

BIODIVERSITY OF MANGROVES IN ESTUARINE ECOSYSTEMS OF RATNAGIRI DISTRICT



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Abstract: Biodiversity is prevalent in the tropical estuarine system, particularly in the inter tidal forested vegetation known as Mangrove. Mangroves are salt tolerant forest ecosystem of tropical and subtropical intertidal regions near river mouths with high productivity. They are open systems with respect to both energy and matter and thus couple upland terrestrial and coastal estuarine ecosystems. Mangrove vegetation contributes to the primary production in the aquatic environment in the form of leaf and litter fall. Ratnagiri is a coastal district of Maharashtra state, situated in the western ghat area of Sahyadri, Western coast of India. It has 167 km long sea coast of Arabian Sea which contains ecologically important area full of biodiversity. During the last 25 years, about 40% reduction in the mangrove cover of Maharashtra has been due to human interference and State Kharland Development Board. Some of the major problems faced by the littoral zone and the shore front areas of Maharashtra coast are related to coastal erosion, siltation, pollution, destruction of mangrove swamps, salt marshes, sea level rise, landslides and slope failure, pressure of population, industrialization, road transport etc. The national committee on mangroves, formulated by Ministry of environment and forests has identified mangroves of Ratnagiri as one of the 15 selected areas under threat. The earlier studies do not give the estimate about the number of species, area covered significantly varies and clear-cut information is lacking. So objective of present paper is to study biodiversity of mangroves along coast of Ratnagiri district for conservation of estuarine ecosystem and mangroves for sustainable development. Different estuaries of Ratnagiri districts were visited frequently for study. Plants were identified with the help of standard literature and floras. The studies revealed that Ratnagiri district shows biodiversity of mangroves with 20 species with 15 genera. *Sonneratia*, *Avicennia* were the more common genus with three species each. The present floristic diversity of Ratnagiri shows that species like *Bruguiera parviflora* recorded by the earlier workers have become locally extinct. Importantly, a rare mangrove species *Xylocarpus granatum* has been recorded from a few localities close to mangrove patch of Jaigad. Though this species has been categorized as Least Concern in the IUCN red list, the conservation notes on it emphasize on its declining populations all over the country due to severe habitat loss. Immediate efforts should be made by Government, concerned authorities, policy makers to conserve estuarine ecosystem and biodiversity of mangroves by different methods such as education and awareness programmes to local people about ecological values of mangroves for sustainable development.

Key words: Anthropogenic, Coastal, Conservation, Endangered, Sustainable development

INTRODUCTION

Mangroves are salt tolerant forest ecosystem of tropical and subtropical intertidal regions near river mouths. It includes a variety of trees that grow in saline coastal sediment habitats in the tropics and subtropics. The term 'mangrove' describes both the ecosystem and the plant families that have developed specialized adaptations to live in this tidal environment (Alka Shiva, 2006; Tomlinson, 1986). Mangroves dominate three-quarters of tropical coastlines

(Hogarth, 1999). Mangroves support the conservation of biological diversity by providing habitats, spawning grounds, nurseries and nutrients for a number of animals (Takle, 2007). These include several endangered species and range from reptiles and amphibians to mammals.

The role of mangroves in the marine food chain is crucial (Kapetsky, 1985). Climate of any

intertidal region acts as the most significant and important factor for natural growth, development and succession of the mangroves. Among the climatic factors, temperature fluctuations, humidity percentage, total annual rainfall, regular wind flow, radiation and sedimentation along with upstream water supply also play very dominant role for the growth and viability of mangroves. Mangroves build their own environments (Mazda *et al.*, 2005). Mangrove swamps protect coastal areas from erosion, storm surge (especially during hurricanes), and tsunamis. (Danielsen, 2005) The mangroves' massive root systems are efficient at dissipating wave energy (Massel *et al.*, 1999). Mangroves have been reported to be able to help buffer against tsunami, cyclones, and other storms (Dahdouh and Guebas, 2005).

The Western ghat area is one of the *world's* ten Hottest *biodiversity hotspots*. The Konkan region consists of wildlife and variety of plants including mangroves. Anthropogenic interferences such as wood felling, dumping of non biodegradable waste, pollution, are affecting adversely on biodiversity of Mangroves in Ratnagiri district and Maharashtra state. It will devastate one of Maharashtra's most serene coastal areas and Western Ghat areas which are home to rich biodiversity including several globally endangered species. Majority of the mangrove forests of Maharashtra have vanished due to anthropogenic pressures in the recent years. During the last 25 years, about 40% reduction in the mangrove cover of Maharashtra has been due to human interference and State Kharland Development Board. The earlier studies do not give the estimate about the number of species, area covered significantly varies and clear-cut information is lacking. So objective of present paper is to study biodiversity of mangroves along coast of Ratnagiri district for conservation of estuarine ecosystem and mangroves for sustainable development.

MATERIALS AND METHODS

Study Area

Ratnagiri is a coastal district of Maharashtra state, situated in the Western Ghat area of Sahyadri, Western coast of India. It is situated at latitude 17°N and longitude 73°19'E. The

district is bounded by the Arabian Sea to the west, Sindhudurg district to the south, Raigad district to the north and Satara, Sangli and Kolhapur districts to the east. It has 167 km long sea coast of Arabian Sea which contains ecologically important area full of biodiversity. Some of the major problems faced by the littoral zone and the shore front areas of Maharashtra coast are related to coastal erosion, siltation, pollution, destruction of mangrove swamps, salt marshes, sea level rise, landslides and slope failure, pressure of population, industrialization, road transport etc. The national committee on mangroves, formulated by Ministry of environment and forests has identified mangroves of Ratnagiri as one of the 15 selected areas under threat.

Methods

Earlier study about mangroves in Maharashtra was carried out by Botanical Survey of India. For this study the coastal area of Ratnagiri district was visited frequently by authors. Morphological features of plant were studied with the help of standard literature. The collected and preserved plants were identified using Flora of Presidency of Bombay (Cooke, 1958), Flora of Maharashtra by (Almeida, 1996-2009), (Singh and Karthikeyan, 2000), (Singh *et al.*, 2001), Flora of Raigad District (Kothari and Murthy, 1993), The Flora of Sawantwadi (Almeida, 1990). Voucher specimens were deposited in the herbarium of ASP College, Devrukh.

RESULTS AND DISCUSSION

Total mangroves found and identified in estuarine ecosystem in Ratnagiri district are given in Table 1. It shows biodiversity of mangroves with 20 species with 15 genera. These mangroves are belonging to different twelve families, out of that Rhizophoraceae family showed maximum five genus of mangroves while nine families showed one genus each.

The present floristic diversity of Ratnagiri shows that species like *Bruguiera parviflora* recorded by the earlier workers have become locally extinct. Importantly, a rare mangrove species *Xylocarpus granatum* has been recorded from a few localities close to mangrove patch of Jaigad. Though this species has been categorized as Least

Table 1. Biodiversity of mangroves in Ratnagiri District

No.	Name of plant	Family
1.	<i>Acanthus ilicifolius</i> L.	Acanthaceae
2.	<i>Acrostichum aureum</i> L.	Pteridaceae
3.	<i>Aegiceras comiculatum</i> Bl.	Myrsinaceae
4.	<i>Avicennia alba</i> Bl.	Avicenniaceae
5.	<i>Avicennia Marina</i> (Forsk.) Vierh.	Avicenniaceae
6.	<i>Avicennia Officanalis</i> L.	Avicenniaceae
7.	<i>Bruguiera gymnorrhiza</i> (L.) Lam.	Rhizophoraceae
8.	<i>Ceriops tagal</i> (Perr.) Rob.	Rhizophoraceae
9.	<i>Clerodendrum inerme</i> (L.) Gaertn.	Verbenaceae
10.	<i>Derris heterophylla</i> Willd	Fabaceae
11.	<i>Exoecaria agallocha</i> L.	Euphorbiaceae
12.	<i>Kandelia candel</i> (L.) Druce	Rhizophoraceae
13.	<i>Lumnitzera racemosa</i> Willd	Combretaceae
14.	<i>Rhizophora Apiculata</i> Blume.	Rhizophoraceae
15.	<i>Rhizophora mucronata</i> Lamk.	Rhizophoraceae
16.	<i>Salvadora persica</i> L.	Salvadoraceae
17.	<i>Sonneratia apetala</i> Buch. Ham.	Sonneratiaceae
18.	<i>Sonneratia alba</i> Smith	Sonneratiaceae
19.	<i>Sonneratia caseolaris</i> (L.) Engl.	Sonneratiaceae
20.	<i>Xylocarpa granatum</i> Koenig	Meliaceae

Concern in the IUCN red list, the conservation notes on it emphasize on its declining populations all over the country due to severe habitat loss. Immediate efforts should be made by Government, concerned authorities, policy makers to conserve estuarine ecosystem and biodiversity of mangroves by different methods such as education and awareness programmes to local people about ecological values of mangroves for sustainable development.

Mangroves are destroyed mainly by man-made activities in different forms, which pose serious threat to the ecosystem around the map and silently become one of the reasons for Global warming and climate change. This is due to population growth and unsustainable economic development including deliberate land reclamation for urban and industrial development (Khan and Ali, 2009). Approximately 35% of mangrove area was lost during the last several decades of the 20th century (in countries for which sufficient data exist), which encompass about half of the area of mangroves (Botkin and Keller, 2003; MEA, 2005). An increase in mangroves has been suggested for climate change mitigation. (Maharaj, 2002).

Now it is a need of the hour to concentrate and protect mangroves for generations. Mangrove form the most threatened habitats in the world, disappearing at an accelerating rate with little public notice (Khan, 2007). With continuing degradation and destruction of mangroves, there is a critical need to understand them better. Mangrove are often the object of conservation programs, including national biodiversity action plans (Mazda and Yoshihiro, 1997).

Table 2. Families of Mangroves

No.	Name of family	No. of genus
1.	Rhizophoraceae	05
2.	Avicenniaceae	03
3.	Sonneratiaceae	03
4.	Acanthaceae	01
5.	Pteridaceae	01
6.	Myrsinaceae	01
7.	Verbenaceae	01
8.	Fabaceae	01
9.	Euphorbiaceae	01
10.	Combretaceae	01
11.	Salvadoraceae	01
12.	Meliaceae	01

Ratnagiri district of Konkan region showed great diversity of mangroves with 20 species with 15 genera. The diversity and distribution of mangroves along the Konkan coast indicates the sensitivity of mangroves to various environmental changes. The increasing anthropogenic pressures, in the form of conversion of habitats or pollution, are responsible for the decline in species level diversity of mangroves along the coast. For conservation of mangroves social awareness program must be implanted in coastal area with the help local people.

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