

Diversity of plants used for non-medicinal purposes by the traditional communities of Coastal Karnataka, India

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Abstract. Bhandary JM. 2021. Diversity of plants used for non-medicinal purposes by the traditional communities of Coastal Karnataka, India. *Asian J Ethnobiol* 4: 106-114. The Coastal Karnataka region of India, comprising of two districts called Dakshina Kannada and Udupi, is ethnobotanically prosperous owing to its floristic and cultural diversity. This is justified because many ethnobotanical studies have been reported from this area. However, all these studies are concerned only with documentation of traditional knowledge and medicinal plant diversity; the various non-medicinal uses of plants have not received any scientific attention so far. Therefore, this study was undertaken to document the diversity of plants used for edible, piscicidal, and fodder purposes and make different household materials. Plant specimens and associated traditional information were gathered from the knowledgeable elders from other areas' different indigenous tribal and non-tribal communities. Prior-informed, open-ended interviews, and discussions were conducted with 32 purposively chosen informants in the field during different seasons of the study period. The botanical identity of the plants mentioned as applicable by informants was confirmed with the help of local flora, and enumeration of plant species was done based on the user category. A total of 125 species of angiosperm plants used for non-medicinal purposes by different traditional and tribal communities were documented during the present study. Among them, 116 species were used for any of the above four studied purposes, and only nine species were used for two different purposes. As many as 76 species were used for edible purposes, 18 species as piscicides, 21 species as fodder plants, and 19 species used to make baskets, mats, and other traditional artifacts used in daily lives. This study confirmed that the traditional communities of the study locality have considerable traditional knowledge about non-medicinal uses of local plants. However, the practical use of wild plants for the studied traditional purposes has gradually decreased due to a lack of interest in the newer generation and the availability of modern alternatives.

Keywords: Coastal Karnataka, edible plants, fodder plants, material culture, piscicidal plants, traditional plant uses

INTRODUCTION

The indigenous people's understanding of local plants has manifested itself in several ways, including using them as sources of medicine, food, fiber, fodder, and various other essential artifacts that form part of their material culture. This traditional knowledge, gained by the indigenous communities as a result of their continued interactions with nature, is an integral part of human cultural heritage, much of which is currently threatened and on the verge of disappearing due to environmental changes, livelihood diversification, and the influence of cultural conflicts (Cao et al. 2020). Loss of such precious traditional wisdom is permanent and irreversible as it is only orally transmitted over generations of traditional communities without any written accounts. Thus, the exploration and documentation of the local traditional knowledge are of utmost importance in any part of the world.

The documentation of ethnobotanical knowledge about the medicinal uses of plants has received considerable scientific attention in India (Pushpangadan and George 2010, Pathak and Bharati 2020). On the contrary, only a few studies have been undertaken to record the non-medicinal uses of plants (Choudhary et al. 2008; Sasi and Mohan 2018; Saini and Sood 2018; Lokhande 2020). This

is true also for the Coastal regions of Karnataka, a southern state of India. Several ethnic-medico-botanical reports are available from this area (Bhandary 2020; Bhandary and Chandrashekar 2001, 2003, 2011; Bhandary et al. 1995, 1996; Harsha et al. 2003, 2006). As many as 342 species of plants have been reported to be used for various ethnomedicinal purposes by the different indigenous communities of this region (Bhandary and Chandrashekar 2014). However, the non-medicinal aspects of the ethnobotany of this area have not received any scientific attention so far. They remain entirely unknown. Therefore, this study was undertaken to catalog the diversity of plants used for non-medicinal purposes such as edible, piscicidal, fodder, and making different household artifacts by the traditional communities of Coastal Karnataka, India.

MATERIALS AND METHODS

Study area and its traditional people

Dakshina Kannada and Udupi are the two coastal districts of Karnataka State, India, constituting 8441 km². They are located between 12°29'36'' and 13°49'22'' N latitudes, and 74°37'24'' and 75°41'00'' E longitudes (Figure 1). The 136 km long stretch of coastline facing the Arabian Sea forms the western edge of these districts,

while the towering heights of the unbroken sweep of the Western Ghats mark their eastern boundary.

Together with the northern part of the adjoining Kasaragod district of Kerala State, these two districts constitute a historical and cultural landscape called the *Tulunadu* (land of Tulu) because of the dominance of traditional communities speaking a language called *Tulu*. These districts are the home for several tribal and other indigenous communities such as the *Billavas*, *Bunts*, *Idigas*, *Mogaveers*, *Gowdas*, *Koragas*, *Malekudiyas*, *Kunabis*, *Maratis*, and others who have maintained a close association with the components of nature in their surroundings.

The total population of these two districts was 32,67,010 (Census of India 2011). The area is still predominantly rural and agricultural, with about 80 % of the workforce employed in agriculture and allied activities, including coconut cultivation, areca nut, and other horticultural products. More than 70 % of cropland is under cereals, with rice as the principal crop. Fishing is the other significant traditional livelihood activity, with about 1,00,000 people directly engaged in fishing. This region receives rain in the range of 2,500-3,000 mm; heavy rainfall harbors different vegetation types such as littoral,

scrub, moist deciduous, and typical evergreen. The littoral and the scrub forests are found along the coastal belt, the moist deciduous forests mainly in the inland plateaus extending to the foot of the ghats, and the evergreen forests localized only in the ghats. The floristic diversity of this region has been sufficiently studied and documented (Gamble 1967; Bhat 2003).

Data collection and analysis

Information regarding the plants used for edible, piscicidal, fodder, and making household artifacts was gathered from the knowledgeable elders belonging to the different indigenous communities, including two tribes, namely the *Koraga* and the *Malekudiya*, residing in the study area. This study was an extended part of an ongoing comprehensive ethnobotanical documentation project started in the study area in 1995, resulting in many publications (Bhandary et al. 1995, 1996; Bhandary and Chandrashekar 2001, 2003, 2011, 2014; Bhandary 2020). Data collection was made through prior-informed interviews and discussions with informants in the field during different seasons of the study period. A total of 32 people, including 27 males and 5 females, were selected as informants to represent other study area locations. These informants were chosen based on the opinion and recommendations of the community and village heads. The mean age of all informants was 63 years.

The selected informants were contacted and convinced about the objectives of the study. Prior oral consents were also obtained from them. Later, they were repeatedly taken to the nearby forest patches and other locations where useful plants were available, and open-ended discussions and interviews gathered data. Simultaneous to recording information on uses, additional related information such as common names, parts used, and methods of use of the plants were also recorded. Herbarium materials of the plants were gathered for botanical identification. They were identified with the help of local floras (Gamble 1967; Bhat 2003; Bhat 2014) and deposited in the Herbarium of the Department of Applied Botany, Mangalore University. Information gathered in the field was analyzed for enumeration and comparison of plant uses for different non-medicinal purposes, and the list of plants was presented in tabular form.

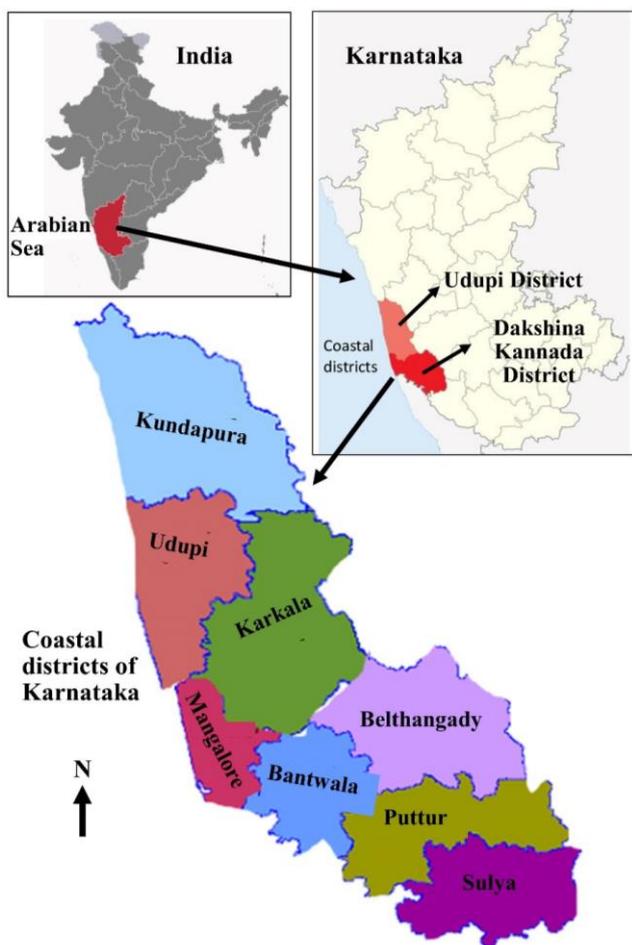


Figure 1. Map of the coastal district of Karnataka State, India

RESULTS AND DISCUSSION

A total of 125 species of angiosperm plants used for edible, piscicidal, fodder, and artifact-making purposes by different traditional and tribal communities of the study area were documented during the present study. Several plant species, genera, and families used for each of these other purposes are summarized in Table 1.

As many as 116 of the 125 species were used for only one of the four purposes, whereas nine species were used for two different purposes. *Bambusa bambos* (L.) Voss (Poaceae), *Borassus flabellifer* L. (Arecaceae), *Pandanus odorifer* (Forssk.) Kuntze (Pandanaceae) and *Smilax zeylanica* L. (Smilacaceae) were used for their edible parts

and also for making artifacts like baskets, containers, and mats. However, the components used for each of the purposes were generally different. Fresh fruits of *Borassus flabellifer* and *Pandanus odorifer* were edible while their dried leaves were employed for making baskets and mats.

Similarly, *Asparagus racemosus* Willd. (Asparagaceae), *Ficus racemosa* L. (Moraceae), *Maranta arundinacea* L. (Marantaceae) and *Xylia xylocarpa* (Roxb.) Taub. (Fabaceae) were used both for edible and fodder purposes. *Merremia umbellata* (L.) Hall. f. (Convolvulaceae) was used as fodder and as raw material for weaving baskets.

Plants used for edible purpose

As shown in Table 2, people of Coastal Karnataka used different parts of 65 species of plants for edible purposes. This list excludes popularly cultivated vegetable and fruit plants.

Fruits, leaves, tubers, and rhizomes were the commonly used edible parts. Fruits were generally eaten fresh in raw form while other factors like leaves and tubers were consumed, usually after cooking. Analysis indicated that fruits/seeds were the most widely used edible part (54%), followed by leaves (16%), stems/rhizomes (6%), and tubers (6%). In 18% of plants, more than one part of the same plant was used for edible purposes.

A total of 71 plant species belonging to 63 genera and 39 families have been recorded as wild edibles in a study conducted with the Gond tribe of Maharashtra, India (Lokhande 2020). Fruits were the widely used edible part (43.2%), followed by leaves (22%). Communities of Udhampur district, Jammu & Kashmir, India, used 90 plant species belonging to 45 families and 78 genera for edible purposes (Bhatia et al. 2018). However, in this study, the maximum number of species were used as vegetables (46 species), followed by fruits (37 species).

A notable feature of the traditional use of wild edible plants in Coastal Karnataka was that some plants have to be customarily consumed during specific seasons or some specific cultural occasions. For example, a tender stem of *Bambusa bambos* (L.) Voss, locally called *kanile*, and leaves of *Colocasia esculenta* (L.) Schott. (*kesu* or *thevu*), *Senna tora* (L.) Roxb. (*tajank*) and *Remusatia vivipara*

(Roxb.) Schott. (*mara kesu* or *mara thevu*) They were invariably consumed during *aati*, the fourth month in the Tulu calendar coinciding with the July/August months of the English calendar. These plants generally considered good for health were collected from the wild for personal use by families and were also sold in the local markets of the study area during this season (Figure 2). *Aati* month is generally considered an inauspicious month in Coastal Karnataka with some prohibitions and restrictions. It is also associated with other local traditional practices like mass drinking of a decoction prepared from the stem bark of *Alstonia scholaris* (L.) R. Br. (Apocynaceae) are believed to be improving immunity (Bhandary 2020).

The leaves of *Senna tora* were used to treat leprosy, ringworm, flatulence, colic, dyspepsia, constipation, cough, bronchitis, and cardiac disorders in the Ayurvedic systems medicine (Mazumder 2005). Phyto-pharmacological studies of *Colocasia esculenta* have proved its antimicrobial, antihepatotoxic, anti-cancer, antioxidant, antibacterial, antifungal, anthelmintic, antidiabetic, hypolipidemic, anti-melanogenic, estrogenic, and neuropharmacological effects (Pawar et al. 2018, Sudhakar et al. 2020). Leaves of *Remusatia vivipara* have a high antioxidant activity (Asha et al., 2013). Many of the other plants used for edible purposes are also reported to be having various ethnomedicinal uses in coastal Karnataka (Bhandary and Chandrashekar 2014). All this scientific evidence indirectly endorse using many of the above plants as seasonal foods to promote health.

Table 1. Number of plant species, genera, and families used for different non-medicinal purposes by traditional communities of Coastal Karnataka, India

Use purpose	Number of species used	Number of genera	Number of families
Edible	76	62	41
Piscicidal	18	18	15
Fodder	21	18	13
Making of household artifacts	19	19	16

Table 2. List of plants used by traditional communities of Coastal Karnataka, India for edible parts

Name of the species and Family	Local name(s)	Part(s) used	Method of use
<i>Aglaia elaeagnoides</i> (A. Juss.) Benth. (Meliaceae)	Pucche pamdu	Fruit	Raw
<i>Alangium salvifolium</i> (L.f.) Wangerin (Alangiaceae)	Ankole hannu, mullankole	Fruit	Raw
<i>Alocasia macrorrhizos</i> (L.) G. Don (Araceae)	Mundi kesu	Tuber	Cooked
<i>Alternanthera sessilis</i> (L.) R. Br. Ex DC. (Amaranthaceae)	Honagonne	Leaf, stem	Cooked
<i>Amaranthus spinosus</i> L. (Amaranthaceae)	Mullu harive, mullu padpe	Leaf, stem	Cooked
<i>Amaranthus tricolor</i> L. (Amaranthaceae)	Harive, padpe	Leaf, stem, seed	Cooked
<i>Artocarpus altilis</i> (Parkinson ex F.A.Zorn) Fosberg (Moraceae)	Deevi halasu, deegujje	Fruit	Cooked
<i>Artocarpus gomezianus</i> Wall ex. Trec. (Moraceae)	Hebbalasu, pejakkayi	Fruit	Cooked
<i>Asparagus racemosus</i> Willd. (Asparagaceae)	Halavu makkala beru, udri kande	Tuber	Cooked
<i>Atalantia monophylla</i> (Roxb.) DC. (Rutaceae)	Kaadu nimbe, kaipe puli	Fruit	Raw
<i>Bambusa bambos</i> (L.) Voss (Poaceae)	Biduru, kanile	Tender stem	Cooked
<i>Basella alba</i> L. (Basellaceae)	Basale	Leaf, stem	Cooked

<i>Boehrvia diffusa</i> L. (Nyctaginaceae)	Nela komme, teglame	Leaf	Cooked
<i>Borassus flabellifer</i> L. (Arecaceae)	Thaale, thaari	Fruit	Raw
<i>Bulbophyllum sterile</i> (Lam.) Suresh (Orchidaceae)	Marabaale	Petiole	Cooked
<i>Caesalpinia mimosoides</i> Lam. (Fabaceae)	Kengige, chimullu	Tender leaf, seed	Cooked
<i>Canna indica</i> L. (Cannaceae)	Baare poo	Rhizome	Cooked
<i>Canthium coromandelicum</i> (Burm. F.) Alston (Rubiaceae)	Kaare kayi, adkaare	Fruit	Raw/cooked
<i>Centella asiatica</i> (L.) Urban (Apiaceae)	Ondelaga, thimare	Leaf	
<i>Centrosema pubescens</i> Benth. (Fabaceae)	Kadu alasande	Fruit	Cooked
<i>Cheilocostus speciosus</i> (J. Koen.) C. Specht (Costaceae)	Naayi karmbu	Leaf	Cooked
<i>Cissus quadrangularis</i> L. (Vitaceae)	Mangaravalli, sanduballi	Stem	Cooked
<i>Cleome viscosa</i> L. (Cleomaceae)	Kaadu sasive, santhemi	Leaf	Cooked
<i>Colocasia esculenta</i> (L.) Schott. (Araceae)	Kesu, thevu	Leaf, corm	Cooked
<i>Cordia dichotoma</i> Forst.f. (Boraginaceae)	Mannadake, challehannu	Fruit	Raw
<i>Cynodon dactylon</i> (L.) Pers (Poaceae)	Kadikke	Leaf	Cooked
<i>Dioscorea alata</i> L. (Dioscoreaceae)	Mudigenasu, soona kereng	Tuber, bulbil	Roasted/cooked
<i>Dioscorea hispida</i> Dennst. (Dioscoreaceae)	Nore	Tuber	Roasted/cooked
<i>Dioscorea oppositifolia</i> L. (Dioscoreaceae)	Nore	Tuber	Roasted/cooked
<i>Elaeagnus conferta</i> Roxb. (Elaeagnaceae)	Halage hannu	Fruit	Raw
<i>Entada rheedei</i> Spreng Spreng (Fabaceae)	Palle	Seed	Cooked
<i>Ficus racemosa</i> L. (Moraceae)	Atthi, arthi	Fruit	Raw/cooked
<i>Flacourtia indica</i> (Burm.f.) Merr. (Salicaceae)	Mullu hannu	Fruit	Raw
<i>Flacourtia montana</i> Graham (Salicaceae)	Abbalu hannu, arpu parnd	Fruit	Raw
<i>Garcinia indica</i> Thouars Choisy (Clusiaceae)	Murgala, punarpuli	Fruit	Raw
<i>Garcinia xanthochymus</i> Hook. F. ex. T. Anderson (Clusiaceae)	Jarige	Fruit	Raw
<i>Glycosmis pentaphylla</i> (Retz) DC. (Rutaceae)	Pandilu	Fruit	Raw
<i>Hibiscus cannabinus</i> L. (Malvaceae)	Pundi soppu	Leaf	Cooked
<i>Hibiscus hispidissimus</i> Griff. (Malvaceae)	Kaira puli	Tender leaf, fruit	Cooked
<i>Hibiscus rosa-sinensis</i> L. (Malvaceae)	Dasavala	Leaf, flower	Cooked
<i>Holigarna ferruginea</i> Marchand (Anacardiaceae)	Holegeru, chere	Tender leaf	Cooked
<i>Hugonia mystax</i> L. (Linaceae)	Ankole,	Fruit	Raw
<i>Ixora coccinea</i> L. (Rubiaceae)	Kiskaara, kepula	Fruit	Raw
<i>Madhuca longifolia</i> (L.) J.F. (Sapotaceae)	Irpe	Flower, seeds	Cooked
<i>Momordica dioica</i> Roxb. ex. Willd. (Cucurbitaceae)	Mada haagala, kaat kanchel	Fruit, root	Cooked
<i>Maranta arundinacea</i> L. (Marantaceae)	Koove	Rhizome	Cooked
<i>Melastoma malabathricum</i> L. (Melastomataceae)	Nekkarika, nekkare	Fruit	Raw
<i>Moringa oleifera</i> Lam. (Moringaceae)	Nugge, nurge	Leaf, fruit	Cooked
<i>Musa paradisiaca</i> L. (Musaceae)	Baale, baare	Stem	Cooked
<i>Oxalis corniculata</i> L. (Oxalidaceae)	Puliyarile, pullampuruche	Leaf	Cooked
<i>Pandanus odorifer</i> (Forssk.) Kuntze (Pandanaceae)	Mundovu, mundige, kedige	Fruit	Raw
<i>Persicaria chinensis</i> (L.) H. Gross (Polygonaceae)	Nelagumbala, bili konde	Leaf, root	Cooked
<i>Physalis angulata</i> L. (Solanaceae)	Guppate	Fruit	Raw
<i>Portulaca oleracea</i> L. (Portulacaceae)	Goli soppu, goli padpe	Leaf	Cooked
<i>Remusatia vivipara</i> (Roxb.) Schott. (Araceae)	Mara kesu, mara thevu	Leaf, rhizome	Cooked
<i>Salacia chinensis</i> L. (Celastraceae)	Ekanayaka	Fruit	Raw
<i>Schleichera oleosa</i> (Lour.) Merr. (Sapindaceae)	Chakate kayi	Fruit	Raw
<i>Senna sophora</i> (L.) Roxb. (Fabaceae)	Kaasamarda	Leaf	Cooked
<i>Senna tora</i> (L.) Roxb. (Fabaceae)	Tajank	Leaf	Cooked
<i>Smilax zeylanica</i> L. (Smilacaceae)	Chennere balli, chennere booru	Fruit	Raw/cooked
<i>Solanum americanum</i> Mill. (Solanaceae)	Kooki	Fruit	Raw
<i>Solanum lasiocarpum</i> Jacq. (Solanaceae)	Mullu badane	Fruit	Cooked
<i>Solanum torvum</i> Sw. (Solanaceae)	Kudane	Fruit	Cooked
<i>Solena heterophylla</i> Lour. (Cucurbitaceae)	Karvolu	Fruit	Raw
<i>Spondias pinnata</i> (L.F) Kurz. (Anacardiaceae)	Ambate	Fruit	Raw/cooked
<i>Sterculia foetida</i> L. (Malvaceae)	Peenari, atte kayi	Seed	Roasted
<i>Syzygium caryophyllatum</i> (L.) Alston (Myrtaceae)	Kuntanerale, kuntangeru	Fruit	Raw
<i>Syzygium cumini</i> (L.) Skeels (Myrtaceae)	Nerale	Fruit	Raw
<i>Tamilnadia uliginosa</i> (Retz.)Tirv. & Sastre (Rubiaceae)	Adka bare	Fruit	Raw
<i>Terminalia bellirica</i> (Gaertn.) Roxb. (Combretaceae)	Shaanthi kaayi	Seed	Raw
<i>Toddalia asiatica</i> (L.)Lam. (Rutaceae)	Are madala	Fruit	Raw
<i>Xylia xylocarpa</i> (Roxb.) Taub (Fabaceae)	Jamba, chirve	Seed	Cooked
<i>Zanthoxylum rhetsa</i> (Roxb.) DC. (Rutaceae)	Jummana kaayi, kaavate, gaamate	Fruit	Raw/cooked
<i>Ziziphus mauritiana</i> Lam. (Rhamnaceae)	Bore hannu	Fruit	Raw
<i>Ziziphus oenoplia</i> (L.) Mill (Rhamnaceae)	Choorimullu	Fruit	Raw
<i>Ziziphus rugosa</i> Lam. (Rhamnaceae)	Kotte mullu, kotte parndu	Fruit	Raw

Plants used as piscicides

Fishes form an essential component of the people's food of Coastal Karnataka. Rural folk used a variety of local plants either to kill or stupefy fishes, in addition to different types of fish traps, in their fishing activity. These piscicidal plants were commonly employed to catch fishes from shallow and stagnant freshwater bodies, such as ponds, pools, and streams. In this primitive method of fishing, a sufficient quantity of crushed or finely chopped

plant material was added to water which was then thoroughly churned—this action aids in releasing ichthyotoxic substances from the plant material to moisture. Fishes killed or inactivated by the activity of such substances were then either handpicked or collected using nets or fish traps. Eating such fish was claimed harmless to the human body. Plants commonly used as piscicides by the people of Coastal Karnataka are listed in Table 3.



Figure 2. Species of wild edible plants commercially sold in the markets of coastal Karnataka, India. A. Leaves of *Senna tora* (Local Name: *Tajank*), B. Leaves of *Colocasia esculenta* (Local Name: *Thevu*) and tender shoots of *Bambusa bambos* (Local Name: *Kanile*) placed one above the other, and C. Leaves of *Remusatia vivipara* (Local Name: *Mara thevu*)

Table 3. Plants used as piscicides by traditional communities of Coastal Karnataka, India

Name of species and family	Local name(s)	Part(s) used
<i>Adenia hondala</i> (Gaertner) W.J. de Wilde (Passifloraceae)	Irolu kande	Root
<i>Allophyllus rheedii</i> (Wight) Radik. (Anacardiaceae)	Mooji kabar tappu	Fruit
<i>Anamirta cocculus</i> (L.) Wt. & Arn. (Menispermaceae)	Chiplu kotte	Seed
<i>Barringtonia racemosa</i> (L.) Spreng. (Lecythidaceae)	Samudra phala	Fruit / Stem bark
<i>Canthium coromandelicum</i> (Burm. F.) Alston (Rubiaceae)	Kaare	Fruit
<i>Catunaregam spinosa</i> (Thunb.) Tirvengadam (Rubiaceae)	Kaare	Fruit
<i>Cerbera odollam</i> Gaertner (Apocynaceae)	Thende	Fruit
<i>Croton tiglium</i> L. (Euphorbiaceae)	Jaapala, Byari bithu	Fruit
<i>Derris scandens</i> (Roxb) Benth. (Fabaceae)	Madengi booru	Stem
<i>Euphorbia neriifolia</i> L. (Euphorbiaceae)	Kalli	Stem
<i>Falconeria insignis</i> Royle (Euphorbiaceae)	Kanappati	Stem
<i>Guidonia esculenta</i> (Roxb.) Baill (Salicaceae)	Modia	Stem bark
<i>Hopea parviflora</i> Beddome (Dipterocarpaceae)	Karmar	Stem bark
<i>Hydnocarpus pentandra</i> (Buch.-Ham.) Oken (Achariaceae)	Soorante	Fruit
<i>Pandanus kaida</i> Kurz (Pandanaceae)	Mundovu	Fruit
<i>Piper nigrum</i> L. (Piperaceae)	Adde munchi	Stem
<i>Sapindus trifoliatus</i> L. (Sapindaceae)	Narvolu	Fruit
<i>Strychnos nux-vomica</i> L. (Loganiaceae)	Kayer	Fruit

The Malai Pandaram tribals living in the Achankovil River basin of Kerala, India, used as many as 41 plant species belonging to 33 genera and 18 families for piscicidal purposes (Sasi and Mohan 2018), while tribals of Nagaland used only 17 species (Dominic and Ramanujam 2012). A review of ethnobotanical reports of plants used as piscicides has revealed that as many as 307 species of plants are used for this purpose in the whole of India (Jawale 2018). Out of the 18 species used in Coastal Karnataka, 11 species have already been used in other parts of India as piscicides, supporting their piscicidal property. The remaining seven species, namely *Adenia hondala* (Gaertner), W.J. de Wilde (Passifloraceae), *Allophylus rheedii* (Wight) Radik. (Anacardiaceae), *Canthium coromandelicum* (Burm. F.) Alston (Rubiaceae), *Hopea parviflora* Beddome (Dipterocarpaceae), *Hydnocarpus pentandra* (Buch.-Ham.) Oken (Achariaceae), *Pandanus kaida* Kurz (Pandanaceae), and *Piper nigrum* L. (Piperaceae) are reported for the first time in this study.

Plants used in material culture

Material culture has been generally defined as the full range of objects produced by a particular society, including functional items such as tools, shelters, clothing, and more decorative arts and handicrafts (Bahru et al., 2012). Throughout the world, plants are the basis of human material culture. Most indigenous societies which traditionally have lacked the metals and synthetic materials ubiquitous in modern society rely almost entirely on plants for their material needs. The number and variety of uses to which indigenous people put plants are astonishing, ranging from woven cords and plant adhesives of sufficient strength to hold large ocean-going rafts together to arrow poisons (Balick and Cox 1996). According to Cotton (1996), although synthetic products have an increasing

influence on the material culture of traditional societies, plants remain vital to many aspects of traditional life.

Various containers and baskets woven from plant parts were used as household articles in Coastal Karnataka. Processed fibrous stems of woody climbers such as *Getonia floribunda* Lam. (Combretaceae), *Pristimera indica* (Willd), A.C. Sm. (Celastraceae), and *Calamus rotang* L. (Arecaceae) were the mainly used plant materials. Mats woven from dried and processed leaves of *Pandanus odorifer* and *Borassus flabellifer* were used in most traditional houses. A complete list of these and other plants used in basket making and other weaving practices is given in Table 4.

Weaving baskets, containers, and mats from plants and supplying them to the peasant communities was the main life-sustaining occupation of one of the tribes of Dakshina Kannada, the *Koragas*. Both men and women of this tribe participate in gathering the plant materials from the nearby forests, processing them, and weaving the artifacts (Figure 3). In the olden days, these products were directly supplied to the farmers in exchange for foodstuffs. However, presently, they are sold through middlemen in the local market for monetary prices.

The indigenous agrarian communities of Coastal Karnataka prepared and used a variety of implements widely used in their agricultural activities, from plants. Plowing tools such as *noga*, *naayer*, and *palaya* were made from the wood of commonly growing and easily accessible trees like *Anacardium occidentale* L. (Anacardiaceae), *Mangifera indica* L. (Anacardiaceae), and *Strychnos nuxvomica* L. (Loganiaceae). These implements formed an intimate part and parcel of most of the rural agricultural houses and occupied a place of honor in the cultural life of the local people.

Table 4. Plants used for making baskets, mats, and such other artifacts by the traditional communities of Coastal Karnataka, India

Name of species and family	Local name(s)	Part(s) used
<i>Acacia pennata</i> (L.) Willd. (Fabaceae)	Chende	Stem
<i>Bambusa bambos</i> (L.) Voss (Poaceae)	Bedru, Bidiru	Stem
<i>Borassus flabellifer</i> L. (Arecaceae)	Thaari	Leaf
<i>Bridelia stipularis</i> (L.) Blume (Phyllanthaceae)	Banda naru	Stem
<i>Calamus rotang</i> L. (Arecaceae)	Bettha	Stem
<i>Careya arborea</i> Roxb. (Lecythidaceae)	Daddala	Stem bark
<i>Caryota urens</i> L. (Arecaceae)	Indu	Stem, Leaf
<i>Dalbergia volubilis</i> Roxb. (Fabaceae)	Parantolu	Stem
<i>Getonia floribunda</i> Lam. (Combretaceae)	Enjir	Stem
<i>Helicteres isora</i> L. (Malvaceae)	Kayyolu naar	Stem
<i>Ichnocarpus frutescens</i> (L.) W. T. Aiton (Apocynaceae)	Per ballu	Stem
<i>Jasminum malabaricum</i> Wt. (Sphenocleaceae)	Adroli	Stem
<i>Leea indica</i> (Burm.f.) Merr. (Vitaceae)	Nedil	Stem
<i>Merremia umbellata</i> (L.) Hall. f. (Convolvulaceae)	Kulovu	Stem
<i>Pandanus odorifer</i> (Forssk.) Kuntze (Pandanaceae)	Mundovu	Leaf
<i>Pristimera indica</i> (Willd) A. C. Sm. (Celastraceae)	Maderi	Stem
<i>Smilax zeylanica</i> L. (Smilacaceae)	Chennere ballu	Stem
<i>Strychnos wallichiana</i> Steud. ex. DC. (Loganiaceae)	Ballu Kayer	Stem
<i>Uvaria narum</i> (Dunal) Wall. Ex Wight & Arn. (Annonaceae)	Kari maderi	Stem

In addition, they also followed an indigenous system of measuring their agricultural produces. Different types of wooden containers of a fixed volume known variously as *paavu*, *konde*, *balla*, and *kalase* were employed in this measurement system (Figure 4). Hollow stems of *Bambusa bambos*, the bole of palms like *Borassus flabellifer* and *Caryota urens*, and the branch of *Calamus rotang* were the primary plants from which such articles are made.

Plants used as fodder

Agriculture with animal husbandry is the predominant traditional livelihood of the study area. Livestock relies

mainly on fresh fodder extracted from local ecosystems. In the domestic cattle-rearing practice of Coastal Karnataka, a variety of local plants were used as fodder and galactagogues. Parts of these plants were fed to cattle, either in raw form or after cooking and mixing with other materials like paddy husk or rice-bran. A list of commonly used fodder and galactogenic plants is given in Table 5. These species comprise a mix of trees, shrubs, and herbs and are available during different seasons. This ensures an uninterrupted supply of fodder to livestock throughout the year (Rashid 2012).



Figure 3. A basket prepared from the stems of *Pristimera indica*, locally called maderi (A), and a Koraga tribal weaving basket from processed branches of *Getonia floribunda* (locally called enjir, B)

Table 5. Plants used as fodder and galactagogues by traditional communities of Coastal Karnataka, India

Name of species and family	Local name(s)	Part(s) used
<i>Albizia lebbek</i> (L.) Benth. (Fabaceae)	Baage	Leaf
<i>Aporosa cardiosperma</i> (Gaertn) Merr. (Phyllanthaceae)	Saroli	Leaf
<i>Asparagus racemosus</i> Willd. (Asparagaceae)	Udri kande	Tuber
<i>Dillenia pentagyna</i> Roxb. (Dilleniaceae)	Mucchir	Leaf
<i>Dracaena terniflora</i> Roxb. (Asparagaceae)	Kaadu Koove	Leaf
<i>Elephantopus scaber</i> L. (Asteraceae)	Nela mucchir	Entire plant
<i>Ficus racemosa</i> L. (Moraceae)	Arthi, Atti	Leaf
<i>Ficus hemicordata</i> Buch.-Ham. (Moraceae)	Arthi, atti	Leaf
<i>Flemingia strobilifera</i> (L.) W. T. Aiton (Fabaceae)	Kankuta	Entire plant
<i>Ipomoea batatas</i> (L.) Hallier (Convolvulaceae)	Genasu, Kereng	Entire plant
<i>Ipomoea mauritiana</i> (L.) Hallier (Convolvulaceae)	Nela genasu, Nela Kereng	Entire plant
<i>Lagenandra toxicaria</i> Dalzel (Araceae)	Neer Koove	Leaf
<i>Maranta arundinacea</i> L. (Marantaceae)	Koove	Leaf
<i>Merremia tridentata</i> (L.) Hall. f. (Convolvulaceae)	Kulovu	Stem, Leaf
<i>Merremia umbellate</i> (L.) Hall. f. (Convolvulaceae)	Kulovu	Stem, Leaf
<i>Mussaenda laxa</i> (Hook. F.) Hutch. Ex Gamble (Rubiaceae)	Bolle tappu	Leaf
<i>Pothos scandens</i> L. (Araceae)	Arke	Stem, Leaf
<i>Pterocarpus marsupium</i> Roxb. (Fabaceae)	Honne	Leaf
<i>Sida cordata</i> (Burm.f.) Borss. (Malvaceae)	Kurundoti	Entire Plant
<i>Trema orientalis</i> (L.) Blume (Ulmaceae)	Bedikeri	Leaf
<i>Xylia xylocarpa</i> (Roxb.) Taub. (Fabaceae)	Jambe	Leaf



Figure 4. Traditional wooden measuring instruments of coastal Karnataka, India

In conclusion, the use of as many as 125 species of local wild plants for non-medicinal purposes, such as edible, piscicidal, fodder, and artifact making, by the different traditional and tribal communities of coastal districts of Karnataka, India, indicate that these communities possess a rich wealth of traditional ecological knowledge. Many wild edible plants, including those part of seasonal food customs, have proven nutritional and medicinal advantages.

The art of weaving and artifact making using plant materials, an intimate part of the local tribal material culture, has gradually disappeared. Thanks to various factors, the major ones being the lack of interest among the newer generation, scarcity of plant raw materials, improper marketing system, and the popularity of plastic and other synthetic substitutes. Nonetheless, a revival of tribal interest in this techno-cultural skill with steps, such as training the younger generation, ensuring a sustainable supply of raw materials, and arranging for proper marketing for finished products carry great potential for community development without distancing them from their original culture.

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