CHAPTER 3. STUDY AREA

Achencovil River, selected for the present study is a freshwater perennial lotic system of the southern Western Ghats formed by the confluence of several small streams like Kallar, Kanayar, Chittar and Kakkadyaar originating from the hills of Rishimala, Pasukidamettu and Ramakkalteri in Eastern Kerala, India. The Achencovil Reserve Forest (9°0′N- 9°10′N, 77°0′E-77°16′E) is located in the proximal drainage area of Achencovil River. This river with about 130km length has a catchment area of 1484 Km² and passes through Mavelikkara, Thiruvalla and Karthikapally Taluks before joining the Pamba River at Veeyapuram (9°19′N, 77°27′E) in Alappuzha District (Plate 1). The river exhibits dendritic drainage pattern at its source area but becomes trellis and sub trellis towards low lands (Abbassi et. al., 1997; Manu and Anirudhan, 2008) (Plate 2). This river has been the lifeline for several villages in between, being the major source for drinking water, agriculture and means of transportation.

This river plays a cardinal role in balancing the ecosystem by conserving the precious aquatic biodiversity which is a prime consideration for sustainable development but the very existence of these life-giving rivers is now threatened by extreme environmental degradation. The various anthropogenic activities may alter the physico-chemical characteristics, changing the riverine habitats thereby affecting the biodiversity of river Achencovil. Unsustainable development policies, unsound planning, human greed and the desire for material comforts have combined together to create this precarious situation. Information about the biodiversity of Achencovil river system is provided to an extent by Kurup et. al., 2004; Neelakandan et. al., 2006; Johnson and Arunachalam, 2009 and Swapna, 2009.

Most of the part of this river flows through Pathanamthitta and Alappuzha districts which are densely populated and the river is depended on for various domestic and agricultural purposes. During the season of Sabarimala pilgrimage, this river is found excessively used by devotees of Lord Ayyappa as it is flowing through Pandalam – the birth
place of Lord Ayyappa. The pollution of this river causes water borne diseases such as diarrhoea, dysentery, gastroenteritis and jaundice among the people using this water during pilgrim season.

### 3.1 STUDY SITES

Four segments along the river were demarcated as study sites for the present investigation. They were Achencovil (origin of river), Pandalam, Kochalumood & Veeyapuram (river mouth). Brief descriptions of the selected segments are given below:

#### 3.1.1 Achencovil

Origin of the river lies in the forest area of Achencovil reserve forest that has three forest ranges – Kallar, Kanayar and Achencovil ranges $[9^00'N - 9^010'N, 77^00'E - 77^016'E]$. During the study period this segment was featured by small and moderate perennial rocky stream with shore-line trees of semi-evergreen and evergreen forests. Cool and clear water was found flowing over eroded bedrock, cobbles and boulders with good current velocity. Moderate waterfalls, creeks, brooks, cascades, alternating riffle and pool sections were also characteristics of this segment. Mid-stream depth was below 1.0m making the segment wadeable. Achencovil segment was divided into five sampling sites viz Kallar, Kanayar, Kuttar, Thoovalmala and Alimukku, for getting sample replicates and to avoid biases (Plate 3).

#### 3.1.2 Pandalam

Pandalam segment of the river lies in the district of Pathanamthitta $[9^013.59'N - 9^014.03'N$ and $76^040.49'E - 76^040.23'E]$. The segment was characterised by mid-stream depth of more than 1.0 m making it non-wadeable. Distinct meanders and levees were part of the riverine system here and were wide with considerable deposition, predominated by silt. Water seemed to be warm and turbid surrounded by floodplain forest in some areas, and by sand and clay banks with sediment bars in other areas. This segment was found densely populated by
human inhabitants on banks of river. Summer cultivation of common vegetables is popular in this part of the river. Rubber plantations could be seen in close proximity with the river at Pandalam segment. Further, rubber processing factories are located near the river at Aruvappulam in Konni Panchayat. Sand mining was above the desired limit in this part. River water has been found to be extensively used by devotees of Lord Ayyappa during Sabarimala Pilgrimage season at Pandalam segment. Pandalam segment was divided into five sampling sites viz Aruvappulam, Thumpamon, Kaippuzha, Edappon- Vettiyar and Pulakkadavu for getting sample replicates (Plate 4).

3.1.3 Kochalumood

Kochalumood segment of river Achencovil is in the district of Alappuzha [9°15.13’N - 9°15.40’N and 76°35.03’E - 76°34.37’E]. This segment was also non-wadeable with commentable depth at mid-stream region. Water temperature and transparency was found to be altered by discharge of effluents from industries at this segment. Nearly hundred and thirty five small scale industries are located in the Industrial estate of Kochalumood. Kochalumood segment was divided into five sampling sites viz Nanjookkad, Kollakadavu, Cheriyanadu, Mannar and Anchuthengu for getting sample replicates (Plate 5).

3.1.4 Veeyapuram

Veeyapuram segment lying in the district of Alappuzha encompasses the river mouth [9°21.01’N - 9°19.39’N and 76°27.37’E - 76°27.57’E]. River mouth of Achencovil is not directed to sea or brackish water, but the water discharges into another major river called river Pamba at Veeyapuram. This segment of the river was found to be surrounded by paddy fields with intensive agricultural activity during the study period. Several outlets from agricultural land were visibly aiding water flow as land run-off to the river. Veeyapuram segment was divided into five sampling sites viz Veeyapuram I, Veeyapuram II, Veeyapuram III, Veeyapuram IV and Veeyapuram V for getting sample replicates (Plate 6).