Successful planning and utilization of the vast brackishwater areas, inland bays, tidal pools, lakes and backwaters along the entire coastline of India for cultivation of prawns under controlled conditions requires very urgent consideration in the context of increased food production in the country. Although a small portion of these areas, especially those in Kerala, are being utilized for capture of prawns by a special indigenous process called filtration, vast stretches of these backwaters and estuaries still remain unattended. These areas in most cases provided biologically potential environment for healthy growth of many a species of fishes and prawns.

BACKGROUND

Existing method of culture were largely based on empirical knowledge. Lacking a scientific basis as such methods did, they were often wasteful and suffered severe limitation. Modern methods of fish and prawn culture based on scientific research, have revolutionized the industry in recent years and not only extended its scope to cover the whole country but led to increased fish and prawn production. An understanding of the biological capability of the water in the perennial and seasonal culture ponds, and the nature and extent of the influence of the abiotic factors on the production of organisms in the primary level of food chain would contribute to effectively implement management measures in the stocking strategies and in the evaluation of economics of production of prawns.
It is against this background that the present topic of investigation "Studies on the ecology and production of algae in prawn culture systems" was selected.

Investigations were carried out on the hydrological characteristics, seasonality in the concentration of nutrients, algal production and nutrient enrichment aspects in prawn culture ecosystems during the three monsoon season, viz., pre-monsoon, monsoon and post-monsoon period of 1986 and 1987. Three different prawn culture ecosystems were selected for the present study viz., a perennial prawn culture pond of Central Institute of Brackishwater Aquaculture (referred to as CIBA pond in the text, area 0.6 ha), perennial canals in the coconut grove where prawns are farmed (referred to as COCO field in the text, area: 1.0 ha), and a seasonal culture pond locally called POKKALI field (area, 0.8 ha), all of which are situated at Narakkal near Cochin.

The thesis is presented in five Chapters.

In Chapter I, a review of the status of shrimp aquaculture in the artisanal sector is included in order to assess the trend in recent production, demand and export of these organisms in Kerala State.

Chapter II presents an introduction to the topic of study. A review of relevant works done in the same field is made in order to bring an awareness of the present status of our knowledge on the subject, and also stress the importance of such study for shrimp aquaculture operations in the coastal bodies of water on scientific lines. The material and methods adopted in the
field collections and laboratory analyses, and also in the experimental work are presented in this chapter.

RESULTS of investigations carried out during 1986 and 1987 on the variations in the hydrological characters, nutrient distribution, production and distribution of algae and experimental aspects of nutrient enrichment of the medium on algal production along with the results of statistical analyses are presented in three parts under Chapter III.

Spatial and temporal variation in the distribution of hydrological properties such as salinity, dissolved oxygen, temperature, hydrogen-ion concentration (pH) and redox potential (Eh) in the three culture systems are described in Part - I. Part - II deals with the pattern of distribution of the available nutrients such as reactive phosphate (PO$_4$), nitrite (NO$_2$), nitrate (NO$_3$) and ammonia (NH$_4$) of water in the ecosystems.

The magnitude of gross primary production (GP) and net primary production (NP) was estimated and the results presented in Part - III(A). Nature and extent of variation in the concentration of Chlorophyll a, b, c and carotenoids, and their possible ratios were estimated and presented in Part - III(B). In Part - III(C), results of observation on the seasonal numerical variation of algal cells during 1987 are presented and explained. Results of computer analyses of the correlation between ecological and productivity parameters are presented, and the significance of correlation by multiple regression analysis highlighted in Part - III(D). In Part - III(E) an assessment of the status of
production at primary level has been made through NP:GP ratio, assimilation number and ratio of Chlorophyll pigments.

In order to delineate the effect of fertilisation on the primary production in the culture ponds, nutrient enrichment experiments were conducted under in situ during pre- and post-monsoon seasons (1987-'88) and in vitro during monsoon season. Nutrients such as nitrogen, phosphorus and silica and trace metals such as zinc, manganese, molybdenum, cobalt, copper, iron and EDTA were employed in the experiment individually and in combination. ANOVA technique was used to test the significance of the effects of treatments. The results of the experiments and statistical interpretation of the findings form the subject matter of Chapter IV.

In data on the above aspects, whenever necessary are given in tabular and graphical forms for effective representation of the results.

In Chapter V (DISCUSSION), an overall assessment of the interrelations between abiotic environmental factors and productivity has been attempted, and a critical evaluation of the implication of primary productivity on the economic production of prawns under farming presented and both the above aspects discussed in detail.

An executive summary of the results of investigation is presented in the final section of the thesis which is followed by a detailed list of references on the subject matter.