

Abstract

Mangrove wetlands are an irreplaceable and unique ecosystem, providing a vast array of ecological and economic services and among the most productive ecosystems in the world. Among the natural resources, which are becoming increasingly threatened by the anthropogenic pressure, mangroves in the world are at a higher risk probably due to the fact that their distribution overlaps with the distribution of poverty and highest population densities in the world. Moreover the attitude that mangroves are wastelands those are of no value until they have been 'developed' through conversion may aggravate the situation. The way of destruction of mangroves of Sri Lanka indicate that Sri Lankan scenario is also not exceptional. Rekawa and Kahandamodara are two mangroves located closely to Kalametiya lagoon, of which fauna, flora and water quality are reported as changed over the last few decades as a result of human impacts. Therefore the primary objective of this project was to study the vegetation changes of the mangroves of Rekawa and Kahandamodara during the last four decades and elucidate possible causes.

The diversity of true mangroves and the importance of their values in Rekawa lagoon are higher than those of Kahandamodara lagoon. The species composition of common mangrove associates is almost same in both lagoons, but the abundance of associates is much higher in Kahandamodara lagoon. In addition to these variations between the two lagoons, visual analysis of aerial photographs (i.e. air borne remote sensing) in cooperation with field studies revealed that there is a considerable heterogeneity in species composition and forest structure, even within each lagoon. All these vegetational differences appeared to be a reflection of the edaphic diversity, mainly of the salinity regime, associated with hydrological variations. The simple zonation observed in mangrove flora of each lagoon appears to be associated with the differential exposure to inundation and resulting gradients in edaphic factors. It was noticed that an undisturbed and wider innermost zone with larger trees of composite species occurred until 1980s, was disturbed sometime after 1987 by removing larger trees of *Rhizophora mucronata* and *Bruguiera gymnorrhiza*. Anthropogenic pressure appeared to be responsible for some other changes also took place in the vegetation structure of each mangrove during the last few decades.

The accuracy of the differentiation of the mangrove cover and its species assemblages based on visual analysis of aerial photographs in this study was corroborated by field data,

highlighting the relevance importance of aerial photographs in vegetation studies. Overlay of vegetation maps of 1994 and 1956 for each lagoon revealed that the mangrove cover of Rekawa and Kahandamodara in 1956 have been increased by 49 % and 35 % respectively during the 38 year period until 1994. However, a part of the each mangrove cover has been destroyed during the same period, leaving 28% increase in Rekawa and 25% increase in Kahandamodara as net changes.

A remarkable proportion of the dwellers of the two lagoons, Rekawa and Kahandamodara, depend on the lagoon and its mangrove for their fundamental needs, food, fuel, shelter, medicine and monetary earnings. Extraction of woods (fuel wood and service wood) appeared to be the most common and widely practiced use of mangroves in both lagoons. Both mangroves in combination with the relevant lagoons are assets for dwellers and their life style was linked to them. However there are evidences for that the pressure from dwellers on each mangrove has been increased during the last few decades.

Decreases of the mangrove cover and most of the changes in the forest structure took place in each mangrove during the 38 year period from 1956 to 1994 can be attributed to the pressure from dwellers but not the increases of each mangrove cover. The cover appears to be caused by some recent water works, upstream each mangrove. Udawalawe irrigation scheme that was constructed by damming the river Walawe at 30km upstream started discharging irrigation water in 1967, increasing the amount and widening the temporal distribution of the fresh water inflow to the three lagoons.

However, there are considerable differences in the species composition between disappeared and newly grown mangrove areas in each lagoon. Therefore, economic and ecological consequences and trends of these changes should be investigated further and analyzed in order to know mitigating circumstances of causative human activities of changes.