SECTION V
SUMMARY & CONCLUSION
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The River Tamiraparani is the longest river in Kanyakumari District. During the course of flow the river crosses various physiographical units. Human settlements are found along the bank of this river, making it polluted using its water for household purposes, agriculture and animal husbandry. Bathing, washing animals and vehicles and dumping domestic wastes and municipal wastes make the river highly polluted. This river is the major fresh water source in this area. Agricultural processes like cultivation of rubber trees, banana trees and coconut trees were done in the banks of the river. Coconut husk retting is also done in many places of this river. Many brick industries are present in the banks of this river. Sand mining in many parts of this river makes it deep in many parts.

In the present study three hypothesis were set and the investigations were carried out. The first hypothesis states that there will be seasonal variation in physicochemical parameters. The present study shows seasonal variations in the physicochemical parameters like temperature, pH, electrical conductivity, amount of calcium, magnesium, sodium, potassium and chloride.

In the present investigation the water temperature shows seasonal fluctuation. Maximum temperature was recorded in summer and a minimum temperature was recorded during winter and rainy seasons.

The pH was less than 7 in most of the places. In retting zone (station I) very low pH was observed in summer.

Electrical conductivity was very low during the rainy seasons especially when a very high flood occurred in the month of December 2010. But in the month of December 2011 the conductivity was high. This may be due to the lesser amount
of rainfall during this month. In December 2010 the conductivity was very low in station I and J. Although the conductivity was very low in the month of December the conductivity was high in these stations in the month of January 2011 and other months.

The dissolved oxygen was very low in samples taken from many stations especially the amount of dissolved oxygen in station I was very low since retting activity is done in this area. In waters contaminated with fertilizers, suspended material, or petroleum waste, microorganisms such as bacteria will break down the contaminants. The oxygen will be consumed and the water will become anaerobic and so the dissolved oxygen becomes less.

Electrical conductivity, alkalinity and amount of calcium, sodium and magnesium were very high during the month of March 2011 in station J comparing to other months. In March 2012 and April 2012 the conductivity and the amount of calcium, sodium and magnesium were very high. This may be due to the absence of rain during these month.

The higher amount of chloride was due to the addition of organic materials like domestic sewage.

Rivers generally contain 1-2 ppm calcium. In lime areas rivers may contain calcium concentrations as high as 100 ppm. But the calcium level of Tamiraparani river ranges from 6 ppm to 332 ppm. The amount of calcium is very high in station I. High amount of calcium may be due to the mixing of calcium containing compounds. High amount of calcium in station I may be due to the mixing of ashes from crematoria and leaching from animal bones. The amount of magnesium is also higher in station I.
Seawater contains approximately 11,000 mg/L sodium. Rivers contain only about 9 ppm. Drinking water usually contains about 50 mg/L sodium. In the present investigation the amount of sodium varies from 0.400 mg/L to 8000mg/L during the first year of the study period. The highest amount of sodium was observed in station J during the month of March 2011. The highest amount of sodium in March 2011 may be due to the intrusion of salt water in the estuary. The lowest amount in the month of December 2010 may be due to the heavy rain occurred in this month. Sodium was present in very large amount in the month of March 2011, March 2012 and April 2012. Rivers generally contain about 2-3 ppm potassium. But the amount of potassium is more than 3 ppm in most of the stations except in monsoon months. Amount of potassium was very high during May 2011 and April 2012. This high amount of potassium may be due to the addition of fertilizers from the nearby agricultural lands.

The sodium adsorption ratio is below 1 in many places the water was excellent for irrigation purpose. The sodium adsorption ratio of station I and J are beyond the permissible limit and so that water is not suitable for irrigation purposes.

The second hypothesis was there will be metal pollution in this river. This was analysed by using geo accumulation index. The geo accumulation index shows that this river was not contaminated with heavy metals. The heavy metals like zinc, copper, iron and manganese are present in very low amount. Since sand mining is done in a large amount in this river the metals are present in lower amount. The decrease in metal concentration is due to the sandy nature of the bottom sediments.
The third hypothesis was that the mean value of all the parameters of first year of the study period was equal to the second year of the study period. This is analysed by using student’s t test. The t test was made for all the parameters in water sample and the parameters like temperature, hydrogen ion concentration, dissolved oxygen, dissolved iron and dissolved copper were found to be highly significant the dissolved zinc was found to be significant. Therefore these results were in conformation with our hypothesis that is the mean values are not equal over years.

The sediment of this river shows acidic pH in most of the places. The electrical conductivity is high in station J. A very low amount of electrical conductivity was observed during the month of August 2011. The amount of nitrogen and phosphorus decreases towards ocean. The amount of nitrogen, phosphorus and potassium are also present in higher amount. This is due to the intrusion of fertilizers from nearby agricultural land.

The t test was made for all the parameters in sediment and the parameters like electrical conductivity, amount of nitrogen, phosphorus, potassium and dissolved zinc were found to be highly significant. Therefore these results were in conformation with our hypothesis, that is the mean values are not equal over years.

In this river, station I is the more polluted area. The amount of calcium in this area is very high. The dissolved oxygen in this area is very low. Also this water is unfit for irrigation since sodium adsorption ratio in this area is very high. Since sodium adsorption ratio in this area is high the amount of sodium, calcium and magnesium in this station is also high. The pH of this station is also very low.
In the present study it is learnt that sand mining deepens the river by removal of the topmost layer in many places and the trace metals are very low in this river. The trace metals like iron, zinc and manganese were present in very low amount.

Kanyakumari district is not an industrial area and the amount of rainfall was also higher during the study period and so this river is not much polluted as the other rivers. But the amount of chloride content indicates that organic impurities like municipal sewage and domestic wastes were dumped in this river.

In this river sand mining should be stopped in order to prevent soil erosion. Regular environment monitoring should be carried out to have baseline information on the state of the health of river. In water the parameters like temperature, hydrogen ion concentration, dissolved oxygen, dissolved zinc, dissolved iron and dissolved copper were increasing according to t test. In sediments the parameters like electrical conductivity, amount of phosphorus, amount of potassium and zinc were significant according to student’s t test and so these ions were increasing year by year and so further studies can be carried out in the above factors.