

ENVIRONMENTAL STUDIES OF THE EZHUMALA BEACH

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ABSTRACT

Ezhumala, an extremely clean beach about 13 km north of Payyannur on the Kerala coast, is bordered by the Arabian Sea on the west and seven large hills on the other sides engulfing an extensive area of ideal picnic spot. NIO team studied the area in September and November, 1978 and March, 1979 with reference to environmental parameters and human habitation and has found it suitable for the purpose of tourism.

INTRODUCTION

Beaches apart from being extremely interesting zones biologically, as the meeting place of two major ecosystems viz. the terrestrial and aquatic systems, are an important natural resource, subject to a variety of human use. The Indian coastline has a profusion of these and is under considerable population pressure, as the coastal areas are the most densely populated in this subcontinent. Some of the beaches are endowed with exceptional scenic beauty and have tremendous potential to be developed as tourist resorts, which with imaginative planning backed up by scientific thinking can match the best resorts in the world. A critical evaluation of the major beaches from this point of view merits the immediate attention of planners, engineers, scientists and entrepreneurs. It is in this direction that the scientists have an important role to plan for tourism in this country at large.

The present paper deals with the water quality, environmental features, stability and bacteriological characteristics of the Ezhumala beach.

Description of the area:

Located along the Malabar coast, Ezhumala is a sandy beach, about 13 km by road from Payyannur in Cannanore District. The beach is surrounded by seven hills from which the name is derived. It has a wide supra-littoral area occupied by beach flora. The area in between the slope of the hills and the sandy beach is under marginal cultivation. This beach situated between two promontories can be considered a pocket beach. The sediment has a higher proportion of coarse sand and is clean. The gradient of the beach is steep and the wave height range from 1-2 metres, and frequency 3-6 waves/min.

MATERIAL AND METHODS

Sand and water samples for environmental characters, bacteriological estimations and water quality were collected following standard procedures and

preserved wherever necessary using recommended preservatives. Details of the methods of analyses are available in Raveendran *et al.*, (1978) and Sarala Devi *et al.*, (1979). The beach and sea were systematically surveyed for visual pollution counts, an index based on visual evidence of faecal matter and other anthropogenic extraneous material (Shuval *et al.*, 1968), as well as tar ball deposition. The beach was visited once in each of the seasons, the pre-monsoon, post-monsoon and monsoon seasons. The survey was made as part of an ongoing programme to assess the pollution status of the estuaries and beaches of Kerala.

RESULTS AND DISCUSSION

In August 1978 a Panamanian cargo vessel "Good Fortune" ran aground at Ezhumala and during the first visit in September 1978 the area was examined critically for possible ill-effects of which there were none. The dampening of waves in the zone between the ship and the shoreline resulted in accretion of sediments in this area and tongue like extension of the shoreline was seen developing there. The ship in effect acts like a break water (Fig. 1).

Water quality and environmental features:

Table 1 gives the annual ranges of some environmental features and water quality characteristics of Ezhumala, Payyambalam and Moplah Bay in Cannanore

Table 1. Annual ranges of environmental parameters and water quality characteristics of Ezhumala, Payyambalam, Moplah Bay and Kovalam.

	Temp. (°C)	Sal. (‰)	O ₂ (ml/l)	Alkali- nity (mg Ca Co ₃ /l)	Dichro- mate COD (mg/l)	Perman- ganate COD (mg/l)	BOD ₅ (mg/l)	pH
EZHUMALA								
Premonsoon	31.40	35.30	3.00	20.70	< 10	1.20	5.0	7.8
Monsoon	23.00	34.90	4.30	43.50	< 10	1.30	8.0	7.5
Postmonsoon	29.00	33.90	4.30	66.20	< 10	2.20	4.0	7.8
PAYYAMBALAM								
Premonsoon	28.40	34.20	3.80	73.20	144	1.63	17.0	7.8
Monsoon	26.50	34.40	4.70	52.00	< 10	5.00	4.6	7.5
Postmonsoon	27.25	32.59	4.63	55.25	123	2.42	1.5	7.8
MOPLAH BAY								
Premonsoon	29.10	34.40	4.20	81.20	267	2.10	13.0	7.6
Monsoon	27.20	31.90	4.40	59.80	< 10	4.30	6.2	7.2
Postmonsoon	27.00	29.50	4.70	33.40	445	2.90	2.7	7.8
KOVALAM								
Premonsoon	29.90	33.40	4.20	69.60	41	2.20	2.5	7.8
Monsoon	25.80	34.10	4.60	65.60	< 10	1.70	8.2	7.5
Postmonsoon	30.00	34.20	3.90	72.70	< 10	1.40	11.0	7.8

District, which occupy an ascending order in the degree of human use. Values for Kovalam, a famed seaside resort and picnic spot is also given. While the environmental features are largely comparable, the organic loads as indicated by permanganate COD and BOD₅ show the influence of backland drainage and proximity to urban areas. It can be seen readily that the quality of water at Ezhumala is good and the water fit for recreational purposes.

Bacteriological characters and cleanliness of the beach:

Table 2 gives the bacteriological characters, tar deposition on the beach and visual pollution counts at Ezhumala for the different seasons. Faecal contamination was found to be almost non-existent as deduced from the absence of indicator organisms like *E. coli* and *S. faecalis* as well as the absence of macro-faeces both in water and sand. In assessing the nature of faecal contamination of an environment, FC/FS ratios (Faecal coliforms/ Faecal streptococci) are considered to be of great value. This is based on the fact that in human intestines the FC counts are far higher than the FS counts as against in nonhuman sources. A ratio of >2 indicates primary human faecal pollution while <1 indicate non-human sources. The consistently low FC/FS ratios at Ezhumala indicate absence of human faecal contamination and hence the higher coliform counts in the monsoon season in themselves need not be regarded as a cause for alarm. The beach may be regarded as 'Safe' and 'Clean' and acceptable from a bacteriological point of view.

Tar deposition along the Indian coastline is reported previously and along the west coast fresh deposition starts with the onset of SW monsoon season (Dwivedi and Parulekar, 1974). The higher values at Ezhumala during the monsoon season might have resulted from the fresh deposition. The annual ranges in values (Table 2) are far lower compared to the reported figures for the Indian coastline (Dwivedi and Parulekar, 1974).

Visual pollution counts in all cases were <10 indicating a clean environment (Shuval *et al.*, 1968). Table 3 gives a comparison of the bacterial counts at Ezhumala, Moplah Bay and Payyambalam. The counts at Moplah Bay can be seen to be an order of magnitude higher than that of Ezhumala. This increase may be attributed to the population pressure at this area.

Based on the present observations, Ezhumala should be regarded as a 'Clean' beach, 'Safe' from a public health point of view and water quality. Aesthetically, the clean beach devoid of debris and other objectionable matter and picturesque setting provides an ideal spot for holiday makers. The wide supralittoral area occupied by beach vegetation points to a fairly stable condition of the beach. The area also provides some scope for sport fishing.

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Fig. 1. "Good Fortune" Panama ship stranded at Ezhumala.

Table 3. Comparison of the occurrence of *Salmonella* and indicator bacteria at Ezhumala, Moplah Bay and Payyambalam during different seasons.

	EZHUMALA			PAYYAMBALAM			MOPLAH BAY					
	Trans I Wat. Sand	Trans II Wat. Sand	Trans III Wat. Sand	Trans I Wat. Sand	Trans II Wat. Sand	Trans III Wat. Sand	Trans I Wat. Sand	Trans II Wat. Sand	Trans III Wat. Sand			
<i>Premonsoon</i>	1	—	—	—	—	—	19	14	6	16	15	23
Coliforms	—	—	—	—	—	—	18	5	1	3	2	9
<i>E. coli</i>	—	—	—	—	—	—	9	17	3	10	5	14
<i>S. faecalis</i>	—	—	—	—	—	—	—	—	—	—	—	—
<i>Salmonella</i>	—	—	—	—	—	—	2.0*	0.3	0.33	0.3	0.4	0.6
FC/FS ratio	—	—	—	—	—	—	—	—	—	—	—	—
<i>Monsoon</i>	26	27	15	16	—	2	—	—	—	—	—	—
Coliforms	—	—	—	—	—	—	13	15	6	22	7	19
<i>E. coli</i>	—	—	—	—	—	—	6	7	1	19	3	15
<i>S. faecalis</i>	—	—	—	—	—	—	4	9	9	22	1	15
<i>Salmonella</i>	—	—	—	—	—	—	—	—	—	—	—	—
FC/FS ratio	—	—	—	—	—	—	0.6	1.5	0.11	0.85	3.0*	1.0
<i>Postmonsoon</i>	1	1	2	2	—	—	—	—	—	—	—	—
Coliforms	—	—	—	—	—	—	13	8	9	3	2	18
<i>E. coli</i>	—	—	—	—	—	—	10	3	9	2	2	9
<i>S. faecalis</i>	—	—	—	—	—	—	11	4	4	5	3	15
<i>Salmonella</i>	—	—	—	—	—	—	—	—	—	—	—	—
FC/FS ratio	—	—	—	—	—	—	0.9	0.75	2.2*	0.4	0.66	0.6
Visual pollution counts	$\angle 10^+$											
Tar ball deposition	43^+ g/m ²											

+ Values are averages for the year. * Human. Payyambalam (all months 'Nil' record)

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