Project Updates April 2022

During this period, we conducted three main activities, as follows.

- Ground-truthing activity aimed at calibrating and validating the accuracy of remotely sensed data to assess the land use/cover system.
- Computer-based analysis for the spatial information of the Lutembe Bay Wetland aimed at classifying the land use/cover types.
- Land cover change detection between 1995 and 2020

Ground-truthing activities

The team successfully conducted a ground-truthing activity which involved the day of collection of information about Lutembe Bay wetland from a field survey by going around the wetland, interviewing local people, and personal experience through performing a surface observation on vegetation cover, water, built up areas, and bare soils (agricultural activities). The objectives of this activity were to identify land use/cover types of the reallocation and then compare it to the classified image, to verify the pre-interpreted image data that was developed prior to ground-truthing, and to collect more related data from local communities adjacent to the wetland through interviewing local members for more details such as land use activities and settlement history.

Photo 1: Ground-truthing activity aimed at calibrating and validating the accuracy of the remotely sensed data

With the ground-truthing, we could confirm the land use types (settlements, vegetation, water, and bare soil (agricultural activity) by surface observations and interview sessions from local people adjacent to the wetland in the focus groups, they

mentioned the drivers to the wetland changes from 1995 to 2020, which have been classified into social and economic drivers.

Dimensions	Significant drivers
Economic drivers	- Sand mining - Agriculture - Poor fishing - Flower farm
Social drivers	- Hunting - Settlement - Cutting trees

Photo 2: Proliferation of built-up areas (settlement) in Lutembe Bay wetland

Photo 3: A flower factory site in Lutembe Bay Wetland

Computer-based analysis for the spatial information of the Lutembe Bay Wetland
Annual wetland land use/cover types were calculated using the Quantum Global Information System (QGIS), which displays land cover types in a reasonable manner that shows the good separation of land use/cover types. Training data for wetland use/cover classification was collected through visual interpretation of high-resolution, freely available satellite imagery for each subset of each time period in 1995 and 2020. Then, the random forest classification technique (RFT) and accuracy assessment were then performed for each period. Both classification results were subjected to a post-classification, where both results were calculated against each other. The filtering method was performed on the classified images for pixel noise-cleaning to synchronize classes into four land use/cover types.

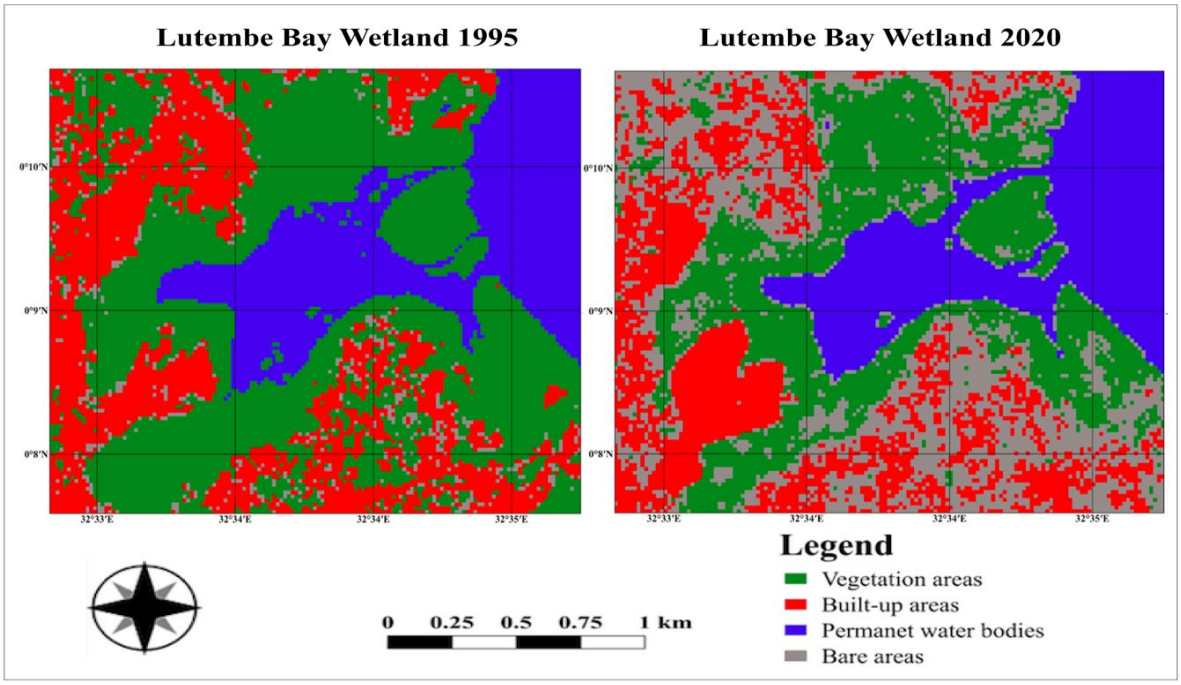


Photo 4: Classification of Lutembe Bay Wetland Land Cover/Use for 1995 and 2020
Land cover change detection between 1995 and 2020

The land cover types were performed in a QGIS tool to calculate the total area change for the categories from 1995 to 2020 based on cross-tabulation. Inter-class change statistics were generated. Union operations were combined to perform site-specific analyses of inter-class changes in all four land-use types to provide changes in land-cover types over time.

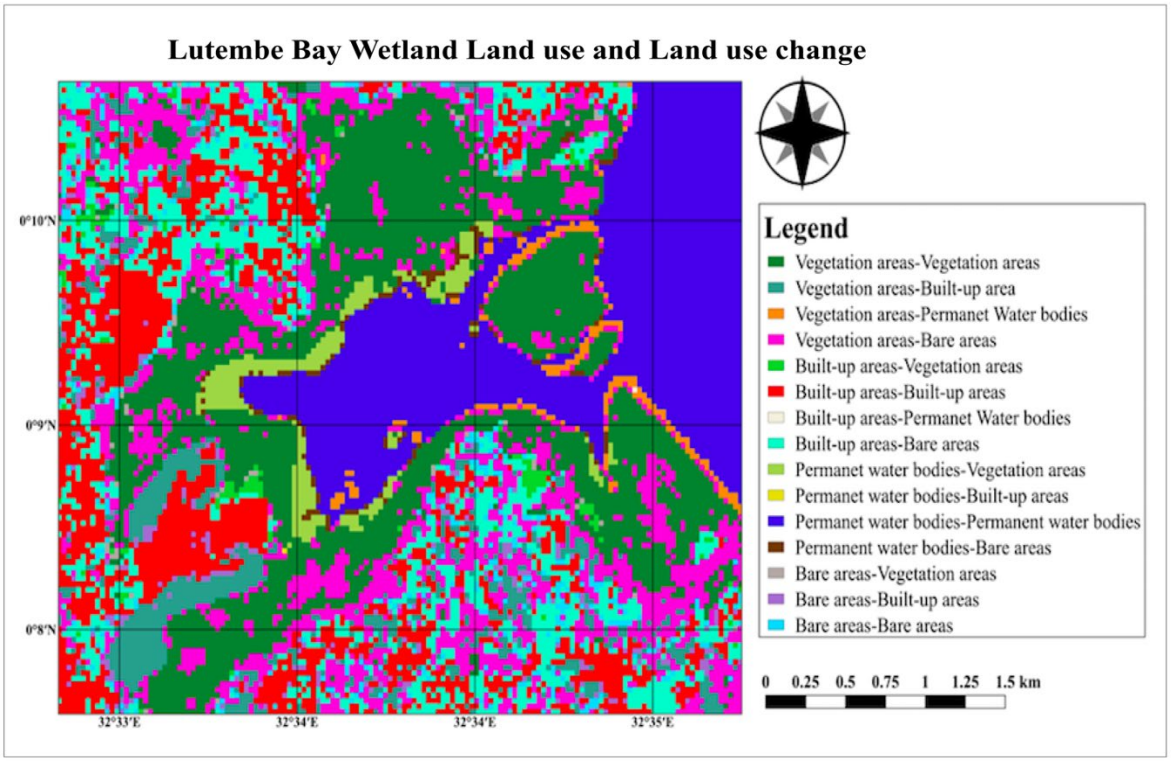
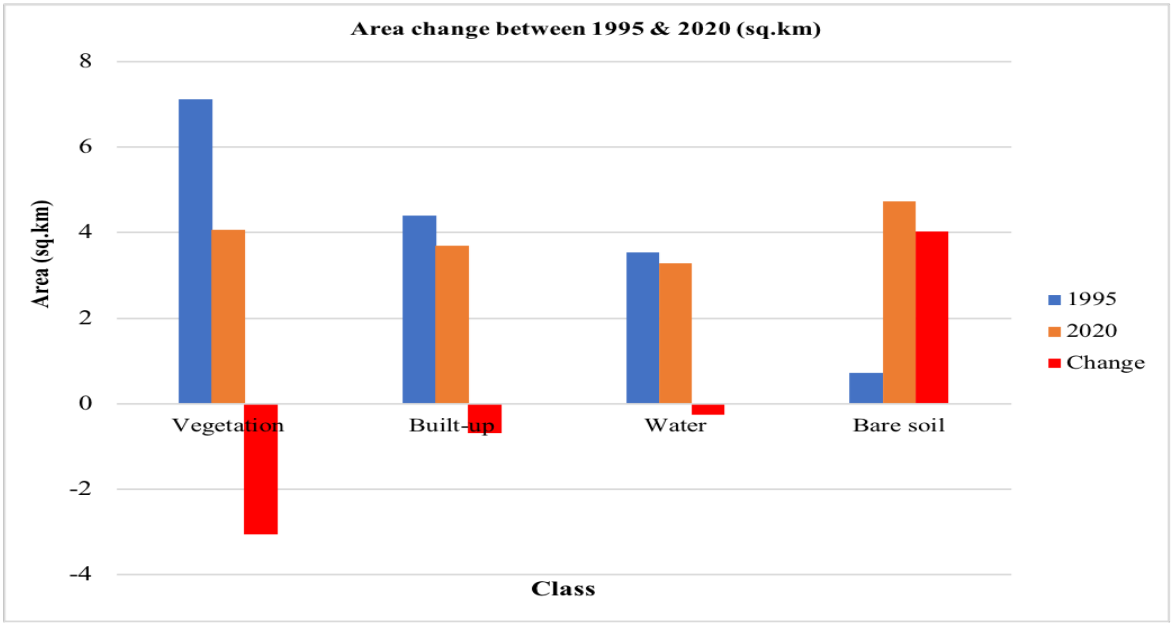


Photo 5: Lutembe Bay Wetland change map of land-use 1995 and 2020, QGIS based map



In 1995, vegetation was the predominant wetland cover type over 7.2 km^2 (45%) within the Lutembe Bay Wetland System. However, there have been more significant changes of 4.0 km^2 (25.72%) in Lutembe wetland use/cover types in 2020. These changes are mainly seen in a noticeable loss of land encountered in vegetation due to bare soil, with an increase of 4.8 km^2 (30.04%) in 2020. The continued loss of vegetation was mainly responsible for the large differences of about -3.0 km^2 (-19.43%) between 1995 and 2020 in the total study area (15.8 km^2) of the Lutembe Bay wetland system.

All in all, the rate of increase in built-up areas such as settlements and bare soils such as farmland is encroaching on the wetland vegetation that serves as Shoebill habitat. Wetland vegetation (*Cyperus papyrus*) in particular, is known for creating a typical habitat for shoebills. However, the observed loss of wetland vegetation may affect the shoebill breeding patterns, causing them to migrate to other wetland locations.
As the locals around the Lutembe Bay wetlands said in our interview with the shoebill distribution, their numbers have dwindled due to reduced vegetation. Thus, the conservation of these vulnerable wetlands not only enhances outdoor tourism but also revives the wetland as a habitat for wildlife species, especially shoebills.

Upcoming activities

- Awareness meeting to communicate and discuss the findings with all the key stakeholders involved in the project and local members.
- Sensitisation workshops and training with local communities adjacent to the wetland to enable them to conserve and access wetland resources in a manner that is sustainable for the future generation.