GENERAL INTRODUCTION
CHAPTER I

INTRODUCTION

An estuary is a semi enclosed coastal body of water which has a free connection with the open sea and within which seawater is measurably diluted with freshwater derived from the land drainage (Pritchard, 1967). The estuaries are naturally productive ecosystem with large amount of plant material and significant population of crustaceans and finfishes. Fish production is usually higher in estuaries than any other natural water bodies. The estuaries provide a highly variable environment where salinity; temperature, turbidity and oxygen concentration of the water fluctuate periodically. In spite of this; estuaries serve as important nurseries for some species of prawns and fishes, which are of commercial importance. The estuaries are ideal habitat for aquaculture. The detailed investigation of hydrological factors, sedimentological factors and feeding habitats of organisms are of important aspects for proper utilization of estuarine habitat.

As estuaries provide good fishery and molluscan resources, some investigations have been made on some estuaries along the East and West Coast of India. The coastal belt of Karnataka State is distributed along the districts of Uttar Kannada, Udupi and Mangalore comprising number of estuaries along the 300-km coastal line. Some of the investigations have been carried out on the Kali, Sharavati and Netrnvnti estuaries but no systematic work is done on other estuaries. The Aghanashini estuary is well known for good crustacean,
molluscan, and fishery resources but detailed hydrological, planktonic and sedimentological studies are not carried out on the estuary. Therefore in the present work an attempt is made to carry out some studies on Aghanashini estuary, its hydrological features, sedimentological nature, zooplankton, benthos and seed distribution.

It is known that the ecology of a particular estuarine system differs with the geographical region, climatic condition and meteorological feature of that particular area. Therefore in second chapter some geomorphologic details of Aghanashini from its origin to the confluence with sea at Tadri village is described. Based on the preliminary survey of the estuary four sampling stations were identified for the collection of water and sediment samples. The four sampling stations represent four zones; lower marine water dominated area, lower middle typical estuarine region, upper middle region and the upper fresh water dominated reaches of Aghanashni estuary.

The basic physical and chemical studies of natural water bodies help to understand and plan for the proper use of water resource. So it is essential to carry out studies on the fundamental characters of water to have a proper understanding of the ecosystem. The regular monitoring of hydrological features helps in assessment of species dispersion, diversity and distribution at different trophic levels, which is an important requisite for ecological studies. Therefore in the third chapter hydrological details of selected stations collected regularly for
the period of twelve months is elaborated. The periodic changes brought about by the increased temperature during the pre-monsoon months and the change brought about by the heavy monsoons are also recorded, since it is known that increased rainfall altered the physical and chemical parameters of the estuary. The present study on hydrological characters of Aghanashini estuary will also help in understanding the quality of water and its capacity to support biota.

The estuaries are the areas where huge amount of organic matter is built-up; and considerable amount of organic detritus sinks to the bottom. The proper understanding of the estuarine fauna requires an adequate knowledge of sediment factors of the habitat. Therefore the sediment samples at different study area are collected for the period of twelve months by using the grab and analysed in laboratory to find out the composition. In the fourth chapter of the thesis, the sediment character of the Aghanashini estuary is elaborated.

It is known that the fish yield of an aquatic system depends on planktonic population. It is also reported that species composition of tropical estuaries is distinct from their counterparts in the temperate region. Hence in the fifth chapter, the distribution of zooplankton of the Aghanashini estuary studied for twelve months is elaborated. The total planktonic species occurring per m$^3$ of water area of study is computed. The present study throws light on the region wise planktonic population that is, yields in the lower, middle and upper reaches respectively.
Benthos is a collective term used for the organisms associated with aquatic sediments comprising bacteria, plants and animals from different phyla. The macro fauna of the estuarine basin is explained in the chapter six. The distribution of benthic fauna throws light on ecological habit and species composition of a given estuarine habitat. The benthic fauna was collected for a period of one year and analysed for its species composition.

Most of the commercially important shrimps and fishes use the estuarine habitat as their nursing ground. From the economic point of view, the study of natural distribution of seeds is important. Therefore in the seventh chapter, the seed distribution of the estuary is discussed.

The freshwater enters from the river and the circulation depends on residual river current and the stress of the wind on the water surface. According to the ratio between evaporation and seepage through the bar on the land and freshwater inflow plus precipitation on the other, the salinity varies. The estuary may become hypersaline or may retain normal value or it may become hyposaline.

Estuarine sediments are subjected to textural and morphological changes in response to wind induced waves and the lesser extent tidal currents. Closure to the shore, the role of waves and currents change in relative importance, although
wave may dominate. In estuaries, the relative role of waves and currents is not only reversed, but the dynamics are further controlled and complicated by the progression and recession of waves corresponding to frequency of the tides. The various parameters, which affect dynamics and sedimentation are fluvial river, intermixing of fresh and saltwater, residual motion and waves.

Estuaries are naturally very productive ecosystems with large amount of plant materials, crustaceans, molluscs, fishes and birds. The fish production per unit area is higher in estuaries than any other natural water bodies. (Woodwell et al., 1973), but the conditions of life are harsh and variable. The fauna of an estuary is generally a mixture of sea and inland water. Some of the marine and freshwater forms dwell in estuaries only transiently for the sake of feeding, breeding, migrating from sea to freshwater or vica-versa. Estuaries also serve as important nurseries for certain species of fish and crustacea, many of which are of commercial importance (Potter et al., 1983).

The study of estuaries has an added importance for monitoring the effect of pollution and for prospecting the Fish, Oysters, Clams and Prawns. Estuaries are ideal grounds for aquaculture, as successful in Japan, Australia and United States. Mussel culture is most successful in Japan and Taiwan where shallow areas of the estuarine inland sea are enclosed by fences.
The Aghanashini is one of the prominent esturine systems, well known for edible molluscan resources. It is relevant to point out that there is no consolidated information on aghanashini estuarine system located in Karnataka state, west–coast of India, though it is a very good estuary for biomass and aquaculture. A detailed survey of the region including the regional distribution of organisms, hydrological features of the ecological niche is felt necessary.

Therefore in the present work an attempt is made to define hydrobiological feature, distribution of plankton, sedimentological aspects, distribution of benthos and seeds to reveal the importance of Aghanashini estuary.

This work constitutes eco-physiological study on Aghanashini estuary covering investigations on hydrological and sedimentological aspects, zooplankton resources, benthos and seed resources of the study area.