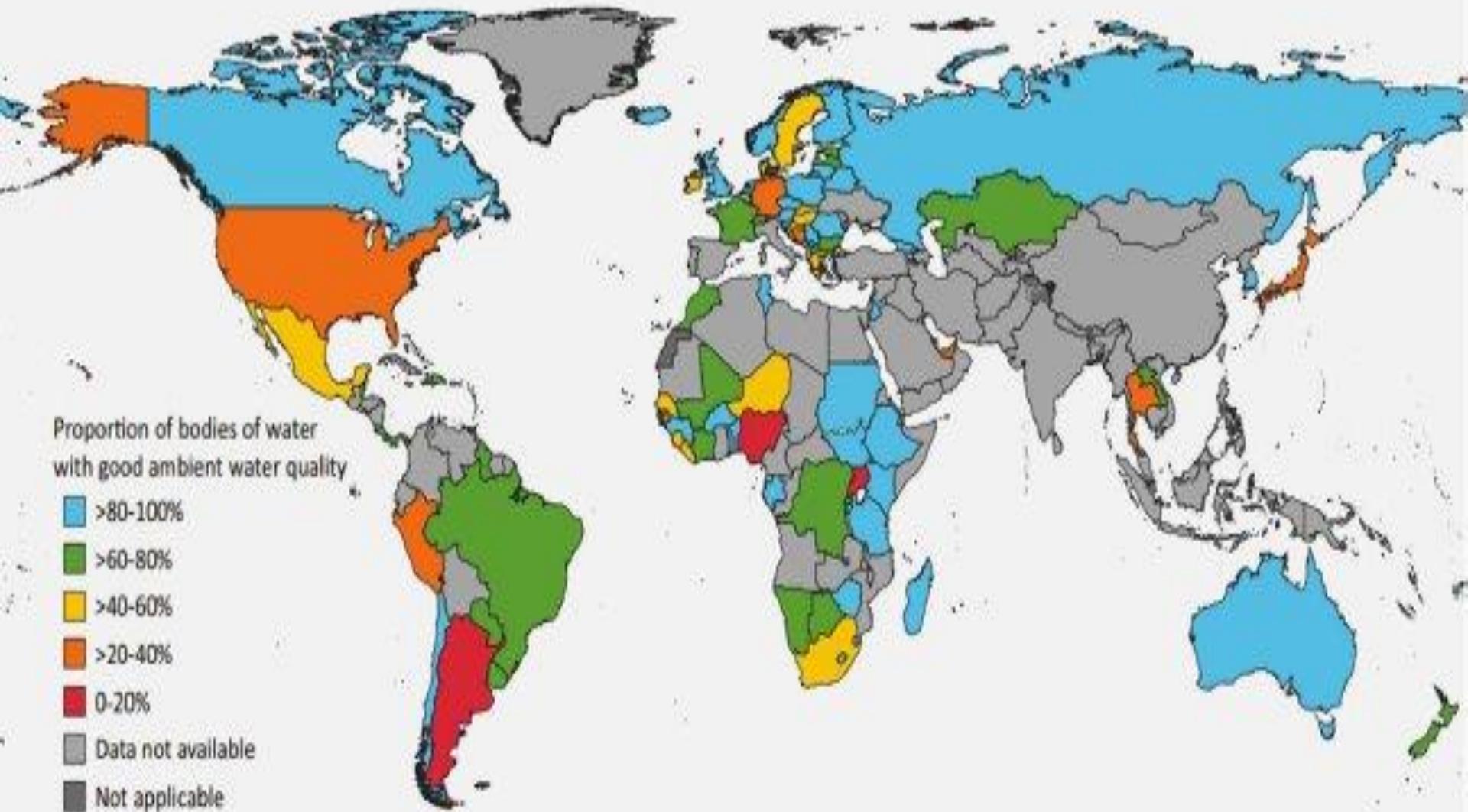


Citizen science confirms nature-based water purification: evidence from Yala Swamp, Lake Victoria Basin-Kenya



*Ronoh EK., Agramont A. Nyongesa JM., Otieno DO.,
Nyadawa MO and van Griensven A.*

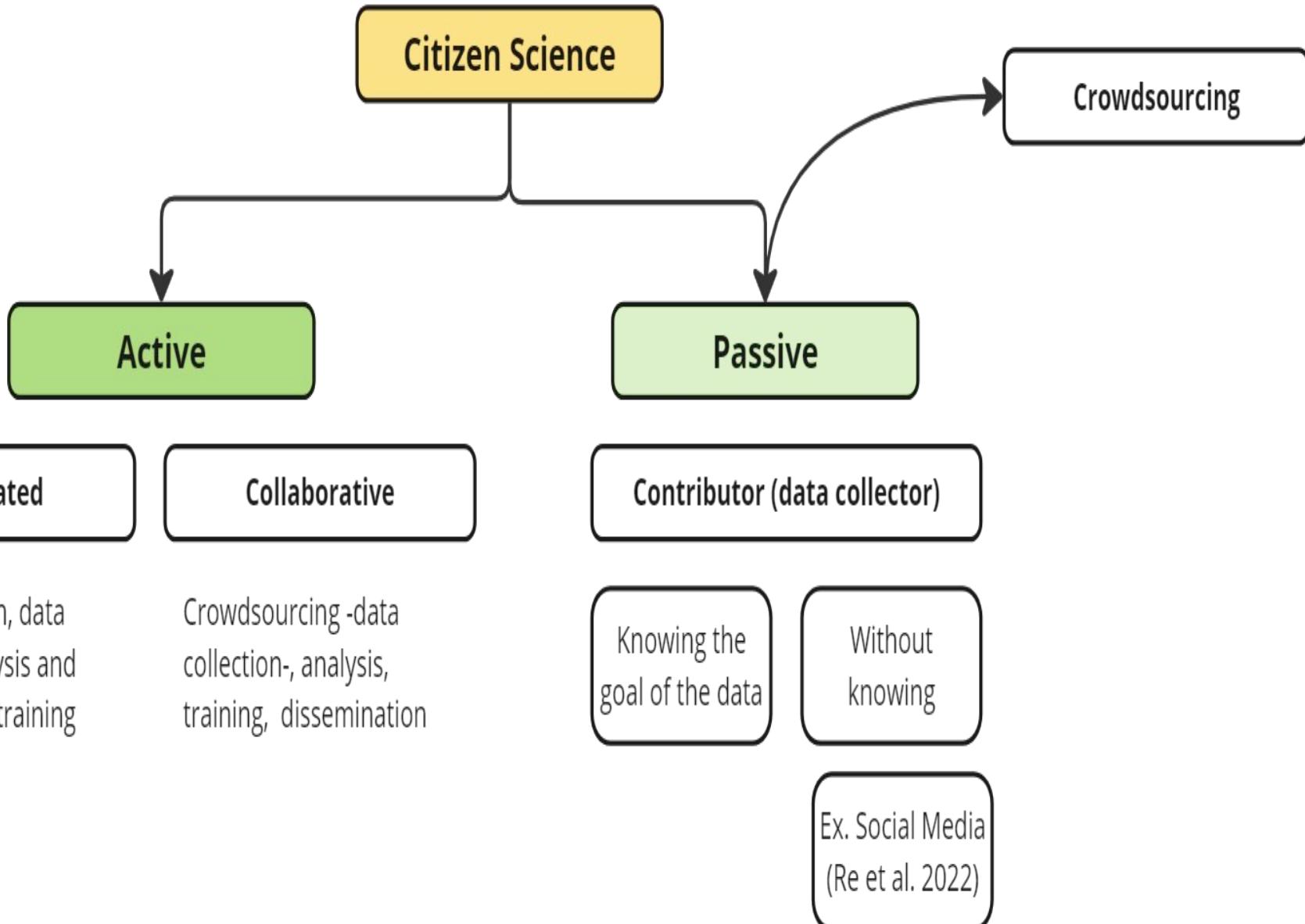
Water Quality



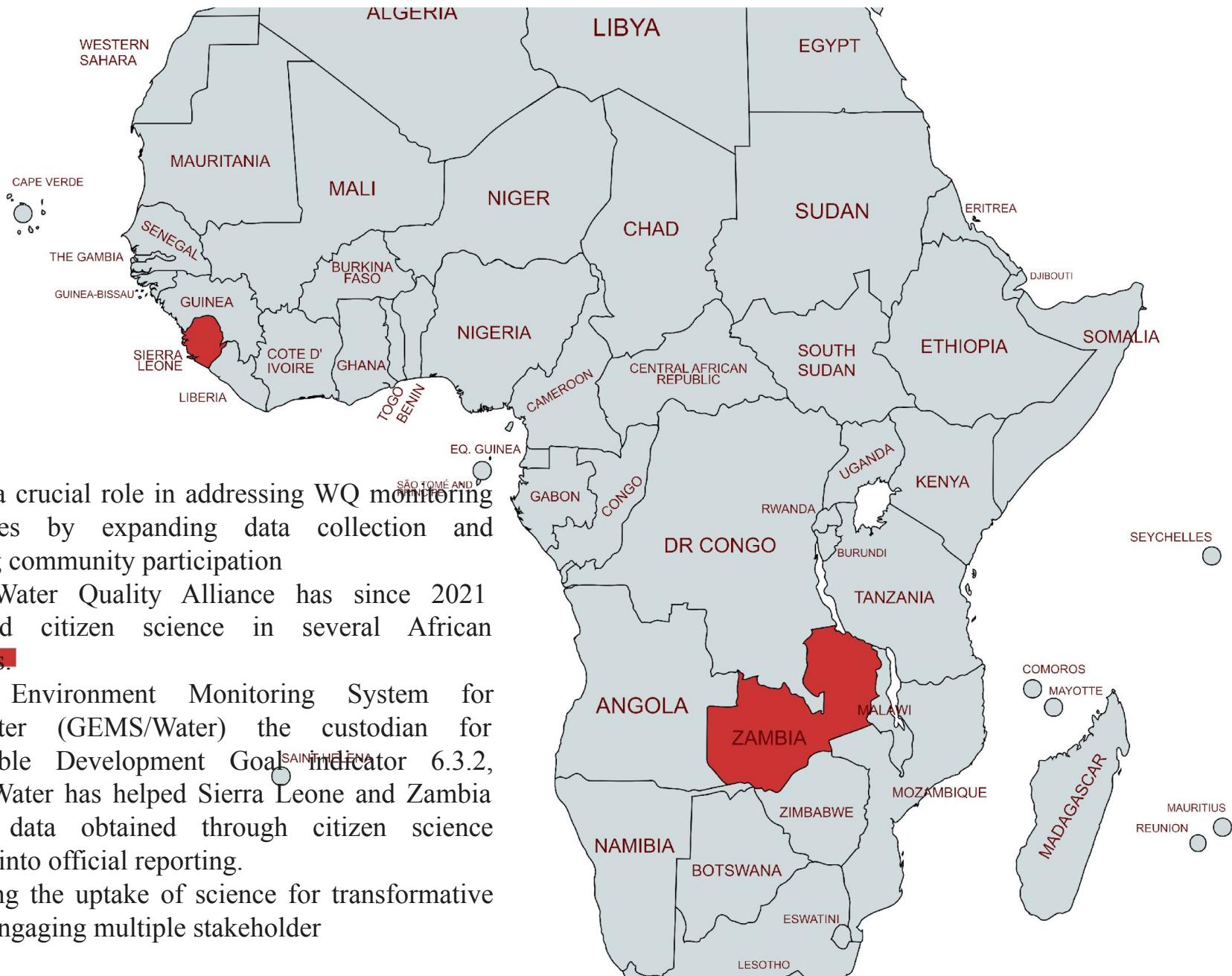
- Achieving SDG Target 6.3 (improve water quality) by 2030
- The health and livelihoods of *4.8 Billion people could be at risk*
- *Half of the world contributed less than 3% of the water quality data points monitored by 2024*
- Countries with low capacity to monitor WQ are *unprepared for the impacts*
- Filling the WQ data gap is essential (*UNEP, 2024*)

Citizen Science

Level of Involvement and Engagement between Citizens and Researchers



CS - African perspective



- CS has a crucial role in addressing WQ monitoring challenges by expanding data collection and fostering community participation
- World Water Quality Alliance has since 2021 supported citizen science in several African countries.
- Global Environment Monitoring System for Freshwater (GEMS/Water) the custodian for Sustainable Development Goal indicator 6.3.2, GEMS/Water has helped Sierra Leone and Zambia include data obtained through citizen science projects into official reporting.
- Increasing the uptake of science for transformative action, engaging multiple stakeholder

WQ threats in Kenya: Yala swamp as case study

- Yala Swamp is one of Kenya's largest freshwater wetlands, which is threatened
- Major threats Agricultural effluence, and Swamp degradation.
- Lack of long-term monitoring limits effective conservation.
- Urgent need for sustained, community-based monitoring approaches.
- FOR YALA SWAMP:
- The swamp is 175 km²
- It is under pressure from land use and pollution.
- Citizen science was adopted to enhance stewardship and monitoring.



Yala Swamp and Sampling Sites

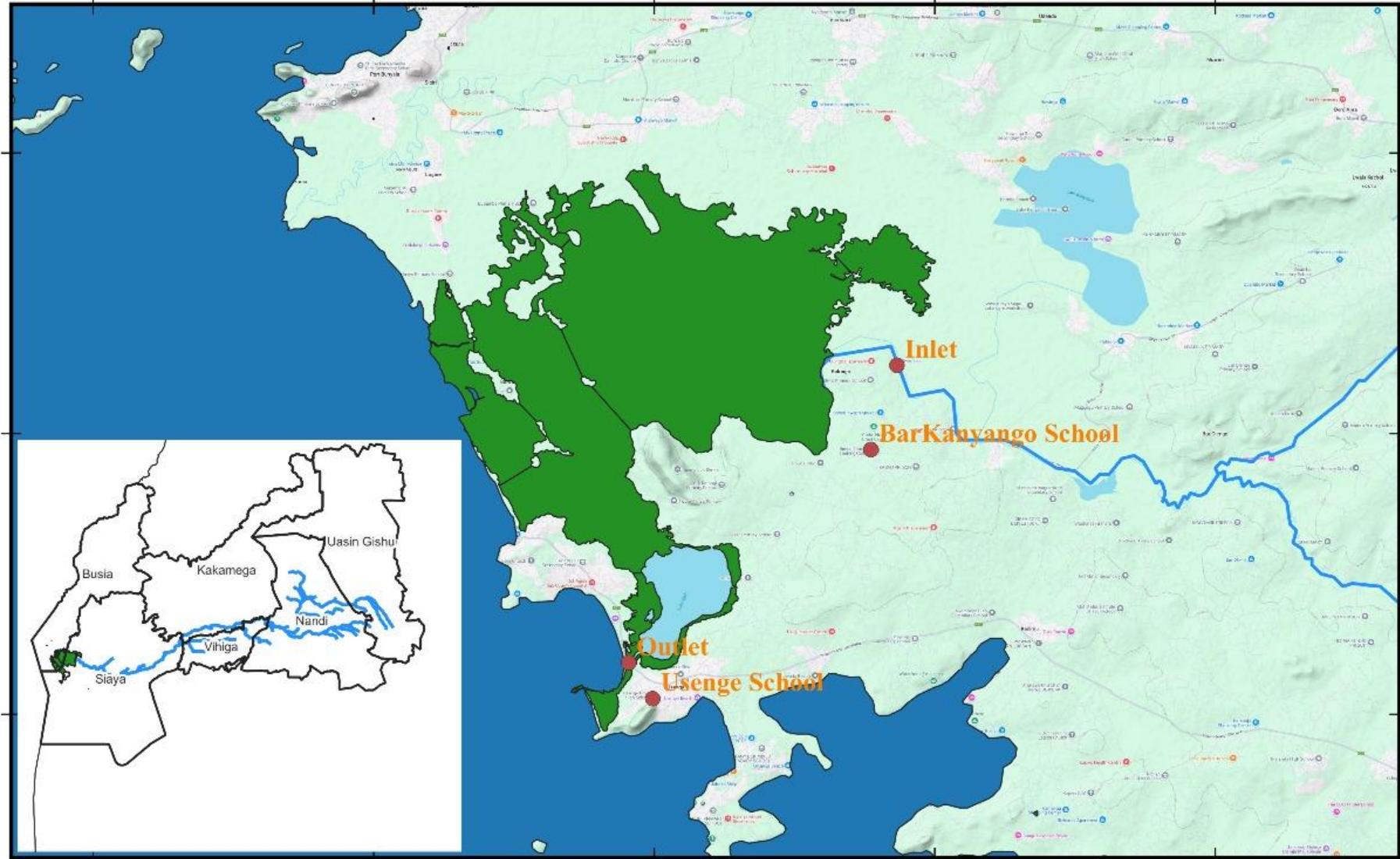
33°54.00'E

33°58.50'E

34°3.00'E

34°7.50'E

34°12.00'E



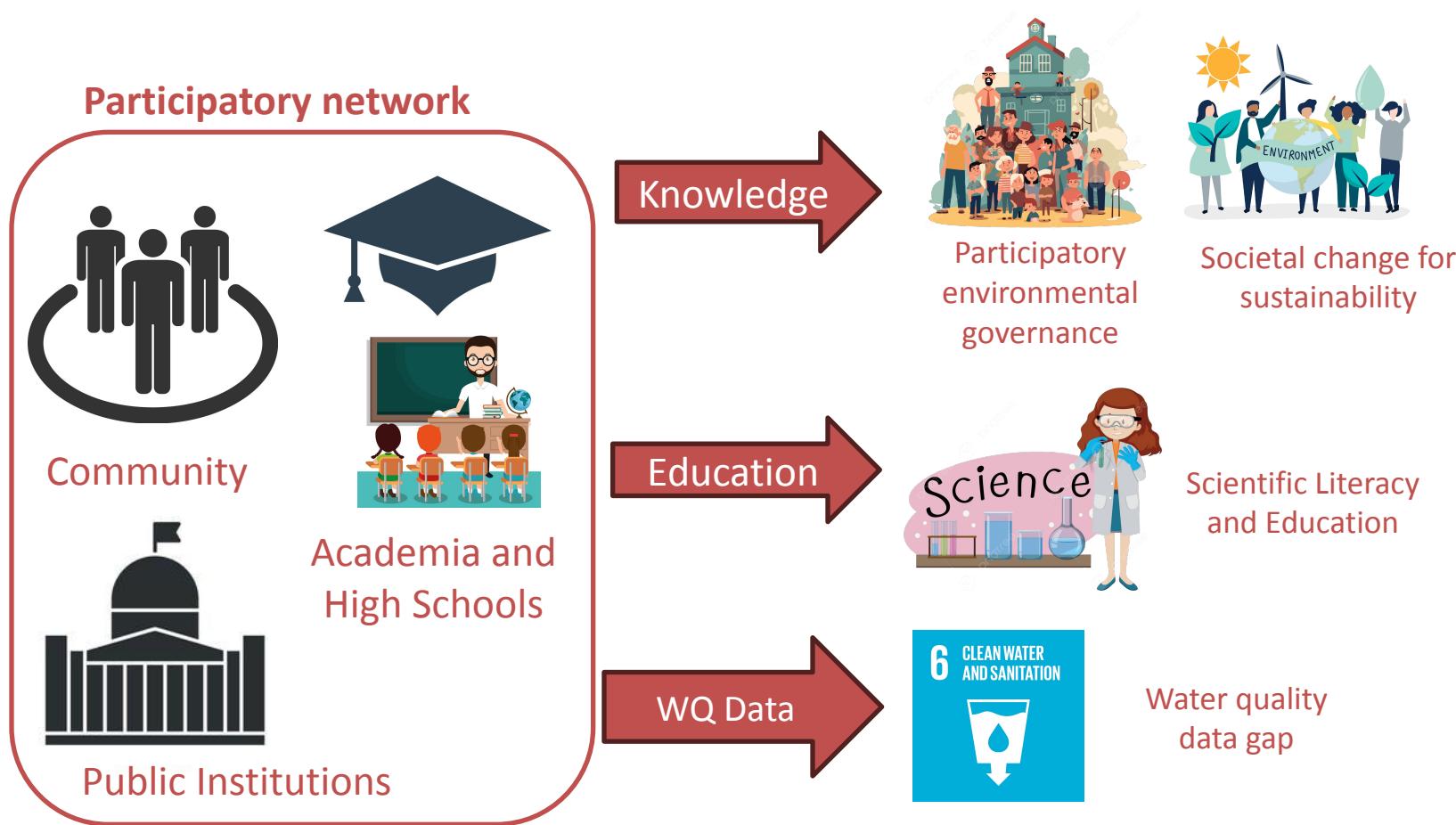
0 2.5 5 km



- Sampling Sites and Schools
- Yala Swamp
- Yala River
- Lake Victoria

Data Sources: Google Terrain; OpenStreetMap; Insitu Data.
Cartographer: Ernest K. Ronoh
Created on: May 30, 2025

CS Water Quality Monitoring framework



- Students from Barkanyango Secondary (Inlet) and Usenge High School (Outlet) were trained with portable water quality kits.
- Monthly sampling from Sept 2024 to Apr 2025
 - Measurements included pH, Temperature, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Salinity, Nitrate (NO₃), Phosphate (PO₄), and Turbidity kits. We also carried out FGD for the young learners in April
 - A workshop on CS, linked to the water quality results.

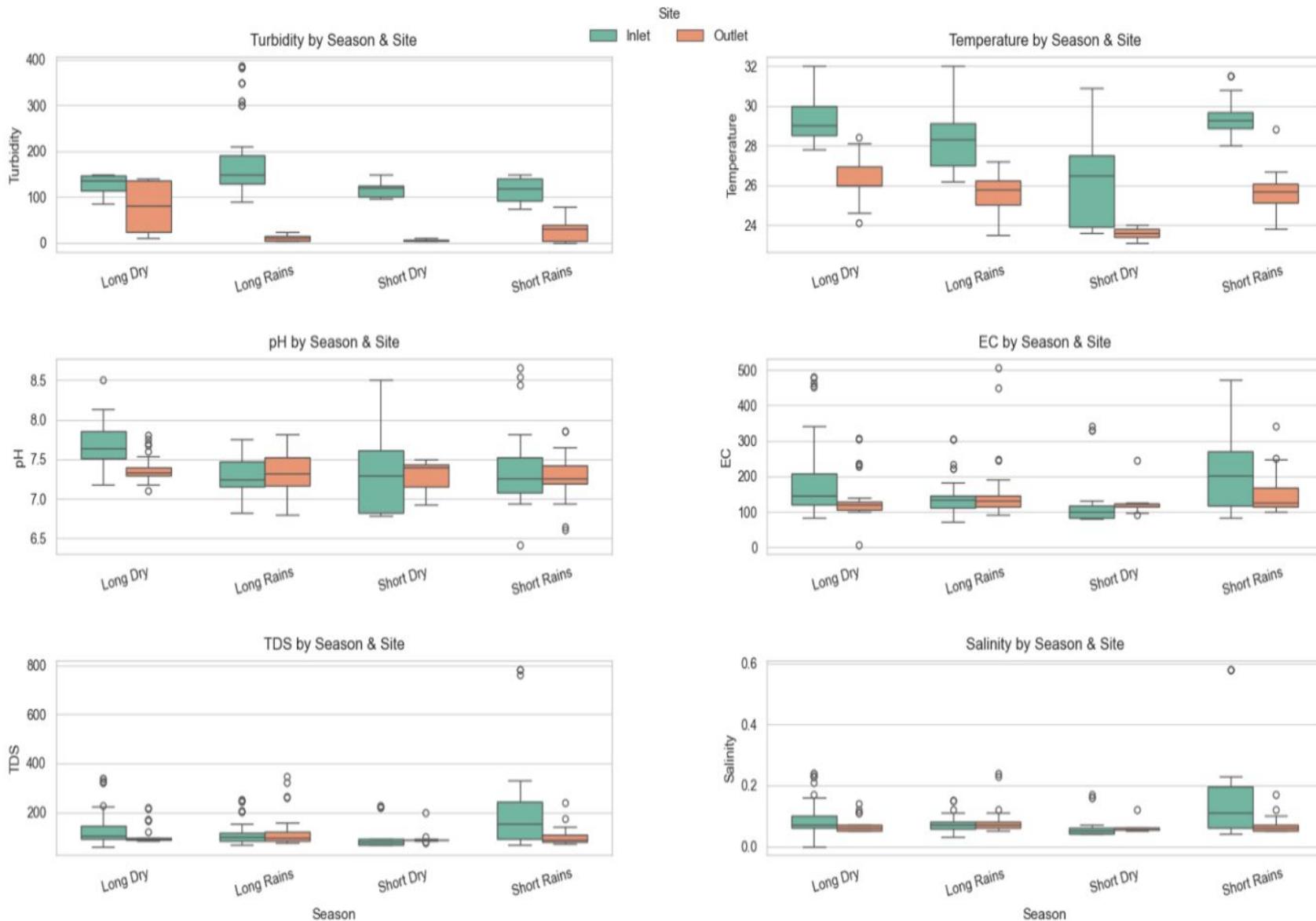
The CS Field Activities



Results - FGD

Thematic Area	Key Findings	Representative Figures/Slogans
1. Water Quality Measurements	- Consistent pH 7.0 at inlet despite weather	"No nitrates on the lower part"
	- Low nitrates downstream despite pollution	"pH is always 7.0 regardless of weather"
	- Rainfall-driven turbidity spikes	
2. Community Water Perception	- Good quality = Disease prevention + fisheries	"Good water quality promotes fish growth"
	- Bad quality = Eutrophication risk	"Water is not good for consumption without treatment"
	- Irrigation suitable but not drinking water	
3. Swamp Ecosystem Services	- Debris filtration (100% groups)	"Swamp is water purifier"
	- Nitrate absorption	"It absorbs all nitrates from upper part"
	- Flow regulation & silt deposition	
	- CO ₂ /O ₂ balancing	
4. Threat Assessment	- Top 3 threats: Human waste (71%), water hyacinth (57%), land conversion (43%)	"People around the swamp are pollutants"
	- Drought & papyrus cutting as compounding factors	"Papyrus cutting is a threat"
5. Conservation Messaging	- 100% groups advocated conservation	Slogans:
	- Pollution control as primary action	"For clean water, healthy fish—conserve the swamp!" (G1)
	- Ecosystem valuation emphasis	"My wetland my future" (G3)
		"Don't overexploit!" (G6)
6. Citizen Science Insights	- Swamp health = Human responsibility	"Human beings contribute to water quality"
	- Spatial understanding: Upper (polluted) vs Lower (filtered)	"We are ready to conserve it"
	- Need for treatment protocols	

Results – WQ Analysis



Motivation



Snacks and University
Researcher Engagements –
Boost ambition to join
university



Certificates of participation

Impact and Outcomes

- Most of the outlet samples passed the recommended quality levels
- Water quality monitoring has increased scientific literacy among young environmental stewards .
- Scientific evidence highlights disproportionate exposure to contamination.
- New generations are becoming more aware of their environment.
- CS can support Nature-based Solutions (NbS) - sustainable monitoring of the Ecological health of Yala river
- Recommendation: Upscaling the project

Proposed plan



Site Identification upstream

Way forward

Diversify participants
Engage WRUA's
Collaborate with WRA
Midstream and
Upstream
Freshwater watch kits

Challenges

Motivation
Funding

Diversification of participants



Field Demonstration

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