Assessing eutrophication indicators in lake basins for water quality management

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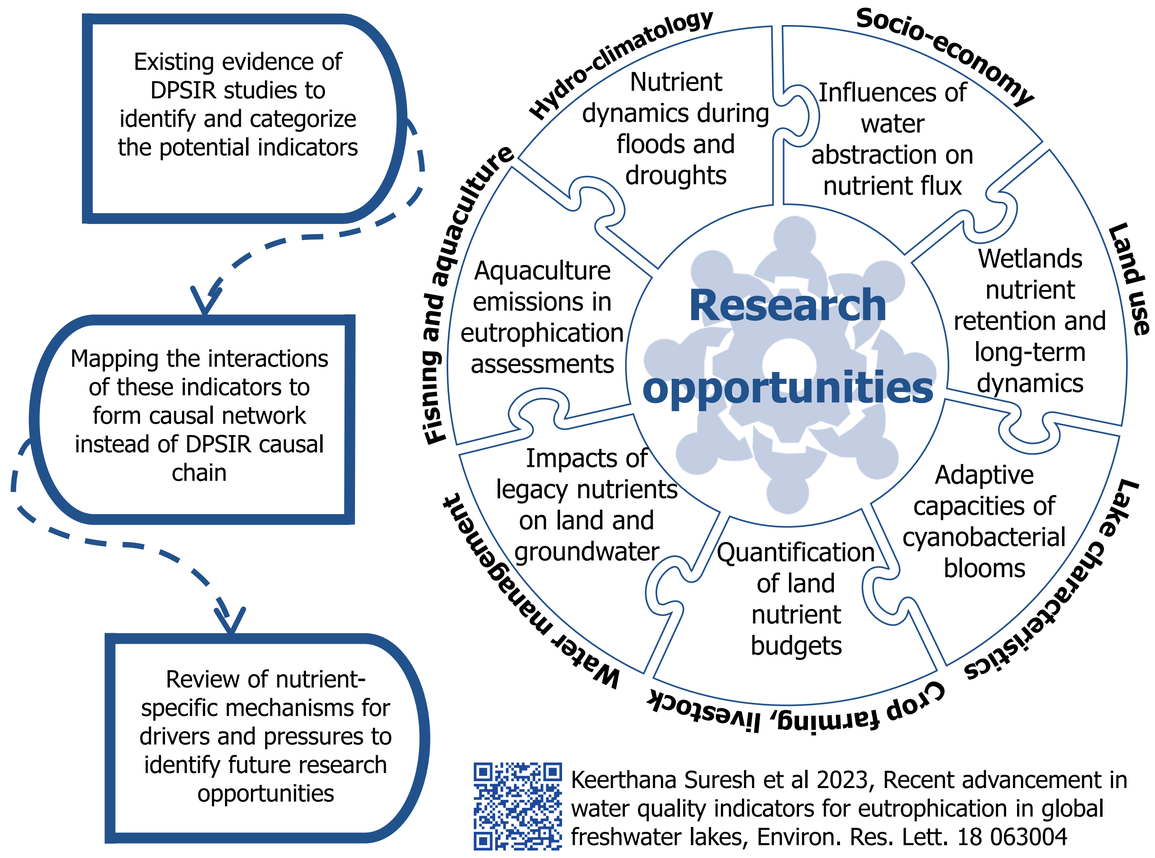
1. Research Motivation

- Most of the current approaches **focus on in-lake monitoring** to assess eutrophication status in lakes, which is needed, but not enough to explain the story of causes and effects.
- The feedback of anthropogenic influences that include **interactions of nutrient inputs** with climate, landuse, hydrology is necessary to evaluate trophic status and to set realistic water quality targets.
- Indicators that represent these characteristics in a holistic way can **help to better understand** and monitor the responses and extent of impacts.

2. Review of water quality indicators



Keerthana Suresh et al 2023, Recent advancement in water quality indicators for eutrophication in global freshwater lakes, Environ. Res. Lett. 18 063004

Figure 1: (left) Review method; (right) highlight of research gaps categorized based on review of nutrient mechanisms, categorized for seven-cross cutting themes of driver and pressure indicators

3. Design of the modeling framework

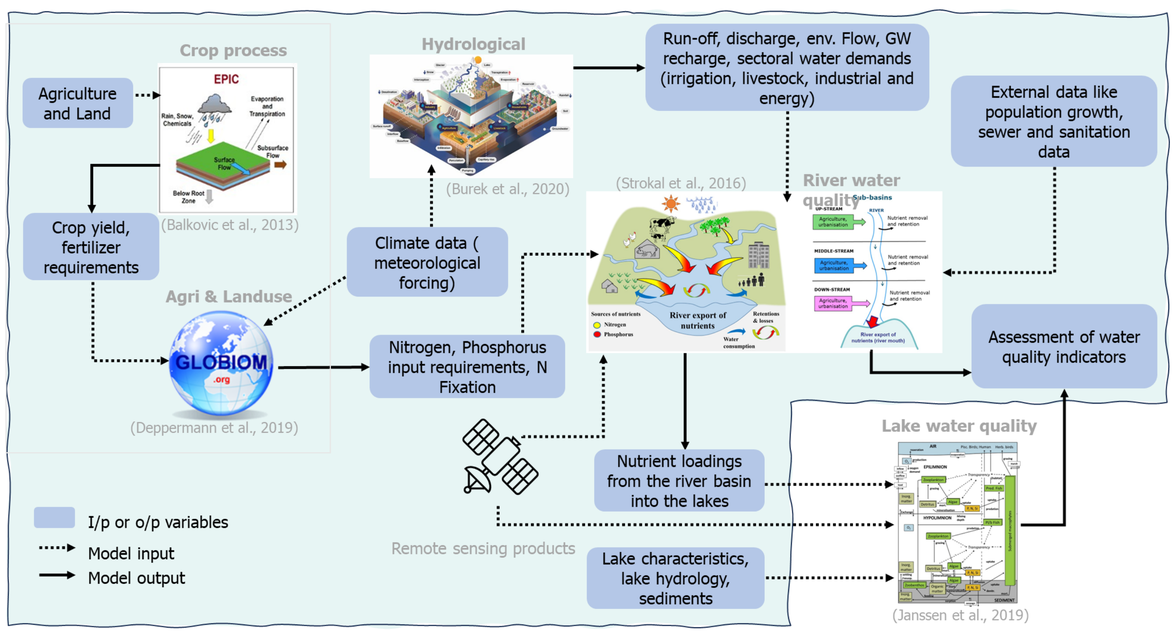


Figure 2: Integrated modeling framework to quantify and assess the indicators to understand the drivers and pressures causing impacts of global changes in freshwater lakes.

Discussion

- Work is in progress to: (a) estimate nitrogen and phosphorus loads from subbasins and (b) determine the critical indicators of eutrophication in Lake Victoria basin.
- Future work includes implementation of the modeling framework to global scale to understand the drivers and pressures of lake eutrophication, that could be used as proxies to monitor water quality status and impacts under the changing climate and socio-economic development.

4. Case study

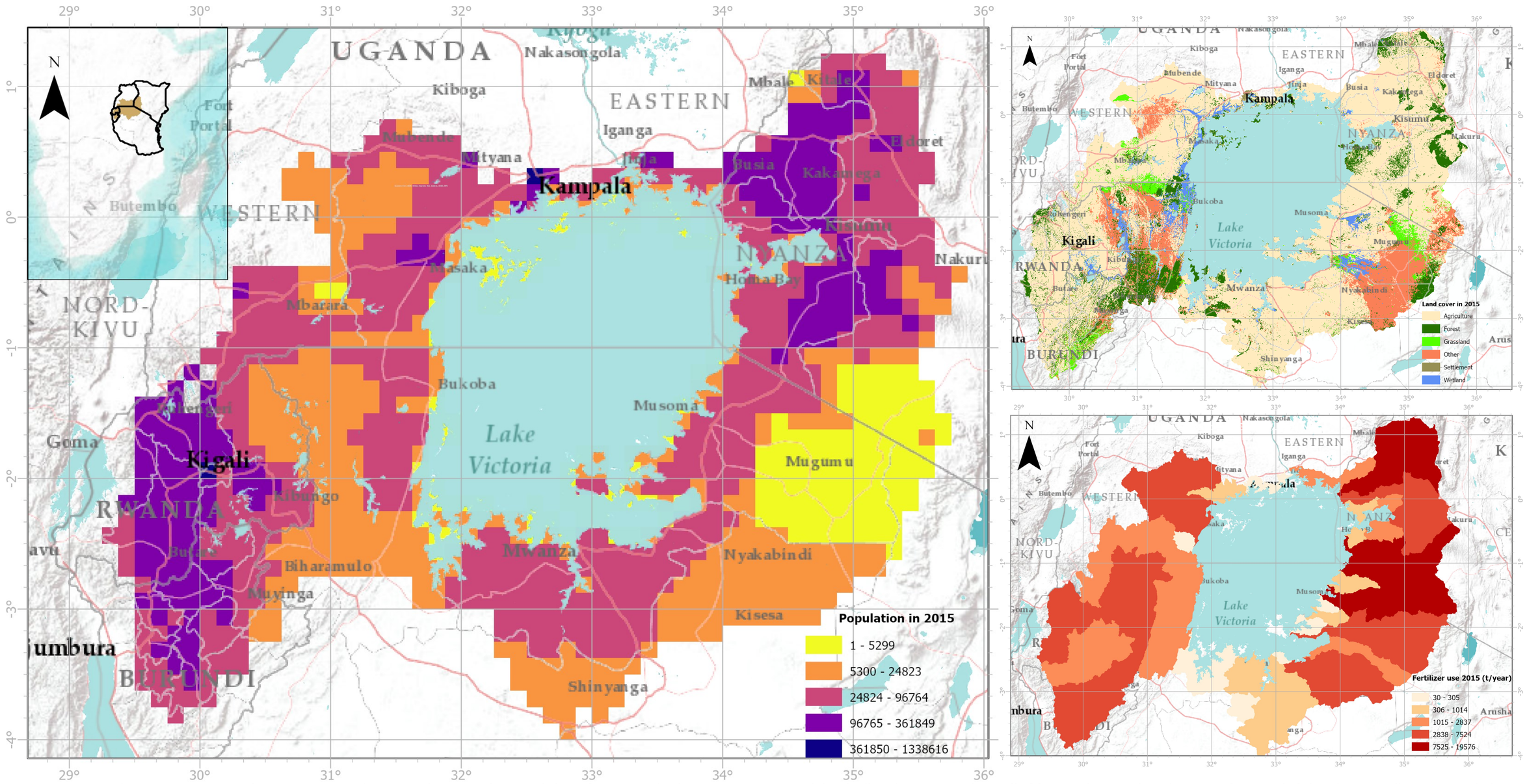


Figure 3: Lake Victoria is used as a case study to implement the modeling framework shown in Figure 2 (shaded). The maps show (left) population distribution; (top right) landcover; (bottom right) fertilizer input in the basin for 2015.

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inventWater project is funded by European Union's Horizon 2021 research and innovation programme under the Marie Sklodowska-Curie Grant Agreement number 956623. MSCA-ITN-ETN – European Training Network