



Environmental Sensitivity Analysis

Maha Oya Lowland & Coastal Regions

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1. Background

Environmental Sensitivity Analysis is an estimate of susceptibility of depleting or gaining natural resources against the actions of natural or non-natural processes. In the study, merged environments of Maha Oya lowland, Gin Oya stream and adjacent coastal stretch have been considered in the sense of hydrology, geophysical and the biomass.

The ground elevations in the lowland (lowest) corridor are much lower and seasonal floods are occurred frequently. Some of the lowland areas had been used for shrimp farming and now part of them remain as abundant farms. Few other farms are reclaimed for home gardens or industrial uses.

The landuse/landcover in the areas have changed considerably for the last five decades, mainly from coconut lands to home plots or industrial lands. It would say that the area could be considered as semi urban. More improvements have been done for the road network too.

2. Analytical Method

For the environmental sensitivity analysis the entire area was surveyed for the environmental features, such as physical, biological, and socioeconomic. Considering the networking and merged nature of Maha Oya, Gin Oya and surrounding near shore and coastal area, entire area contain the said environment was selected as the study area. The natural and non-natural processes, that could influence any impact on the elements of environment or part thereof, were then explored. The characteristics of the natural features were detailed for analyzing their sensitivities. Further the management practices that exist in the region were analyzed for assessing the state of moderated sensitivities on future scenarios. Number of future scenarios, which were determined by exploring the recent trends, were considered in the analysis.

3. Hydrology

At the Maha Oya lowland (lowest) corridor, the water bodies of Mata Oya and Gin Oya are merged in to a twin system which is having varying hydrodynamics and biodiversity. In the past the two streams were connected together through a stream at Maha Oya mouth, but due to the coastal erosion and human activities the connectivity has now been lost. However the water circulations between two streams are still prevailed through Dutch canal.

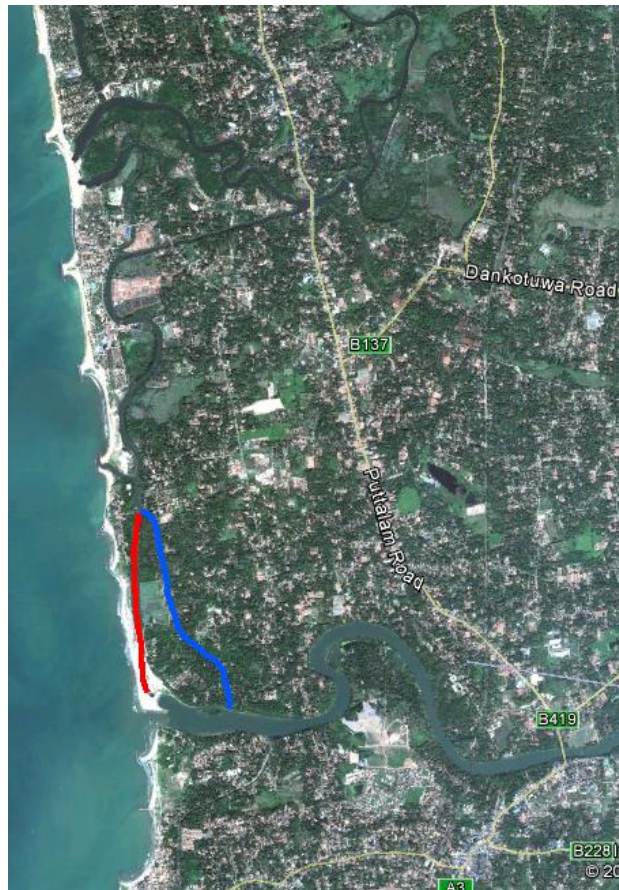


Figure 1 Lost and existing connectivity

For a long period, the Gin Oya discharged to sea at the Maha Oya mouth. With the erosion and erosion control structures have changed the hydrology in the systems and new sea outlet has been formed behind the breakwater.



Figure 2 New sea outlet behind the breakwater

Further seasonal water exchange of Gin Oya and sea is being taking place at the modified pocket between two breakwaters.



Figure 3 Seasonal outlet between structures

4. Sensitive Environments

In the region considered under the study, the distribution of sensitive environments are mapped and attached hereto. The sensitive environments are more coastal specific and limited to the low elevated lands mainly in and adjacent to the blackish water areas in the intertidal and estuarine zones.

Sensitive biomasses are mangrove dominant. By exploring the area it can be found that the spread of the special botanical species of *Nypa fruticans*, "Ging Pol" that is the only palm that grows naturally in water. The Ging Pol is a mangrove plant which is unique to Gin Oya environment. In the area it is also found rich mangrove cover of *Rhizophora spp.* *Rhizophora spp.*, which is a true mangrove species, provides very important environment as nursery ground for tropical fish. Hence the environment could be considered as a unique ecosystem of mangrove habitat with indigenous aquatic and terrestrial plants.

Since the mangroves are distributed along the reverine and estuarine areas, it is uncertain that they provide any protection against stormy conditions. Even though they do not provide protection for coastal erosion, they would create a barrier for flood water flows with high energies in storm conditions.

5. Risk Assessment on Sensitive Environments

The natural and non-natural processes were examined for the assessment of threats to the sensitive environments in Maha Oya Lowland corridor. There are hardly any natural processes could be found as threat to the nature. But there might be few natural processes, which are directly or indirectly influenced by human actions. One such process is the water exchange in the merged system of Maha Oya estuary, Gin Oya and sea. Due to the structures introduced for controlling the sea erosion the water exchange in the system has been changed considerably. Hence there might be changes in the water chemistry in particular the salinity resulting changes in the ecosystem of the sensitive environments.

With the urbanization of the area there is increased need of transport. Hence new roads are added to the network while the existing roads are upgraded. The water exchange in the system has now been altered due to the development of the road network. Some of the culverts and small bridges introduced to the road network have no adequate clearances for water exchange. This may result for separation of the environment into few colonies, which will be having varying characteristics. Since the catchment of Gin Oya is too small, the water circulation in the system is kept minimal. In this circumstances water stagnation would be another risk of changing the current environmental conditions.



Figure 4 Culverts and bridges etc in the road network



Figure 5 A new bridge under construction

Last two decades, the low land areas within the Maha Oya lowland corridor had been converted to shrimp farms, and now the farms are abandon. Some of them are remain as water log areas, but others are reclaimed for home plots and industries.

The stagnated water added to the Maha Oya and Gin Oya system in the flood seasons, resulting degrading the estuarine environment.



Figure 6 Abandon shrimp farms

The reclamation might create risk of pollution of water bodies, since massive amount of garbage is used as reclamation materials.

Few initiatives for environment enhancement are in place in combination with tourism activities. The top hotels in the area have linked tourism promotion activities, based on ecotourism, and taken steps for preserving the ecosystem. Few more hotels have been proposed in the area, and self or promoted programs with the hotel industry could be the most appropriate action towards sustainable management of Maha Oya ecosystem.