

Original Research Article

Biodiversity and conservation of mangroves present in Krishna District, Andhra Pradesh

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ABSTRACT

Mangrove plants have special adaptations such as stilt roots, viviparous germination, salt-excreting leaves, breathing roots, knee roots by which these plants survive in water logged anaerobic saline soils. The study of mangrove ecosystems in the deltaic region of Krishna river, particularly in Machilipatnam coastal region is very less and hence taken up. Selection of the main field stations, the study of various representative quadrats of sub-field stations and the study of mangrove species are made. The study identify the several mangrove plants and several animal species ,threats of mangroves and restoration or conservation of mangroves present in Krishna District

KEYWORDS

Avicennia marina | Biodiversity | Conservation | Mangroves | Krishna River

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Introduction

A mangrove is a woody tree or shrub that lives along sheltered coastlines within the tropic or subtropic latitudes. In fact, the various species of mangroves aren't necessarily closely related to one another, but they do share the unique capability of growing within reach of the tides in salty soil. Some mangrove species live so close to the shoreline that they are flooded with salt water every day as the tide comes in and submerges their roots. All mangroves have evolved special adaptations that enable them to live in salty, oxygen-poor soil.

There are about 80 different species of mangrove trees. All of these trees grow in areas with low-oxygen soil, where slow-moving waters allow fine sediments to accumulate. Mangrove forests only grow at tropical and subtropical latitudes near the equator because they cannot withstand freezing temperatures.

The mangrove forests in Andhra Pradesh are located in the estuaries of Krishna and Godavari rivers. The total area of mangrove in Andhra Pradesh is 354 Sq.Km, of which 189 Sq.Km is in Godavari delta, 158 Sq.Km is in Krishna delta and the rest 7 Sq.Km is in Prakasam District.

Mangrove forests stabilize the coastline, reducing erosion from storm surges, currents, waves, and tides. The intricate root system of mangroves also makes these forests attractive to fish and other organisms seeking food and shelter from predators. The mangrove forests in Andhra Pradesh are located in the estuaries of Krishna and Godavari rivers. The total area of mangrove in Andhra Pradesh is 354 Sq.Km, of which 189 Sq.Km is in Godavari

delta, 158 Sq.Km is in Krishna delta and the rest 7 Sq.Km is in Prakasam District.

According to recent estimation there are 82 species of mangroves in India distributed in 52 genera and 36 families from all the 12 habitats (Mandal and Naskar, 2008).

Materials and methods

Study area: Machilipatnam is between 16°10'N to 16.17°N latitudes and 81°09'E to 81.13°E longitudes on the southeast coast of India and in the east corner of Andhra Pradesh. Mangroves in this area lie between latitude 16° 0' - 16° 15' N latitude and 81° 10' - 81° 15' E longitude. The northern distributary of Krishna river drains in this area near Hamsaladevi. Machilipatnam sea coast is receiving a stream called Upputeru from Kolleru region at Pedapatnam. So, Pedapatnam is a riverine based mangrove region. The other field stations *viz.* Gilakaladindi, Polatitippa and Pallethummalapalem of the region are the mangrove areas receiving sea water by tidal effect. Hence these field stations gain significance in the study of mangroves.

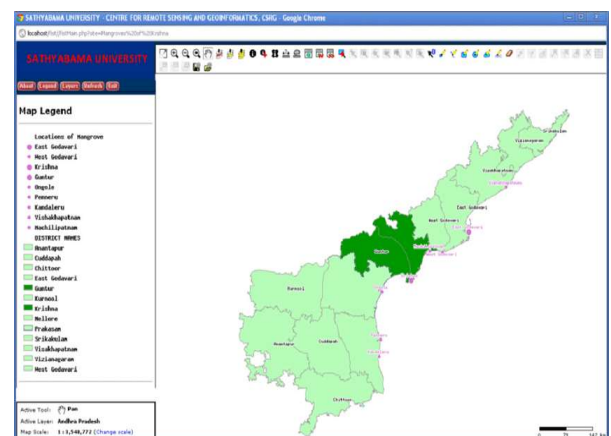


Fig. 1

Results and Discussions

In the present study, it is observed that there are 17 mangrove species in Machilipatnam region while there are 26 species in

Diviseema region. A comparison of the species composition reveals that there are 17 mangrove species in common. The increase in diversity by 9 species, which are associated species, in Diviseema region, is due to dense mangrove ecosystem. The common pioneer species in the two regions are *Aegiceras corniculatum* (Guggilam), *Avicennia alba* (Gudammada), *Avicennia marina* (Tellamada), *Avicennia officinalis* (Nallamada) etc. Simpson and Shannon-Wiener Indices are calculated in order to determine the species richness between the two regions. Simpson index values for the two regions of the study area are found to be 0.0626 and 0.0417 respectively. The values indicate no remarkable variation in species richness.

Invertebrates: Invertebrates of fishery importance in the study area are recorded. These are found abundant in maritime sediment and nearer to coastal waters of the study area. Molluscan species occurring near to shore of the surveying areas include *Mytilus indica*, *M. viridis*, *Crossostrea madrasensis*, *Xancus psycum*. At low salinity areas, the species mostly found are *Meretrix meretrix*, *vellorita cyprinoids*, *Anadora granosa* and *Katylisia spina*. The other species such as *Ammusium*, *Pecten*, *Anadora* and *mecter* are exclusively available at the marginal areas.

Mangrove swamps play a vital role as nursery grounds for shrimps and other crustacean species. Crustaceans are divided into crabs and prawns. Among the crabs, riddler crab (*Uca dussumieri*) is the most commonly found crab towards sea whereas other species like *Scylla serrata*, *S. oceanic*, *S. trangubarica* and *S. paramansina* are the common forms

noticed in brackishwater. Mangrove waters rich in detritus form highly potential breeding medium of prawns and fishes. The study area accounted for nine species of penaeid prawns like *Penaeus indicus*, *P. monodon*, *P. semisulcatus*, *P. mergiensis*, *Metapenaeus dobsoni*, *M. monoceros*, *M. brevicornis*, *M. affinis* and *Macrobrachium rosenbergii*.

Vertebrates: There are 43 species belonging to four major vertebrate (mammals, aves, amphibians and reptiles) with significant wildlife importance in the study area. It is observed that crustaceans and fishes are the most abundant fauna towards seaward fringes, its channels and creeks. Mollusks are found in the forest edges and the marginal area is densely populated by wildlife important species like amphibians, reptiles, birds and mammals. It is worth noting that some migratory birds are exclusively found in Krishna delta mangrove region and are not even found in Godavari mangrove region. These birds which are listed below, migrate from countries like Siberia, Australia to Kolleru, Krishna District and from there to Krishna mangroves.

Threats to biodiversity of mangroves in Krishna District: Krishna estuarine region facing severe threat owing to the anthropogenic activities like industrialization, urbanization, construction of port city coupled with aquaculture/agriculture, utilization mangrove for their society needs. Particularly, in the Interu mangrove swamp salinity affect mangrove ecosystem biodiversity due to the lesser inflow of the freshwater into the swamp which might have resulted formation of sand bars in swamp mouth region. For the past two decades the aquaculture activities have been increasing

rapidly in this area. This activity might have been affecting the swamp ecosystem. The study will provide updated information on the Krishna estuarine region for the sustainability of the mangrove ecosystem otherwise Krishna mangrove ecosystem would meet the upcoming predictions propose that 30- 40% of coastal wet lands (IPCC, 2007) and 100% of mangrove forests (Duke *et al.*, 2007) could be lost in the coming 100 years if the present rate of loss continues.

Conservation strategies: Restoration of degraded mangroves: Based on the salinity levels of soil, mangrove species namely *Avicennia marina*, *Avicennia officinalis* and *Excoecaria agallocha* were selected for planting in the degraded areas. Reason being

that these species could tolerate wide range of salinity. Normally the soil salinity of the degraded area is about 140 ppt during summer. To reduce the high soil salinity, tidal flushing was facilitated by constructing canals as described in the previous pages. Due to this, the soil salts are slowly leached out and the soil salinity is reduced gradually. The reduction in salinity improved the survival percentage and also reduced the saline stress to the young seedlings. The planting was done during October and November, after the southwest monsoon. During that period the rainwater reduces the salinity further. The salinity of the creek water is also low (about 10-15 ppt).



Fig. 2: Research team at Krishna mangroves in Machilipatnam, Krishna District, (A.P.)



Fig. 3: Animal biodiversity Animal biodiversity, (River otter, fishing cat and gastropod)



Fig. 4: Mangroves of Krishna River

S. No	Family	Scientific Name	Local Name
1.	Cyperaceae	<i>Fimbristylis ferruginea</i> (L.)Vahl	---
2.	Poaceae	<i>Aeluropus lagopodioides</i> Trin.ex Thwaites	---
3.	Boraginaceae	<i>Heliotropium curassavicum</i> L.	---
4.	Aizoaceae	<i>Sesuvium portulacastrum</i> (L.)L.	Vangaredukura
5.	Amaranthaceae	<i>Salicornia brachiata</i> Roxb.	Saakati Pusalu; Barillakoyalu
6.	Amaranthaceae	<i>Suaeda maritima</i> (L.) Dumort.	Uppaaku; Ilakura
7.	Amaranthaceae	<i>Suaeda monoica</i> Forssk. ex J.F. Gmel.	---
8.	Amaranthaceae	<i>Suaeda nudiflora</i> (Muhl.ex Willd.)Moq.	Revu cada
9.	Myrsinaceae	<i>Aegiceras corniculatum</i> (L.) Blanco	Guggilliam
10.	Fabaceae	<i>Dalbergia spinosa</i> Roxb.	Chillanki; Chillingi
11.	Fabaceae	<i>Derris trifoliata</i> Lour.	Angarvalli; Nalla tiga
12.	Acanthaceae	<i>Acanthus ilicifolius</i> L.	Alchi; Alisi; Alasyakampa
13.	Avicenniaceae	<i>Avicennia alba</i> Blume	Gunda mada; Vilavada mada
14.	Avicenniaceae	<i>Avicennia marina</i> (Forsk.) Vierh.	Tella mada
15.	Avicenniaceae	<i>Avicennia officinalis</i> L.	Nalla mada
16.	Lamiaceae	<i>Volkameria inermis</i> L.	Pisingi; Pisung; Eruppichha
17.	Euphorbiaceae	<i>Excoecaria agallocha</i> L.	Chilla; Tilla; Tella
18.	Rhizophoraceae	<i>Bruguiera cylindrica</i> (L.) Blume	Varavada; Vurada
19.	Rhizophoraceae	<i>Bruguiera gymnorhiza</i> (L.) Lam	Duddu ponna; Thudda ponna
20.	Rhizophoraceae	<i>Ceriops decandra</i> (Griff.)Ding Hou	Gatharu
21.	Rhizophoraceae	<i>Rhizophora apiculata</i> Blume.	Uppu ponna; Kaaki ponna
22.	Combretaceae	<i>Lumnitzera racemosa</i> Willd.	Kadivi; Thanduga; Kadavi
23.	Lythraceae	<i>Sonneratia apetala</i> Buch.-Ham.	Kalingi

Table 1: Plant species present in Krishna river mangroves

Conclusion: present study concluded that there are several types of mangrove plants are present in krishna mangrove area.the plant families includes are *Aegiceras corniculatum* (Guggilam), *Avicennia alba* (Gudammada), *Avicennia marina* (Tellamada), *Avicennia officinalis* (Nallamada). There are several animal species include vertebrates and invertebrates are present in machilipatnam mangrove area.Invertebrates includes *Scylla serrata*, *S. oceanic*, *S. trangubarica* and *S. paramansina* are the common forms noticed in brackish water.The study area accounted for nine species of penaeid prawns like *Penaeus indicus*, *P. monodon*, *P. semisulcatus*, *P. mergiensis*, *Metapenaeus dobsoni*, *M. monoceros*, *M. brevicornis*, *M. affinis* and *Macrobrachium rosenbergii*.fishing cat, sea otter and deers are common in Krishna river mangrove area.we need to take several

conservation strategies to conserve the mangroves of Krishna river.

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