

# **Effects of human activities on aquatic eco systems around Kandy**

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# 1. Introduction

Sri Lanka is a developing country with rich bio diversity. Irrespective of the size Sri Lanka has a rich eco system diversity because of its topographic and climatic heterogeneity as well as its coastal influence. It is considered as a bio diversity hotspot and is a water rich country. There are many diverse aquatic habitats [1] spread all around the country.

Kandy which is situated in central province [2] is a water rich area with high bio diversity and is considered as a water catchment area. In Sri Lanka ground water is the main source of water .Therefore Kandy is very important to the whole country as it is rich in ground water resources and , as many rivers and streams flow through Kandy. So, the aquatic habitats of Kandy is important to the whole country.

However, with the time various human activities that has resulted by the increasing of human population density, economic development, industrialization, urbanization etc. have caused disruptions in aquatic eco systems around Kandy [3]. Poor land use and planning, indiscriminate exploitation of biological resources, unsystematic waste disposal are some of human activities which may lead to water pollution, eutrophication, bio degradation, invasive alien sp. ,habitat loss and habitat fragmentation. The absence of an integrated conservation management approach, legal systems remaining static though aquatic ecological factors and human factors have evolved and weak enforcement of legislations have further accelerated the demolition of aquatic eco systems around Kandy.[4]

This has caused a massive declination of biological diversity in aquatic habitats around Kandy. [5]

[1] <https://www.slideshare.net/dsamkhan/freshwater-biodiversity-of-sri-lanka>

[2] <https://kandycity.lk/geography-kandy-sri-lanka/>

[3] <https://www.ips.lk/talkingeconomics/2013/05/20/biodiversity-as-a-cornerstone-of-sustainable-development-a-sri-lankan-perspective/>

[4] <https://www.cea.lk/web/en/acts-regulations>

[5] <https://news.mongabay.com/2020/07/new-assessment-shows-74-of-sri-lankas-freshwater-fish-threatened-with-extinction/amp/>

## 2.Hypothesis

- I. Human activities may lead to rapid loss of bio diversity and accumulation of toxic pollutants in aquatic water bodies in the Kandy vicinity causing damages to aquatic eco systems.
- II. Invasive species may drive local species in to extinction because of high reproductive rate and ability to adopt to extreme conditions of water bodies.

## 3.Objectives of the study

- I. Identifying the human activities damaging aquatic eco systems in Kandy.
- II. Monitoring the pollution of aquatic eco systems in Kandy.
- III. Observing the reduction of bio diversity in aquatic eco system.
- IV. Comparison of water quality of aquatic eco systems.
- V. Suggesting measures to reduce and prevent degradation of aquatic eco systems.

## 4.Methodology

### Experiment 1

#### Materials

- pH meter
- Test kits and strips

#### Method

1. Collecting water samples from Hydro resources around Kandy (Kandy Lake-polluted, Mahaweli River-polluted, Streams around Peradeniya-non polluted)
2. Taking
  - Ammonium ( $\text{mg l}^{-1}$ )
  - Nitrite ( $\text{mg l}^{-1}$ )
  - Nitrate ( $\text{mg l}^{-1}$ )
  - Turbidity  $\text{mg l}^{-1}$ )
  - Hardness ( $\text{mg l}^{-1}$ )

- pH level of above samples.
- 3. Comparing
  - Readings of the polluted source and non-polluted source
  - Fluctuation of the above readings with time.

## Experiment 2

### Materials

- *Hydrilla sp.*
- *Cryptocoryne wendtii*
- Identical tanks
- Culture medium
- Water

### Method

1. Adding equal amounts of culture medium to 2 identical tanks.
2. Planting equal number of plants in 2 tanks.
3. Adding equal amount of water from the same source to water tanks.
4. Allow species to grow in culture medium under same controlled conditions.
5. Maintain controlled conditions such as Temperature and pH level.
6. Take observations and readings
  - Final length( $L_2$ ) , Initial length( $L_1$ )
  - Growth rates (by comparing initial lengths of the plants with final lengths of the plant)
7. Comparing average growth rates of the two plants.

$$\text{Growth rate} = \frac{L_2 - L_1}{L_1} \times 100\%$$

## 5. Time Frame

| Activity                     | Time   |   |   |   |   |   |   |        |   |    |    |    |    |    |        |    |    |    |    |    |    |        |    |    |    |    |    |    |       |    |    |
|------------------------------|--------|---|---|---|---|---|---|--------|---|----|----|----|----|----|--------|----|----|----|----|----|----|--------|----|----|----|----|----|----|-------|----|----|
|                              | Week 1 |   |   |   |   |   |   | Week 2 |   |    |    |    |    |    | Week 3 |    |    |    |    |    |    | Week 4 |    |    |    |    |    |    | Other |    |    |
|                              | 1      | 2 | 2 | 3 | 5 | 6 | 7 | 8      | 9 | 10 | 11 | 12 | 13 | 14 | 15     | 16 | 17 | 18 | 19 | 20 | 21 | 22     | 23 | 24 | 25 | 26 | 27 | 28 | 29    | 30 | 31 |
| Problem Identification       |        |   |   |   |   |   |   |        |   |    |    |    |    |    |        |    |    |    |    |    |    |        |    |    |    |    |    |    |       |    |    |
| Literature review            |        |   |   |   |   |   |   |        |   |    |    |    |    |    |        |    |    |    |    |    |    |        |    |    |    |    |    |    |       |    |    |
| Proposal writing             |        |   |   |   |   |   |   |        |   |    |    |    |    |    |        |    |    |    |    |    |    |        |    |    |    |    |    |    |       |    |    |
| Aquatic eco systems analysis |        |   |   |   |   |   |   |        |   |    |    |    |    |    |        |    |    |    |    |    |    |        |    |    |    |    |    |    |       |    |    |
| Report writing               |        |   |   |   |   |   |   |        |   |    |    |    |    |    |        |    |    |    |    |    |    |        |    |    |    |    |    |    |       |    |    |



