PREFACE

“A handful of sand is an anthology of the Universe”

David McCord

The coastal sedimentary environment of Kerala is blessed with a chain of water bodies such as fluvial channels, estuaries and backwaters. These aquatic environments play a significant role in the socio-economic and environmental scenario of the State. The health of these aquatic systems is, perhaps, responsible for the scenic beauty, productivity and unique heritage of this “God’s own country”. Unfortunately, the various aquatic systems that sustain the life and greenery of the state are at the verge of severe deterioration as consequence of various kinds of human activities over the past 2 to 3 decades. Stringent efforts are needed to revive the healthy environmental quality of these life-supporting systems. Lack of scientific information regarding the existing environmental setting is the one of the major setbacks challenging wise decision-making and implementation of conservation and management schemes.

The present study is intended to generate the base line information regarding sedimentological and geochemical aspects of one of the major estuarine systems of the Kerala, “the Kayamkulam estuary” (Latitudes 9° 2’ to 9° 15’ N and Longitudes 76° 25’ to 76° 32’ E), located in the southwest coast of India. Attempts have also been made to assess the human activities responsible for the Shrinking of the Kayamkulam estuary. This is done, primarily through the
study of time series changes of the estuarine system using survey records as well as the remote sensing data base (IRS-IC, LISS III). The informations were transferred in the form of various thematic maps, were integrated using GIS for identifying the major causative factors for environmental degradation of this valuable estuarine / backwater system set naturally in the interface between Kollam and Alappuzha districts.

The present study enfolds information on the environment of deposition and lateral variation in texture, mineralogy and geochemistry with respect to various physico-chemical processes operating in the system. The geochemical analysis of major and trace elements, organic matter and carbonate content helped to establish their distribution pattern in the estuarine substratum in regard to toxic contamination / pollutant loading. The heavy and clay mineral investigations enable to decipher the nature and source contributions of the sediments. For the better understanding and expression of the results, the study area has been broadly divided into three zones namely: the northern, central and southern sectors.

The whole work is addressed into 7 chapters

Chapter I deal with the general introduction, which provides the location, climate, geology, physiography, geological and environmental setting of the study area besides the regional geology and historical perspective. The objectives of the present work are given towards the end of this chapter.
Chapter II provide the details of the field work, methods of sample collection, processing, analytical procedures employed for textural, mineralogical, geochemical and remote sensing and GIS studies.

Chapter III enfolds the textural and sedimentological characteristics of the surficial sediments of the Kayamkulam estuary.

Chapter IV describes the mineralogical constitution of estuarine sediments. An attempt has been made to unfold the provenance of sediments as well.

Chapter V presents the geochemistry of organic carbon, carbonates and major and trace elements in the estuarine sediments. The contamination status of estuarine sediments is also worked out in this chapter.

Chapter VI gives the integration of remote sensing data pertaining to the estuarine system as well as the adjoining areas. Geographic Information System (GIS) has been used to integrate various layers of information gathered in the form of thematic maps.

Chapter VII presents the summary of the whole study and the salient conclusions drawn from the results thereof.

The pertinent literatures cited are furnished towards the end of the thesis.