

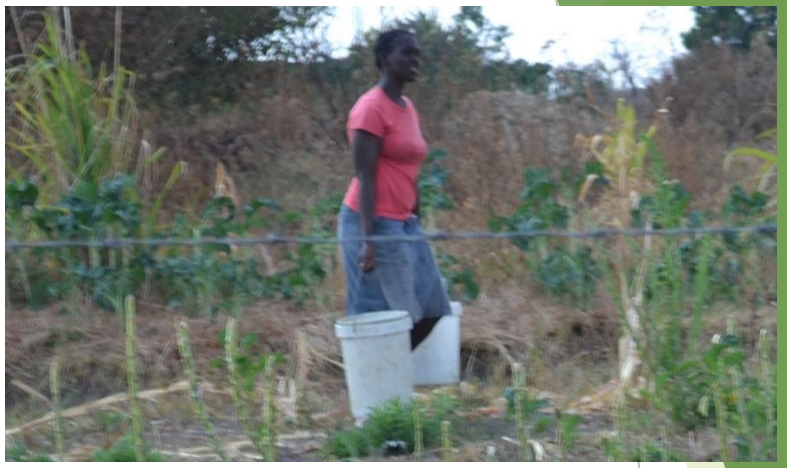

Assessing the sustainability of land uses in Driefontein and Intunjambili wetlands, Zimbabwe.

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MIDLANDS STATE UNIVERSITY

GMES AND AFRICA

African Union

WeMAST

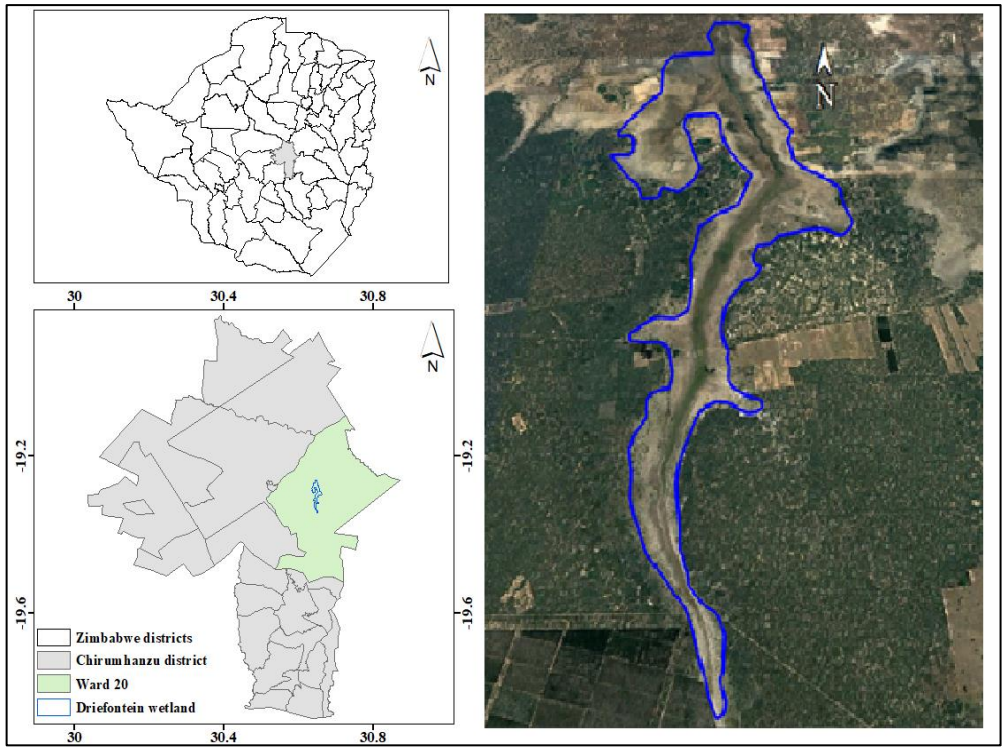
Introduction

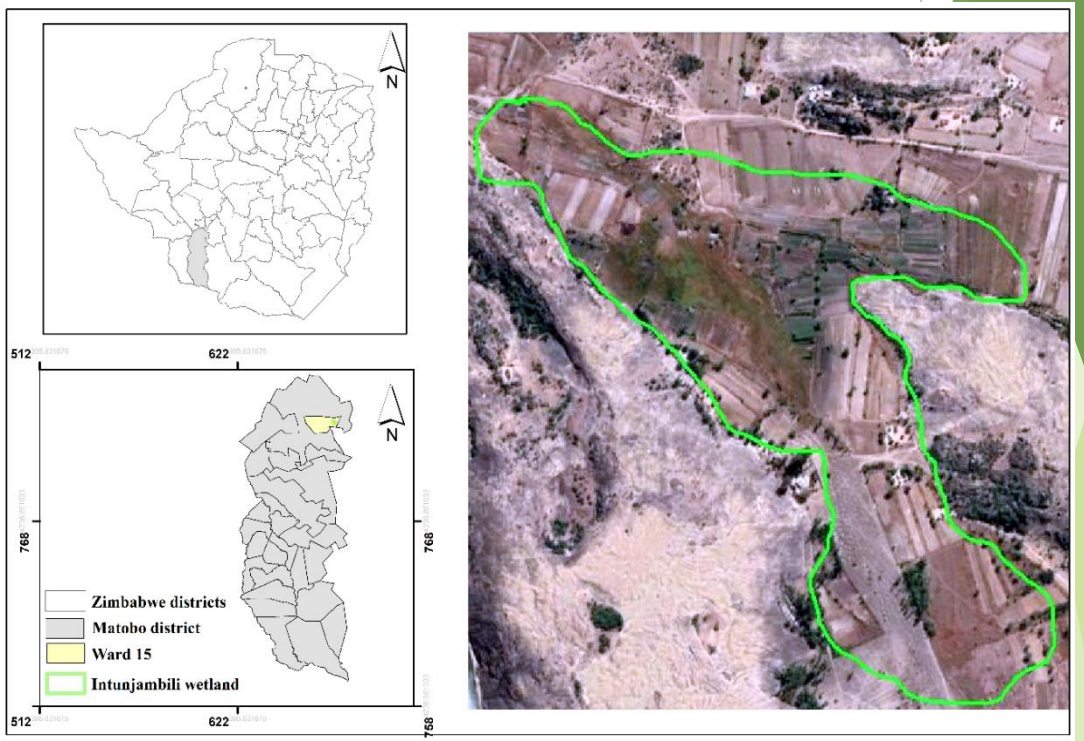
- Wetlands are defined as areas that are intermittently or constantly inundated with water.
- They provide ecosystem goods and services vital for people, through crop cultivation, livestock grazing.
- Land use type, for example crop cultivation may impact differently on wetland ecological conditions.
- The objectives of this study are to: 1) establish land uses within the wetlands and their catchments and 2) assess the sustainability of current human wetland use patterns using the WET-Sustainable Use framework.

Justification of the study

- This study will provide information that will be integrated to come up with tools that can inform sustainable utilization such as the Wetland Monitoring and Assessment Service for Transboundary basins in Southern Africa (WeMAST) platform under development.
- This is the first study in Southern Africa to use Sentinel data with the WET-Sustainable Use framework.
- The study findings will contribute to the attainment of the Sustainable Development Goals (SDGs). SDG 1 (No poverty), SDG 2 (Zero Hunger) and 14 (Conservation and sustainable use of wetland and marine resources).

Study area





Driefontein wetland

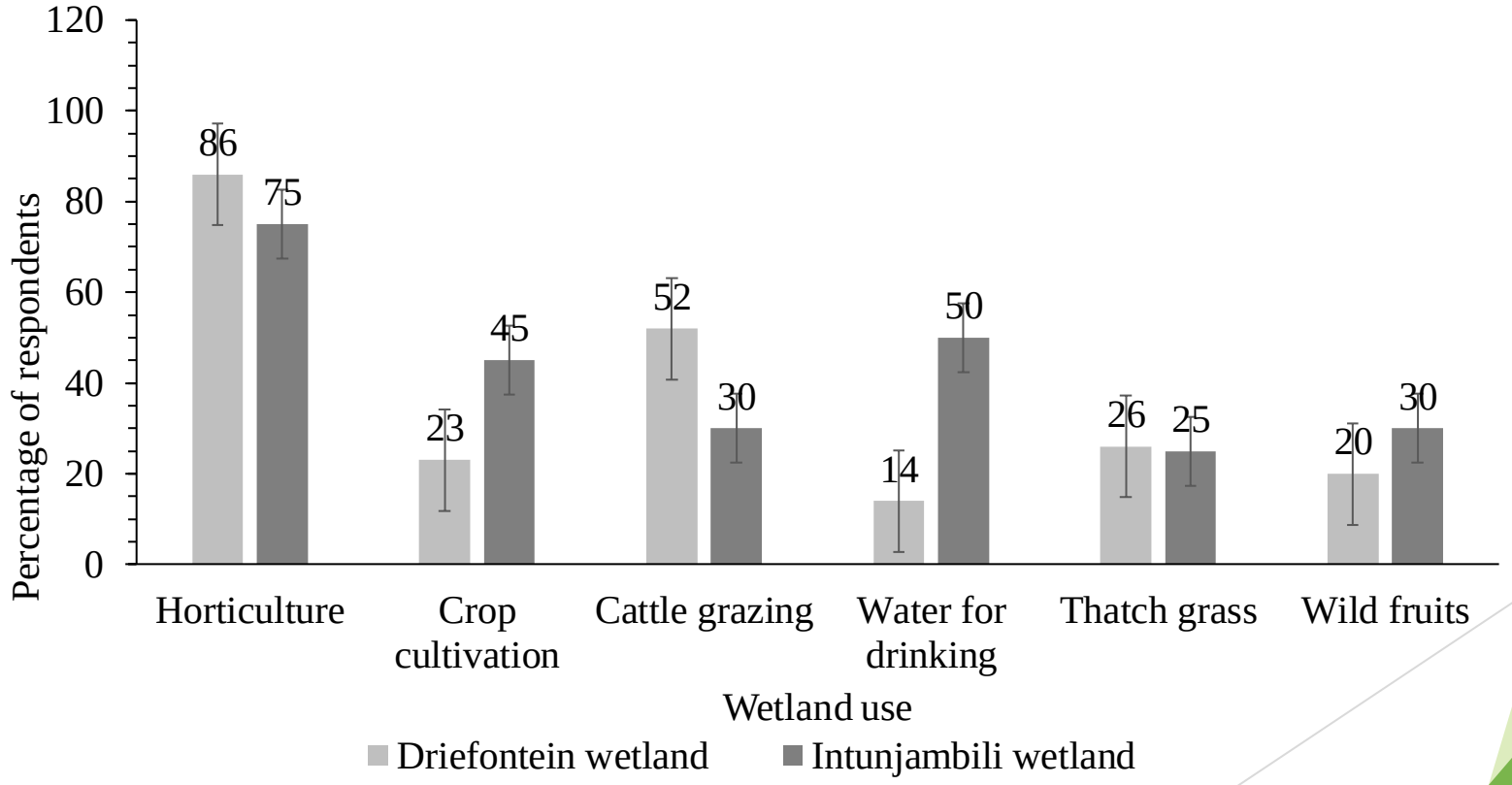
Intunjambili wetland

Methods of data collection

- Level 2 of the WET-Sustainable Use framework which is based on field assessment was used.
- Questionnaires survey, Semi structured interviews with the Wetland Committee Chairperson, to understand wetland use patterns and the possible effect on wetland biophysical conditions.
- Field observations conducted through transect walks were essential in guiding application of the WET-Sustainable Use framework.
- Sentinel 2 image (2019) was used to determine extent of land cover/use type.
- Analysis was guided by level 2 of the WET-Sustainable Use framework to estimate extent and intensity so as to determine magnitude of impact on wetland components- Hydrology, geomorphology, Soil Organic Matter accumulation, nutrient retention and vegetation.

Results: Land uses in wetlands and their catchments

- Questionnaire survey results revealed that both wetlands are used for different purposes.
- The majority of the households in Driefontein (86%) and Intunjambili (75%) indicated that there is no change in wetland utilization patterns over the past decade as horticultural activities remain the predominant activity.



Results: Sustainability of human wetland use using the WET-Sustainable Use framework.

Table 1: Summary of the wetland ecological conditions

Wetland component	Wetland name and score	
	Driefontein	Intunjambili
Hydrology	5.52	4.85
Geomorphology	4.2	5.7
SOM accumulation	5.06	4.65
Nutrient cycling and retention	6.4	5.11
Vegetation	8.12	7.4

Magnitude of impact score range : 0–0.5 (none), 0.6–1.5 (small), 1.6–2.9 (moderate), 3–5 (large), 5.1–7 (serious), 7.1-9 (critical).

Conclusion and Recommendations

- The study findings show that wetlands are vulnerable to various land uses such as crop cultivation and cattle grazing which have varying impacts on wetland components.
- Of all the components vegetation is the critically modified due to clearance of land for cultivation.
- The hydrology of Driefontein wetland is seriously modified, whereas hydrological modifications in Intunjambili are rated as large.
- The geomorphology of Driefontein wetland is largely modified whereas in the Intunjambili wetland is seriously modified.
- The impact of land use on Soil Organic Matter accumulation and nutrient retention in Driefontein and Intunjambili wetlands is largely modified

Conclusion and Recommendations

- The dominance of cultivation and its importance towards food security of local communities calls for a longitudinal research that focuses on the impact of human activities on wetlands with different hydrogeomorphic types. This is because there is danger to generalize about how wetlands are likely to respond to use.
- There is need to promote use of freely available data such as Sentinel which have not been explored by previous studies using the WET-Sustainable Use framework.

Publications

- Musasa, T., Marambanyika, T., (2020). Threats to sustainable utilization of wetland resources in Zimbabwe: A review. Wetlands Ecology and Management, Springer DOI 10.1007/s11273-020-09732-1

THE END - THANK YOU