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Global Health Impacts of Harmful Algal Blooms in Ugandan Crater Lakes

Christine Park

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GLOBAL HEALTH IMPACTS OF HARMFUL ALGAL BLOOMS IN UGANDAN CRATER LAKES

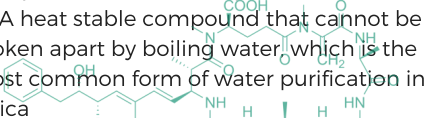
CHRISTINE PARK
 MAKERERE UNIVERSITY BIOLOGICAL FIELD STATION (MUBFS), KIBALE NATIONAL PARK
 MMASC GLOBAL HEALTH SYSTEMS IN AFRICA CLASS OF 2017

Project Goals

- 1 | Assess algal toxin levels and related parameters to better understand the impact of human activity on the biological integrity of two crater lakes in Uganda
- 2 | Extract various determinants of health including social, cultural, political, and environmental factors in the context of Ugandan freshwater systems
- 3 | Derive implications about the cumulative health-related effects of hepatotoxin accumulation on community health

What is Microcystin?

- 1 | A hepatotoxin most commonly produced by the cyanobacteria Microcystis
- 2 | A heat stable compound that cannot be broken apart by boiling water, which is the most common form of water purification in Africa
- 3 | Chronic exposure can be detrimental to human health, potentially rupturing the liver, damaging other organs such as the kidneys, spleen, and heart, and acting as a potential tumour enhancer



Personal Development

- 1 | Applied knowledge of global health systems obtained through coursework in the context of a developing country facing unique challenges related to community health and wellbeing
- 2 | Discovered underlying interest in environmental health and stewardship with relation to human health systems
- 3 | Further honed my potential as a leader in global health and gained invaluable field experience through self-reflection and participatory engagement



Project Activities

- 1 | Conducted high frequency sampling at two crater lakes in Western Uganda: Lake Nkuruba and Lake Saka
- 2 | Measured transparency and water level fluctuations, and constructed temperature and dissolved oxygen profiles for each lake
- 3 | Analyzed Microcystin and chlorophyll concentrations
- 4 | Created case study and teaching note highlighting the context-specific issues related to eutrophication of freshwater systems



Professional Learning

- 1 | Developed a transdisciplinary, planetary health lens that considers all aspects of health, particularly the interdependence of human and natural systems
- 2 | Realization that complex, "wicked" problems such as food insecurity and eutrophication are context-specific issues that cannot be mitigated entirely, but can be moderated with proper management
- 3 | Improved critical thinking skills and diversified skillset as a global health professional

Outcomes

- 1 | Revealed toxic levels of Microcystin apparent in both crater lakes, including the one in a privatized eco-tourist area
- 2 | Implicated direct correlation between human activity (i.e., agricultural activity, overfishing, deforestation) and occurrence of cyanobacteria
- 3 | Recognized impacts of toxin-producing cyanobacteria on community health and the need for environmental stewardship

Challenges

- 1 | Working under resource-strained conditions (e.g., lack of internet access and educational learning tools, lack of updated scientific apparatus)
- 2 | Language and cultural barriers in the field and throughout daily life in general

Moving Forward

Lake Nkuruba and Lake Saka encompass vastly different conditions that have implications for the complex dynamics of aquatic ecosystems and their subsequent effects on community health. "Wicked" problems such as this must be addressed with a holistic, systems approach.

