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Beachside Plantations: Future Beauty Plantations

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ABSTRACT

The present study focusses on the assessment of tree species biodiversity in the human settled beach area through quadrat study and comparative morphology. *Cocos nucifera*, *Calophyllum inophyllum*, *Thespesia populnea* are indigenous tree species in the study sites whereas *Terminalia catappa*, *Pongamia pinnata* are introduced species to the coast but they thrives well in the sandy habitat of Southern Peninsula. Study site B-3 recorded maximum number of tree species even though it is a tourist spot. The acclimatized indigenous, avenue and medicinal economically important tree species in the selected beaches of central Kerala was identified through the investigation and they are potential for wide scale propagation for future plantation activities in the construction restricted area along the beaches of Peninsular India.

INTRODUCTION

A beach is defined as 'the zone of unconsolidated material that extends from the mean low water line to the place where there is a marked change in material or physiographic form, or to the line of permanent vegetation that is to the coastline (Mangor, 2004). Indian beaches are also very vulnerable to a variety of natural and artificial hazards including cyclones and tsunamis. It is estimated that about 70 percent of the world's sandy shorelines are eroding (Bird, 1985 quoted in Leatherman *et. al.*, 1994). It is intact coastal ecosystems – dense mangrove forests, wide sandy shores, and healthy coral reefs – that provide the buffer between elements of nature and human beings. People have lived on the coast for thousands of years; today, an estimated 41 percent of the world's population lives within 100 km of the coast and marine fisheries provide over 15 percent of the dietary intake of animal protein (CBD, 2012). Traditionally, coastal areas have played an important role in the socio-economic development of a country primarily because seaborne trade remains the cheapest method of transporting large quantities of goods over long distances. Pressure on the coast has been increasing since the dawn of civilization (Mee, 2012). Many of the world's greatest or largest cities that have been known as centres of trade are located on the coast. But the vulnerability of the coast is well known too. A coastal forest is steadily encroached upon and replaced by a concrete jungle, thus altering long stretches of the coastline (UNEP 2007, OSPAR 2009) One does not realize these impacts on a global scale unless one sees a bird's eye view of the world's coast.

Beach areas have played an important role in the socio-economic development of a country primarily because seaborne trade remains the cheapest method of transporting large quantities of goods over long distances. As more people migrate towards the coast, there is extensive change in land use and an increasing pressure on land and marine resources. Marshy areas and tidal flats are 'reclaimed', creeks are diverted, and mangroves are felled. Destruction of habitats has been identified as one of the major cause for loss of biodiversity (CPCB, 2005).

India's mainland coast of more than 6,000 km is a fraction of the world's coastline, but 17 percent of the world's population according to the 2011 census lives in India (CMFRI, 2012). There are 73 coastal districts (of a total of 593). Indian beaches are under tremendous pressure – from population and 'development'. However, there are no assessments available at the national level to provide estimates of the extent of the coast that is actually occupied by various human activities, and their possible impacts on coastal biodiversity even though the

concept of carrying capacity has been used in India in a few places (Wafar, 1997, Kulkarni, *et. al.* 2011, Vethamony *et. al.* 2007).

The present study deals with assessment of tree species biodiversity in the human settlement of the selected beach area by quadrat analysis. The acclimatized indigenous, avenue and medicinal economically important tree species in the selected beaches of central Kerala are being studied. The study also aims to identify the potential tree species, which are viable in establishing beach beachside plantations through future plantation programs.

2. MATERIALS AND METHODS

For the present study three-beach area were identified after pilot field visits. The selected area are Edavanakad Beach (B-1), Azhikode Beach (B-2) and Cherai Beach (B-3), which are located in central Kerala. First-hand information was gathered from each study spots by repeated field study in order to cover different aspects. Data gathering using plant collection, identification and quadrat study was the basic method utilized ($10m^2$ for tree species). Data were gathered from Tsunami colony and other inhabitants along the beach area within a border limit of 50 m from the line of separation by sand dune. The data obtained through plant collection, identification and quadrat study was then processed for interpretation. Frequency, Density, abundance were calculated based on data generated from quadrat studies.

3. RESULTS

In order to evaluate the tree diversity along the beach area of central Kerala, pilot field visits was conducted to eight beaches initially and extensive documentation was performed in three beaches (B-1), (B-2) and (B-3). Field visits were conducted during December 2015 to March 2017 for plant collection and quadrat studies.

A total Of 72 plants were recorded out of which 30 were trees from the quadrat studies in the homesteads and beach sides of the three selected study area. In order to ensure the ecological status of the plants, quadrate study was conducted in all selected beach area and the ecological parameters such as density and frequency for each species were performed. Table 1, Table 2 and Table 3 contains the details of plants documented with their scientific name, common name, frequency, density and abundance of plants at study area.

Table 1. Quadrat study details from site – (B-1)

Sr. No.	Species name	Local name	Frequency	Density	Abundance
1	*Cocos nucifera*	Thengu	60	2.0	3.33
2	*Terminalia cattapa*	Thallithenga	20	0.4	2
3	*Mangifera indica*	Mavu	30	0.6	2
4	*Thespesia populnea*	Pooparuthi	40	2.4	6
5	*Gliricida sepium*	Seemakonna	40	2.0	5
6	*Murraya koenigii*	Kariveppu	10	0.1	1
7	*Glochidion zeylanicum*	Nellikapulli	10	0.1	1
8	*Syzygium jambos*	Chamba	10	0.1	1
9	*Areca catechu*	Kavungu	20	0.7	3.5
10	*Averrhoa bilimbi*	Chemmenpulli	20	0.2	1
11	*Punica granatum*	Mathalam	20	0.4	2
12	*Swietenia macrophylla*	Mahagani	30	0.4	1.33
13	*Tamarindus indica*	pulimaram	10	0.1	1
14	*Syzygium lanceolatum*	Njaval	10	0.1	1
15	*Bambusa bambos*	Mula	10	0.3	3
16	*Calophyllum inophyllum*	Punnamaram	10	0.1	1
17	*Artocarpus hirsutus*	Aanjili	10	0.1	1
18	*Artocarpus integrifolia*	Plavu	20	0.2	1

Table 2.- Quadrat study details from site (B-2)

Sr. No.	***Species name***	***Common name***	***Frequency***	***Density***	***Abundance***
1	*Cocos nucifera*	Thengu	70	2.4	3.42
2	*Thaliparitit illiaceum*	Thalliparuthi	30	2.2	7.33
3	*Terminalia catappa*	Thallithenga	50	1.6	3.2
4	*Mangifera indica*	Mavu	40	0.8	2
5	*Thespesia populnea*	Pooparuthi	20	0.7	3.5
6	*Gliricidia sepium*	Seemakonna	30	1.4	4.66
7	*Manilkara zapota*	Sappota	10	0.1	1
8	*Murraya koenigii*	Kariveppu	10	0.1	1
9	*Azadirachta indica*	Aryaveppu	30	0.4	1.33
10	*Casuarina litorea*	Kattadi	30	0.7	2.33
11	*Anonna muricata*	Mullanjakka	20	0.2	1
12	*Glochidion zeylanicum*	Nellikapulli	10	0.1	1
13	*Anacardium occidentale*	Kasumavu	40	0.9	2.25
14	*Phyllanthus emblica*	Nelli	10	0.1	1
15	*Psidium guajava*	Pera	10	0.1	1
16	*Swietenia macrophylla*	Mahagani	10	0.1	1
17	*Tamarindus indica*	Pulimaram	10	0.2	2
18	*Syzygium lanceolatum*	Njaval	10	0.1	1

Table 3. Quadrat study details from site - (B-3)

Sr. No.	Species name	Local name	Frequency	Density	Abundance
1	*Cocos nucifera*	Thengu	10	0.1	1
2	*Terminalia catappa*	Thallithenga	10	0.1	1
3	*Mangifera indica*	Mavu	20	0.2	1
4	*Thespesia populnea*	Pooparuthi	20	0.3	1.5
5	*Gliricida sepium*	Seemakonna	50	2	5
6	*Manilkara zapota*	Sappota	20	0.2	1
7	*Murraya koenigii*	Kariveppu	20	0.4	2
8	*Glochidion zeylanicum*	Nellikapulli	20	0.5	2.5
9	*Phyllanthu semblica*	Nelli	10	0.1	1
10	*Psidium guajava*	Pera	40	0.5	1.25
11	*Syzygium jambos*	Chamba	20	0.2	1
12	*Tectona grandis*	Thekku	10	0.2	1
13	*Averrhoa bilimbi*	Chemmenpulli	10	0.2	1
14	*Punica granatum*	Mathalam	10	0.1	6
15	*Tamarindus indica*	pulimaram	30	0.3	1
16	*Albizia lebbeck*	Vaka	10	0.1	1
17	*Cassia fistula*	kanikonna	10	0.1	1

4. DISCUSSIONS AND CONCLUSION

The importance of beach tourism and eroding shorelines has led to various shoreline protection mechanisms in terms of armouring the coast. Hard defence techniques, such as building seawalls, have been used since the 1800s while soft defence techniques have been used since the 1900s. Beach nourishment, underwater sand nourishment and beach scraping were first used in the 1960s and their use is increasing (OSPAR Commission, 2009).

The data gathered in the present study about in three beaches (B-1), (B-2) and (B-3) can be summarized as follows.

Site B- 1

Name of Study Site	:	Edavanakadu Beach Area
Total number of Angiosperm plants listed	:	47
Total number of trees	:	18
Number of medicinal trees	:	7
Number of Fruit trees	:	9
Timber yielding species	:	5
Under utilized trees	:	8

Site B-2

Name of Study Site	:	Azhikode Beach Area
Total number of Angiosperm plants listed	:	38
Total number of trees	:	18
Number of medicinal trees	:	5
Number of Fruit trees	:	10
Timber yielding species	:	4
Under utilized trees	:	4

Site B- 3

Name of Study Site	:	Cherai Beach Area
Total number of Angiosperm plants listed	:	51
Total number of trees	:	17
Number of medicinal trees	:	6

Number of Fruit trees	:	7
Timber yielding species	:	3
Underutilized trees	:	4

The in three beaches namely Edavanakad Beach (B-1), Azhikode Beach (B-2) and Cherai Beach (B-3), spots wise analysis based on the studies shows that (B- 3) Cherai is the most species rich area. Of the total tree biodiversity in the area cultivated plants belong to several families. From quadrate study, it is clear that species *Cocos nucifera* high frequency as they were present in all quadrate. *Tectona grandis, Swietenia mahogany, Alstonia scholaris, Vitex negundo* has least frequency as the occurred in only one quadrate. Carrying capacities in nature are not fixed, static or simple relations. They are contingent on technology, preferences, and the structure of production and consumption. They are also contingent on the ever-changing state of interactions between the physical and biotic environment' (Arrow *et. al.* 1995).

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