

Assessing the sustainability of land uses in Driefontein and Intunjambili wetlands, Zimbabwe

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Abstract

The study assesses the sustainability of the land uses in Driefontein and Intunjambili wetlands in Zimbabwe using the WET-Sustainable Use framework. The framework is based on indicator and impact scores of extent, intensity and magnitude of impact of different land use types on the wetland's ecological conditions. The study findings show that the two wetlands are vulnerable to crop cultivation and cattle grazing, although these two land uses have different impacts on each of the wetland's components such as hydrology, geomorphology, nutrient retention, soil organic matter (SOM) accumulation and vegetation. Of all the assessed components, vegetation has been modified by cultivation in the two wetlands, resulting in the introduction of alien invasive species and ruderal weeds. Cultivation has been contributing to increased bare land and drying in the Driefontein wetland where SOM accumulation is also altered by the removal of plant residues from the fields, although nutrient retention is enhanced by the application of inorganic fertilizers and livestock waste. Soil erosion, evidenced by gullies, and water abstraction using diesel powered pumps have been largely affecting water retention in the Intunjambili wetland, although SOM accumulation is high due to retention of crop residue in the fields. Overall, the study findings revealed that the current land uses are largely unsustainable as the wetlands' hydrology and vegetation are declining though SOM is maintained in Intunjambili whose other parts are experiencing soil erosion. This calls for the identification of suitable crop farming and livestock grazing methods that maintain balanced wetland hydrology, vegetation, SOM, erosion and nutrient retention.