GENERAL INTRODUCTION
1.0. GENERAL INTRODUCTION

In India there are five major river systems, namely the Ganga, the Brahmaputra and the Indus river system in north, together with the Peninsular East coast and West Coast river systems in south. Rivers in India have unique hydrological regime characterised by peak flows during monsoon and lean flows either in winter (Himalayan rivers) or in summer (Peninsular rivers).

Indian rivers with a catchment area of 3.12 million sq.kms form a repository biological wealth characterised by a highly diverse fish fauna. Rivers in India constitute the backbone of capture fisheries. The 113 major and minor rivers along with their principal tributaries forms a biological wealth, unmatched in its qualitative and quantitative abundance. The rivers have through the ages supported a flourishing artisanal fisheries producing livelihood to millions of small-scale riparian fisherman. However, the increasing anthropogenic pressures on the rivers have adversely affected the fish production potentialities and they no longer support the rich biotic wealth.

The rivers of Kerala generally are short, steep, fast flowing and monsoon fed. Kerala has 44 rivers with length ranging from 15 km to 244 kms. Out of the 44 rivers 41 originate from the western ghats, flow towards the west and join the Lakshadweep sea and the remaining three rivers originate from the western ghats and join the Bay of Bengal, flowing through the neighboring states. The fishable river water in Kerala has length of more than 4,827 km. (85,000 ha)

Even though there are 44 rivers in Kerala State, information on the
ecology of these rivers is scanty. Hence this is an attempt to study in detail certain aspects of the ecology of one of the rivers in Kerala, the Ithikkara River.

1.1 Ithikkara River

The Ithikkara river system after its origin from Madathurikunnu, transverses through the Southern region of Kollam and finally drains into the Paravur lake. It is a comparatively unpolluted river of the State without any major industry in its bank. The cottage industries like pottery are located in the bank of the river. Bricks manufacturing units are also seen.

In its course it receives a variety of domestic wastes and domestic waste water and agricultural effluents. This river water is used for drinking, bathing and fisheries.

Ithikkara river origins from Madathurikunnu (Chinikkal) which lies at a height of about 240 meters above M.S.L. (Latitude 8°52'; longitude 77°1'). The main tributaries of the river are Vattaparambu Thodu, Kundumon thodu, Vattam thodu, Kulangethodu, Pallimon Ar.

The river flows through Pathanapuram, Kottarakkara and Kollam Taluks of Kollam district for a distance of 56 Km.

The following aspects of the Ecology of Ithikkara river were studied.

1.2. Hydrography

A detailed hydrography based on monthly collections during the period of one year from six selected stations starting from the origin to the mouth of the river.
Physico - Chemical parameters.

a) Rainfall
b) Temperature
c) Transparency
d) Velocity of flow
e) Hydrogen ion concentration (pH)
f) Dissolved oxygen
g) Free carbon dioxide
h) Salinity

Micro nutrients

i) Nitrate
j) Nitrite
k) Phosphate
l) Silicate.

1.3. Planktons

Studies were done on the distribution, nature and variations of the phytoplankton and the zooplankton of the river.

1.4. Benthos

The following aspects were studied.

a) Texture of the sediment
b) Hydrogen ion concentration of the sediment
c) Organic content of the sediment
d) Flora of the sediment

e) Fauna of the sediment.

1.5 Detailed survey of the fishes and other macro fauna.

1.6 Morphometric features of Ithikkara river basin

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin area</td>
<td>642 Km²</td>
</tr>
<tr>
<td>District of Kerala in which basin is located</td>
<td>Kollam</td>
</tr>
<tr>
<td>Origin of river</td>
<td>Madathurikunnu</td>
</tr>
<tr>
<td>Elevation</td>
<td>240m above M.S.L</td>
</tr>
<tr>
<td>Length of main stream</td>
<td>56 km</td>
</tr>
<tr>
<td>Main tributaries</td>
<td>Vattam thodu, Vattaparambu thodu, Kulanje thodu, Pallimon Ar, Kundumanthodu</td>
</tr>
<tr>
<td>Average annual rainfall</td>
<td>2400 mm</td>
</tr>
</tbody>
</table>

Identified rain gauge stations with their locations

a). Nilamel (08° 50'N and 76° 53'E)

b). Paravur (08° 47'N and 76° 53'E)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average annual stream flow</td>
<td>489 mm³</td>
</tr>
<tr>
<td>Navigable length of river</td>
<td>16 Km</td>
</tr>
<tr>
<td>Catchment area</td>
<td>642 sq.km.</td>
</tr>
</tbody>
</table>

(Fig. 1 & 2)
1.7. Physical features of selected stations

Station I Chinikkal

Height 240 meter above M.S.L
Lat. $8^0 52'$ Longitude $77^0 1'$

Since the Ithikkara river originates from Madathurikunnu and flows through dense forest, it is very difficult to make collections from this region. The elevation of this region is 240 meter above M.S.L. The river flows and reaches the station I, Chinikkal. Here Two rivulets merge and form a narrow, shallow body of water. The substratum of this area consists mainly of large boulders and bedrock. This area is surrounded by reserve forest with thick vegetation. There are Eucalyptus plantations and paddy fields in this area. The water is crystal clear at this spot. The depth of this region varied from 0 to 70 cm. A small pool is located in this region, during April the quantity of water decreased in the pool. A bricks manufacturing unit is located in this region, yet Human habitation is scanty. (Plate I)

Station II Minkulam

Height 122 meter above M.S.L.

Latitude $8^0 53'$ Longitude $76^0 52'$

About 10 km from station I is Minkulam. In this station there is a pool having a depth of 1.5 to 2 Mts. The pool is followed by a flat rapidly flowing meander and flood plain. This region of the river is shallow and was selected for collections of samples. A narrow man made canal coming from the paddy fields
opens into the river. On one side there are paddy fields and plantain plantations. Water was turbid and is used for washing and bathing. During dry season the water body becomes very shallow and narrow (Plate I).

**Station III Malapperur**

Height 70m above M.S.L.
Latitude $8^\circ 53'$ Longitude $76^\circ 52'$

After a distance of 15 km from Station II (Minkulam) is situated Malapperur. This region of the river was selected as Station III. There are many deep pool zones in this region. Many pools, located in this region, the river, are shallow and wide. The bottom consists of coarse sand, pebbles, rocks, large boulders and bedrock. Water is turbid and is used for washing and bathing. Both sides of the river are inhabited and human influence is considerable. Intermittently on both sides of the river there are rubber plantations. Irrational exploitation patterns of the fishing have led to degradation of habitat. (Plate I)

A remarkable peculiarity of the station is the abundance of *Tristicha ramossissima*, Willis - a hydrophyte (Family: Podostemaceae)

**Station IV Chenkulam**

Height 20 meters above M.S.L.
Latitude $8^\circ 52'$ Longitude $76^\circ 45'$

The fourth station, Chenkulam, is situated 16km from Malapperur, the third
station. This is also a rocky area. The water is very turbid and discolored. Sand is being collected from the riverbed (sand mining) for industrial use. Due to sand mining many regions of this station became 10-20 feet deep pools. The river slows down in this region, and the bottom is sandy. Collection of sand from the riverbed is a regular affair in this zone (Plate II).

**Station V. Ithikkara**

Height 18. Meters above M S L.

Latitude $8^\circ 51'$ Longitude $76^\circ 42'$

Ithikkara is situated 7 Km. from Chenkulam. The river is wide and deep. Here Pallimoni Ar-a tributary, merges with Ithikkara river and form a vast body of water and flows slowly. On one side of the river is paddy field. Here the river is slightly polluted with oil owing to the cleaning of vehicles (Plate II).

**Station VI Perumpuzha**

Height 4 meters above M.S.L.

Latitude $8^\circ 47'$. Longitude $76^\circ 40'$. 

Perumpuzha is located 7 km. from Ithikkara. This is the widest and deepest part of the river; it enters the Paravur Lake. The river slows down in this region. Water is turbid and the bottom is sandy and muddy. On one side there are coconut plantations. River mouth is located in this area. Here, Ithikkara river flows through open area and is wide. Human habitations are found along the banks (Plate II).
Fig. 1. Lthikkara river indicating study sites
Fig. 2. Longitudinal profile of the surface gradient of the Ithikkara river
Station IV. Chenkulam

Station V. Ithikkara

Station VI. Perumpuzha