Benthos is an important and essential component of the marine and estuarine biome, but except for the species with obvious commercial value, it received little attention. Earlier investigations on benthos were directed towards the discovery of species and enumerating them. During the beginning of the present century, interests seemed to be directed more on the benthic ecology with particular reference to benthos as an essential component of marine and estuarine food chain system and to understand their structure and function.

A closer examination of almost any coastal beach, marine and estuarine, shows the signs of a galaxy of life that exists beneath its surface, the evidence of which is laid down by their highly dramatic activities, with mass of changing contours caused by various organisms. The larger animals that leave these tell-tale patterns are usually called the macrofauna or benthos but these comprise only a part of the fauna inhabiting the sediments.

Estuarine salt marshes sheltering sand and mud-flats are subjected to ever-occurring physical restraints which control the type of growth of the biota, they can support. These are silt, and saline water, given these physical restrictions. The kinds of plants and animals which can survive at any particular part of the world are
then largely governed by the prevailing macro- or micro-climates. By tradition the typical benthic ecological approach has to be concentrated on physicochemical characters of the environment and usually to tolerance responses of organisms to these environmental variables.

One of the most obvious relationships between benthic communities and environmental factors is that between feeding type and silt-clay fraction of the estuarine sediment. Sanders (1958) was the first to quantify this relationship, from his studies on the benthic fauna of Long-island Sound, New-York. The history of quantitative investigation on Chthnos is rather recent. It was not until the early years of the 20th century that C.G. John Peterson (1914) made extensive investigations in Danish water to study the importance of bottom-fauna in the marine economy. It is generally recognised that a detailed understanding of the benthic communities is necessary to obtain a comprehensive picture of the fishery potential of an area.

With this view in mind, an extensive study has been conducted on the macrobenthic communities in some of the selected deltalic environs, in the Hooghly-Matla estuarine system. This estuary is a good example of a coupled system that achieves a balance between physical and biotic components, and thereby a high rate of biological productivity. It is evident from the present study that the mudflats and littoral waters on the north-east and south coast of Sagar Island,
the largest "obs of the Gangetic delta, located in the Hooghly-Matla estuarine system, display considerable seasonal fluctuations in several environmental factors. A hoard of benthic fauna, both infauna (sessile, semisessile and burrowing) and epifauna (crawlers and creepers) are the happy residents of these habitats which are subjected to the varied oscillatory exposures of hydrological parameters.

Biological activity on and in tidal mudflats starts off the processes of soil formation from mineral sediments, and salt marsh development in the Sundarbans mangrove environment, and accelerates these processes. We have little quantitative information about the role played by the tidal flat organisms, fiddler crabs in particular; but there are a number of ways in which these precursors favour salt marsh formation. Once the flats are formed in sufficiently sheltered conditions, environment becomes favourable for the growth of salt-marsh vegetation, both micro- and macro-phytes (mangroves in this estuary). Ginsburg and Lowenstam (1958) reviewed the evidence of stabilising and salt trapping powers of filamentous algae and marine phanerograms (mangroves) in shallow sheltered waters. The burrows of invertebrate arthropods improve soil aeration and colonies of decapod brachyurans, l< fiddler crabs, molluscs and polychaetes, in the mudflats of Sara Island provide surface roughness which promotes sedimentation. Stronger growth of algae on the silt increases stability and accretion for the subsequent establishment of salt marsh benthic
invertebrates (Renwell, 1972), which in turn reconstitute clay into faecal pellets which settle quicker than unmodified clay flakes and help to promote accretion.

A field biologist is really amazed by the complexities of nature and specially the marvellous adaptations that species show to their habitats and to their neighbouring associate species. In this bewildering variability, and immediately observable pattern it becomes apparent that a few species are very common, represented by many individuals while most species are rare, represented by one or few individuals. There are two common ways to expressing such patterns, as a rank of abundance from the most to the least abundant species or as a relative abundance of each species.

The present dissertation enjoys the privilege to communicate the macrobenthic faunal structure and function with special reference to the fiddler crabs in six selected stations of the mudflats in Sagar Island, in relation to various noted environmental parameters, their diversity and ecological activity, as well as the interspecific interactions. So in the study on the diversity of benthic community is concerned, Sanders (1968) in his paper describing the rarefraction method stimulated a debate that caught the imagination of many workers that resulted a new dimension in ecological research on benthos. Benthic ecologists have done enough theorizing for the time being and now more concrete data of a natural history type are needed before any material advances in our understanding of factors
controlling the structure of benthic communities can be made (Gray, 1981).

In marine and estuarine biological studies, two approaches have recently been followed to simplify and extract information from the very complex patterns and events evidenced by collection of multispecies population. The first is classification in which collections are classified on the basis of their biotic content, or species are classified on the basis of their distribution within a series of collections according to some mathematical criteria. The second approach is the analysis of community structure, in which the distribution of importance (as measured by one or a number of criteria, usually abundance) among species is of primary interest. This includes such aspects as species diversity and its component dominance, constancy and periodicity.

This study is an attempt at such a combination of approaches and involves the classification by "objective" criteria of collections of macrobenthic animals from an estuarine ecosystem and the analysis of their composition, community structure and seasonal dynamics of the resultant association. Mathematical techniques are descriptively and analytically employed to aid the efficient extraction of important information and the simplification of complex structure.