Mangroves of Tamil Nadu: A Literature Review

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Abstract

Mangroves are a diverse group of salt-tolerant, mostly arboreal, flowering plants. They are primarily tropical and subtropical in distribution, and are generally more along the coastlines of the east than on the west of the continents. In India, mangroves are found along the coastline of nine states and four Union Territories, 70% on the east coast, 12% on the west coast and 18% on the Bay Islands. Indian mangroves have recorded 46 true mangrove species belonging to 14 families and 22 genera, 42 species and 4 natural hybrids. Of these, 16 mangroves belonging to 11 genera and 9 families have been recorded along the Tamil Nadu coast. Mangrove habitats are now threatened by various factors such as reduction in freshwater flow, marine and coastal pollution, siltation, sedimentation and excessive salinity.

Key words: Mangroves, Distribution, habitats, pollution, siltation, sedimentation.

Introduction

Mangroves are salt-tolerant forest ecosystems distributed mainly in tropical and subtropical inter-tidal regions of the world. They are one of the most productive ecosystems on Earth with a mean production of 2.5 g C m^{-2} day^{-1} (Jennerjahn and Ittekkot, 2002). The combination of shallow waters, high level of nutrients, and high primary productivity makes these areas ideal for supporting intricate food webs in several environmental settings (Twilley and Rivera-Monroy, 2005). Mangroves prefer a humid climate and freshwater inflow that brings in abundant nutrients and silt. Mangroves grow luxuriantly in alluvial soils.Mangroves helps to stabilize shorelines and reduce the devastating impact of natural disasters such as tsunamis and hurricanes. They also provide breeding and nursing grounds for marine and pelagic species, and food, medicine, fuel and building materials for local communities. The rapid disappearance and degradation of mangroves could have negative consequences for transfer of materials into the marine systems and influence the atmospheric composition and climate. Due to their distribution at the continent–ocean interface, the mangrove habitat may suffer heavy impacts from global climate change, exacerbated by local human activities. The past and present distribution of mangrove species on a global scale has been reviewed by several authors (Tomlinson, 1986; Ricklefs and Latham, 1993; Duke, 1992; Field, 1995; Duke *et al*., 1998; Ellison *et al*., 1999; Saenger, 2002; Wang *et al*., 2003; Spalding *et al*., 2010). Without adequate knowledge of the exact species composition it will be difficult to identify and implement conservation priorities for the mangroves of India. The present study was aimed at providing information on the distribution of mangroves of Tamil Nadu.

Global Distribution of Mangroves

Mangroves occur worldwide in the tropics and subtropics, in 124 countries and territories. Global coverage has been variously estimated at 10 million ha (Bunt, 1992), 14-15 million ha (Schwamborn and Saint-Paul, 1996), and 24 million ha (Twilley *et al*., 1992). Mangrove distribution is strongly affected by temperature (Duke, 1992). Asia and Australia have the greatest diversity and distribution of mangrove forests, with more than 40% are found along the Asian coasts. The largest mangroves are found in Indonesia (Kothari and Singh, 1998), Brazil and Sundarbans of India. In total, there are about 84 mangrove plant species belonging to 24 genera and 16 families distributed throughout the world, of which only 70 species are reported as true mangroves and the rest 14 as mangrove associates (Jun *et al*., 2008).

Distribution of Mangroves in India

India harbours some of the best mangrove forests of the world which are located in the alluvial deltas of the major rivers such as the Ganga, Mahanadi, Godavari, Krishna, Cauvery and also on the bay of Andaman and Nicobar Islands (Mishra *et al*., 2005; Kathiresan and Rajendra, 2005; Thatoi and Biswal, 2008; Upadhyay *et al*., 2008; Mandal and Naskar, 2008). It covers about 6,749 sq.km. along the 7,516.6-km-long coastline, including island territories (Mandal and Naskar, 2008). India is the third mangrove richest country in the world (after Indonesia and Australia). Mangrove forest cover in India has increased over the last two decades because of the strict conservation and afforestation programmes implemented by the Government of India to recover them from decline during the 1990s. Major mangrove wetlands are spread along the east coast and Andaman and Nicobar Islands while in the west coast they are predominantly localized. The location and diversity of these forests are influenced by the inflow of fresh water which is more pronounced in the east coast as major rivers of the Indo-Gangetic plain and Deccan plateau discharge into the Bay of Bengal. The inflow of fresh water decreases from north to south likewise which is accompanied by a decrease in species diversity and mangrove cover. Indian mangrove consists of 46 true mangrove species belonging to 14 families and 22 genera, which includes 42 species and 4 natural hybrids. In other words, about 57% of the world's mangrove species are represented in India.

Mangroves of Tamil Nadu

Tamil Nadu has a coastline of about 950 km. The coastal zone of Tamil Nadu is very narrow except in the Vedaranyam-Muthupet stretch of Thiruvarur-Thanjavur district where extensive mud flats are present. These coasts favour the luxuriant growth of mangroves here. Of the 46 mangrove species present in peninsular India, 16 belonging to 11 genera and 9 families were recorded along the Tamil Nadu coast (Figure 1; Table 1). Of these, four species are common in the Puthalam saltpan and Manakudy estuarine environment of Kanyakumari district. The major mangrove wetlands of Tamil Nadu are located in the deltaic regions of the river Cauvery. A large patch of healthy mangroves is present in the Devipattinam area, bordered by Palk Strait in the east, in Ramanathapuram district. In the islands of the Gulf of Mannar Biosphere Reserve, mangroves are present in a few hundred hectares. Pichavaram mangroves of Cuddalore district, Muthupet mangroves of Thiruvarur district, Ramnad mangroves of Ramanathapuram district, Punnakayal mangroves of Tuticorin district and mangroves of the Gulf of Mannar are the significant mangrove ecosystems of Tamil Nadu. Salinity-sensitive mangrove species like *Xylocarpus granatum*, *Kandelia candel*, *Bruguiera gymnorrbiza* and *Sonnera tiaapetala* have completely disappeared from Pichavaram mangroves.

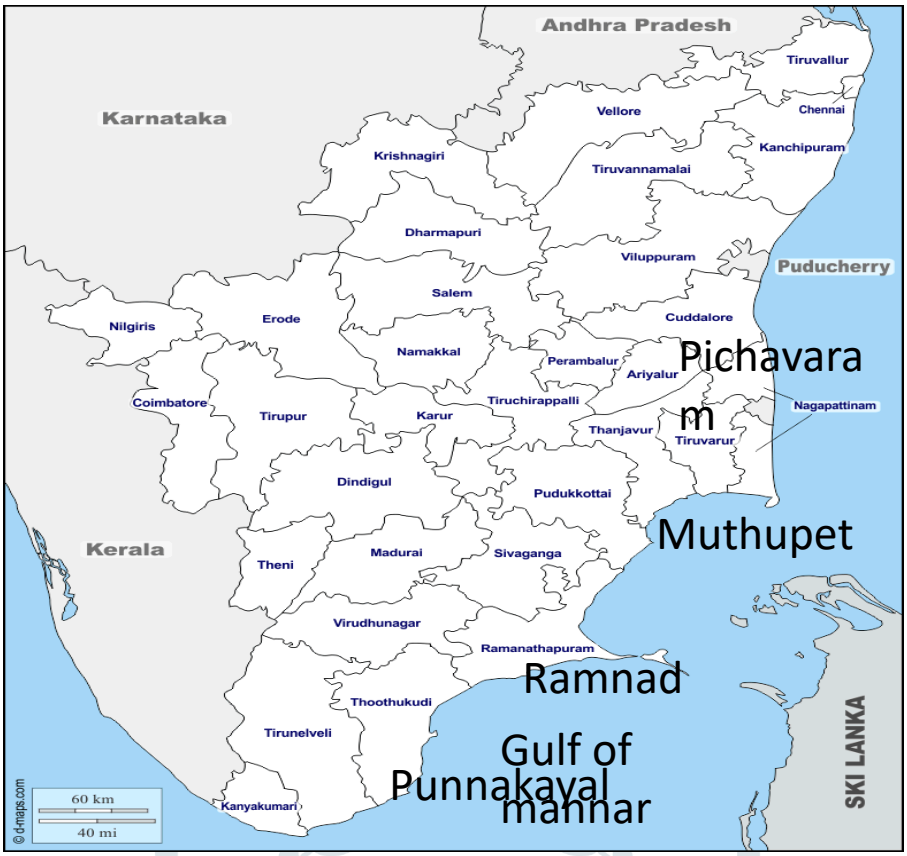

Figure 1. Distribution of mangroves in Tamil Nadu

Table 1. List of Mangrove species in Tamil Nadu

Sl. No	Scientific Name	Family	Habit
1	*Avicennia alba* Blume	Avicennaceae	Tree
2	*Avicennia marina* (Forsk.) Vierh	Avicennaceae	Tree
3	*Avicennia officinalis* L.	Avicennaceae	Tree
4	*Aegiceras corniculatum* (L.) Blanco	Myrsinaceae	Tree
5	*Acanthus ilicifolius* L.	Acanthaceae	Shrub
6	*Acrostic humaureum* L.	Pteridaceae	Ferns
7	*Bruguiera cylindrica* (L.) Blume	Rhizophoraceae	Tree
8	*Bruguiera gymnorrhiza* (L.) Savigny	Rhizophoraceae	Tree
9	*Ceriops decandra* (Griff.) Ding Hou	Rhizophoraceae	Tree
10	*Excoecaria agallocha* L.	Euphorbiaceae	Tree
11	*Heritiera littoralis* Drynd	Sterculiaceae	Tree
12	*Lumnitzera racemosa* Willd	Combretaceae	Tree
13	*Rhizophora apiculata* Blume	Rhizophoraceae	Tree
14	*Rhizophora annamalayana* Kathir	Rhizophoraceae	Tree
15	*Rhizophora mucronata* Poir.	Rhizophoraceae	Tree
16	*Xylocarpus mekongensis* (Prain) Pierre	Meliaceae	Tree

Conservation and Management of Mangroves

Mangrove forests are among one of the world's most productive tropical ecosystems. Mangrove vegetation is more vulnerable to human interferences and natural climatic changes. Mangrove habitats are now threatened by various factors such as reduction in freshwater flow, marine and coastal pollution, siltation, sedimentation, excessive salinity, global climate change and human activities. The rapid disappearance and degradation of mangroves could have negative consequences on marine ecosystems. There is a critical need to understand them better and care must be taken to prevent degradation and destruction of mangrove ecosystems. There is a need to conserve the mangrove species in Tamil Nadu through: (i) making people aware of the importance of mangroves; (ii) encouraging research into problems related to pests and diseases of mangroves; and (iii) restoring and rehabilitating degraded mangrove forests. Co-ordination between government agencies, research institutes, local bodies, environmental organizations and environmentalists needs to be strengthened to achieve these goals.

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