Challenges of Spatio-temporal Transformation of Urban Wetlands in Sri Lanka: A Case Study of Muthurajawela Marsh and Negombo Lagoon

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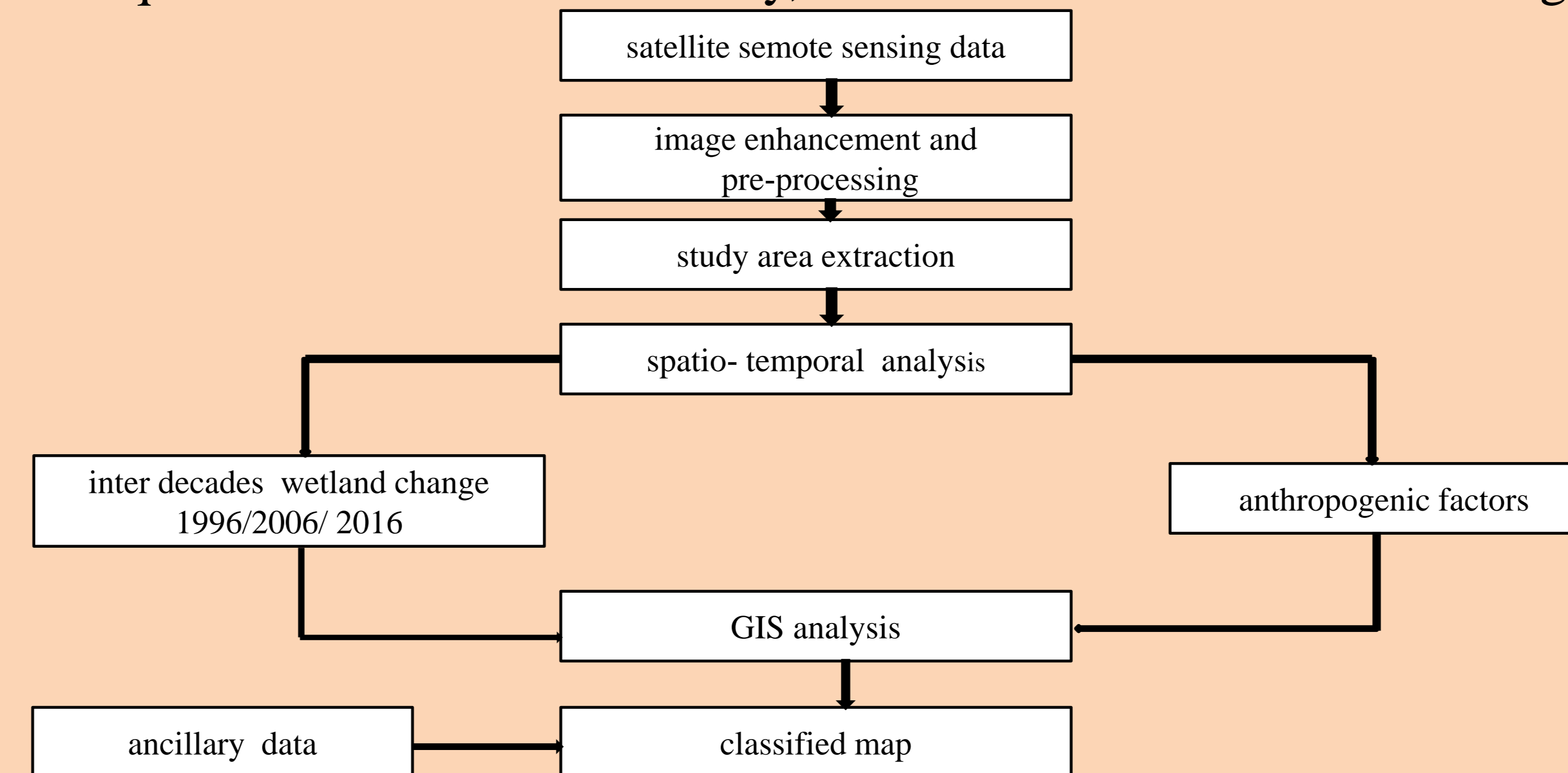
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Introduction

Western region of Sri Lanka represents one of the most densely populated, intensely urbanized and heavily industrialized parts of the country. There is extreme pressure on the natural environment and wetland ecosystems. Land use planning processes have paid little attention to the need to maintain green spaces for Sri Lanka's western city-dwelling population. This case study will describe to assess the Spatio-temporal formation of Muthurajawela Marsh and Negombo lagoon, situated to the north of the capital city Colombo. Both wetland ecosystems and urban parks are poorly represented in Sri Lanka's national protected area network, and Muthurajawela marsh and Negombo Lagoon fulfils an almost unique role because it combines both of these attributes.

Methodology

This research methodology is a combination of techniques of environmental history, wetland science and urban ecology.
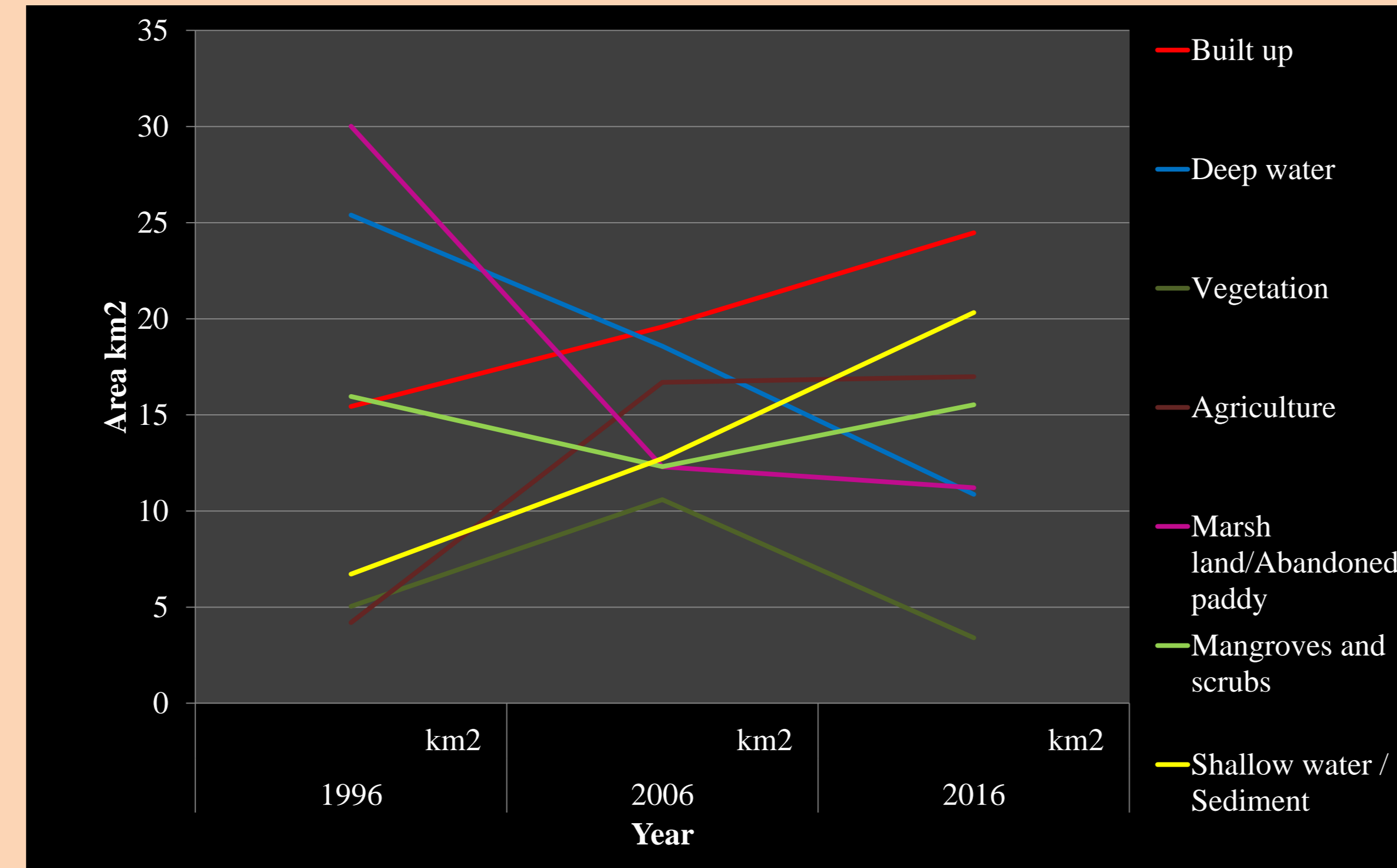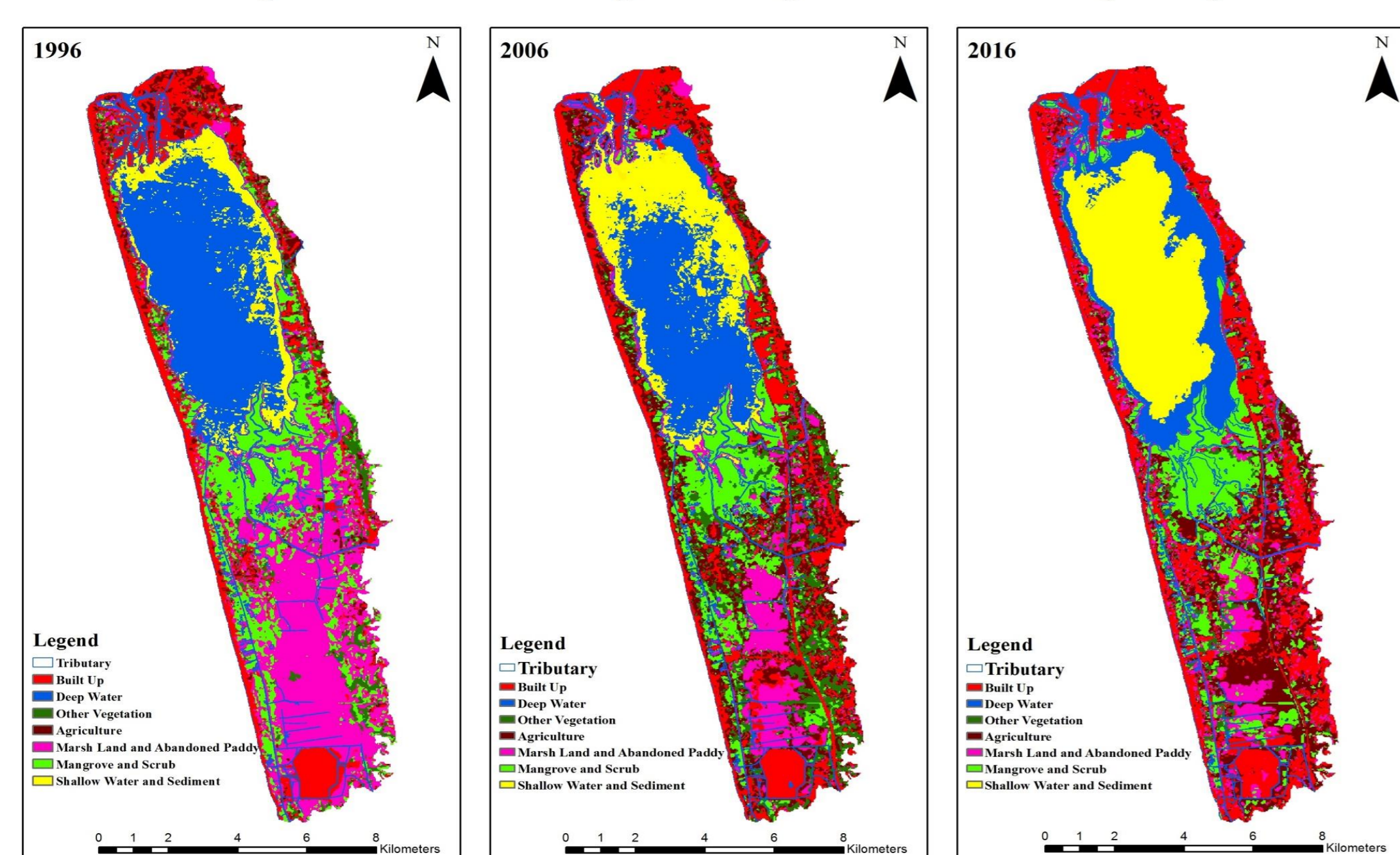
satellite semote sensing data → image enhancement and pre-processing → study area extraction → spatio-temporal analysis

inter decades wetland change 1996/2006/ 2016 — anthropogenic factors

GIS analysis

ancillary data → classified map

Human Impact of the Study Area

Illegal Settings – Negombo lagoon

Human Impact – Negombo lagoon

Illegal Settings – Muthurajawela Marsh

Human Impact – Muthurajawela Marsh

Results

Muthurajawela Marsh and Negombo Lagoon With Tributary - Dry Season

1996 2006 2016

Legend: Tributary, Built Up, Deep Water, Other Vegetation, Agriculture, Marsh Land and Abandoned Paddy, Mangrove and Scrub, Shallow Water and Sediment

Area Matrix

Signature	Area km²			Annual average change (km²/year)		
	1996	2006	2016	1996 - 2006	2006 - 2016	1996 - 20016
Built up	15.44	19.58	24.47	0.41	0.48	0.90
Deep water	25.40	18.58	10.87	- 0.68	- 0.77	- 0.72
Vegetation	5.04	10.59	3.40	0.55	- 0.71	- 0.08
Agriculture	4.20	16.69	16.99	1.24	0.03	0.63
Marsh land /Abandoned paddy	30.02	12.30	11.21	- 1.77	-0.10	- 0.94
Mangroves and scrubs	15.96	12.31	15.53	- 0.36	0.32	-0.02
Shallow water / Sediment	6.72	12.73	20.32	0.60	0.75	0.68

Legend: Built up, Deep water, Vegetation, Agriculture, Marsh land/Abandoned paddy, Mangroves and scrubs, Shallow water / Sediment
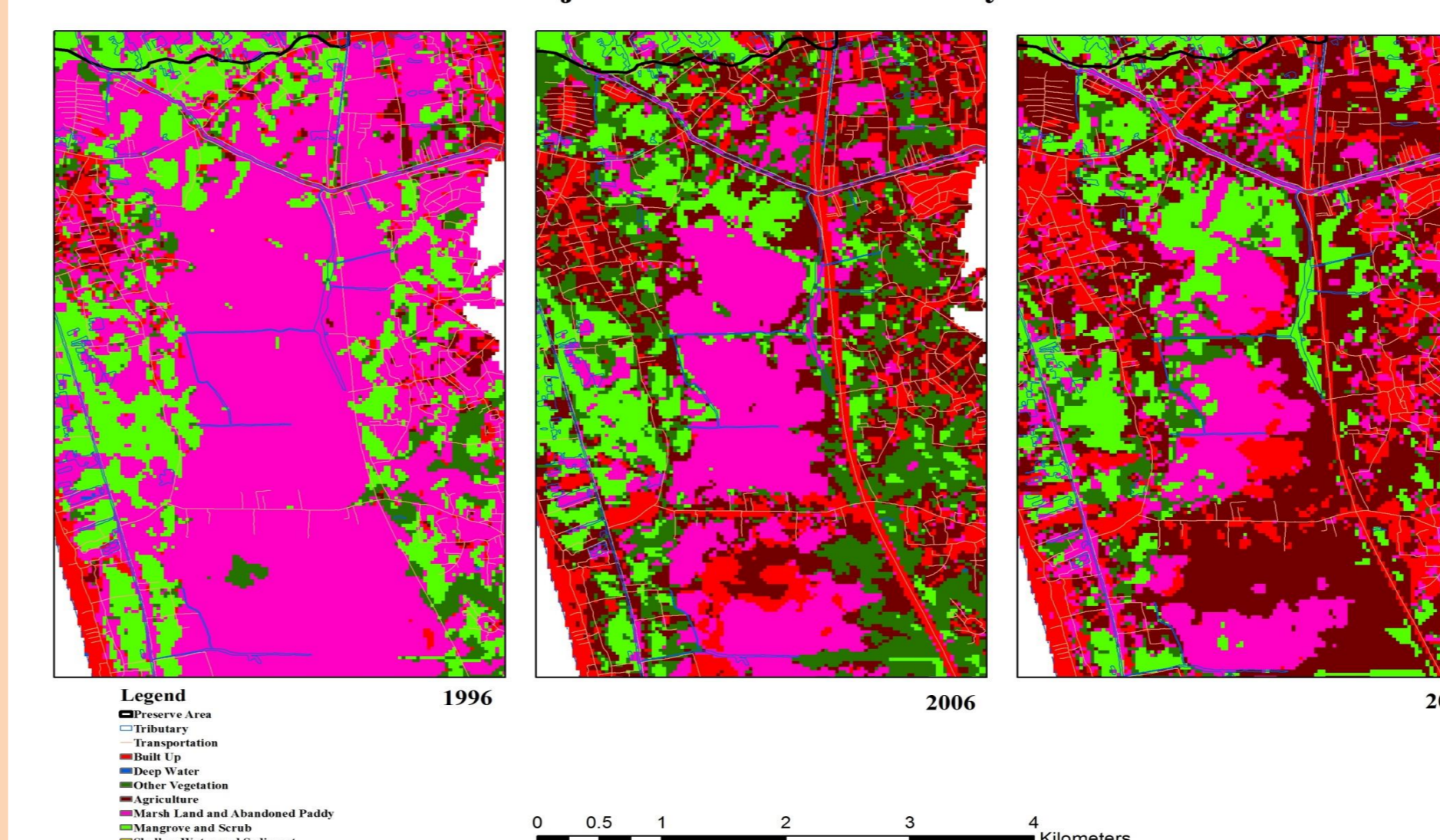
Key Findings – Dry Season

1. Natural process of wetland expansion has been occurring since the declaration of this wetland in 1996.

2. The marsh land is Influenced by the human impact due to encroachment.

Muthurajawela Marsh and Negombo Lagoon Preserve Area - Dry Season

1996 2006 2016

Legend: Preserve Area, Tributary, Transportation, Built Up, Deep Water, Other Vegetation, Agriculture, Marsh Land and Abandoned Paddy, Mangroves and Scrub, Shallow Water and Sediment
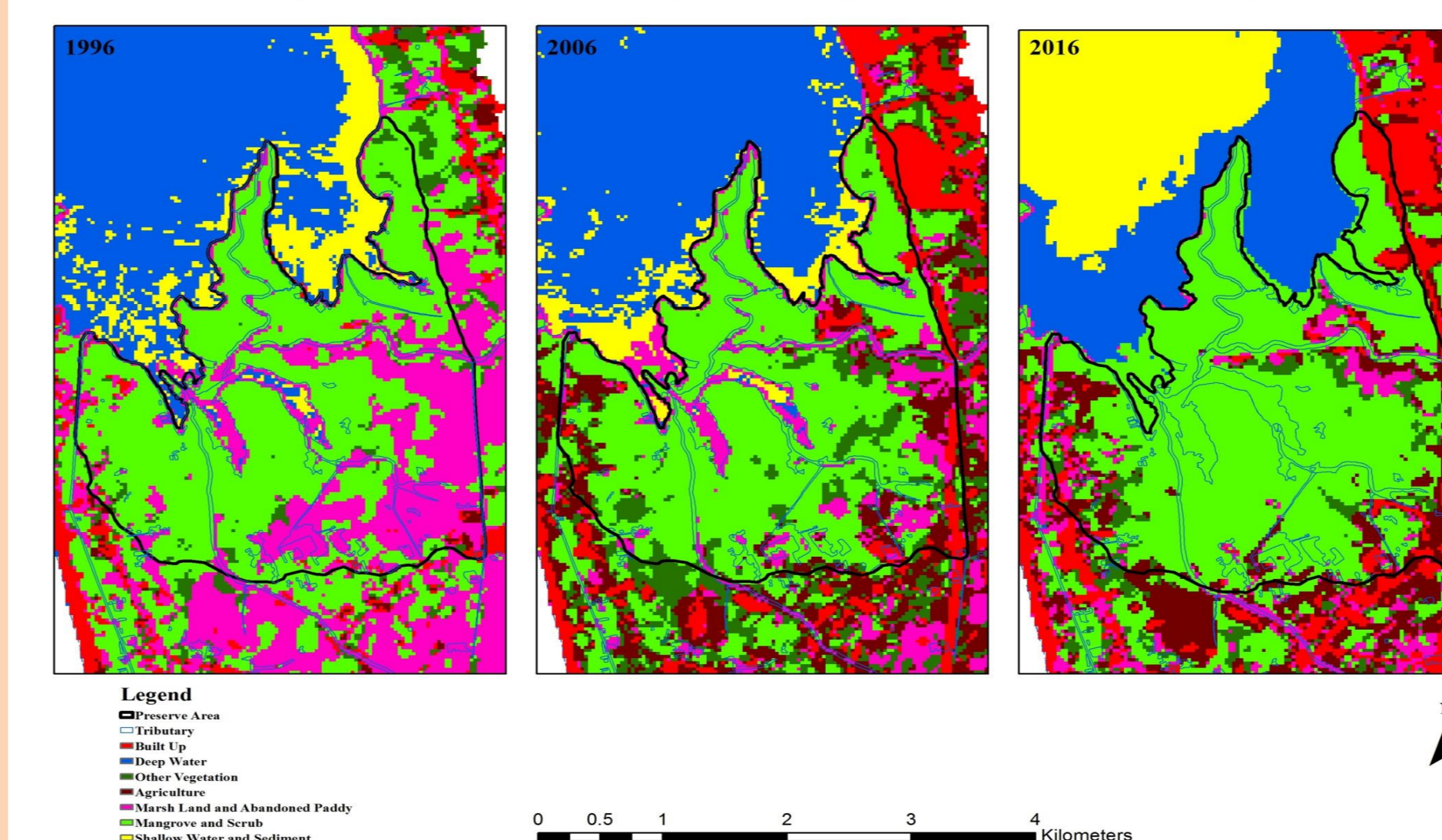
Muthurajawela Marsh Area - Dry Season

1996 2006 2016

Legend: Preserve Area, Tributary, Transportation, Built Up, Deep Water, Other Vegetation, Agriculture, Marsh Land and Abandoned Paddy, Mangroves and Scrub, Shallow Water and Sediment

Conclusions

Preserved Area

1. Declaration of preserved area in 1996 successfully resulting in, to improve natural process of wetland propagation.

2. Human impact of boundary area of this preserve area has an increasing trend along the period of time.

3. The rules and regulations should be strict against violation of present wetland protection act. New laws and regulations should be introduced for the betterment of future of this wetland.

Marsh Land

1. This area is inhabited by endemic species as well as this is a breeding area. Human settlement of marsh land is illegal and very critical phenomena to have solution without delay, because this process will badly influence biodiversity of this area .

2. Strong legal tool should be implemented against this kind of social setting.

Future Actions

1. To classify the wet season in study area.
2. To analyze spatial change of the study area.

References

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