Detecting Urban Wetland Landscape Change in Sri Lanka Using Multitemporal Remote Sensing Image Data Set

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(1) Motivation: Urban wetlands are affected by both human activities and climate changes. The spatio - temporal transformation and seasonal inundation determine the structure and functions of tropical wetland ecosystems. Information on the spatial and temporal changeability of inundation is necessary to understand and manage these ecosystems. The western region of Sri Lanka represents one of the most emerging growth centrees in the country and there is an extreme pressure on the natural environment and wetland ecosystems. Sri Lanka is a tropical country with tropical monsoon climate and it belongs to Keppens´ Am classification. The wetlands are one of the major ecosystems in the island and it is also highly concentrated to the western region of Sri Lanka. It also can be seen diverse, that the human activities influence the spatio-temporal changes of this region.

(2) Method: A combination of methods of environm ental history, urban ecology and wetland science base d on geographical information system (GIS) and rem ote sensing (RS) have been applied to the research. Band 5 is the most important band for wetland classi fication because they can discriminate soil moisture l evels and vegetation types (*Ozesmi, S.L.・Bauer, M.E*, 2002). Maximum Likelihood Classification was used in mapping the study area.

(3) Result: The long term changes of this research area show decreased (deep water and Marshland / Abandoned paddy) and increased (built up and shallow water / sediment) and periods for dry season. Natural process of wetland propagation has been occurring since declaration of this wetland in 1996. Human impact due to encroachments influences the marsh land. Human impact of boundary area of this preserved area has an increasing trend along the period of time. Endemic species inhabit the marsh land. This is a breeding area. Human settlement of marsh land is illegal and very critical phenomenon to have solution without delay. Based on the table 1 change matrix, build up covered an area of 15.44 km^2 in 1996: 24.47 km^2 of built up had change by 2016. Agricultural land and Sallow water/ sediments covered and area of 4.20 km^2 and 6.72 km^2 in 1996: 16.99 km^2 and 20, 32 km^2 of agriculture and shallow water had change by 2016 respectively.

(4) Data used:

- The main source of the imageries used in this research is from the longest running Landsat program. The available Landsat imageries, which cover the study area, were taken in 1996, 2006 and 2016 respectively.
- Census department data from 2001 and 2011.

(5) Acknowledgments: I would like to express thanks to Professor Dr. Yuji Murayama, Division of Spatial Information Science, University of Tsukuba.

(6) References:

Ozesmi, S.L. and Bauer, M.E., 2002. Satellite remote sensing of wetlands. *Wetlands Ecology and Management*, *10*(5), pp.381-402.

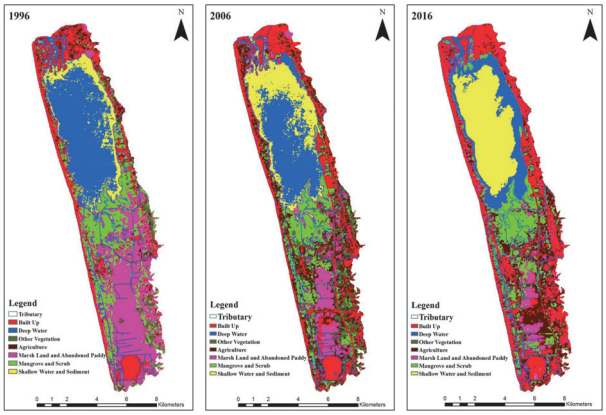

Figure 1: Land cover and land use change of Muthurajawela marsh and Negombo Lagoon 1996, 2006 and 2016.

Table 1: Seven classes change matrix.

	Area km^2		
Signature	**1996**	**2006**	**2016**
Built up	15.44	19.58	24.47
Deep water	25.40	18.58	10.87
Vegetation	5.04	10.59	3.40
Agriculture	4.20	16.69	16.99
Marshland/Abandoned paddy	30.02	12.30	11.21
Mangroves/ scrubs	15.96	12.31	15.53
Shallow water / Sediment	6.72	12.73	20.32