



# COASTAL SAND DUNE VEGETATION STUDY IN EAST MEDINIPUR DISTRICT, WEST BENGAL, INDIA

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## ABSTRACT

The coastal regions are unique ecosystems that lie in between the marine and terrestrial realms. Due to rapid coastal zone urbanization many sand dunes species at risk of degradation by their overuse, misuse and poor management. In this context, the present paper is to study the dune vegetation that is caused by erosion, natural disaster, anthropogenic activity and also after lockdown. As a result of this, the sand beaches and associated dune systems are under increasing pressure along the coast lines of Old Digha and New Digha. The data were collected by random sampling methods to know the plant species composition. However, the sand dunes demand immediate attention for conservation as the vegetation is going towards destruction along the coastal areas.

**Keywords:** Coast, sand dune, vegetation, erosion, conservation.

## INTRODUCTION:

Digha coastal region in Purba Medinipur district has about 5.9km coastline. The vegetation of the coastal region is peculiarly made by the climate, soil, water, sand dune and the weather of this region. Stress tolerance plants and more or less soil binder species can be seen in the sand dune with different types of species present different with different habitats (Das, 2014; Jana, 2016). Sand binder and dune stabilizer is the main function of the vegetation in this region. The flora of ecosystem is highly resources for native socioeconomic and medicinal value. The vegetation has an important role in protecting the land from erosion. The selected study area is a part of the Bay of Bengal whose coastal stretch is about 50-60km long along the coast of West Bengal (Das, 2017). In West Bengal, Digha is a coastal town which is dune based is an important place for tourism. This is a threatening area due to some reason which is many natural and man-made problems deforestation, coastal dune erosion, disaster and urbanization is also a big reason for destroying the natural land. As a result, the vegetation is under threat in this region and many exotic species are found in this coastal belt region (Bhakat, 2013; Das and Das, 2014). Diversity denotes the distribution and abundance of species and is one of the fundamental measures in ecology. The main goal of the present study is the sand dune vegetation after lockdown at Old Digha and New Digha.

## MATERIALS AND METHODS:

The study was carried out from 2023 to 06.01. 2024. The study was carried out along the coastal region of East Midnapore specifically on two beaches Old Digha and New Digha. The composition of this dune vegetation in these areas depends upon sand movement and protection from the wind and salt concentration gradients. The species composition of sand dune vegetation was selected by random sampling methods. Data were collected by laying 5m×5m quadrates. Each of the plant materials was documented and GPS photographs. Various related catalogues, regional flora (Prain 1903), monographs and other literature (Paria 2005; Anon 2010) have been consulted for identification purposes. The plant's scientific name was checked with the World Checklist of Vascular Plant (WCVP 2021) website and only the accepted names were used. Study map prepared by the use of ArcGIS software.

### Geography:

The study was conducted in Old Digha and New Digha. Geographically Old Digha is located at 21.6227°N latitude and 87.5259°E longitude. New Digha is located 21.6205°N, 87.4975°E.

## RESULT AND DISCUSSION:

Plants species in the lower region of the coastal belt mainly those in the herbaceous. The identified plant species are- *Ipomoea pes-carpae* (Convolvulaceae), *Opuntia humifusa* (Cactaceae), *Acalypha lanceolata* (Euphorbiaceae), *Cyperus iria* (Cyperaceae), *Portulaca oleracea* (Portulacaceae), *Cynodon dactylon* (Poaceae), *Crotalaria pallida* (Fabaceae), *Clerodendron infortunatum* (Lamiaceae), *Jatropha sp* (verbenaceae) exotic species *Eupatorium odoratum*, *Hyptis suaveolens* besides this herbaceous plants the contain tree-like *Casuarina equisetifolia* (Casuarinaceae), *Pandanus odorifer* (Pandanaceae), *Eucalyptus sp*, *Phonix sylvestris*. Among them, some species are soil binders because of their long branching root system they can prevent soil erosion.

Table no.1 Quadrate at New Digha:

Quadrate no	Scientific name	Family
1	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Cyperus iria</i> <i>Lantana camara</i> <i>Portulaca oleracea</i> <i>Hyptis suaveolens</i>	Casuarinaceae Poaceae Cyperaceae Verbenaceae Portulacaceae Lamiaceae
2	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Cyperus iria</i> <i>Crotalaria pallida</i> <i>Calotropis gignentia</i> <i>Argemone maxicana</i> <i>Clerodendron sp</i>	Casuarinaceae Poaceae Cyperaceae Fabaceae (Leguminosae) Papaveraceae Verbenaceae
3	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Cyperus iria</i> <i>Lantana camara</i> <i>Portulaca oleracea</i>	Casuarinaceae Poaceae Verbenaceae Cyperaceae Portulacaceae
4	<i>Eucalyptus sp.</i> <i>Pandanus odorifer</i> <i>Hyptis suaveolens</i> <i>Vachellia nilotica</i>	Myrtaceae Pandanaceae Lamiaceae Fabaceae
5	<i>Eucalyptus sp.</i> <i>Cynodon dactylon</i>	Myrtaceae Poaceae

	<i>Cyperus iria</i> <i>Argemone maxicana</i>	Cyperaceae Papaveraceae
6	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Calotropis gignentia</i> <i>Jatropha sp</i>	Casuarinaceae Poaceae Asclepiadeaceae verbenaceae
7	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Lantana camara</i> <i>Eupatorium odoratum</i>	Casuarinaceae Poaceae Verbenaceae Asteraceae
8	<i>Ipomoea pes-caprae</i> <i>Cynodon dactylon</i> <i>Opuntia humifusa</i>	Convolvulaceae Poaceae Cactaceae
9	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Acalypha lanceolate</i> <i>Eupatorium odoratum</i>	Casuarinaceae Poaceae Euphorbiaceae Asteraceae
10	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Ipomea pescarpae</i> <i>Eupatorium odoratum</i>	Casuarinaceae Poaceae Convolvulaceae Asteraceae

Table no.2: Species frequency at New Digha

scientific name of species	Frequency
<i>Casuarina equisetifolia</i>	70%
<i>Cynodon dactylon</i>	90%
<i>Acalypha lanceolate</i>	10%
<i>Opuntia humifusa</i>	10%
<i>Lantana camara</i>	30%
<i>Jatropha sp</i>	10%
<i>Calotropis gignentia</i>	20%
<i>Argemone maxicana</i>	20%
<i>Cyperus iria</i>	40%
<i>Eucalyptus sp.</i>	20%
<i>Vachellia nilotica</i>	10%
<i>Hyptis sp</i>	20%
<i>Pandanus odorifer</i>	10%
<i>Portulaca oleracea</i>	20%
<i>Clerodendron sp</i>	10%
<i>Phonix sylvestris</i>	0%
<i>Crotalaria pallida</i>	10%
<i>Ipomea pescarpae</i>	20%
<i>Eupatorium odoratum</i>	30%

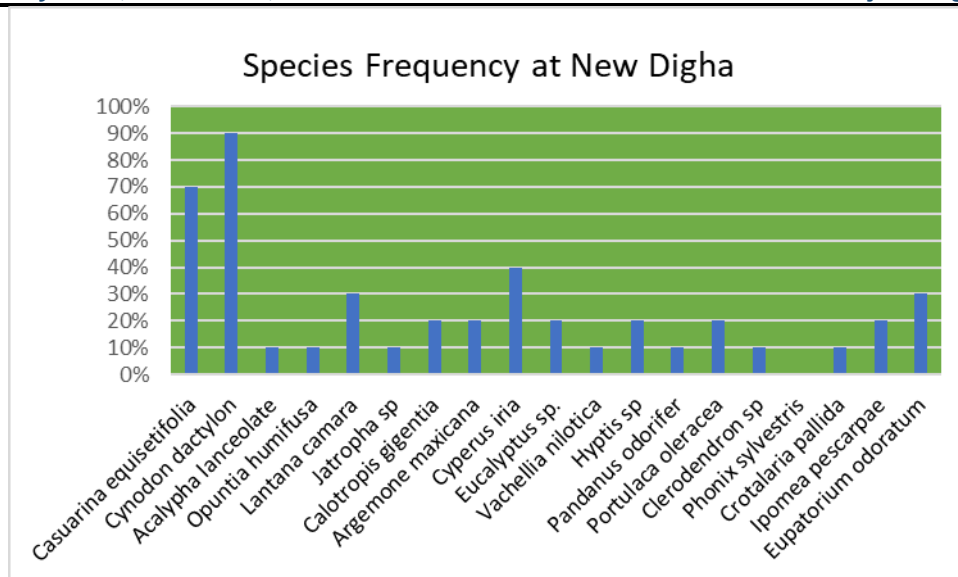


Fig1: Assessment of the abundance of sand dune species

Table no. 3: Quadrate study at Old Digha

Quadrate no	Scientific name	family
1	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Lantana camara</i> <i>Cyperus iria</i> <i>Argemone maxicana</i>	Casuarinaceae Poaceae Verbenaceae Cyperaceae Papaveraceae
2	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Cyperus iria</i> <i>Centella asiatica</i> <i>Portulaca oleracea</i>	Casuarinaceae Poaceae Cyperaceae Apiaceae Portulacaceae
3	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Cyperus iria</i> <i>Lantana camara</i> <i>Crotalaria pallida</i>	Casuarinaceae Poaceae Cyperaceae Verbenaceae Fabaceae
4	<i>Pandanus odorifer</i> <i>Cynodon dactylon</i> <i>Cyperus iria</i> <i>Lantana camara</i> <i>Acalypha lanceolata</i>	Pandanaceae Poaceae Cyperaceae Verbenaceae Euphorbiaceae
5	<i>Eucalyptus sp.</i> <i>Cynodon dactylon</i> <i>Cyperus iria</i> <i>Portulaca oleracea</i> <i>Jatropha sp.</i>	Myrtaceae Poaceae Cyperaceae Portulacaceae Vervencaceae
6	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Cyperus iria</i> <i>Phonix sylvestris</i> <i>Eupatorium odoratum</i>	Casuarinaceae Poaceae Cyperaceae Arecaceae Asteraceae
7	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Cyperus iria</i> <i>Ipomoea pes-caprae</i>	Casuarinaceae Poaceae Cyperaceae Convolvulaceae
8	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i>	Casuarinaceae Poaceae Cyperaceae

	<i>Cyperus iria</i> <i>Acalypha lanceolate</i>	Euphorbiaceae
9	<i>Casuarina equisetifolia</i> <i>Cynodon dactylon</i> <i>Cyperus iria</i> <i>Eupatorium odoratum</i>	Casuarinaceae Poaceae Cyperaceae Asteraceae
10	<i>Eucalyptus sp.</i> <i>Cynodon dactylon</i> <i>Ipomoea pes-caprae</i> <i>Calotropis gignentia</i> <i>Hyptis sp</i> <i>Eupatorium odoratum</i>	Myrtaceae poaceae Convolvulaceae Asclepiadaceae <u>Lamiaceae</u> Asteraceae

Table no.4: Species frequency at Old Digha

scientific name of species	Frequency
<i>Casuarina equisetifolia</i>	70%
<i>Cynodon dactylon</i>	100%
<i>Acalypha lanceolate</i>	20%
<i>Opuntia humifusa</i>	20%
<i>Lantana camara</i>	30%
<i>Jatropha sp</i>	10%
<i>Calotropis gignentia</i>	10%
<i>Argemone maxicana</i>	20%
<i>Cyperus iria</i>	90%
<i>Eucalyptus sp.</i>	20%
<i>Vachellia nilotica</i>	10%
<i>Hyptis sp</i>	10%
<i>Pandanus odorifer</i>	10%
<i>Portulaca oleracea</i>	20%
<i>Clerodendron sp</i>	0%
<i>Phonix sylvestris</i>	0%
<i>Crotalaria pallida</i>	10%
<i>Ipomea pescarpae</i>	20%
<i>Eupatorium odoratum</i>	30%

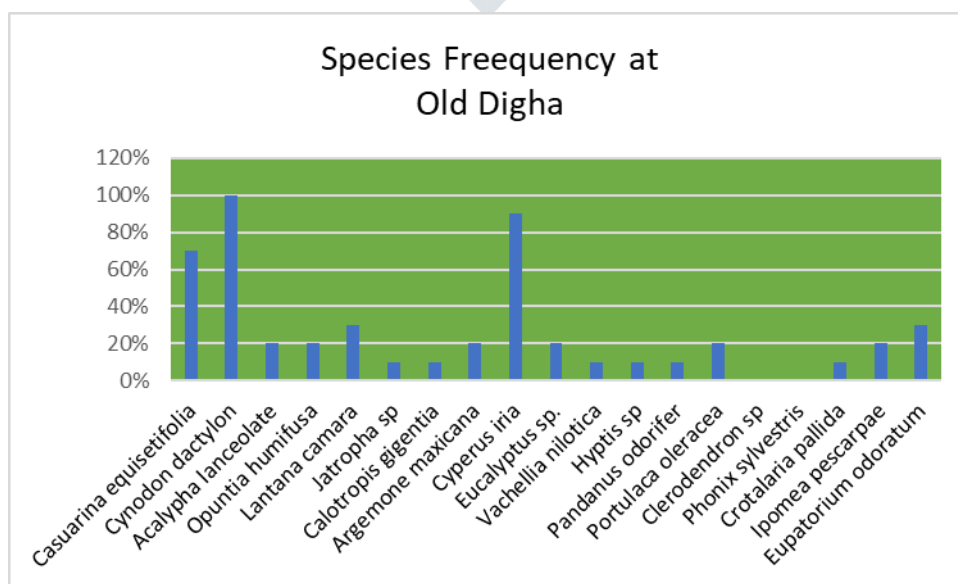


Fig. 2: Assessment of the abundance of sand dune species

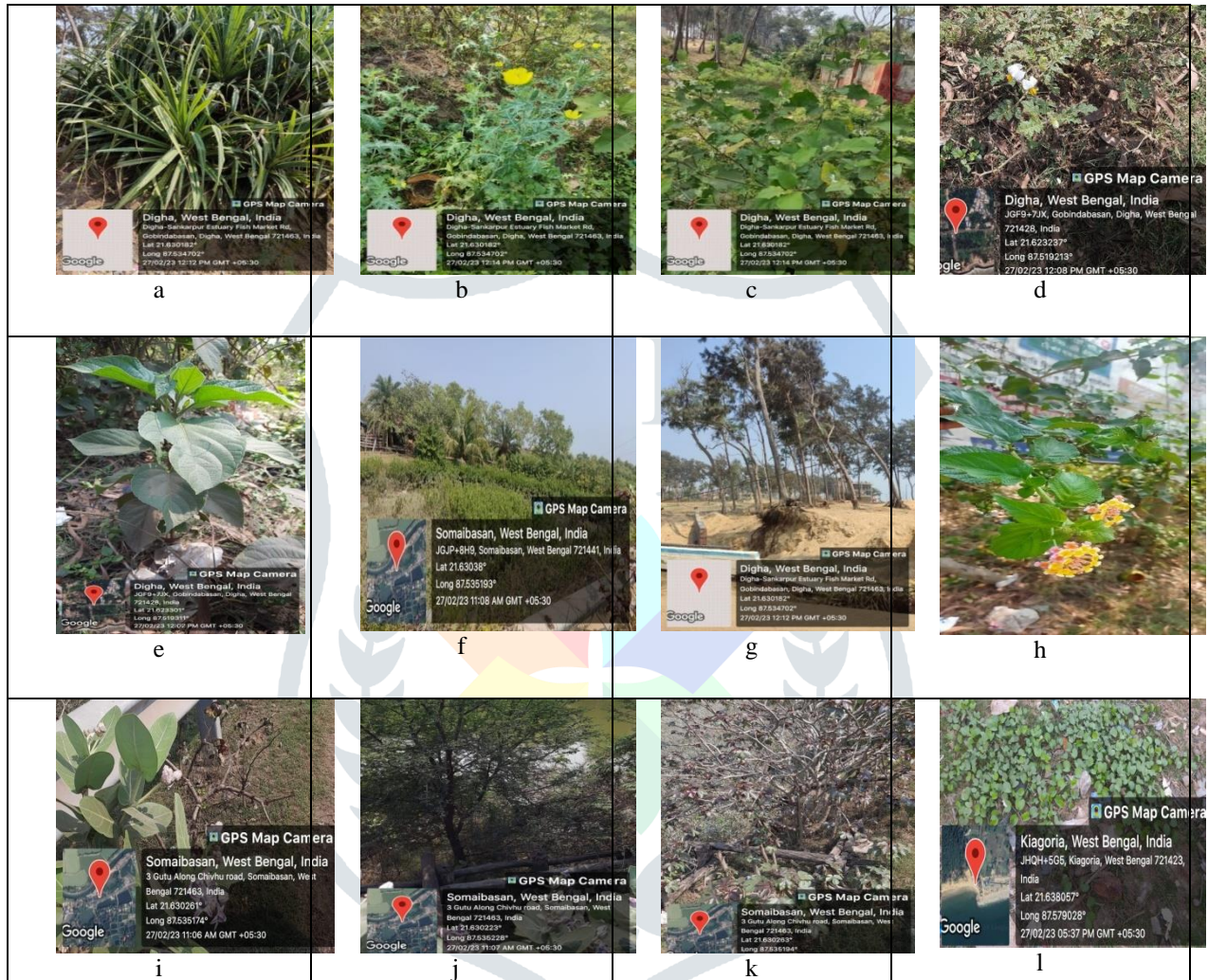


Fig. no. 3: Some dunes species at new digha and old digha: a. *Pandanus odorifer*, b. *Argemone maxicana*, c. *Solanum torvum*, d. *Solanum xanthocarpum*, e. *Clerodendron sp.*, f. *Phoenix sylvestris*, g. *Casuarina equisetifolia*, h. *Lantana camara*, i. *Calotropis gignentia*, j. *Acacia nilotica*, k. *Jatropha sp* l. *Ipomoea pes-caprae*

Species frequency in this selected region was recorded in which maximum species frequency was found that *Cynodon dactylon*(90%), *Casuarina equisetifolia*(70%) below 50% *Lantana camara*(30%), *Cyperus ira* (40%) *Argemone maxicana*(20%) and lowest *Crotolaria pallida*(10%), *Clerodendron*, *Pandanus* (10%) in New Digha. In case of Old Digha *Cynodon dactylon*(100%), *Cyperus ira* (90%) *Casuarina equisetifolia*(70%) below 50% *Lantana camara*(30%), *Eupatorium odoratum*(30%), *Argemone maxicana*(20%) and lowest *Crotolaria pallida*(10%), *Clerodendron* and *pandanus* (10%) (Fig. 1 and 2). The study on this region revealed that the species frequency of *Cynodon dactylon* is highest (100%) in New Digha and also 90% at Old Digha, *Clerodendron infortunum* and *Phoenix sylvestris* is lowest (10%).

# CONCLUSIONS:

Assessment of dune diversity revealed that Old Digha and New Digha are great in threatening conditions. So, an urgent need to establish recommendations for dune preservation and their proper management in this coastal region including the regulations for the sustainable use of coastal land for tourism. In this regard, conservation of the coastal dune species is necessary to protect the biodiversity of the coastal area. Prevention of soil erosion and the construction work that has to be stopped near the coastal area should be maintained.

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