

## Puthuvypin

- Puthuvypin (also called puthuvype) is an upcoming major Industrial area in Kochi in the Indian state of Kerala
- It is a western suburb of Kochi City and is a part of Vypin Island which is 24 km long and 2.6 km wide.
- Vypin island has a total area of 87.85 km<sup>2</sup>.
- The island is situated on the western side of Ernakulam District with Kodungallur Strait on the North, Cochin backwaters and Cochin Port on the South, River Periyar and Cochin city on the East and Arabian sea on the West.
- The ecology of Vypeen island is unique, endowed with large canals extending over 50 km and a network of small canals emerging there from.
- The population of Vypeen is estimated at more than 2 lakhs, with one among the highest density of population in the world (more than 2200 people per km<sup>2</sup>).



- Given its close proximity to the city and to the international sea route Puthuvypin has attracted huge investment projects like the LNG Terminal, Single Buoy Mooring, Ship Repair Complex, to name a few.
- It is perhaps one of the fastest growing industrial areas in the state of Kerala.
- Puthuvype Beach, though a less visited beach at present is also one of the very beautiful beaches which is expected to be developed for tourism and the local administration is making a lot of efforts to promote this place as a highly sought after tourist destination.

Sites of various development projects



## Oceanarium project

- Recently Government of Kerala has decided to set up a mega oceanarium project together with a Marine Biological Research Centre at Puthuvypin with the objective of imparting awareness on the marine resources of the Arabian Sea and the Indian Ocean.
- The oceanarium development project, proposed at Puthuvypin forms the country's first such initiative. It has been conceived as an 'infotainment' facility serving the dual objective of information and entertainment.

- The project envisages setting up of a state-of-the art fifth generation oceanarium, featuring one of the world's most advanced and largest exhibitions of under-water marine life and aims to propagate awareness on conservation of marine environment and biodiversity including mangroves.
- Being an education and entertainment space, the facility would mostly play into its inner dimension with the beauty and diversity of life forms and colours of the underwater realm in order to offer a complete vision of the many ecological facets of marine ecosystems.
- The proposed development site for the Oceanarium project, spread over an area of 50 acres is located in Puthuvypin Village of Kochi Taluk in Ernakulam District.

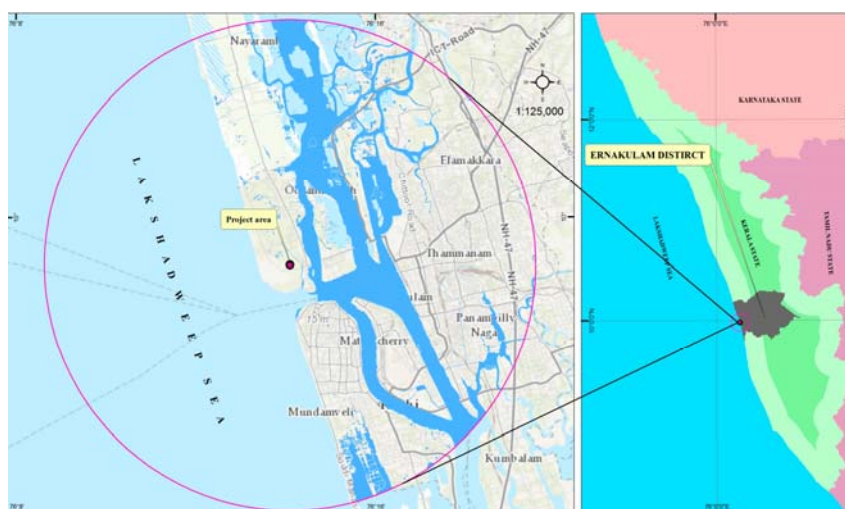
- Though the various development projects contribute to a wide range of advancement in the social and economic fronts and overall growth of the region, they may also bring in adverse effects on the environmental quality, if adequate precautions are not taken.
- Providing economic benefits to the stakeholders are given more importance in such developmental projects and the quality of the environment is often overlooked. This, as felt in many instances, may result into severe landscape changes, degradation of land, water and soil quality, loss of vegetation and habitats, threatening fauna, imbalances in ecosystems, socio-economic and cultural instability, among many other undesirable repercussions.

- Therefore, there is a pertinent need to carefully evaluate the prevailing environmental conditions of the proposed development area and surroundings prior to the implementation of the projects. A comprehensive database on the baseline environmental characteristics is a pre-requisite for an integrated assessment of environmental impacts, if any, with respect to pre-construction, construction and post-construction phases of the various projects.
- The present study is meant to collect information on mangroves of the area which are among the most dynamic but fragile ecosystems of intertidal zone.
- The main objective of the present study is to make an inventory of the mangroves and mangrove associates of the study area with a view to act as a baseline data for future studies on the impact of the projects on the environment.
- The present study also attempts to identify the bio diversity threats to mangroves and mangrove associates in the area.

## Material and methods

- Information on the mangroves of Puthuvypin was collected through field studies during March 2013 to October 2013.
- The area covering the proposed site of the Oceanarium and its surroundings was considered for the study. The area covered under the present study has been located at the geographical coordinates of  $09^{\circ} 58' N$  latitudes and  $76^{\circ} 23' E$  longitudes (Survey of India Topographic sheets No. 58B/4, 58B/8, 58C/1 and 58C/5).

## Study area



- For the estimation of density and percentage of species composition of mangroves, 10 random stations each of 25 m<sup>2</sup> area (5 x 5 m) lying within the mangrove area were selected with the help of a GPS and the species wise number of mangrove plants in each station was noted down.
- The total number of mangrove plants in all the stations put together divided by the total area of the stations (250 m<sup>2</sup>) gave the density of mangroves viz., the number of mangrove plants per square metre.
- The percentage species composition was computed as the number of plants belonging to a particular species divided by the total number of plants which was multiplied by 100.

## **Results and Discussion**

- The area belongs to the coastal tracts-lowlands of Kerala-with the altitudes being near to mean sea level. The development area is part of the Vembanad wetlands, and being close to the coastal area it is prone to tidal inundations. Vembanad lake is one of the important Ramsar Sites in Kerala.

- The mangrove cover of the area could be categorized into three, viz. moderately dense, interspersed with settlements and degraded ones.
- The area houses 11 species of true mangroves belonging to four families and 32 species of mangrove associates belonging to 18 families.

### True mangrove species found in Puthuvypin

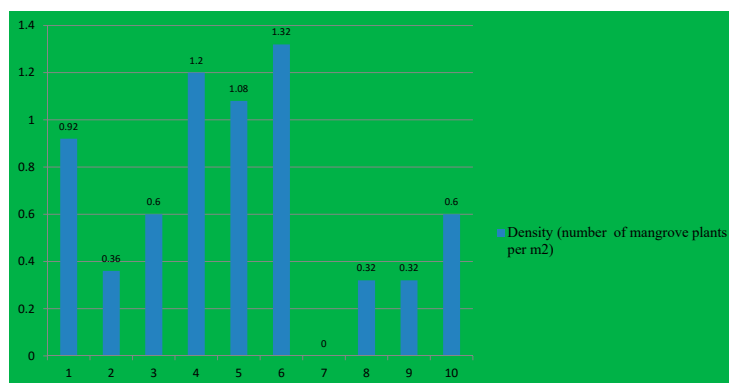
Serial No.	Scientific name	Vernacular name (Malayalam)	Family
1	<i>Avicennia marina</i> (Forsk) Vierh.	Cheru uppatti	Acanthaceae
2	<i>Avicennia officinalis</i> L.	Uppatti, Upootti	Acanthaceae
3	<i>Bruguiera cylindrica</i> Blume	Kuttikandal	Rhizophoraceae
4	<i>Bruguiera gymnorhiza</i> (L.) Savigny	Penakandal	Rhizophoraceae
5	<i>Bruguiera sexangula</i> (Lour.) Poir	Swarnakandal	Rhizophoraceae
6	<i>Excoecaria agallocha</i> L.	Kommatti, Kannampotti	Euphorbiaceae
7	<i>Rhizophora apiculata</i> Blume	Vallikkandal, Naikandal	Rhizophoraceae
8	<i>Rhizophora mucronata</i> Lam.	Pranthankandal	Rhizophoraceae
9	<i>Sonneratia alba</i> J. Smith	Nakshthrakandal	Sonneratiaceae
10	<i>Sonneratia caseolaris</i> (L.)	Chakkarakandal, Blathikandal	Sonneratiaceae
11	<i>Acanthus ilicifolius</i> (L.) Engl.	Chakkaramullu, Chulli, Chullikandal	Acanthaceae



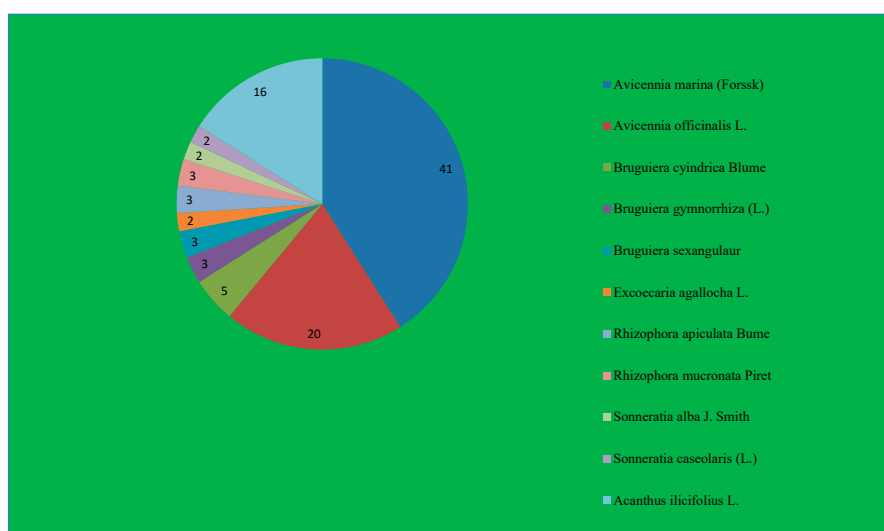
15	<i>Ipomea violacea</i> L.	<u>Convolvulaceae</u>
16	<i>Cyperus javanicus</i> Houtt.	<b>Cyperaceae</b>
17	<i>Morinda citrifolia</i> L.	<b>Rubiaceae</b>
18	<i>Paspalum distichum</i> L.	<u>Poaceae</u>
19	<i>Phragmites karka</i> (Retz.) Trin. ex Steud.	<u>Poaceae</u>
20	<i>Millettia pinnata</i> (L.) Panigrahi	<b>Fabaceae</b>
21	<i>Premna serratifolia</i> L.	<u>Verbenaceae</u>
22	<i>Sauropus bacciformis</i> (L.) Airy Shaw	<b>Euphorbiaceae</b>
23	<i>Schoenoplectus littoralis</i> (Schard.) Palla	<b>Cyperaceae</b>
24	<u><i>Sesbania bispinosa</i> (Jacq.) W.F. Wight</u>	<u>Fabaceae</u>

25	<i>Sesuvium portulacastrum</i> (L.) L.	<u>Aizoaceae</u>
26	<i>Sphenoclea zeylanica</i> Gaertn	<b>Sphenocleaceae</b>
27	<i>Sporobolus virginicus</i> (L.) Kunth	<u>Poaceae</u>
28	<i>Thespesia populnea</i> (L.) Sol. Ex Corr. Corr.	<u>Malvaceae</u>
29	<i>Typha angustifolia</i> L.	<b>Typhaceae</b>
30	<i>Wedelia chinensis</i> Merr	<b>Asteraceae</b>
31	<i>Clerodendrum inerme</i> (L.) Gaertn.	<u>Lamiaceae</u>
32	<i>Crinum viviparum</i> (Lam) Ansari & Nair	<b>Liliaceae</b>

Density of mangroves in different stations (number of plants per m<sup>2</sup>) in the study area (stations on x axis)



Species composition (percentage) of mangroves in the study area



- Puthuvypin mangrove formation, situated towards the southern end of Vypeen-Njarakkal belt, is considered to be the largest single stretch of mangroves in southern Kerala.
- Though sporadic and interspersed with settlements, the mangrove stretch extending from Vallarppadam to Njarakkal and beyond has a significant assemblage of lagoons, backwater channels, marshes and associated mangroves thickets .
- The area is noteworthy for its species richness and diversity, regeneration and near absence of invaded weeds.

- Mangroves of the coastal belts assume utmost conservation significance for its unique biodiversity content and multifarious ecological services. The mangroves are constituted by an assortment of medium trees and shrubs that are adapted to grow in saline coastal sediment habitats.
- The massive root system of mangroves is efficient at dissipating wave energy.
- The mangrove swamps protect the coastal areas from erosion and storm surge, especially during hurricanes and tsunamis.
- Mangrove forests and estuaries also serve as breeding and nursery grounds for a number of marine organisms including the commercially important shrimps, crabs and fishes.
- Hence, loss of mangroves will cause direct and indirect repercussions which are ecologically and economically significant.
- A substantial part of the study area is occupied by inland water bodies with a network channels and ponds, mainly associated with the Vembanad Lake.

- Apart from the other ecosystem services, mangroves play very important roles in sustenance of fishery resources. They act as feeding, breeding and hiding place for many species of fishes. Mangroves also act as nursery grounds for many fin fishes and shell fishes. They play very important role in contributing to the primary productivity of the aquatic environment.
- Despite their benefits, mangrove forests in Kerala have experienced extensive deforestation over the last few decades due to increased demand for commodities. This phenomenon is likely to persist, given the continued increase in population and urbanization.

### Threats to mangroves

- Increased urbanization- development activities such as national projects, residential and commercial complexes, roads and railway lines
- Agriculture
- Aquaculture
- Water pollution
- Siltation
- Increase in temperature, CO<sub>2</sub> emission, storm surges and sea level rise
- Climate change

