

Describing the intersection of human health and the environment of Lake Tanganyika: a mixed methods study in South Kivu, DR Congo



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INTRODUCTION

To achieve better health and environmental outcomes, the interconnection between humans, fauna, flora, and their shared environment must be understood. Previous work in the region generated the hypothesis of complex and strong interactions between human health, food insecurity, lake resource management, vector-control tools, and biodiversity loss.

In 2014, the Lake Tanganyika Floating Health Clinic (LTFHC) in partnership with a local Tanzanian conservation organization conducted hypothesis generating household surveys in Lagosa Ward, Tanzania adjacent to the Mahale National Park. Revealed that:

- **87% of households had used a bed net for fishing at some point.**
- **65% of households reported a subjective decrease in fish supply over time.**

In 2016, the LTFHC conducted a 94-indicator household survey in South Kivu, DRC where **bed net shoreline fishing was observed in 30% of the riparian populations** in surveyed areas.

In early 2022, LTFHC again collected transdisciplinary data with a multi-sectoral approach in South Kivu Province, DR Congo with a focus on the Ubwari Peninsula. Areas of study included Baraka, Kazimia/Nguma, Buma, Mwayenga/Kimino, and Dine/Muzimu. This poster is on the data collected during this 2022 period.

METHODS

We took a mixed methods approach to allow for methodological triangulation. This allowed a more complete description of a operationally complex and under-researched, yet significant context.

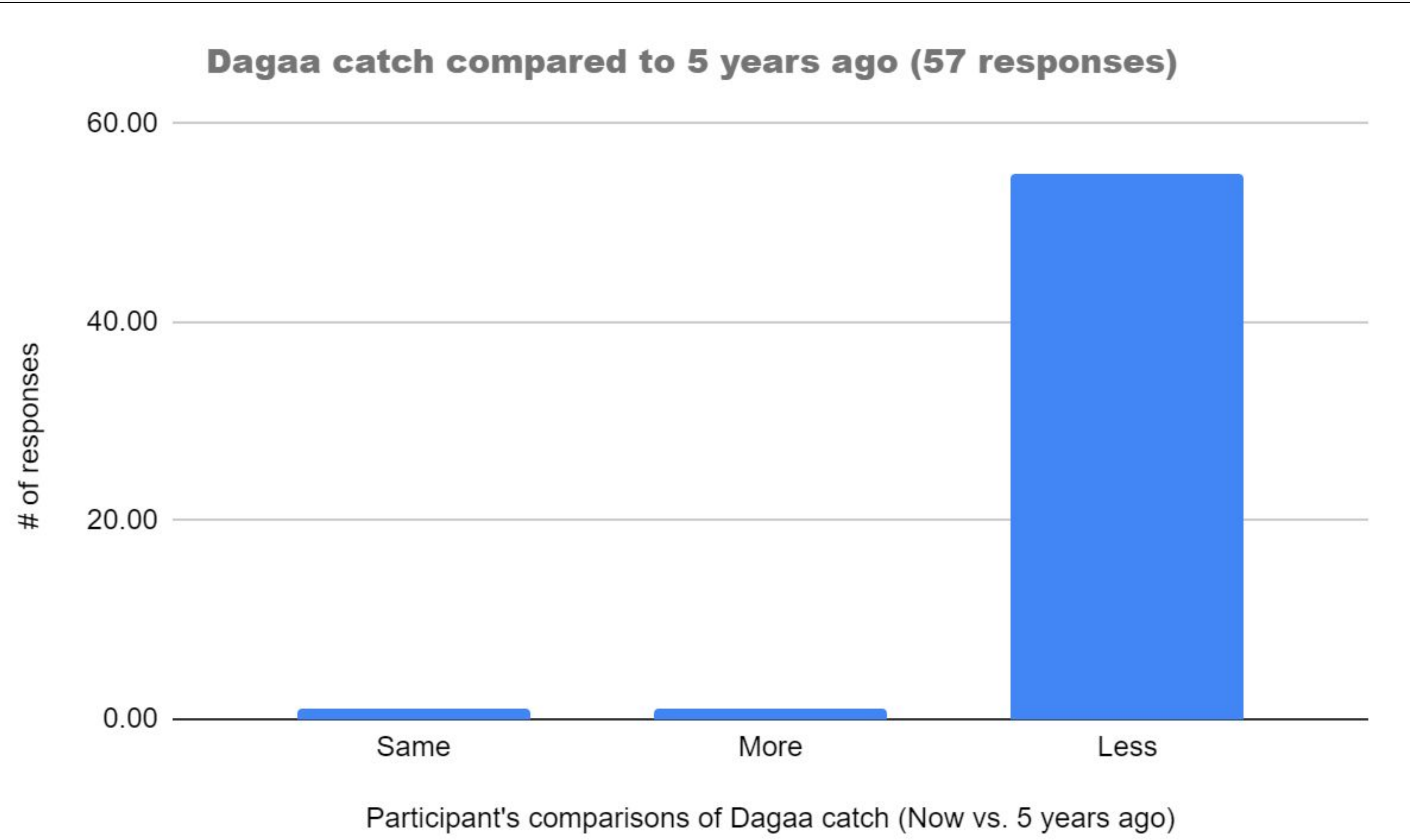
Data collection involved:

- **160 household surveys**
 - 116 questions on demographics, socioeconomics & livelihoods, health, food security, fish consumption practices, and bed net use & mosquito transmission
- **8 key informant interviews**
- **48 mosquito trap samples**
 - CDC Light-Traps for mosquito samples
- **7 village fishery samples**
 - Total of 561 fish collected
 - Total of 7 sites with water quality sampled
- **11 Focus Group Discussions**
 - Total of 111 participants (26 women and 85 men)
 - Local fishers
 - Discussed a variety of topics from fishing, general experiences on the lake, and thoughts on vector control tools like bed nets

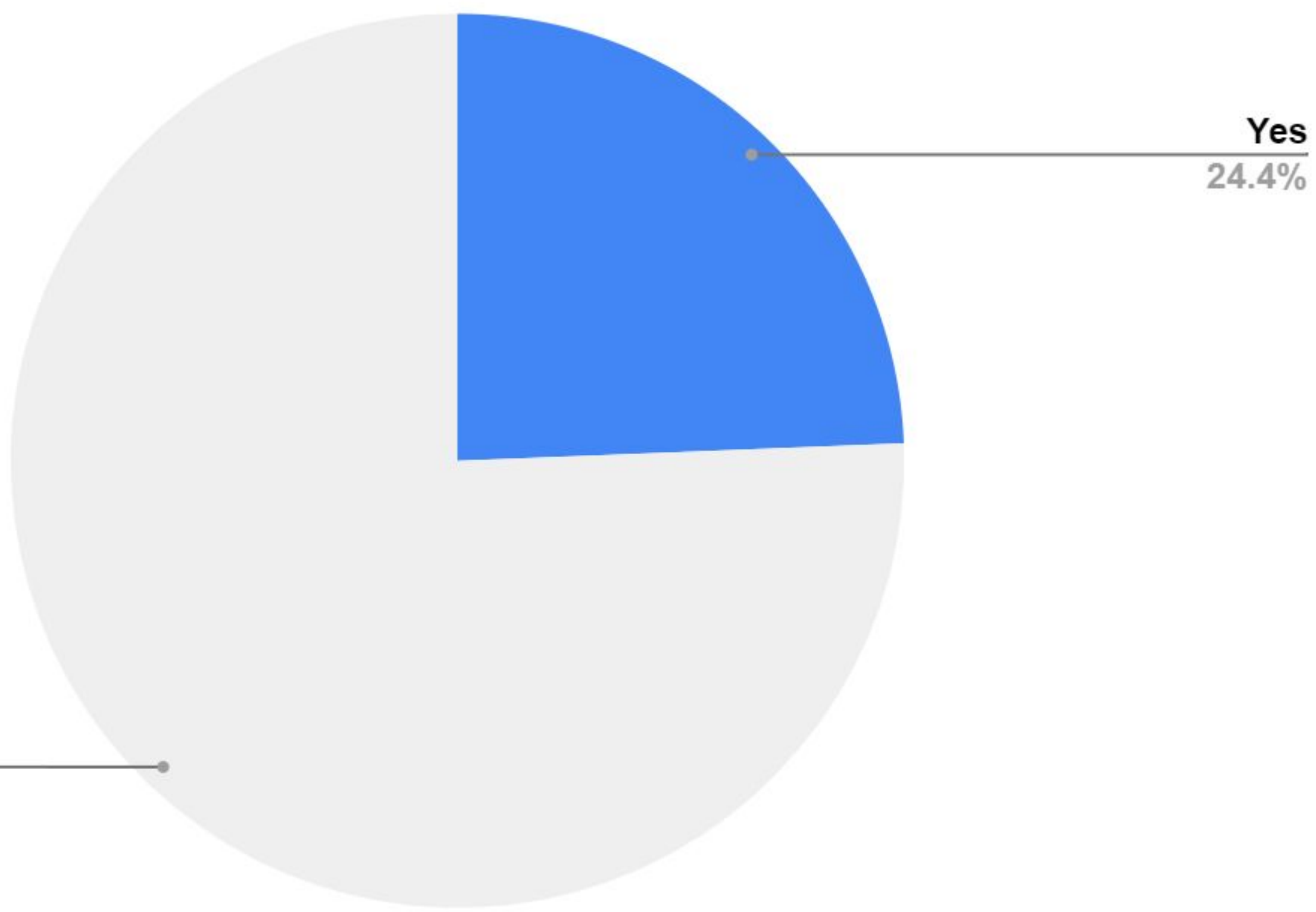
SNAPSHOT OF RESULTS

Of the 57 households that fish for Dagaa on a regular basis, **55 stated that the Dagaa catch was less now** compared to 5 years ago.

Furthermore, of the 32 households that fish for Mikebuka on a regular basis, **all 32 stated that the Mikebuka catch was less now** compared to 5 years ago.



Percentage of people in households who use mosquito bednets to fish



24% of households indicated that at least one person in their household actively uses mosquito bed nets to fish.

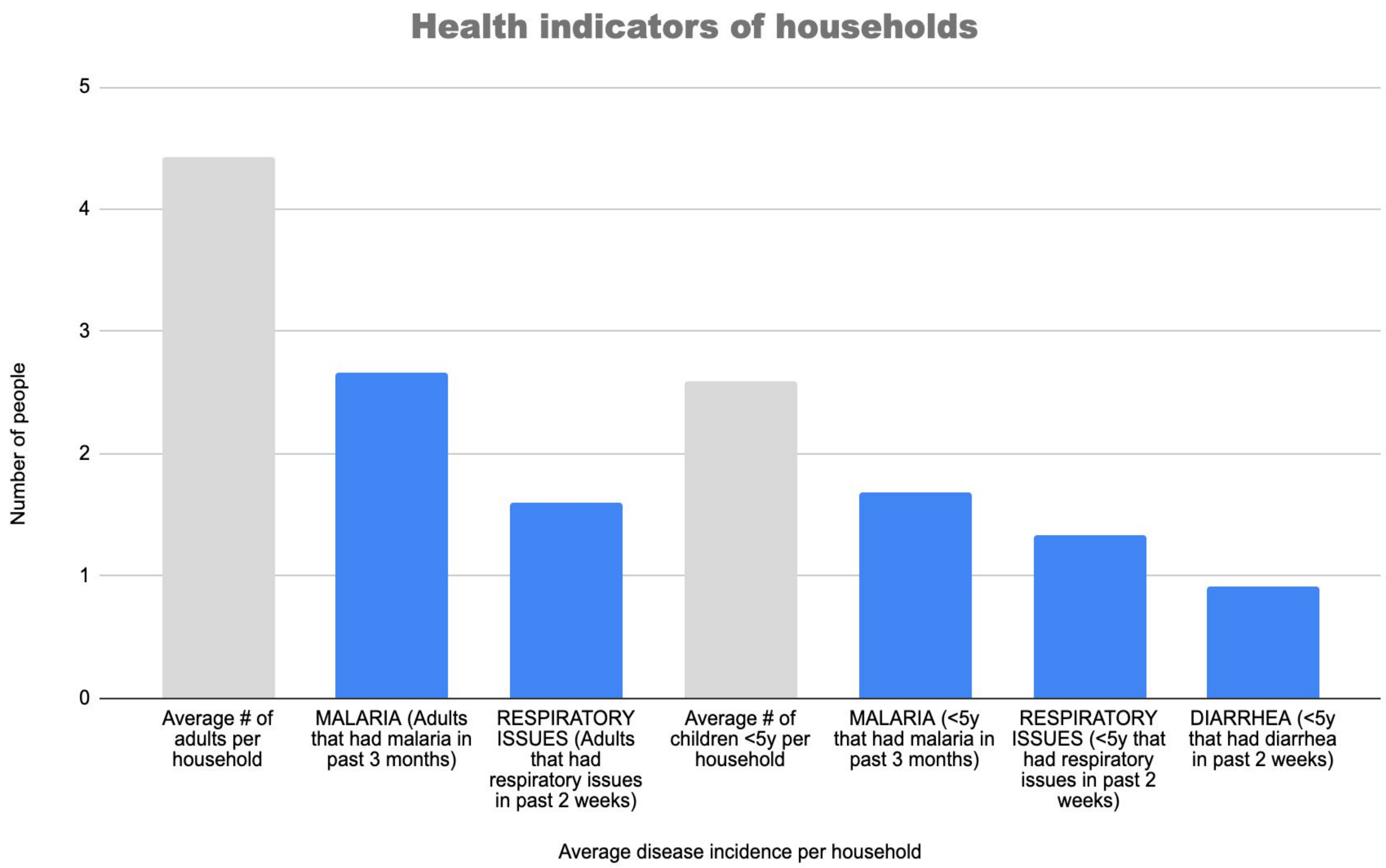
Of these households, **75% stated that the person uses mosquito bed nets to fish at least once a week.**

Furthermore, these individuals stated that when that person fishes with mosquito bed nets, **90% fished along the lakeshore in groups.**

Per household, there were an average of **4-5 adults** and between **2-3 children** <5years of age.

Respondents stated that on average, nearly 2 children <5y per household had malaria in the past 3 months.

This data indicated that **64% of children <5 years had malaria** in the past 3 months. **Roughly 60% of adults had malaria** in the past 3 months.

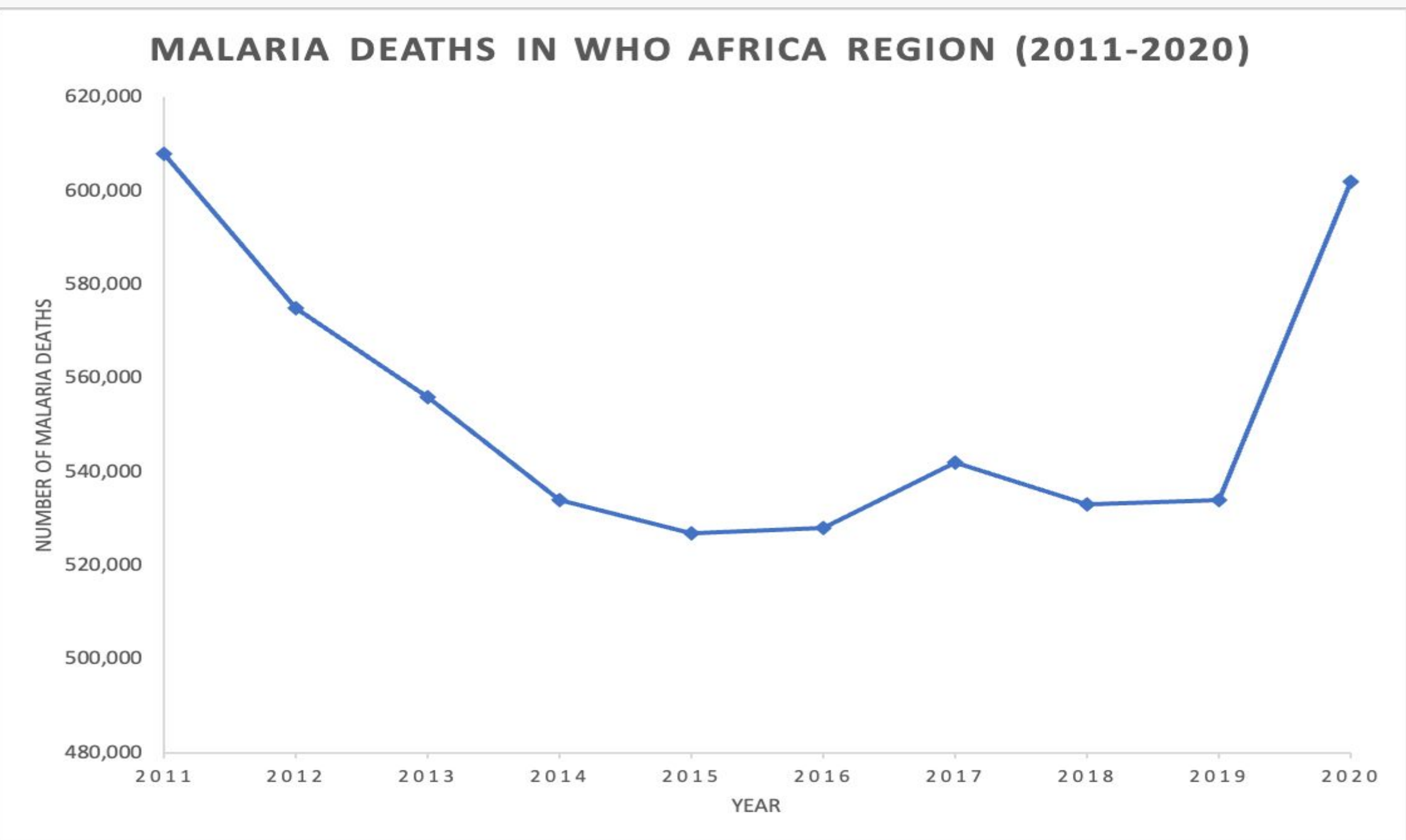


DISCUSSION

In preliminary analyses, many similar themes are present: **a noticeable decrease in commercial catch; multiple pressures upon riparian communities characterized by heavy disease burdens and socio-economic and security fragility; the use of bed nets for shoreline fishing.** An excerpt from focus group discussion participants encapsulates the interconnected issues:

“Fishing activities are no longer profitable at the moment due to the low catches regularly reported. According to participants, this situation accentuate[s] poverty among fishermen who are likely to be vulnerable to many diseases due to the lack of consistent means to seek medical care.”

Why bed nets are diverted for alternate use as a fishing tool is complex; however, it is clear that bed net-only strategies are not working well for malaria control in some of the **highest burden areas in sub-Saharan Africa (where 95% of all malaria deaths occur).**



Changes in biting times, outdoor biting, and multiple disease-carrying species continue to drive disease suggesting that alternative vector control tools are required. **Factoring in the damage to the fishery and to livelihoods that bed net fishing causes makes the need for alternatives all the more urgent.** The LTFHC is the first to collect mosquito species as well as characterize vector-borne transmission dynamics on the Ubwari Peninsula, as well as to look at the ecosystem of disease management holistically with fisheries and conservation indicators.

More interdisciplinary research and collaboration is needed to expand this work along the coasts of Lake Tanganyika and other African inland lakes and rivers to comprehensively design and deploy effective strategies for human disease management as well as conservation and fisheries related oversight and management strategies. **Solutions likely include alternative vector control tools such as spatial repellents, as well as community-led enforcement of conservation and fisheries regulations.**