



5TH SADC GROUNDWATER CONFERENCE

16 – 18 NOVEMBER 2022, WINDHOEK, NAMIBIA

GROUNDWATER: Making the invisible visible for socio-economic development



# Community-based reliance on groundwater and opportunities for transboundary livelihood and SMME support in the Pafuri-Sengwe Node of the GLTFCA

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*This analysis is the intellectual property of the World Bank and is submitted with World Bank Permission. It was completed by a team comprising Sarah Moyer, Maryna Storie, Piet Theron, Lindley Itimu, Nsuku Nxumalo, Kevin Pietersen and Edward Riddell. The work was funded by the Cooperation in International Waters (CIWA)'s Southern Africa Drought Resilience Initiative (SADRI).*

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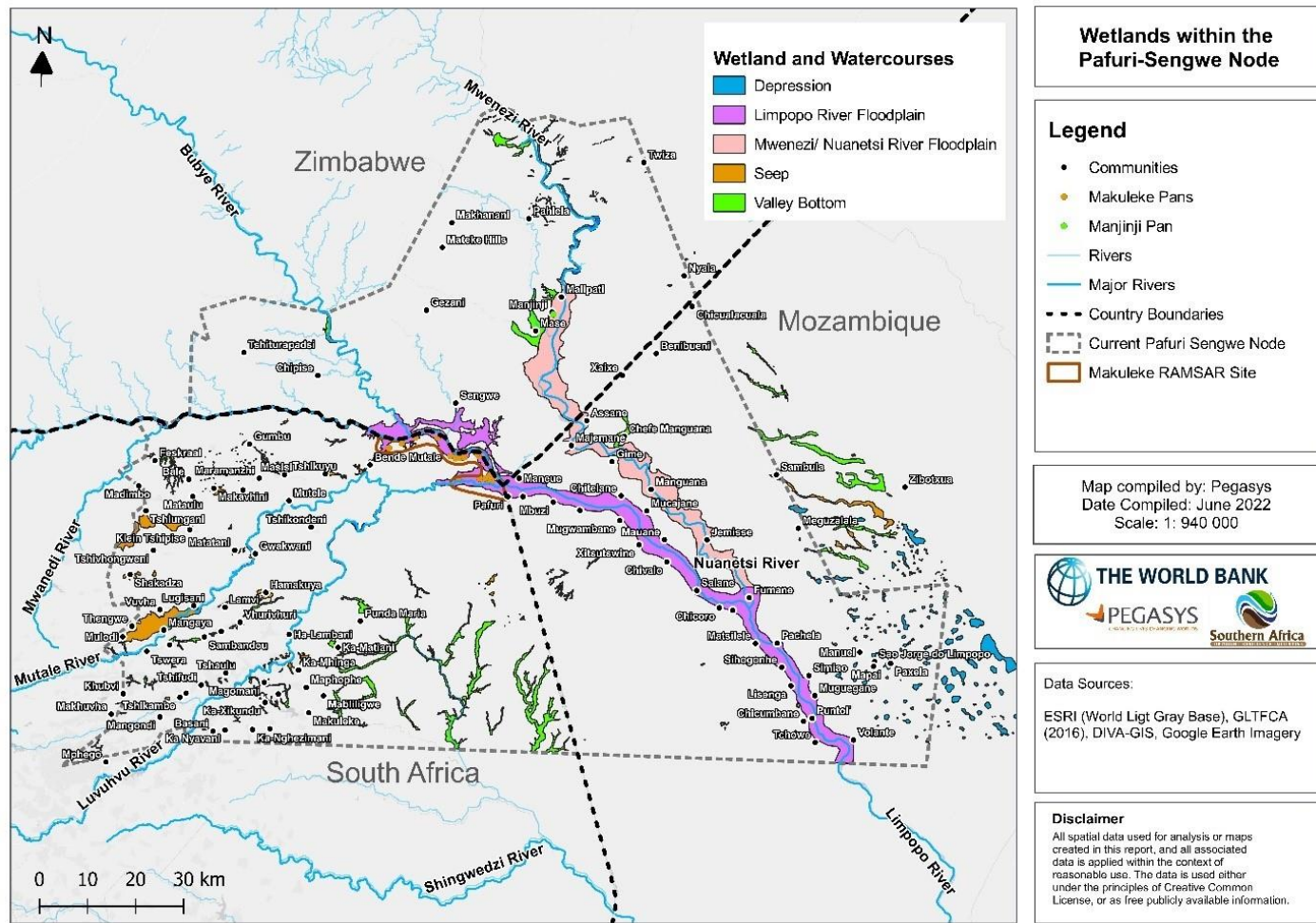


# Project Objective (supported by World Bank/SADRI)

- Determine the **extent of water availability** in targeted **groundwater aquifers, wetlands, and river** systems
- Assess the current **demand and usage** of this water
- Evaluate **governance practices** in place for managing this water
- **Identify, develop, and recommend** short, medium and long-term **actions** for water management leading to **building community drought resilience.**

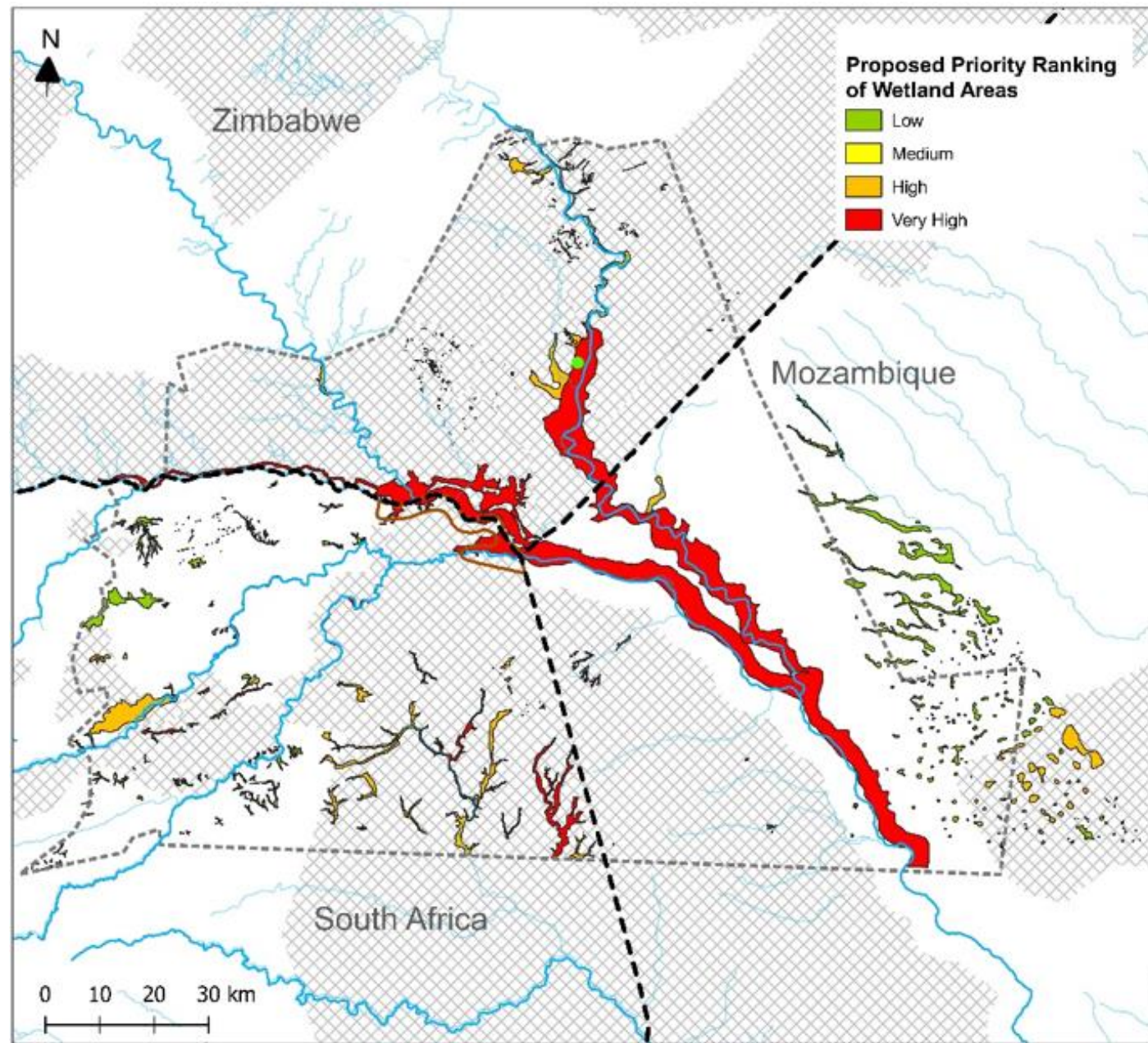
# Brand new digitised wetland data

- Need to be **verified** in-field
- Need to be in a **database** that can be **shared** across the region
- Need **harmonized** transboundary wetland **management**
- Need **land management** interventions to reduce wetland exploration/mining, fires, inappropriate cultivation and livestock impacts



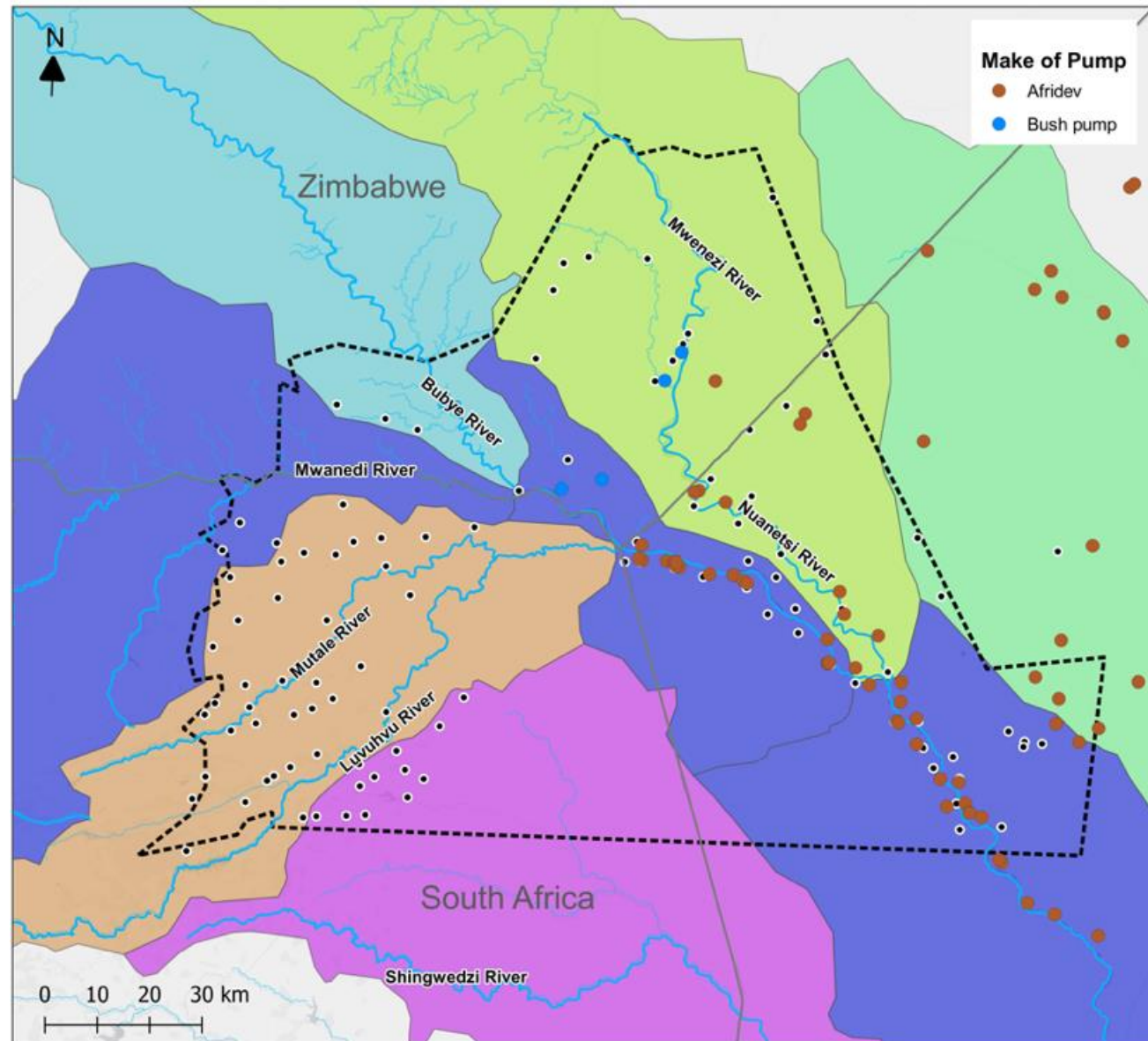
**Prioritisation** of Wetlands that require Specific Conservation and Rehabilitation  
Focus: in support of groundwater recharge and quality

**Harmonisation** between countries needed in data capture, and integrated water resource monitoring and management approaches



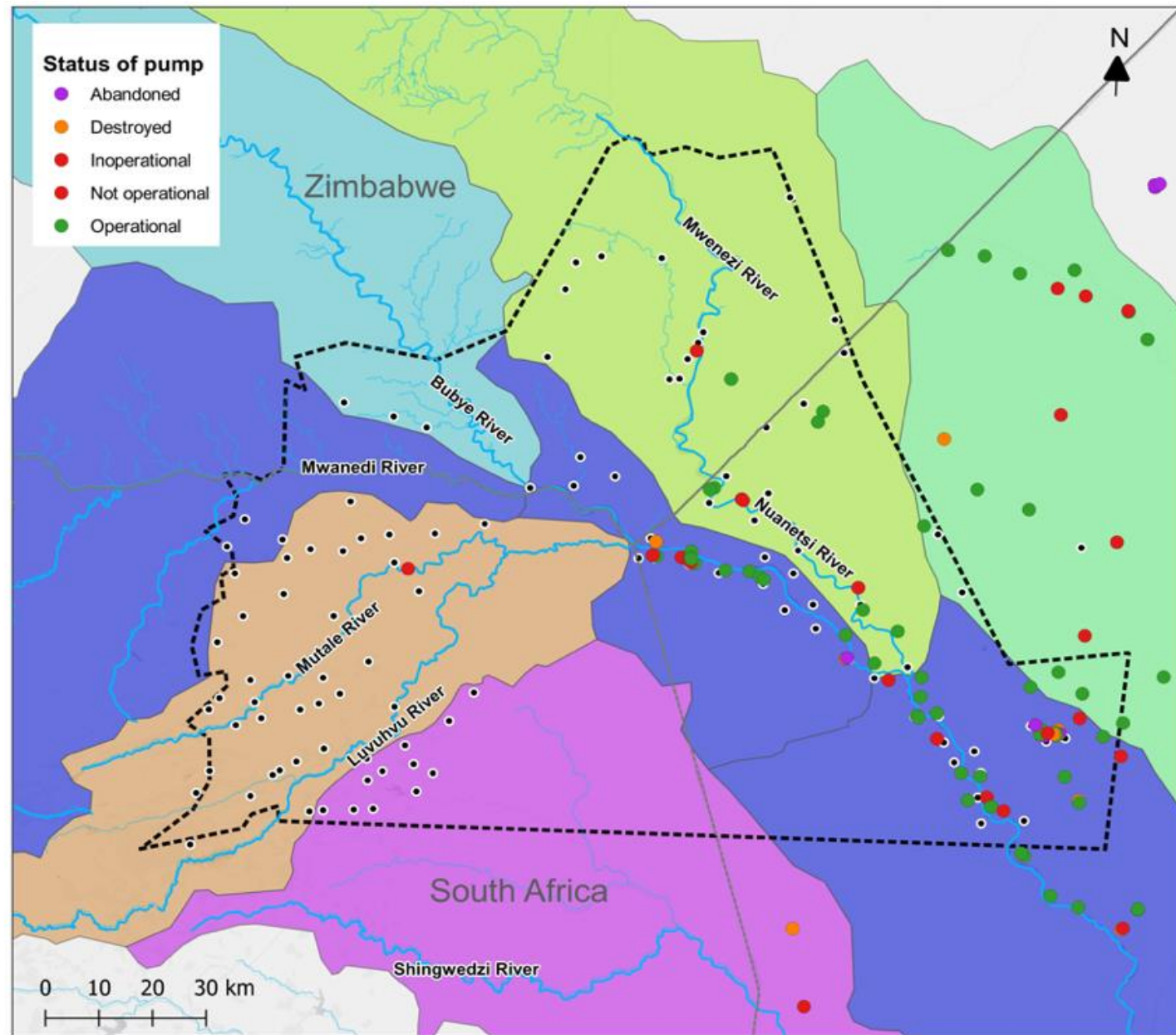
# In-field findings regarding boreholes in the Pafuri-Sengwe Node

- Hand pump functionality is important: it influences community health and socioeconomic status resulting in impaired livelihoods:
  - > AfriDev pump most commonly found in Mozambique (lifts water from 15-45m)
  - VS
  - Bush Pump in Zimbabwe (lifts water up to 80m)



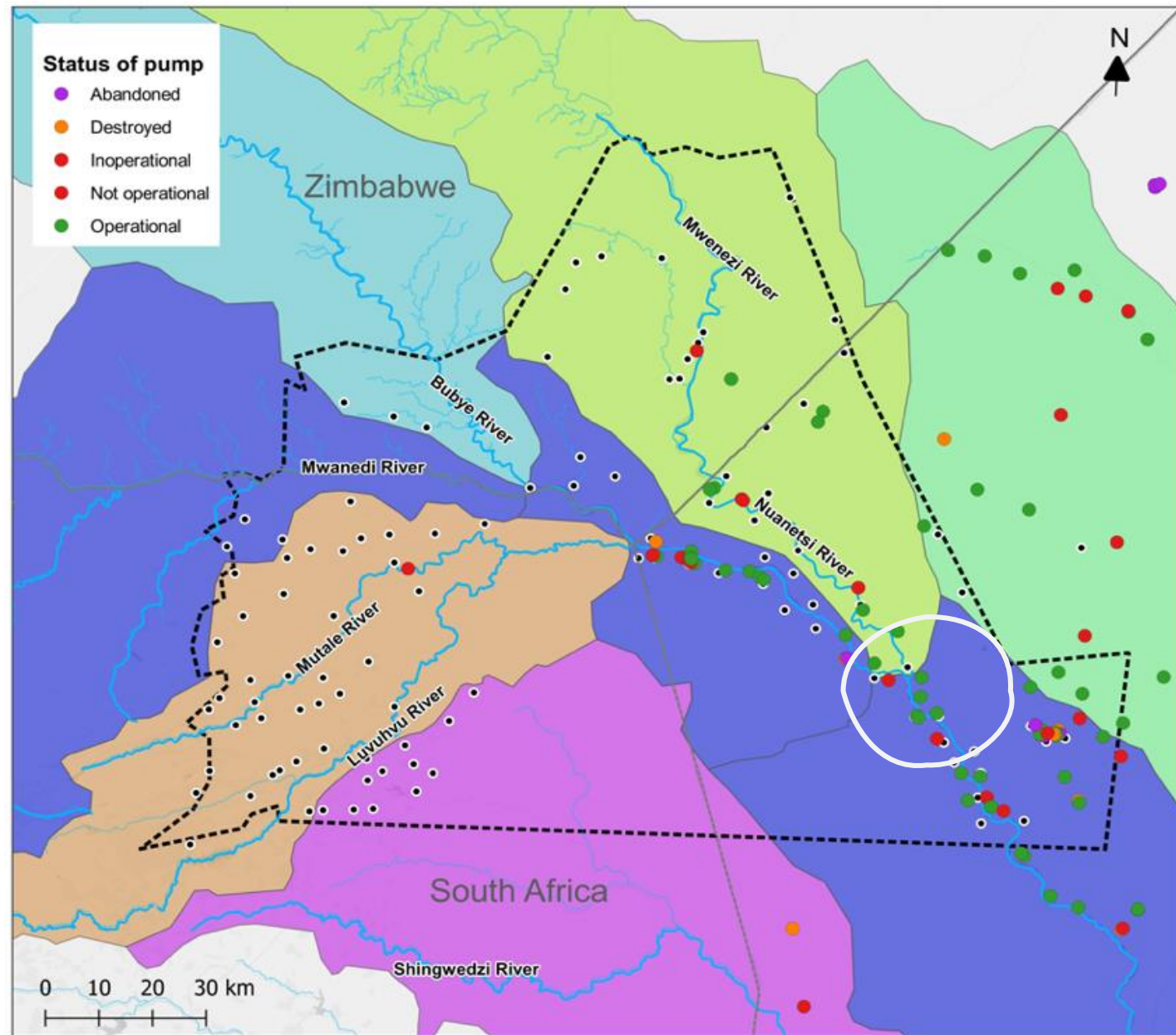
# Borehole status

Groundwater use is predominantly for domestic water supply and community (food) gardens.



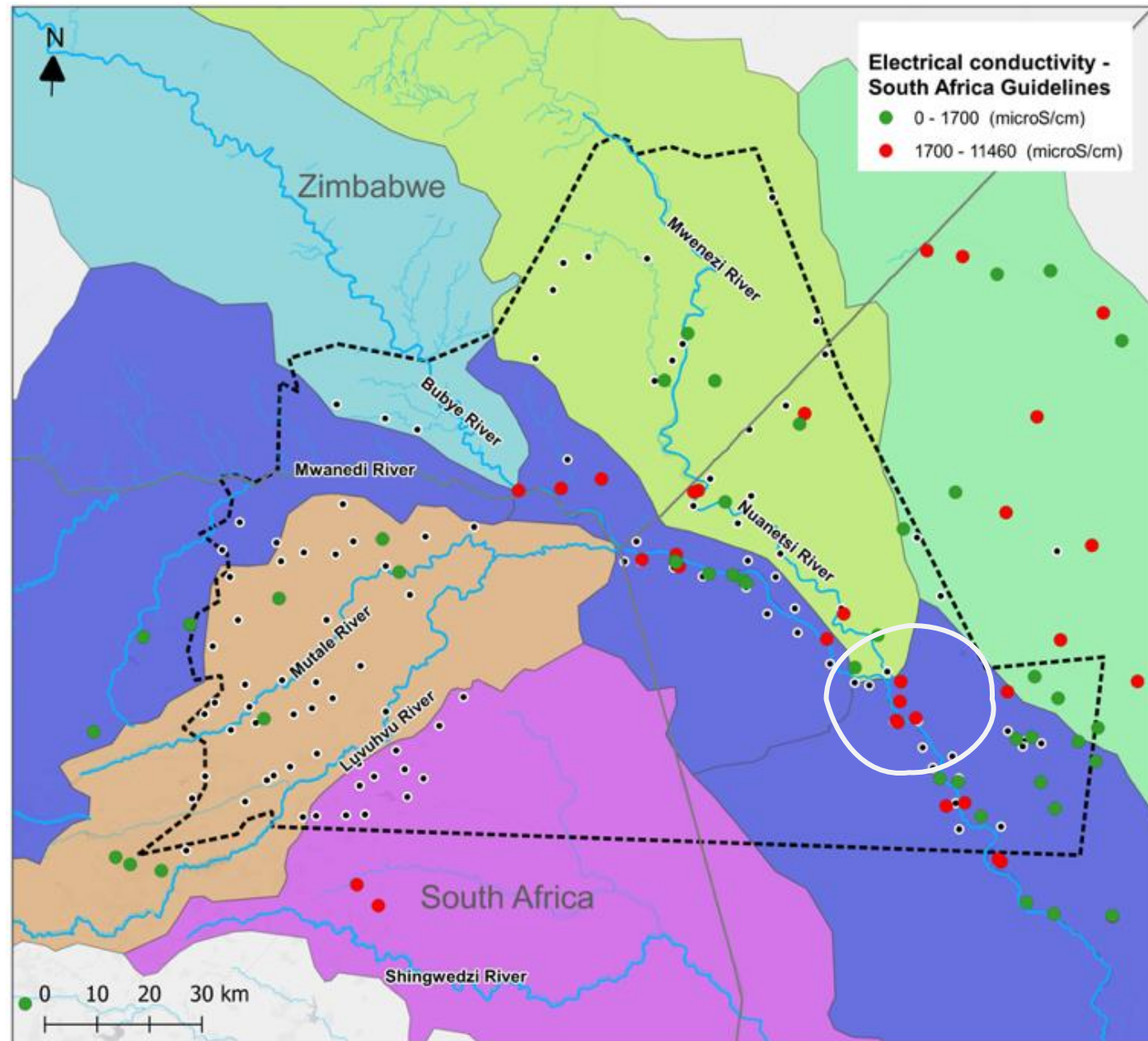
# Borehole status

Groundwater use is predominantly for domestic water supply and community (food) gardens.



# GW Quality – Electrical Conductivity (Salinity) –

map showing  
measurements  
against  
South Africa  
guidelines

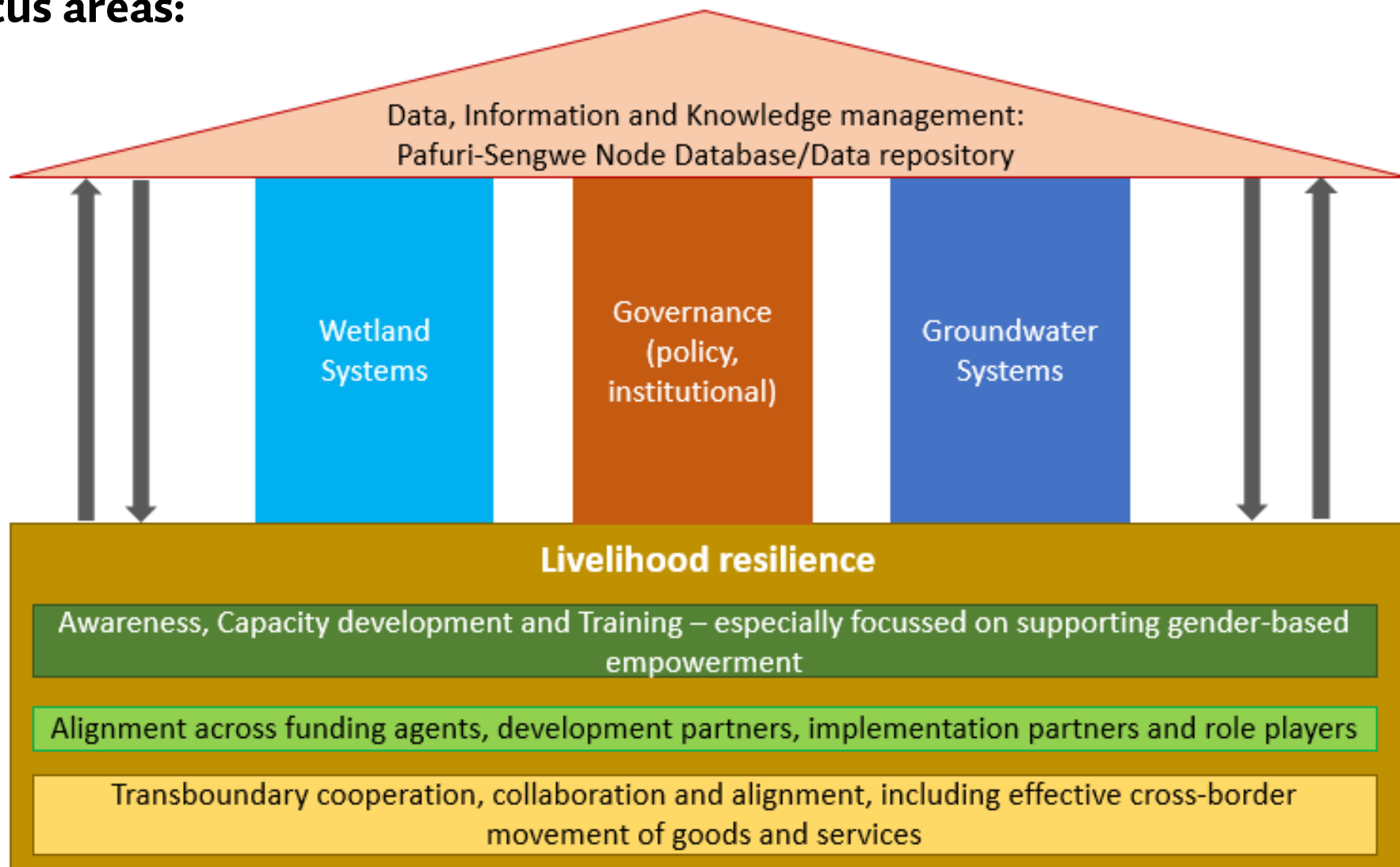




- It is difficult to get **spare parts** and there is a lack of outreach support and **technical knowledge**.
- Implementing water treatment solutions and technologies is complex and specific, requiring skilled operators.
- Treatment Options and relative costs:

Determinant	Units	Most Common Municipal Treatment Processes	Treatment type	Treatment Cost
Electrical Conductivity	µS/m	Reverse osmosis or ion exchange, or electrodialysis	Advanced	High cost
Fluoride as F	mg/L	Activated Alumina	Additional to Conventional	Medium cost
Nitrate and nitrite as N	mg/L	Reverse osmosis or ion exchange, or electrodialysis	Advanced	High cost
Sodium as Na	mg/L	Reverse osmosis or ion exchange, or electrodialysis	Advanced	High cost
Sulphate as SO <sub>4</sub>	mg/L	Precipitation with salts of Calcium, settlement and filtration Reverse Osmosis or ion exchange or electrodialysis	Additional to Conventional or Advanced	Medium OR high cost (depending on the treatment type)
Arsenic as As	mg/L	Flocculation, settlement and filtration	Conventional	Medium cost
Calcium as C	mg/L	Chemical precipitation and sedimentation	Additional to Conventional	Medium cost
Iron as Fe	mg/L	Oxidation, precipitation and filtration	Additional to Conventional	Medium cost
Magnesium as Mg	mg/L	Lime softening & re-carbonisation	Additional to Conventional	Medium cost

# Framework guiding investment approaches and financial investment focus areas:



# Key Findings

- The **historical transboundary sustainable use** of natural resources is critical to recognise and build on (including transboundary movement/sharing of resources across international borders) – recognise cross-border value chains.
- Develop Groundwater, Surface water and Wetland **Monitoring Programmes, harmonised** across borders.
- Geospatial database: a central place to store and access information.
- Develop focussed **trade-offs**. For example, community-based conservation initiatives could be supported by interventions focussed on improved water and food security.
- Promote a **decentralised approach** to natural resource management where **local communities are empowered** (and supported and resourced) to lead decision-making processes relating to sustainable use of the natural resources.
- Develop and implement harmonized groundwater use guidelines.





# Thank you!

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