

II

MATERIAL AND METHODS

i) Study Area

Ratnagiri is one of the coastal districts in Maharashtra. Bordering the south boundry of Ratnagiri city is the river Kajvi. It is also known as Ratnagiri river, but more popularly it is called Bhatye estuary and is located at $16^{\circ}58'$ N and $73^{\circ}17'$ E (Fig. 1). The width of the estuary near the mouth is about 300 m (at this point there is a bridge across the estuary). However, at certain places the width is almost 1 km.

The collection sites were selected on both the banks starting from the mouth of the estuary (Fig. 2). The selection of the sites was made on the basis of human settlements as well as the salinity of the river water. The first site is near the bridge (BR) and on the south bank, upstream to BR are BS and BP. There is a sawmill at site BS. In between BS and BR is a fish-curing yard. Upstream to BS, there is a primary school. The next site, BP, is located near the primary school. On the north bank, the most upstream site is NM, a place called Narayan-mali, downstream is Juve (JV) and Karla (KR). At JV and KR, there is a heavy inflow of domestic sewage. There is no such inflow at NM. While identifying these sites, care was taken to select the areas with mangrove vegetation. However, plants are absent at BR. Sea water collections were made from a site west to BR and site is denoted as SW.

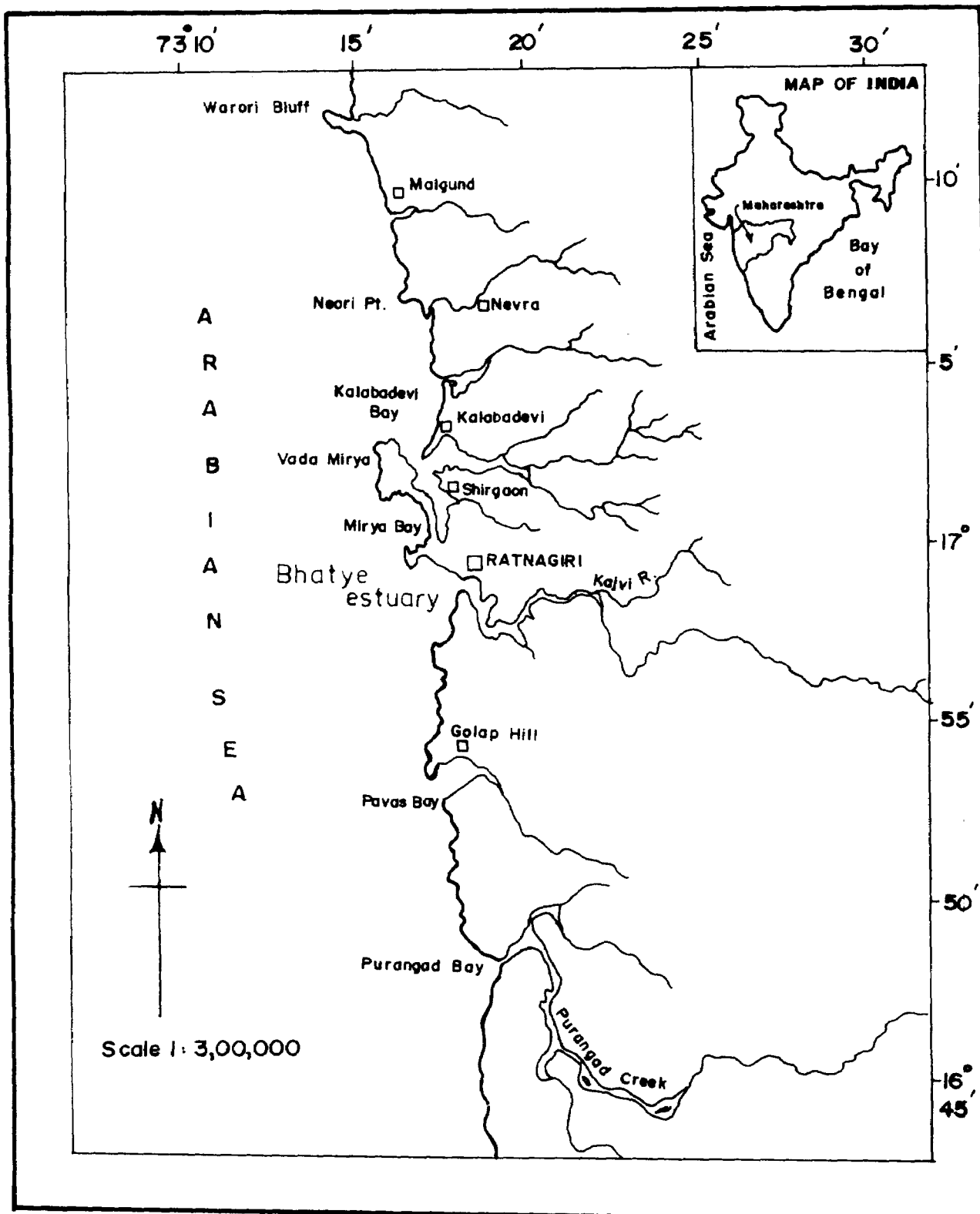


Fig. 1. Location map of study area

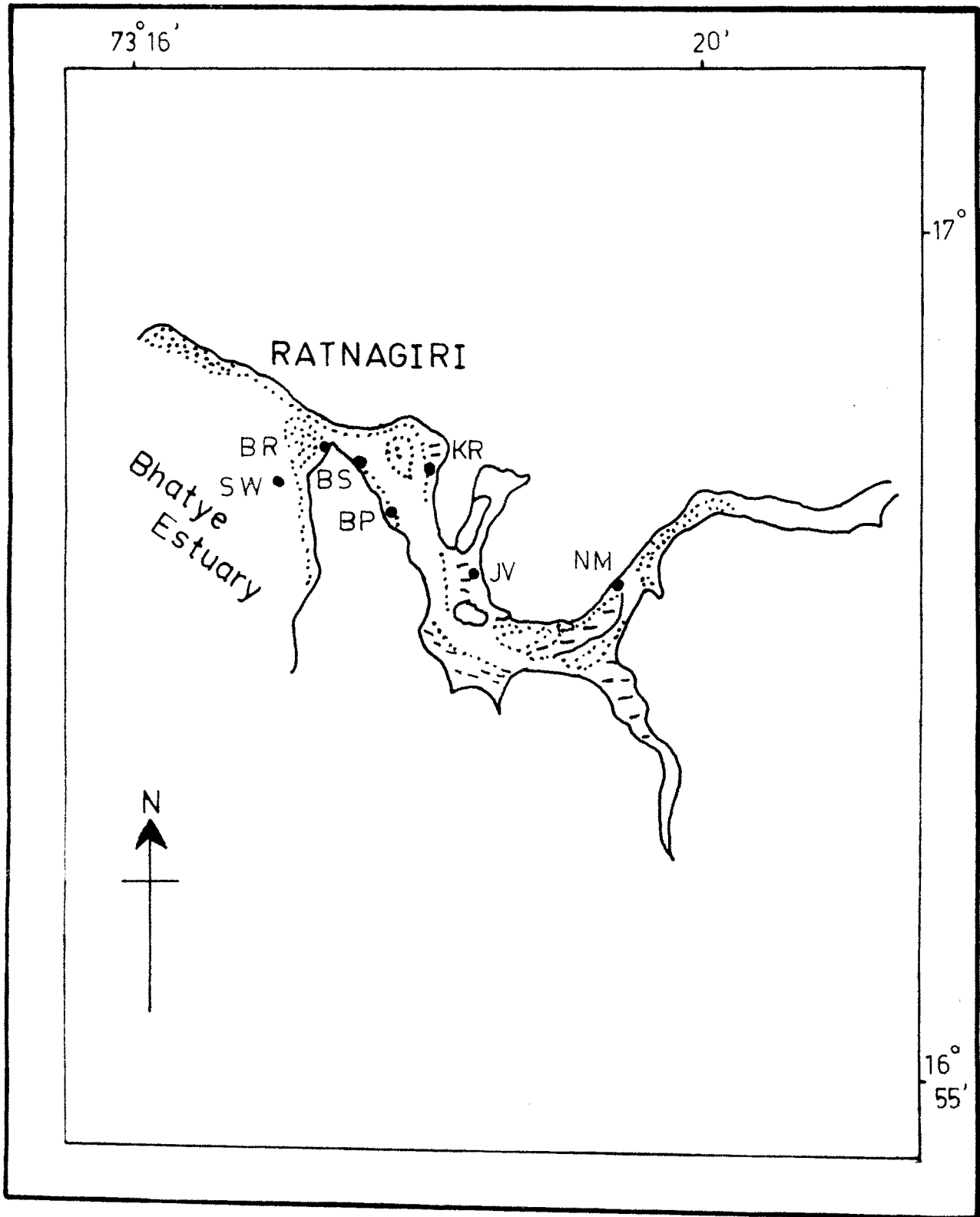


Fig.2. Map showing the collection sites

ii) Collection of Samples

Water, soil and plant samples were collected every month along the Bhatye estuary during 1987-88 and subjected to analysis of different parameters. The sampling was done during low tide at five sites. In addition, sea water sample and samples from the mouth of the estuary were also collected. All samples were collected at a depth of 50 cm in plastic containers and subjected to analysis within 24 hours of collection in the laboratory. After filtration, water samples were used for analysis of chlorides, salinity and elements such as Cadmium (Cd), Lead (Pb), Mercury (Hg) and Zinc (Zn); whereas pH, EC, and temperature were recorded on the field itself.

The soil and plant samples were collected from the vicinity of water sampling sites except for SW. Soil collected from 0-15 cm zone was air-dried and then subjected to analysis of pH, EC, chlorides and salinity.

The twigs of different mangrove species occurring at sites were collected and brought to the laboratory in air-tight polythene bags. Mature leaves were detached, washed with tap water to remove the surface dirt, rinsed with distilled water and were blotted gently. The fresh leaves were used for the determination of moisture content, chlorophyll, polyphenols, EC, TAN etc. while oven dried material was used for analysis of proline and elements like Cd, Pb, Hg and Zn.

iii) Methods of Analysis

Parameter	Method followed
a. <u>Water analysis</u>	
1. Temperature	Air and water temperature by ordinary thermometer
2. pH	Digital pH meter (Global DPN-501)
3. Electrical conductivity (EC)	Field conductivity meter (Naina, N.D.C. 730)
4. Chlorides	Titrometric method using silver nitrate with Potassium dichromate as indicator.
5. Salinity	From chlorinity (Grasshoff <u>et al.</u> , 1983)
6. Heavy metals and zinc	Detected on Atomic Absorption Spectrophotometer (Perkin Elmer 3030)
b. <u>Soil analysis</u>	
1. pH	Digital pH meter
2. EC	Field conductivity meter
3. Chlorides	Titrometric method as above (as in water)
4. Salinity	From chlorinity



c. Plant analysis

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| 1. | Moisture percentage | Drying in oven at 60 ⁰ C till constant weight |
| 2. | EC | Aqueous extract
Field conductivity meter |
| 3. | Titratable Acid Number (TAN) | Thomas and Beevers (1949) |
| 4. | Chlorophylls | Arnon (1949) |
| 5. | Polyphenols | Horwitz (1965) |
| 6. | Proline | Bates <u>et. al.</u> , (1973). |
| 7. | Heavy metals and Zinc | Acid digestion Toth <u>et.al.</u> ,(1948)
and then detection on AAS |

d. Primary productivity

By light and dark bottle method
Gaarder and Gran (1917)
