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STUDENT FEATURE

Tatenda Dzurume

The use of remote sensed data for assessing water quality in wetlands within the Limpopo River Basin (South Africa)



Tatenda is enrolled in a Master in Environmental and Water Sciences at the University of the Western Cape, Bellville, South Africa. Her thesis title is “The use of remote sensed data for assessing water quality in wetlands within the Limpopo River Basin (South Africa)”.

What contribution Tatenda wants to make with her study?

The United Nations (UN) has identified the importance of protecting and restoring wetlands by including them in Goal Six of the Sustainable Development Goals (SDG's). Indicator 6.6.1 highlights the “Change in the extent of water-related ecosystems over time” and this is of importance especially in wetlands.

The deterioration of water quality has been a major concern in Sub-Saharan Africa. Due to this, the water resources constantly need to be monitored. As vulnerable as they are, wetlands have historically been the basis for human survival due to availability of water, biodiversity and sometimes fertile soil. In developing countries, wetlands continue to decrease mainly due to unsustainable human activities driven by community’s high dependence on natural resources for livelihood (Marambanyika and Beckedahl, 2016). Therefore, the need to monitor water quality in wetlands.

The aim of the project is to identify the impacts of LULC (land use and land cover) on wetland water quality within the Limpopo River Basin. This will be done by determining LULC and associated changes around selected wetlands in the Limpopo River Basin, by using Landsat Imagery (supervised classification) to detect LULC change and NDVI (Normalised Difference Vegetation Index) for vegetation change detection. Lastly, the chlorophyll level in the selected wetlands is assessed and monitored.

Wetland selection

Both of the wetlands selected for this study fall within nature reserves, underlying the importance of monitoring water quality in these wetlands. Wetlands have many ecological benefits, especially for animals that are protected in the reserves.

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The chosen wetlands are in Makuleke Nature and in Nysvlei Nature Reserve in the Limpopo River Basin.

The delineation of Land use and Land cover

Landsat 8 (30-m resolution) images between the periods of 2014 to 2018 were used to classify land use and land cover in the basin through supervised classification.

The figure below shows changes in land use and land cover in the Nysvlei Nature Reserve wetland over the period of 5 years, under study.

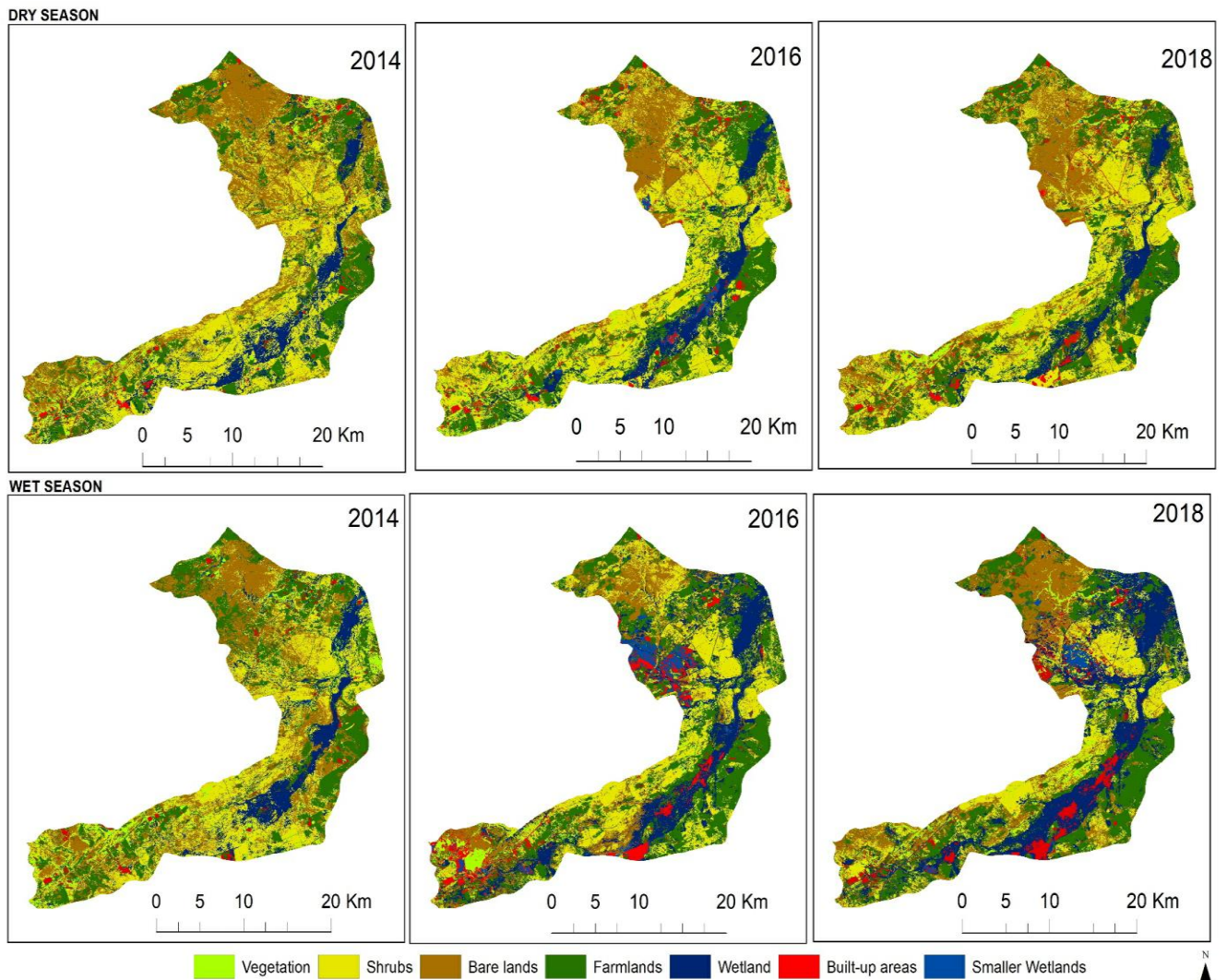


Figure 3: Land use and Land cover map of the Nysvlei Nature Reserve.

To improve the classification accuracy and reduce misclassifications, a post-classification refinement was applied for simplicity and effectiveness to enhance the supervised classification method. Visual analysis, reference data, as well as local knowledge, considerably improved the results obtained using the supervised algorithm.

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