhagipur	Flower buds is used as a vegetable.
		Stem		Stem is used as a tooth brush.
		Fruits	Narsinghpur	Fruits are edible.
<i>Aloe vera</i>	Ghi kuanri	Leaf	Kainmundia	Leaf juice is used to treat boils.
				Leaf juice with honey is used as cooling agent.
<i>Vitex negundo</i>	Begonia	Stem	Talapathapur	Stem is used as a tooth brush.
<i>Alternanthera sessilis</i>	Madaranga	Leaves	Talapathapur	Leaves are used as leafy vegetable.
<i>Marsilea minuta</i>	Sunsunia	Leaves		
<i>Ipomoea aquatica</i>	Kalama saga	Leaves		
<i>Terminalia chebula</i>	Harida	Fruits	Talapathapur	Fruits are used to treat cough, asthma and other respiratory problems.
<i>Terminalia bellirica</i>	Bahada			
<i>Phyllanthus embelica</i>	Amla			
<i>Benkara malabarica</i>	Firiki koli	Whole plant	Bridharipur	Whole plant is used for fencing.
<i>Mimosa pudica</i>	Lajakuli	Root	Barahmanabasta	Root paste is used for headache

<i>Solanum viarum</i>	Bheji baigana	Fruit and root		Fruit and root paste with mustard oil is used in wound healing.
<i>Achyranthes aspera</i>	Apamarga	Whole plant		Whole plant powder with milk given twice a day to cure kidney diseases.
		Leaves		Leaves with black pepper are used to treat malaria.
<i>Pergularia daemia</i>	Iturudi	Milky latex		Milky latex is used for boils.
<i>Rouwolfia serpentina</i>	Patala garuda	Root		Root paste is used for snake and other poisonous insect bites.
<i>Kalanchoe pinnata</i>	Amarapoi	Leaves		3 leaves without margin with 7 black peppers are given thrice a day for diarrhea.
<i>Pterocarpus marsupium</i>	Piasala	Bark		Juice extracted from bark paste is used for stomach aches.
<i>Cissus quadrangularis</i>	Hadajoda	Stem		Stem paste is used for 7 days for bone fracture.
<i>Euphorbia nivulia</i>	Siju	Leaf		Leaf juice is used to treat cough
<i>Alstonia scholaris</i>	Chatian	Bark	Munda sahi	Bark paste is applied externally for pain and inflammation
<i>Sida acuta</i>	Bajrsmuli	Leaves		Leaf paste is used for pain
<i>Rungia pectinata</i>	Sukua saga/ Hasa ala (Munda)	Leaves		Leaves are used as leafy vegetable
<i>Hemidesmus indicus</i>	Dudhi	Whole plant		Whole plant is used for problems in children
<i>Atlantia monophylla</i>	Kantikapali	Root		Root with milk is used for joint pain/ bata
<i>Pongamia pinnata</i>	Kranaja	Bark		Bark juice is given to women after delivery to give them strength
<i>Lannea coromandelica</i>	Mai	Bark		Bark paste is used for wound healing/ stop bleeding

		Fruits		Fruits are edible
<i>Bauhinia purpurea</i>	Singh ala (Munda/ Santhal)	Leaf		Leaves are used as a leafy vegetable.
<i>Cissampelos paeriara</i>	Sandhi kidu	Root		Fruits are edible.
<i>Ageratum conyzoides</i>	Pokasunga	Leaves	Narsinghpur	Leaf paste is used in wound healing.
<i>Tridax procumbens</i>	Bisalyakarani	Leaves		Leaf paste is used in wound healing.
<i>Calotropis gigantea</i>	Arakha	Latex		Latex is used to cure boils.
<i>Argemone Mexicana</i>	Maratha	Leaf		Leaf juice is used in wound healing.
		Seed		Seed oil is used in skin infections.
<i>Olex scandens</i>	Bhadalia saga	Tender leaves	Brahmani village	Tender leaves are used as a leafy vegetable.
<i>Shorea robusta</i>	Sala	Seed		Seed paste is used in diarrhea.
<i>Mangifera indica</i>	Amba	Bark		Bark decoction is used in diarrhea.
<i>Meyna spinosa</i>	Sarla saga	Leaves		Leaves are used as a leafy vegetable.
<i>Indigofera cassioides</i>	Huterba (Ho)	Flowers		Flowers are edible.
<i>Vitex altissima</i>	Chadheigudi	Leaves		Leaves are used in the treatment of malaria and typhoid.
<i>Oroxylum indicum</i>	Rangeabana m (Ho)	Bark		Bark infusion is used to increase appetite.
<i>Diospyros montana</i>	Halada	Bark		Bark paste is applied in body to treat jaundice.
<i>Schleichera oleosa</i>	Kusum	Fruits		Fruits are edible.
		Seeds		Seed oil is used in treating skin infections.
<i>Diospyros melanoxylon</i>	Kendu	Fruit		Fruits are edible.
<i>Pongamia pinnata</i>	Karanja	Seeds		Seed oil is used in skin infections.
<i>Soymida febrifuga</i>	Rohini	Bark		Bark paste is used for body aches.

<i>Polygonum plebeium</i>	Mui ala	Leaves		Leaves are used as a leafy vegetable.
<i>Hygrophila auriculata</i>	Janum ala	Leaves		Leaves are boiled with salt and drunk for blood deficiency.
	Koilekha			Leaf juice is used in diabetes.
<i>Xylia xylocarpa</i>	Kangada	Seeds		Burnt seeds are edible.
<i>Bauhinia vahlii</i>	Siali	Seeds		Burnt seeds are edible.
<i>Artocarpus lacucha</i>	Dohu	Fruits		Fruits are edible
<i>Vanda tessellata</i>	Malang	Leaves	Nuabhuin	Leaves juice is used for ear pain.
<i>Cyperus rotundus</i>	Mutha	Whole plant		Whole plant juice is used for diarrhea.
<i>Anacardium occidentale</i>	Kaju	Bark		Bark decoction is used in diarrhea.
<i>Moringa oleifera</i>	Sajana	Bark		Bark paste is used in teeth problem.
<i>Ziziphus oenopolia</i>	Kantei koli	Fruits		Fruits are edible.
<i>Ziziphus mauritiana</i>	Bara koli	Fruits		Fruits are edible.
<i>Tamilnadia uliginosa</i>	Bhoda koli	Fruits		Fruits are edible.
<i>Careya arborea</i>	Kumbha	Bark		Bark decoction is used in diarrhea.
<i>Buchanina lanzan</i>	Chara	Fruits		Fruits are edible.
<i>Flemingia chapper</i>	Rani	Stem		Stem is used as tooth toothbrush.
<i>Cycas nayagarhensis</i>	Araguna	Tender leaves		Tender leaves are used as leafy vegetable.
<i>Caryota urens</i>	Salapa	Wood		Wood powder is used to make cakes.
<i>Solanum virginianum</i>	Akaranti	Seeds		Seeds are used in teeth pain.
		Fruits		Boiled fruit juice is used in respiratory problems.
<i>Holarrhena pubescens</i>	Karuan	Roots		Root paste is used in diarrhea.

<i>Dioscorea bulbifera</i>	Pita alu	Tubers		Tubers are edible
<i>Dioscorea pentaphylla</i>	Kanta alu	Tubers		Tubers are edible
<i>Dioscorea oppositifolia</i>	Pani alu	Tubers		Tubers are edible
<i>Dioscorea hispida</i>	Bainya alu/ Kadaba alu	Tubers		Tubers are edible
<i>Hybanthus enneaspermus</i>	Madana mastaka	Whole plant		Whole plant paste is used for diarrhea.
<i>Rostellularia quinqueangularis</i>	Nirmala	Leaf		Leaf juice is used in eye cleaning.



Plate 1: Ethnobotanical survey



Plate 2: Ethnobotanical survey

PLANT-ANIMAL INTERACTION

The Mahanadi River ecosystem contributes to the biodiversity and ecological balance of the region. These interactions include mutualism, predation, herbivory, pollination, seed dispersal, etc, all of which are essential for the survival of species and the health of the ecosystem.

Pollination

Pollination is a crucial interaction where animals, mainly insects, birds, and bats, transfer pollen from one flower to another, enabling plant reproduction. Along the Mahanadi River, various plant species rely on pollinators such as bees, butterflies, and birds. Many plants like *Mucuna puriens*, *Calotropis gigantea*, which are commonly found in riparian zones, are pollinated by birds, bees, and butterflies (Figure 44). The Common Mormon butterfly (*Papilio polytes*) is a frequent pollinator of these plants. In this mutualistic relationship, the plants receive pollination services, while the pollinators gain nectar as a food source. Similarly, the Palash tree (*Butea monosperma*), found in forested areas along the river, attracts nectar-feeding birds, which pollinate the tree while feeding on its nectar (Figure 45).



Figure 44: Purple-rumped sunbird and flowers of *Mucuna pruriens*



Figure 45: Rose-ringed parakeet and flowers of *Butea monosperma*

Seed Dispersal

Animals play an essential role in seed dispersal, helping plants to propagate and expand their range. Birds, mammals, and insects transport seeds either by eating fruits and excreting the seeds elsewhere or by carrying seeds that attach to their fur or feathers. Trees such as the *Ficus* species, which are common along the Mahanadi, produce fruits that are consumed by various birds, including the Indian Myna, Bulbul, etc (Figure 46). These birds eat the fruits and disperse the seeds far from the parent tree through their droppings (Figure 47). This interaction not only helps in the regeneration of forest patches along the river but also supports bird species by providing a food source. Additionally, small mammals like squirrels and rodents contribute to seed dispersal by hoarding seeds, which may later sprout if not retrieved.



Figure 46: Yellow-footed green pigeon and *Ficus religiosa*



Figure 47: Scaly-breasted munia (juvenile) and grass

Herbivory

Herbivory is an interaction where animals feed on plants. While this can sometimes be detrimental to plants, it also encourages plant growth and regeneration by stimulating new shoots or removing old parts. Along the Mahanadi River, herbivory is common among animals like deer, cattle, and insects. The Indian palm squirrel (*Funambulus palmarum*), commonly found along the riverbank, feeds on tender shoots, leaves, and seeds of various plants like Neem (*Azadirachta indica*) and Tamarind (*Tamarindus indica*). While these animals consume plant parts, they also aid in seed dispersal by inadvertently dropping seeds or fruits during feeding. Grazing cattle, common in the agricultural lands near the river, feed on grasses and shrubs growing along the riverbanks. This grazing helps maintain grassland ecosystems, though overgrazing can lead to habitat degradation.

Aquatic Ecosystem Interactions

Mahanadi River supports a diverse aquatic ecosystem where plants like water hyacinths, algae, and submerged vegetation interact with aquatic animals like fish, turtles, and insects. Aquatic plants like *Hydrilla* and *Vallisneria* species provide food and habitat for herbivorous fish species, such as the Rohu (*Labeo rohita*), Catla (*Catla catla*), Indian Tent Turtle (*Pangshura tentoria*), and many water birds (Figures 48-49), which are commonly found in the Mahanadi. These fish consume aquatic plants and algae, playing an important role in maintaining the balance of the river's ecosystem by preventing the overgrowth of vegetation.

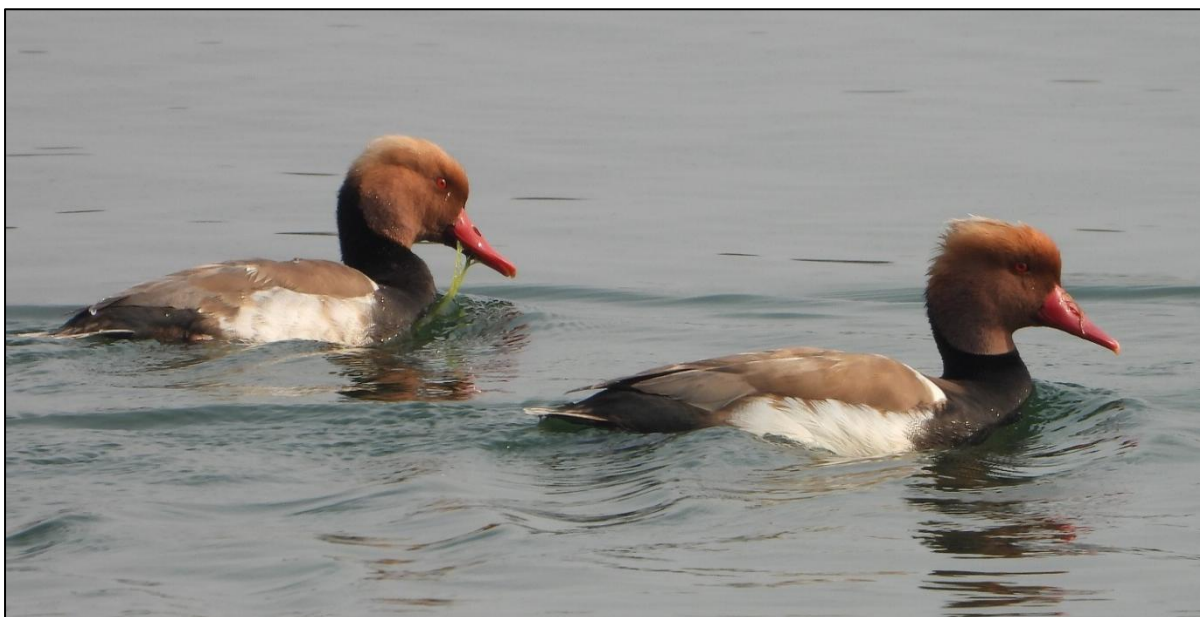


Figure 48: *Netta rufina* feeding on *Vallisneria natans*



Figure 49: Indian Tent Turtle feeding on *Vallisneria natans*



Figure 50: Birds nest on *Ficus benghalensis*



Figure 51: Birds resting on *Ficus religiosa*

The plant-animal interactions along the Mahanadi River are vital for maintaining the ecological balance and biodiversity of the region. These interactions ensure the survival and proliferation of both plant and animal species. These interactions highlight the importance of preserving the river's ecosystem, as any disruption could lead to biodiversity loss and ecological stability (Figures 50-51).

Associate plants in the breeding habitat of the Indian skimmer



Figure 52: Indian skimmer

The Indian Skimmer (*Rynchops albicollis*) (Figure 52) is a riverine bird found along large Mahanadi sandbars. The plants growing along its habitat are mainly riverine, sandy, or riparian plants, adapted to floodplains, sandbanks, and river islands (Table 3; Plate 3).

Table 3: Associate plants in the breeding habitat of the Indian skimmer

Plant Name	Family	Habit
<i>Bergia ammannioides</i>	Elatinaceae	Herb
<i>Bonnaya antipoda</i>	Linderniaceae	Herb
<i>Centella asiatica</i>	Apiaceae	Herb
<i>Chrysopogon zizanioides</i>	Poaceae	Grass
<i>Cleome viscosa</i>	Cleomaceae	Herb
<i>Cynodon dactylon</i>	Poaceae	Grass
<i>Cyperus brevifolius</i>	Cyperaceae	Herb
<i>Cyperus compactus</i>	Cyperaceae	Herb
<i>Cyperus cuspidatus</i>	Cyperaceae	Herb
<i>Cyperus difformis</i>	Poaceae	Grass
<i>Cyperus rotundus</i>	Cyperaceae	Herb
<i>Dentella repens</i>	Rubiaceae	Herb
<i>Echinochloa colonum</i>	Poaceae	Grass
<i>Eclipta prostrata</i>	Asteraceae	Herb
<i>Eichhornia crassipes</i>	Pontederiaceae	Herb
<i>Glinus oppositifolius</i>	Molluginaceae	Herb
<i>Gnaphalium polycaulon</i>	Asteraceae	Herb
<i>Heliotropium ovalifolium</i>	Boraginaceae	Herb
<i>Lindernia dubia</i>	Linderniaceae	Herb
<i>Lindernia procumbens</i>	Linderniaceae	Herb
<i>Oxystelma esculentum</i>	Apocynaceae	Climber
<i>Phragmites karka</i>	Poaceae	Grass
<i>Polygonum glabrum</i>	Polygonaceae	Herb
<i>Portulaca oleracea</i>	Portulacaceae	Herb
<i>Rumex maritimus</i>	Polygonaceae	Herb
<i>Saccharum spontaneum</i>	Poaceae	Grass

<i>Solanum virginianum</i>	Solanaceae	Herb
<i>Tamarix ericoides</i>	Tamaricaceae	Shrub
<i>Tribulus terrestris</i>	Zygophyllaceae	Herb
<i>Trigastrotheca pentaphylla</i>	Molluginaceae	Herb



Plate 3: Some associate plants in the breeding habitat of the Indian skimmer, a) *Bonnaya antipoda*, b) *Dentella repens*, c) *Eclipta prostrata*, d) *Lindernia dubia*, e) *Solanum virginianum*, f) *Tribulus terrestris*

SACRED GROVES

Sacred groves, small patches of forests or vegetation traditionally protected for religious and cultural reasons, play a significant role in biodiversity conservation along the Mahanadi River. These groves are often seen as sacred spaces by local communities, who believe them to be the dwelling places of deities or ancestral spirits. This cultural reverence has, in turn, protected these areas from exploitation.

Shelter for Native Flora and Fauna

Sacred groves along the Mahanadi River in study areas often serve as shelter for native plant species that may have disappeared from other parts of the region due to deforestation, urbanization, or agricultural expansion. These groves are home to a wide variety of flora, including medicinal plants, rare herbs, and endemic tree species, which are preserved due to cultural beliefs (Figure 52). These areas offer a place for species such as reptiles, amphibians, and birds, which rely on such undisturbed habitats for breeding, nesting, and feeding.

Conservation of Water Resources

Sacred groves in the Mahanadi River basin contribute to the protection of water resources, including rivers, streams, and groundwater. These groves often exist near water bodies or springs, and their dense vegetation helps prevent soil erosion and improves water retention in the surrounding area. Sacred groves play a role in stabilizing the riverbanks of the Mahanadi, thus protecting aquatic ecosystems from sedimentation and pollution.

Cultural and Traditional Knowledge

The cultural reverence for sacred groves ensures their protection from human-induced pressures such as logging, grazing, and agricultural expansion. These groves are often maintained through traditional practices and indigenous knowledge passed down through generations.

Protection of Rare and Endangered Species

Some sacred groves along the Mahanadi River are home to rare and endangered species, both plant and animal. Because these areas are protected due to their sacred status, they provide a sanctuary for species that might otherwise be

threatened by habitat destruction or poaching. For instance, medicinal plants that are endangered due to overharvesting elsewhere may still thrive in sacred groves.



Figure 52: Conservation of orchids through sacred groves (Daspur)

Sacred groves along the Mahanadi River in Cuttack are invaluable assets in the conservation of biodiversity. Protecting and restoring these groves is vital for sustaining the biodiversity of the Mahanadi River and ensuring the ecological balance of the surrounding areas.

THREATS

Mahanadi River, the lifeblood of Odisha, is crucial for agriculture, water supply, and hydropower generation in Odisha, but its ecosystems are under serious threat. Biodiversity loss is one of the most significant aspects of this degradation, and the threats come from various factors, including pollution, deforestation, dam construction, overfishing, and climate change. These factors have led to habitat destruction and the decline of terrestrial and aquatic species.

Pollution

One of the most immediate threats to the Mahanadi is pollution. Untreated sewage, industrial effluents, and agricultural run-off are major pollutants. The Mahanadi basin is home to various industries, all of which discharge harmful chemicals like heavy metals into the river. Pesticides and fertilizers used in agriculture also wash into the river, leading to eutrophication and dead zones. These pollutants damage aquatic life, including fish, invertebrates, and aquatic plants, thereby upsetting the food chain and reducing biodiversity (Figure 53-54).



Figure 53: Pollution



Figure 54: Plastic pollution

Deforestation and Soil Erosion

Deforestation in the catchment areas of the Mahanadi has amplified soil erosion, which increases sediment load in the river. This excessive sedimentation harms the riverbed ecosystem by smothering aquatic habitats, reducing light penetration, and affecting water quality. As a result, aquatic plants, which serve as food and habitat for fish and other organisms, suffer, further diminishing the river's biodiversity.



Figure 55: Catchment area near the Mahanadi River

Invasive Species

The introduction of invasive species is another cause of biodiversity loss in the Mahanadi River. Species such as the water hyacinth, *Lantana camara*, *Chromolaena odorata*, *Mikania micrantha*, have spread rapidly near Mahanadi River areas, competing with native plants. This further degrades the habitat for aquatic species, causing a negative effect on the entire ecosystem (Figure 56-58).



Figure 56: *Lantana camara*



Figure 57: *Chromolaena odorata*



Figure 58: *Mikania micrantha*

Climate Change

Floods, droughts, and changing rainfall patterns disrupt the natural flow of the river and stress the ecosystems dependent on it. Warmer temperatures affect water quality, further stressing fish and aquatic plants. Rising temperatures and altered water flow also impact the river's estuarine ecosystem, leading to saltwater intrusion, negatively affecting marine and freshwater species.

Mahanadi River faces severe threats that are leading to biodiversity loss, both aquatic and terrestrial. To preserve this crucial ecosystem, urgent steps are required to mitigate pollution, regulate fishing, ensure sustainable water management, and conserve riparian habitats. Policymakers, local communities, and environmental organizations must collaborate to implement long-term solutions that can restore the ecological balance of the river and prevent further biodiversity loss.

RECOMMENDATIONS

Conservation Efforts

Protecting the unique plant species and habitats identified in the study are essential for maintaining biodiversity in the region.

The areas along the Mahanadi River, are home to a wide range of plant species, some of which population is going to declined due to habitat destruction, anthropogenic activities etc. These plants play crucial roles in the ecosystem, such as providing food and shelter for wildlife, maintaining soil health, and supporting the overall ecological balance.

Conservation efforts might include creating protected areas where human activities are limited or controlled, enforcing laws against deforestation and illegal collection of plants, and restoring degraded areas to their natural state. It also involves monitoring the health of plant populations and taking steps to prevent the extinction of threatened species. By protecting these plants and habitats, we help ensure that future generations can enjoy and benefit from a rich and diverse natural environment. It also supports global biodiversity, which is crucial for the health of the planet.

Community Engagement

Continued engagement with local communities to preserve traditional knowledge and promote sustainable use of plant resources.

The local communities living along the Mahanadi River have a deep, often generational understanding of the plants in their environment. They know which plants are used for food, medicine, and cultural practices. This traditional knowledge is invaluable because it represents sustainable ways of interacting with the environment that have been developed over centuries.

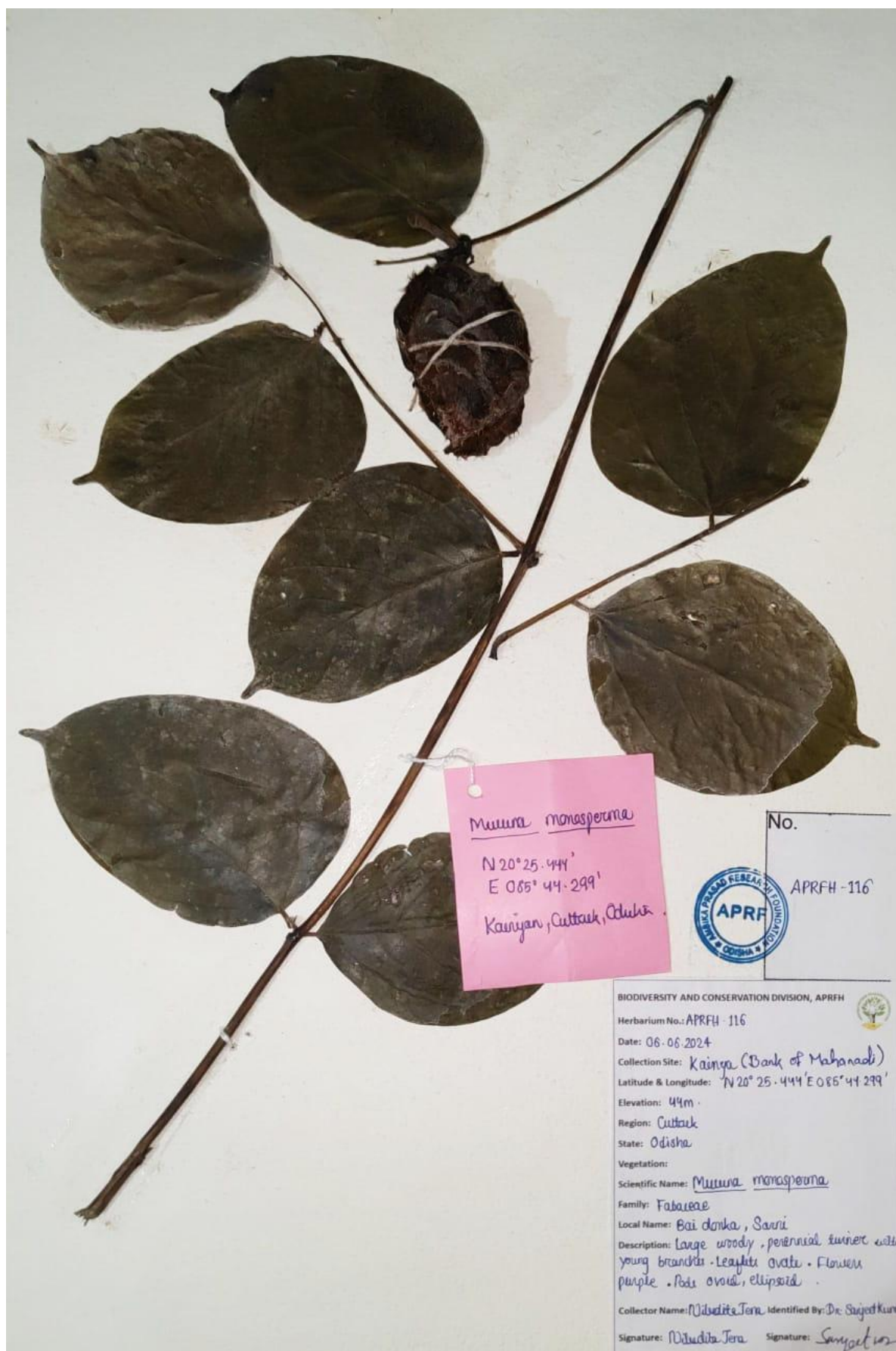
Engaging with these communities means involving them in conservation efforts, listening to their knowledge and concerns, and providing support to ensure that they can continue to use natural resources in a sustainable manner. This might include educating them about modern conservation techniques, offering economic alternatives to unsustainable practices, or helping them document and share their traditional knowledge.

When communities are actively involved in conservation, the efforts are more likely to be successful. Preserving traditional knowledge also helps maintain cultural heritage, and sustainable use of plant resources ensures that the local ecosystem remains healthy and productive for the future. Additionally, this engagement improves a sense of ownership and responsibility among local people, making them service of their own environment.

By focusing on both conservation efforts and community engagement, we can create a holistic approach to preserving the rich biodiversity of the Mahanadi River regions while also respecting and integrating the needs and knowledge of the people who live there.



Sample collection for Herbarium preparation



Herbarium of *Mucuna monosperma* (Collected from bank of Mahanadi River)

FIELD SURVEY





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TEAM MEMBERS



Dr. Sanjeet Kumar
CEO, APRF



Dr. R. Supriya Devi
Project Director, APRF



Sweta Mishra
RA, APRF



Sugimani Marndi
Senior Research
Fellow, APRF



Nibedita Jena
Senior Research
Fellow, APRF



Subhalakshmi Rout
Senior Research
Fellow, APRF



CONTACT

AMBIKA PRASAD RESEARCH FOUNDATION

CDA-13, Cuttack, Odisha

www.aprf.co.in