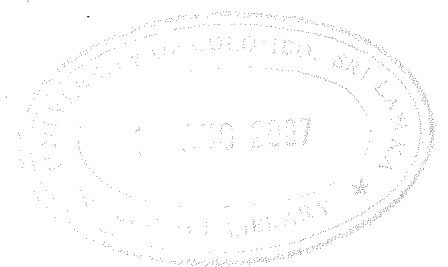


Mapping and identification of Forest Types/Eco-Systems in lower region of Kala Oya river basin and identification of flood plain using GIS and remote sensing.

Jagath C. Vithanage

540278

Thesis submitted as partial fulfillment of the degree of Masters in
Environment Sciences, University of Colombo, Sri Lanka
2006



Abstract

The Kala Oya river basin is the fifth largest river basin in Sri Lanka. It spreads over an area of approximately 2,870 km² of which more than three quarters is situated in the north-western dry zone of Sri Lanka while the remaining part is located in the intermediate zone. It is a long and narrow basin with an average width of about 25 km and an average length of about 150 km and for administrative purposes the basin is subdivided into three sub basins. The basin contains number of important physical, biological and cultural resources. For instance the lower region contains several minerals. The coastal resources in the lower region of Kala Oya basin include varied biotopes such as mangroves, sand dunes, lagoon, estuary and coral reefs. The lower part of the basin consists of the largest wild life reserve in the Sri Lanka "Wilpattu National Reserve" and the Kala Oya River opens to the Puttalam Lagoon changing its depositing pattern.

The Kala Oya river basin has been subjected to rapid development in recent time with the advent of the Mahaweli development programme. As a result, the biodiversity and critical archaeological sites are likely to be effected if there is no proper management of the river basin. Therefore, proper management of the Kala Oya river basin, in order to ensure long term economic productivity to meet the rising demands for the future requires balancing off of the many values and assets that make up and sustain this complex river system.

Remote Sensing techniques, Geographical Information Systems and GPS have been used as tools to assess the change in land use pattern and to identify the critical eco-

systems for conservation in this exercise. The IRS and Landsat satellite images are the main primary data sets that have been used to Change analysis and to construct the Land use/Land Cover (LU/LC) map for the year 2001. Moderate Resolution Imaging Spectroradiometer (MODIS) 8 day time series satellite data and Digital Elevation Model (DEM) were coupled with IRS pan sharpen image to find out the Normalized Differentiated Vegetation Index (NDVI) distribution over the year. Flood plain was delineated using DEM, Soil map and ground truth points collected in rainy season.

The map is updated for the Kala Oya lower basin in 2001 and the River basin and stream network was delineated using satellite images and DEM for the area. Change analysis for 1989 and 2001 was performed and it shows that Water bodies, Marshes, Mangrove, Reverine forest, Open forest, Home gardens have increased while other LU/LC types shows a decreasing trend. 87% of accuracy was obtained for the LU/LC mapping for year 2001. The ultimate target is to utilize the resources effectively and sustainably to increase the overall productivity of the river basin.