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Socio demographic profile of fishermen communities of the selected mangrove sites from Ratnagiri coast

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Abstract

In the present study the socio demographic profile of fishermen communities with respect to mangroves and fishes were studied from selected sites. It was observed from the socio demographic profile that local inhabitants in an around estuaries are dependent totally on estuarine fishery. The working members of the surveyed household of selected sites are maximum in Karla hamlets and minimum in the Area. All study sites are dominated by *Sonneratia alba*, *R. mucronata*, *Avicennia officinalis*, *A. marina* along with subdominant species. It is noticed while interviewing the inhabitants that majority of the fishermen and women do not have much control over the mangroves on which their livelihood depends. Total eighteen edible estuarine fishery resources have been recorded from the study area.

Keywords: Fishermen, mangroves, *Sonneratia alba*

1. Introduction

Mangroves form an important component of our endowment of tropical and subtropical resources. Mangrove ecosystem comprises plant species belonging to intertidal forest communities which are adapted to survive salinity, dynamic tidal regions, high temperature and muddy anaerobic soil. They are reservoirs of flora and fauna that have been associated over a long evolutionary period. Mangrove ecosystem plays a significant role in coastal economy and livelihood of the people. These ecosystems are characterized by higher fishery biodiversity as well as higher standing stock [9, 10, 28, 37, 18, 39]. The importance of mangrove ecosystem to coastal fisheries has been described and the linkage between mangrove and associated fisheries have been emphasized and discussed by many authors [32, 40, 47, 33, 38, 11, 12, 21, 42, 44, 45, 13, 2, 22]. A maximum percentage of the population resides along the coasts and is dependent on the fishing for their livelihood. Over the years, the fish catch has been steadily decreasing day by day. This could be the result of the reduction in the mangrove species. During the last decade much attention has received on mangrove fauna. However, there are still gaps in our knowledge on the total biodiversity of mangrove ecosystem. In the present study socio demographic profile has been studied from the selected sites of Ratnagiri coast. There is no scientific data available related to socio demographic profile of fishermen communities along the mangrove sites. The present paper thus deals with the relationship between mangroves and fishery. For this information is collected from the local fishermen communities related to sustainable uses of mangrove, number of households, dominant edible fish resources.

1.1 Study Area: Five sites were selected based on preliminary survey considering mangrove areas and fishermen communities viz. Are, Bhatye, Chinchkhari, Karla, and Sakhartar. The criteria for the selection of study area is based on the uses of the mangroves, the dependency of the community on mangrove resource and these are existing major mangrove areas of Ratnagiri coast.

2. Material and Methods: The data related to mangrove and fishery were collected from the local fishermen using questionnaire. For the present study, total 10 houses from each hamlet/wadies were interviewed. The questionnaire was made on the basis of family size, occupation, uses of mangroves in their daily life. Mangrove species were enumerated site wise. The analysis was done hamlet wise after obtaining primary and secondary data. The socio demographic analysis was carried out following method of [1].

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3. Results and Discussion: There are 34 different species of mangroves and associates reported along the West Coast of India [6, 7]. Mangroves of Maharashtra comprise 27 species viz. *Rhizophora mucronata*, *Rhizophora apiculata*, *Kandelia candel*, *Ceriops tagal*, *Bruguiera gymnorrhiza*, *Bruguiera cylindrica*, *Bruguiera parviflora*, *Sonneratia alba*, *Sonneratia caseolaris*, *Sonneratia apetala*, *Avicennia officinalis*, *Avicennia marina*, *Avicennia marina var. acutissima*, *Barringtonia acutangula*, *Barringtonia racemosa*, *Carallia brachiata*, *Salvadora persica*, *Derris heterophylla*, *Cerbera odollam*, *Xylocarpus granatum*, *Cynometra iripa*, *Heritiera littoralis*, *Dolichandrone spathacea* [8]. All the five sites are dominated mainly with *Rhizophora mucronata*, *Avicennia marina* and *Sonneratia alba*. The subdominant species are *Lumnitzera racemosa*, *Exocoecaria agallocha*, *Aegiceras corniculatum* and *Acanthus ilicifolius*. *Rhizophora apiculata*, *Bruguiera gymnorrhiza* and *Kandelia candel* are restricted only to Chinchhari and Karla. In Are and Bhatye sites the *Rhizophora apiculata* and *Bruguiera gymnorrhiza* are absent (Table-1). The dominant species occurring at the sites along the study area are namely *Rhizophora mucronata*, *Avicennia marina*, *Avicennia officinalis* and *Sonneratia alba*. In present study it was observed that different mangrove species along the selected sites of Ratnagiri coast are occurring in patches and fragmented areas.

During survey, the sample size of each site was studied. Higher percentage of sample size was obtained for Are site (5%). Chinchkhari site shows the 2.5% sample size (Table-2). Socioeconomic or socio ecological studies on mangroves are becoming more and more used [36]. The socio demographic study of the selected sites shows that the primary income earner of the family is mostly head of the households. About 95% earners belong to 19-55 years age group (Table-3). Females are also involved in fishing for fish catch, bivalves, crabs and other bio resources. It is observed that 100% of the fishermen shows married status.

Table-4 presents the family size of households surveyed in each hamlet. In each house, the range of family size is 6-8 while the total average family size is 4.32.

Over the last decades, many studies have demonstrated a strong relationship between mangroves and fish catch [41, 47, 33, 24, 26, 27], with fishery catch being influenced by the relative abundance of mangroves in a region. The correlations have also been found in such studies provided important information on the fisheries mangrove relationship and were the base for economic valuation of mangroves [4, 19, 3]. Ratnagiri is the major district for the fishery production along the estuary. Estuarine habitats have been recognised as important drivers of near shore fish productivity. Worldwide,

about 30% of all commercial species are mangrove dependent [29], producing annual catch of almost 30 million tones in 2002 [17]. During the survey, information regarding the fishes, bivalves, crabs and other bio resources were collected from the local fishermen. These edible bio resources are sold in Mirkarwada market. Most of the fishermen are selling daily catch in Mirkarwada fishery market to get the higher price. Different varieties of fishes, crabs and bivalves are listed in Table-5(Fig.1). Mangroves provide direct employment to about 0.5 millions fisher folk and about 1 million jobs are dependent on mangrove associated fisheries and the density of population dependent on mangrove was estimated at about 5.6 persons per square meter [35]. Mangrove is an extremely important coastal resources [15, 16, 22]. The most important use of mangrove forest to the villages are ecological functions in terms of protection against tsunami, floods and heavy winds; fish catch; and firewood collection, which are the perceived role of mangroves in fisher folk's livelihood [14].

It was noticed that the local fishermen are not aware about the uses of mangroves. They know mangroves by their local names as 'Chhippi', 'Khajan' and 'Tivar'. Most of the people are using wood of *Rhizophora mucronata*, *Avicennia marina*, *Sonneratia alba* as a dominantly firewood, fish traps and construction purpose (Table-6). The utilization of mangroves have been discussed by [25, 20, 34, 30, 5, 43, 31, 1, 46]. The leaves and fruits of *Avicennia marina* are used as the cattle feed. The leaves of the mangrove tree *Avicennia marina* are used for animal fodder by households in the Indus Delta. On an average, fodder consumption per animal unit was found to be 3.82 Kg/day, of which 1.22 Kg. were mangrove leaves; thus mangrove represent some 32% of domestic animal feed. The study indicates that total monthly consumption of fodder in delta comes to 535,650 kilos, which estimated that fodder provided by the mangroves at about Rs.2,560,000 [23].

4. Conclusion: It is suggested from the present work that local fishermen living near the mangrove areas are mainly depend on the estuarine fishery. It is the only source of income. Ratnagiri fishery has also declining day by day. It is necessary to conserve the mangrove species occurring by involving local people through community approach. Use of mangroves as a food is found to be uncommon and rare. The cattles graze on mangrove leaves of *Avicennia*, *Acanthus* and *Rhizophora* (young leaves) along the coast of Ratnagiri. There is no any commercial exploitation of mangrove resources. However, the species are found to be destructed for firewood purpose mainly along the coast of Ratnagiri. Present study is vital for developing site specific action plans for sustainable fishery and other mangrove resources.

Table 1: Occurrence of mangrove species along the sites of Ratnagiri

Sr. No.	Mangrove species	Are	Bhatye	Chinchkhari	Karla	Sakhartar
1.	<i>Rhizophora mucronata</i>	+	+	+	+	+
2.	<i>Rhizophora apiculata</i>	-	-	+	+	-
3.	<i>Bruguiera gymnorrhiza</i>	-	-	+	-	-
4.	<i>Avicennia marina</i>	+	+	+	+	+
5.	<i>Ceriops tagal</i>	+	+	+	-	+
6.	<i>Sonneratia alba</i>	+	+	+	+	+
7.	<i>Lumnitzera racemosa</i>	+	+	+	+	+
8.	<i>Exocoecaria agallocha</i>	+	+	+	+	+
9.	<i>Aegiceras corniculatum</i>	+	+	+	+	+
10.	<i>Acanthus ilicifolius</i>	+	+	+	+	+
11.	<i>Kandelia candel</i>	-	-	+	+	-

Table 2: Number of households interviewed in the selected villages/Hamlets along Ratnagiri coast

Sr. No.	Villages/ Household	Total no. of households interviewed	Sample size	Percent samples (%)
1.	Are	10	50	5
2.	Bhatye	10	35	3.5
3.	Chinchkhari	10	25	2.5
4.	Karla	10	38	3.8
5.	Sakhartar	10	43	4.3

Table 3: Socio demographic profile of heads of households in the selected villages/hamlets along Ratnagiri coast

Sr. No.	Socio demographic characteristics	Are	Bhatye	Chinchkhari	Karla	Sakhartar	Total
1.	Sample size	50	35	25	38	43	191
2.	Sex :Male	10	10	04	10	10	8.8
	: Female	03	10	-	10	10	8.2
3.	Primary income earner in the family	10	10	04	10	10	8.8
	i) Father	-	-	-	-	-	-
	ii) Mother	-	-	-	-	-	-
	iii) Offsprings	-	-	-	-	-	-
4.	Age structure						
	18 years	-	06	-	-	-	06
	19-55 years	09	03	03	07	06	05
	55 years	01	01	01	03	04	02
5.	Religion						
	Hindu	09	-	07	-	-	08
	Muslim	-	10	-	10	10	03
	Other	01	-	03	-	-	02
6.	Marital status						
	Married	10	10	10	10	10	05
	Single	-	-	-	-	-	-
	Widow/er	-	-	-	-	-	-
7.	Education						
	Illiterate	-	-	-	-	-	-
	1ry E(1-10 gr)	08	07	10	10	08	8.6
	2ry E(10-12)	02	03	-	-	02	2.3
	Higher E(Uni.)	-	-	-	-	-	-

Table 4: Socio demographic profile of family size of surveyed household

Sr. No.	Socio demographic Characteristics	Are	Bhatye	Chinchkhari	Karla	Sakhartar	Total
1.	Family size (percent of households)						
	1-2	01	03	05	01	02	06
	3-5	05	07	05	09	05	6.2
	6-8	04	-	-	-	03	3.5
	9 & more	-	-	-	-	-	-
2.	Average family size	3.3	5	5	5	3.3	4.32

Table 5: Checklist of dominant edible fishes of study sites along Ratnagiri coast

Serial Number	Scientific name	Common name
1.	<i>Sillago sihama (Forsk)</i>	Renvi
2.	<i>Acanthopagrus berda (Forsk)</i>	Palu
3.	<i>Drepane punctata (Bloch)</i>	Chand
4.	<i>Siganus vermiculatus (Valenciennes)</i>	Thaus
5.	<i>Caranx melampygus (Cuvier)</i>	Shitap
6.	<i>Epinephelus diacanthus (Valenciennes)</i>	Gobra
7.	<i>Lutjanus roseus (Pearson)</i>	Tambusa
8.	<i>Eetroplus suratensis (Bloch)</i>	Kalundra
9.	<i>Portunus sanguinolentus Linnaeus</i>	Kurla
10.	<i>Portunus pelagicus (Herbst)</i>	Kurla
11.	<i>Scylla serrata Forskal</i>	Giant mud crab
12.	<i>Perna viridis Linnaeus</i>	Wakhunde
13.	<i>Penaeus monodon Fabricius</i>	Chingul
14.	<i>Penaeus Indicus H. Milne Edward</i>	Chingul
15.	<i>Saccostrea cucullata Born.</i>	Kalave
16.	<i>Polymesoda erosa (Solander)</i>	Mud clam
17.	<i>Scatophagus argus(Linnaeus)</i>	-
18.	<i>Gerres filamentosus(Cuvier)</i>	Shitak



Fig 1: Edible bio resources along the Ratnagiri coast

Table 6: Potentially sustainable uses of mangroves in selected sites.

Sites	Mangrove species	Firewood	Construction purpose	Fish trap	Medicine	Tannin	Food & drinks	Shoreline protection
Are	<i>Rhizophora mucronata</i>	+++	++	++	-	-	-	+
	<i>Avicennia marina</i>	+++	++	++	-	-	-	+
	<i>Ceriops tagal</i>	+++	++	++	-	-	-	+
	<i>Sonneratia alba</i>	+++	++	-	-	-	+	+
	<i>Lumnitzera racemosa</i>	+++	++	-	-	-	-	+
	<i>Excoecaria agallocha</i>	-	-	-	-	-	-	+
	<i>Acanthus ilicifolius</i>	-	++	++	-	-	-	+
	<i>Aegiceras corniculatum</i>	+++	++	++	-	-	-	+
Bhatye	<i>Rhizophora mucronata</i>	+++	++	++	-	-	-	+
	<i>Avicennia marina</i>	+++	+++	++	-	-	-	+
	<i>Ceriops tagal</i>	+++	++	++	-	-	-	+
	<i>Sonneratia alba</i>	+++	++	++	-	-	-	+
	<i>Lumnitzera racemosa</i>	+++	++	++	-	-	-	+
	<i>Exococaria Agallocha</i>	-	++	++	-	-	-	+
	<i>Aegiceras corniculatum</i>	+++	++	+	-	-	-	+
	<i>Acanthus ilicifolius</i>	-	-	-	-	-	-	+
Chinchkhari	<i>Rhizophora mucronata</i>	+++	++	+	-	-	-	+

	<i>Rhizophora apiculata</i>	+++	++	+	-	-	-	+
	<i>Bruguiera gymnorrhiza</i>	+++	++	+	-	-	-	+
	<i>Avicennia marina</i>	+++	++	+	-	-	-	+
	<i>Ceriops tagal</i>	+++	++	+	-	-	-	+
	<i>Sonneratia alba</i>	+++	++	+	-	-	-	+
	<i>Lumnitzera racemosa</i>	+++	++	+	-	-	-	+
	<i>Exocoecaria agallocha</i>	+++	++	+	-	-	-	+
	<i>Aegiceras Corniculatum</i>	+++	++	+	-	-	-	+
	<i>Acanthus ilicifolius</i>	-	-	+	-	-	-	+
	<i>Kandelia candel</i>	+++	++	+	-	-	-	+
Karla	<i>Rhizophora mucronata</i>	+++	++	+	-	-	-	+
	<i>Avicennia marina</i>	+++	++	+	-	-	-	+
	<i>Sonneratia alba</i>	+++	++	+	-	-	-	+
	<i>Lumnitzera racemosa</i>	+++	++	+	-	-	-	+
	<i>Aegiceras corniculatum</i>	+++	++	+	-	-	-	+
	<i>Acanthus ilicifolius</i>	-	-	+	-	-	-	+
	<i>Kandelia candel</i>	++	++	+	-	-	-	+
Sakhartar	<i>Rhizophora mucronata</i>	+++	++	+	-	-	-	+
	<i>Avicennia marina</i>	+++	++	+	-	-	-	+
	<i>Ceriops tagal</i>	+++	++	+	-	-	-	+
	<i>Sonneratia alba</i>	+++	++	+	-	-	-	+
	<i>Lumnitzera racemosa</i>	+++	++	+	-	-	-	+
	<i>Exocoecaria agallocha</i>	+++	++	+	-	-	-	+
	<i>Aegiceras corniculatum</i>	+++	++	+	-	-	-	+
	<i>Acanthus ilicifolius</i>	-	-	+	-	-	-	+

+ Available source, ++ Moderate +++ Dominance – Absent

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