

ACARE-Annual Meeting of the African Great Lakes Stakeholders Network:



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Day 1 Presentation
Mulungushi International Conference Center
4-6 February 2025
Lusaka, Zambia



Presentation Outline

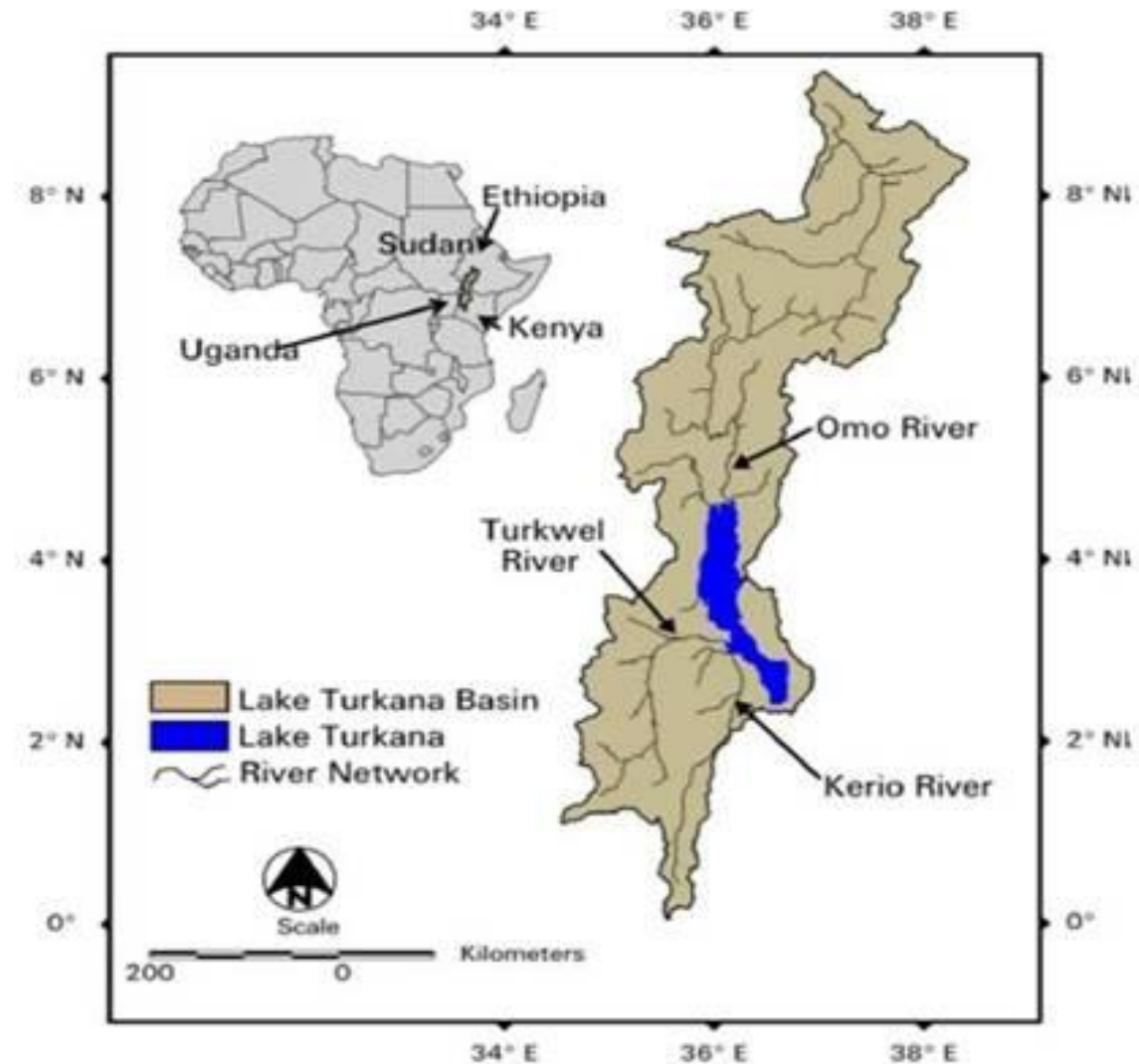
In this talk, I will take you through the following:

- Background Information of Lake Turkana
- Advisory Group Founding: Goals, Objectives and Membership
- 2024 Critical Objectives:
 - *Priorities*
 - *Milestones (i.e., Key activities and achievements)*
 - *Lessons Learnt and Areas of Improvements*

Biogeography of the Lake

Table 1: Physical characteristics of Lake Turkana (Obiero et al., 2023)

Characteristic	Measure
Age (millions of years)	4.3
Position: Latitude and Longitude	3°29'N; 36°17'E
Altitude (m above mean sea level)	360
Catchment area (km ²)	130,860
Lake surface area (km ²)	7,560
Lake area as percentage of catchment (%)	5
Maximum length, North-South (km)	265
Maximum width, East-West (km)	32
Mean width (km)	31
Maximum depth (m)	114
Mean depth (m)	31
Volume (km ³)	203.6
Inflow (km ³ yr ⁻¹)	19
Precipitation (mmyr ⁻¹)	< 200
Annual fluctuations in level (m)	1 – 1.5
Residence time (yrs)	12.5
Country	Kenya, Ethiopia



Map of Lake Turkana Basin: Source Venturi et al., 2012

Advisory Group Founding and Goal

About the Advisory Group:-

- **Founding:** LTuAG founded during the 1st African Great Lakes Stakeholder Workshop, held in Entebbe, Uganda, November 5 - 7, 2019
- Eight (8) members drawn from research and academic institutions (<https://www.agl-acare.org/advisory-groups>)
- **Mission:** To strengthen science, inform policy decisions, and foster collaboration and partnerships for the sustainable management and vibrant future of Lake Turkana.
- **Membership:** 4 Advisors & 25 Members; KEN=16, ETH= 9



2024 Critical Objectives

Objectives	Timeline	Status
To review and strengthen a proposal/concept note for the establishment of the Omorate research station.	March 2024	Done
To conduct the Economics of Ecosystems and Biodiversity (TEEB) study, and mapping of ecosystem services in Lake Turkana basin. Fish VC Study	December 2024	Pending
To complement conduct hydroacoustic study, limnological studies and complete the ongoing experimental fishing activity in L. Turkana ecosystem.	December 2024	Done
To integrate indigenous knowledge and sociocultural knowledge with the scientific research within the catchment areas of Lake Turkana.	December 2024	Pending
To redesign the initial Omorate proposal to target other agencies/stakeholders within fisheries and aquaculture.	June 2024	Done
To expand the membership of ACARE community with a strong emphasis on Ethiopia.	June 2024	In-progress
To develop policy briefs and other values use documents on L. Turkana towards the creation of awareness.	December 2024	Ongoing

Milestones: Key Activities, Progress and Achievements

1. Conducted Pilot Study for Long Term Monitoring of Lake Turkana: Ethiopia and Kenya
2. Carried out 1 Year Experimental Fishing Trial using Local Fishers
3. Conducted Two lake-wide hydroacoustic surveys on Lake Turkana
4. Lake Turkana Value Chain Study: Systems Analysis and
5. Scoping Study: Modelling Potential Sustainable Yield for Lake Turkana's Fisheries Using Satellite Data
6. Future Prospects: Develop Lake Turkana Water Quality Portal to Guide

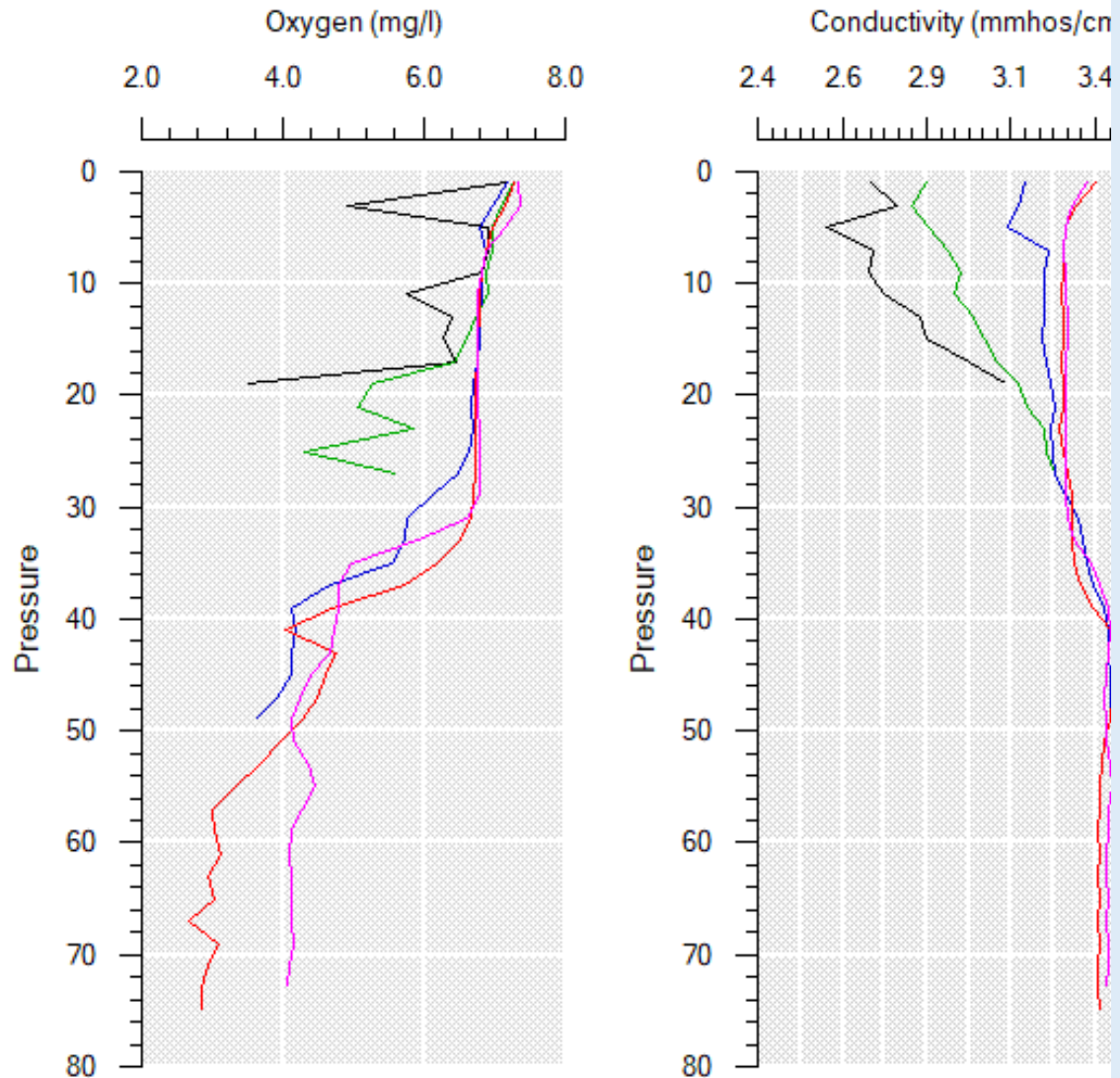
Data Collection in Omo Delta and Lake-wide by Ethiopia and Kenyan Teams

Four rounds of sampling:
May, June, July and August 2024

Focused on Fisheries, Limnology and Socioeconomic studies



Limnological profiles

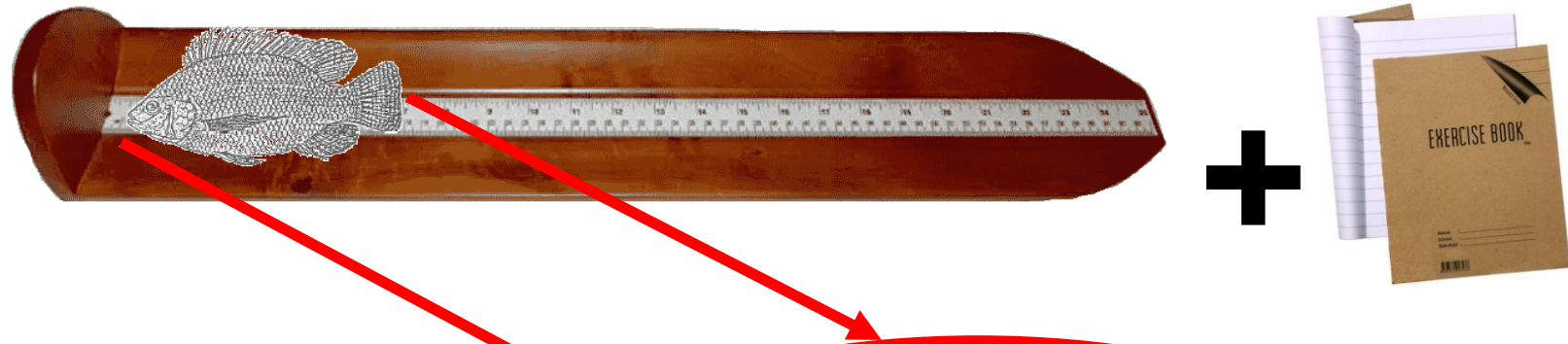


- 1) A clear North-South gradient in conductivity (increasing), and turbidity and temperature (decreasing).
- 2) Surface temperatures (1-10 m) measured were similar to those measured 40 years ago.
- 3) Conductivity measured were slightly lower compared with the 1985-88 survey, most likely owing to the increasing lake levels.
- 4) Very turbid and muddy brown water around the main river inflow deltas (Omo and Turkwell/Kerio)
- 5) Measuring chlorophyll-a and cyano-chlorophyll by fluorescence (AlgaeTorch) was apparently unsuccessful compared with the **pump-and-filter method**.

Activity I: Experimental fishing trials Sept 2023 - Sept 2024



Keep It Sampling Simple (KISS)

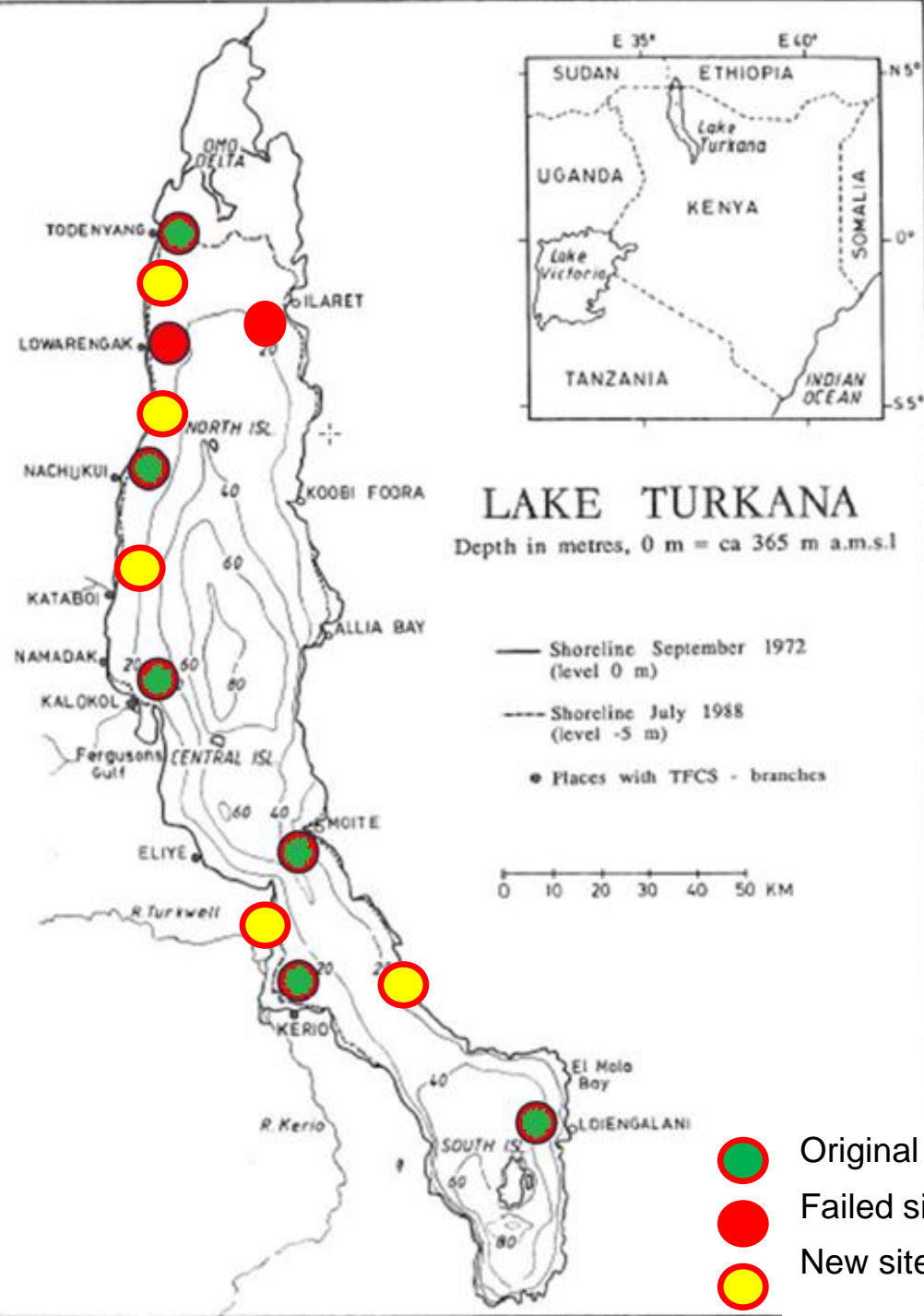


Date	Place	Gear/ mesh	Species (local)	Length (cm)	
X	X	X	X	X	
-	-	-	-	X	
-	-	-	-	X	

Daily data collected by fishers: Lots of really fast, cheap and highly informative data. **Incentivized**

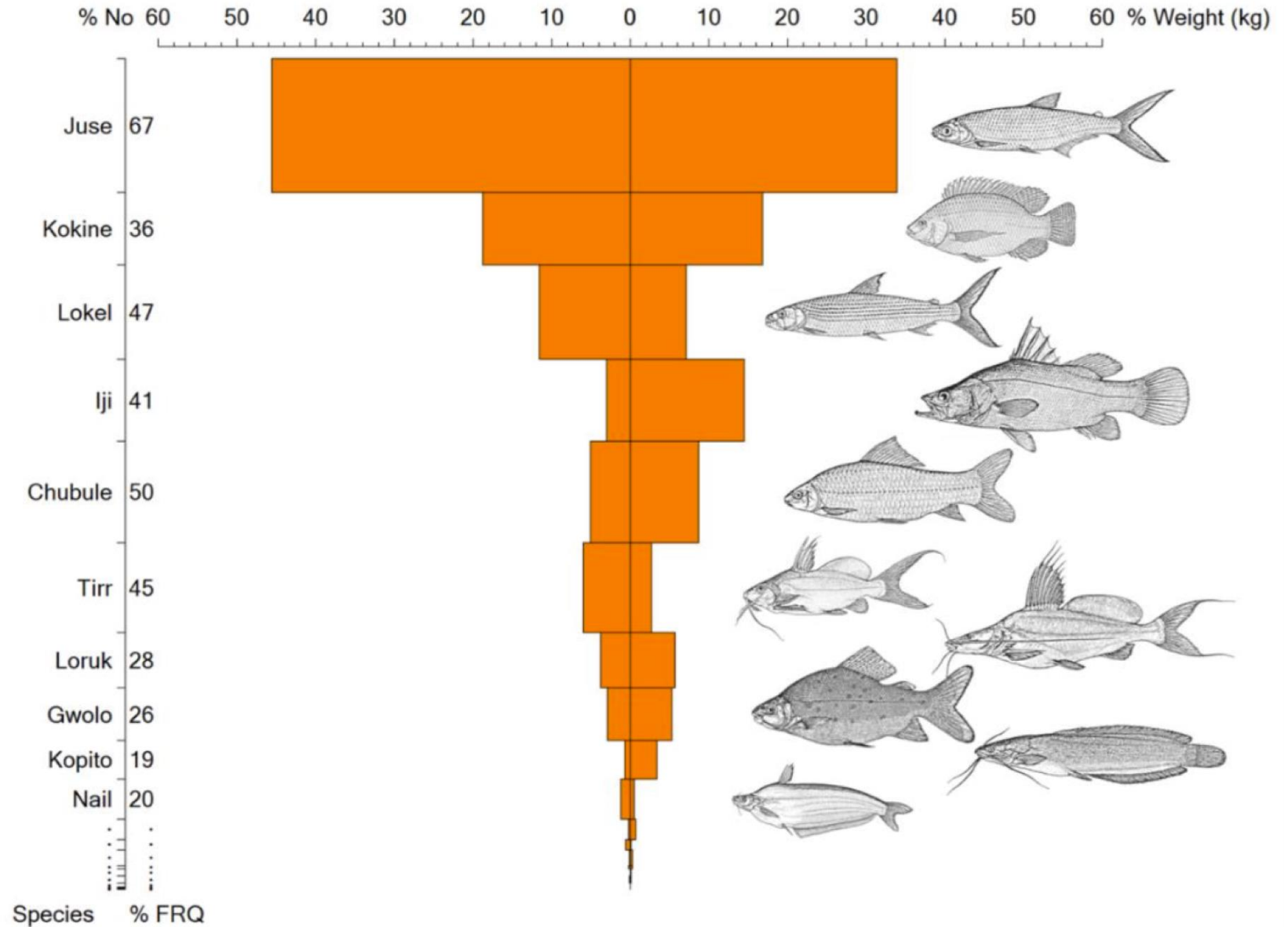
Overview of Experimental Fishing

- 12 locations along the lake (2 failed)
- 24 fishers engaged (12 pairs)
- Period 10/09/2023 to 30/09/2024
- Total of 1,512 days fished
- > 500,000 fish caught
- Total catch by weight: 161 metric tonnes
- Estimated value of KSh 27 Million (USD 208,000)
- Overall, good results with high resolution
- Few Issues:
 - Database management needs strengthening
 - Poor infrastructure, logistical challenge in supervision
 - Some books gone missing

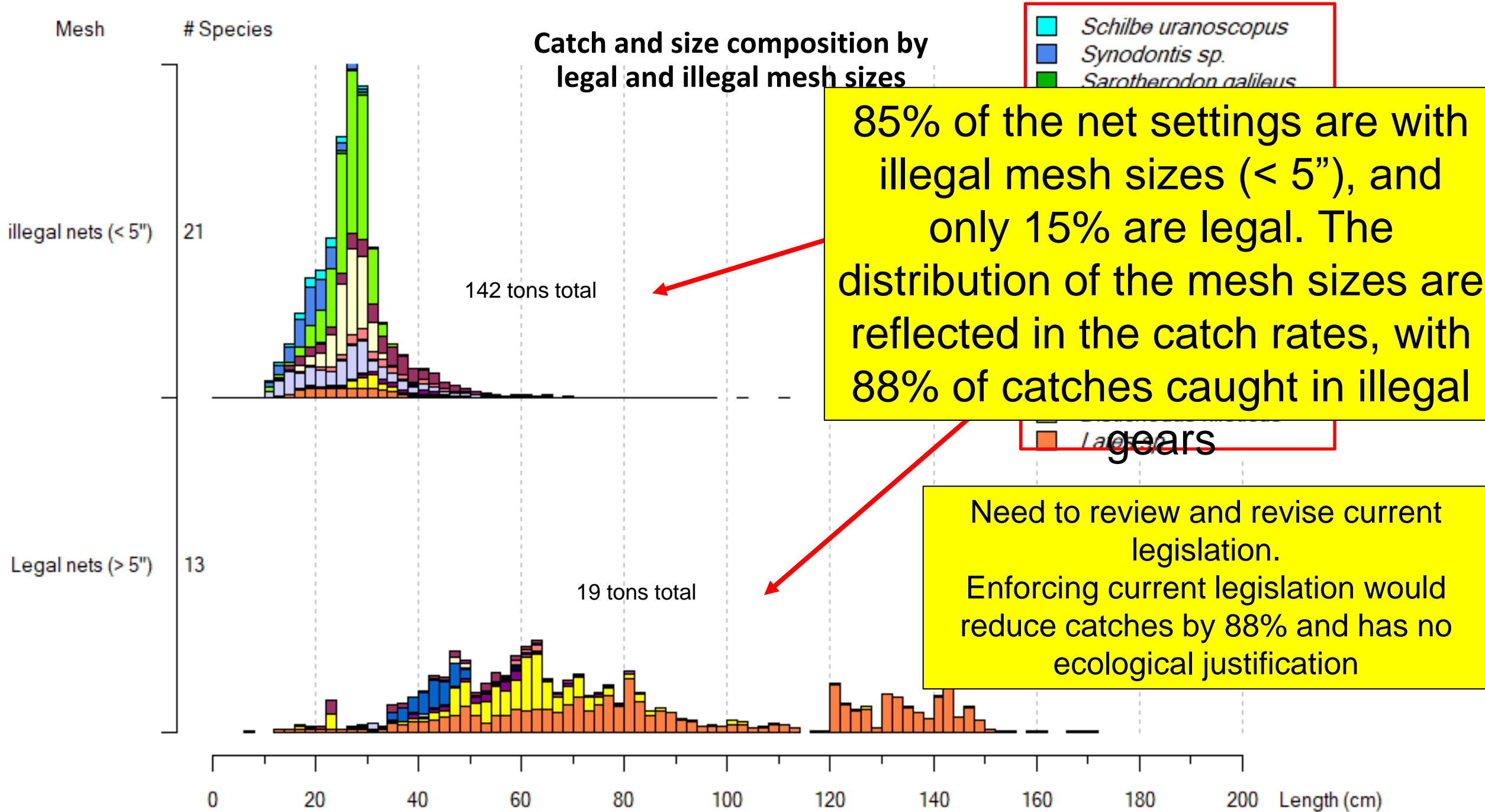


Species	No	% No	Weight (kg)
Juse	233899	45.6	54735
Kokine	96591	18.8	27064
Lokel	59679	11.6	11447
Iji	15579	3.0	23347
Chubule	26305	5.1	14040
Tirr	30655	6.0	4432
Loruk	19344	3.8	9159
Gwolo	14783	2.9	8601
Kopito	3767	0.7	5437
Nail	6110	1.2	789
Momwara	1030	0.2	1079
Lorukaskov	3120	0.6	131
Liis	543	0.1	425
Loruto	778	0.2	465
Dese	256	0.0	212
Nyangang	498	0.1	118
Lokwi	79	0.0	12
Gage	13	0.0	13
Nagiri	11	0.0	4
Lelebe	8	0.0	10
Zuzu	2	0.0	8
Losali	1	0.0	0
Total	513051	100.0	161530

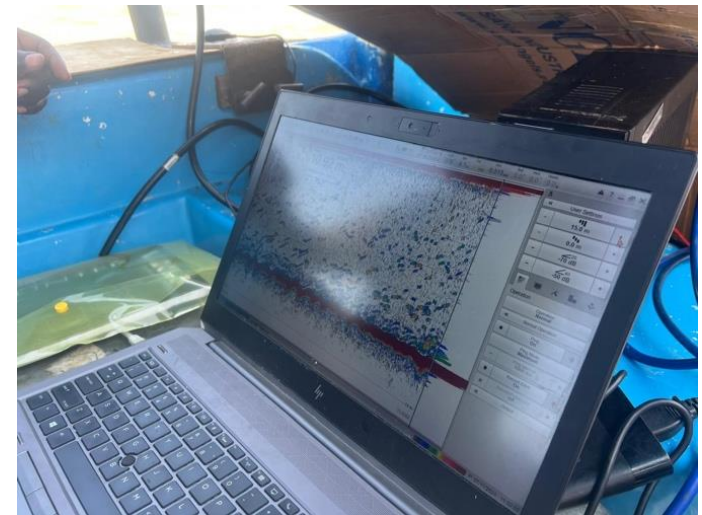
Total catch and composition



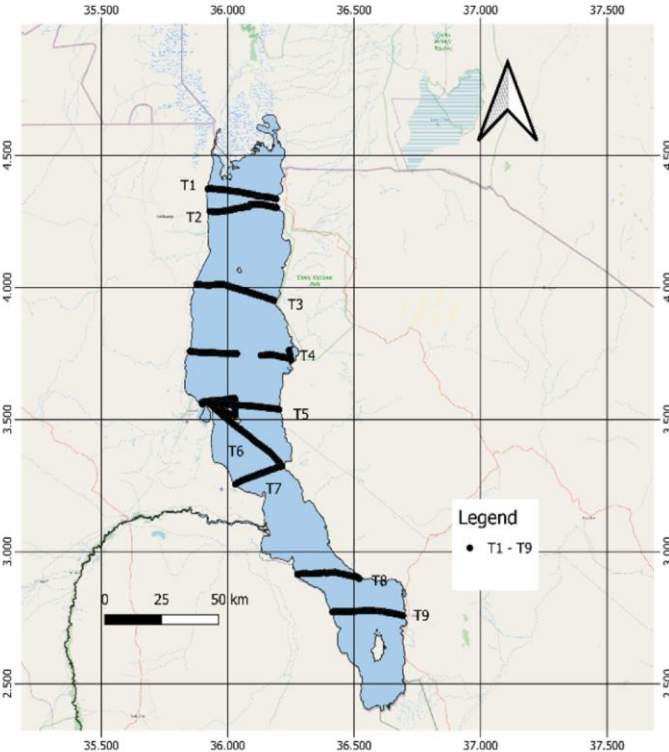
A total of 22 species were recorded in the catch, numeric abundance



Activity 2: Lake-wide Acoustic Surveys

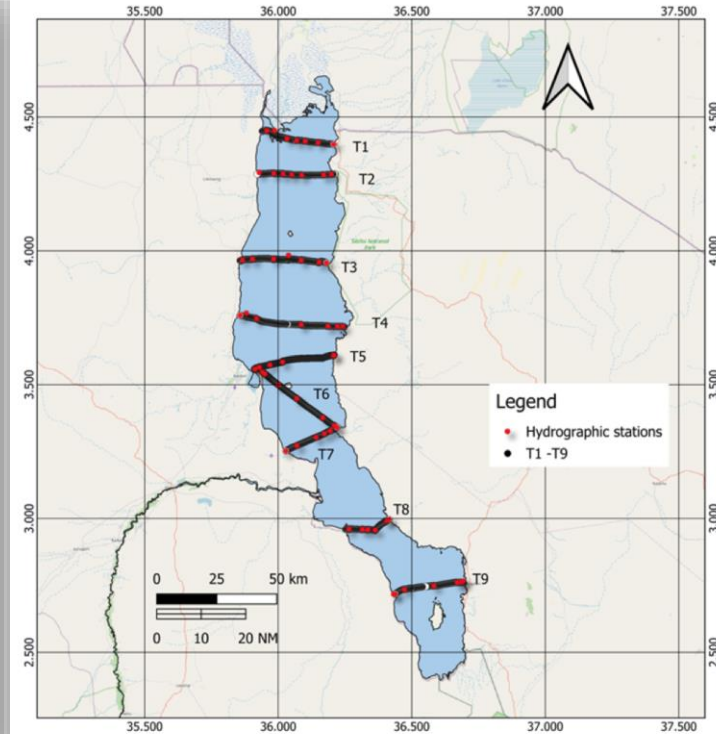


Transects and Key Findings



Transects: May–June 2024

- T1: Kanamkuny – Selicho
- T2: Lowarengak – Illeret
- T3: Koobi For a – Lomekwi
- T4: Kataboi – Sibilo
- T5: Kalokol – Kotela
- T6: Kalokol – Moite
- T7: Moite – Eliye Springs
- T8: Merier – Soit
- T9: Kopoe – Loiyangalani



Transects: November 2024

- T1: Todonyang – Selicho
- T2: Illeret – Lowarengak
- T3: Kalocho - Koobi Fora
- T4: Sibilo – Kataboi
- T5: Kalokol – Kotela
- T6: Kalokol – Moite
- T7: Moite – Eliye Springs
- T8: Merier – Soit
- T9: Loiyangalani – Kopoe

- **Pelagic Stocks:** Dominated by two small endemic species, *Brycinus ferox* and *Brycinus minutus*
- *Alestes baremose* (Juse) is currently the most important fish species in the fishery, both in terms of catch biomass (>60%) and value
- Annual production estimated at **>400,000 tonnes**; Sustainable yield estimates **100,000 tonnes/year**.

- **Larger fish species**, such as Nile perch, Tigerfish and African catfish were detected as single targets.
- Annual production was estimated at **29,003 tonnes** (95% CI: 15,367–46,687 tonnes).
- For single-target fish, sustainable yield estimates varied between **7,251 and 11,601 tonnes annually**

Activity 3: Fish Value Chain Analysis Study

Study Areas: > 20 Landing sites in Turkana and Marsabit.

Domestic markets in 11 counties

Quantitative Household Survey Questionnaire (Fisher Households and Fish value chain actors)

Qualitative data collected using Focus Group Discussions (FGDS) and Key Informant Interviews.

Random & stratified sampling used to select households (fisherfolks sampled from landing sites / Registered BMUs)



Sample distribution



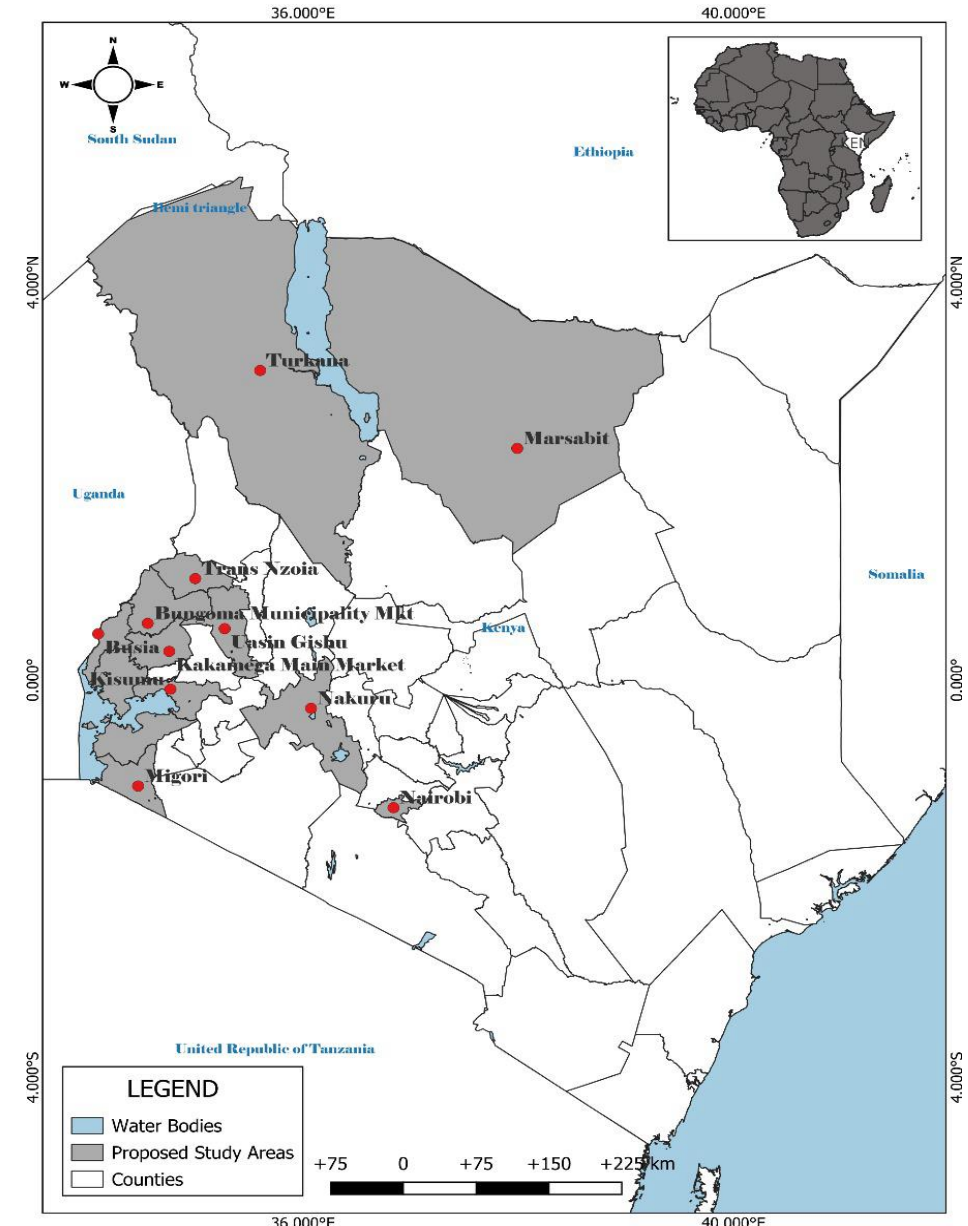
593 fisherfolk households



**3 FGDs
(12 participants)**



> 45 KIIs



Potential Collaboration by EU Cooperation Partner to Develop Water Quality Portal on Lake Turkana

- GoK requested UNESCO's support for the Water quality portal
- KMFRI is involved in finalizing the project proposal with French Cooperation
- French Partners: CNES and IRD, UNESCO and ACARE
- Data and Tool to be managed by Kenyan Partners (WRA and KMFRI) to monitor lake dynamics, level and extension through satellite observation
- Tool to also assist in developing a sustainable predictive model for Lake Turkana



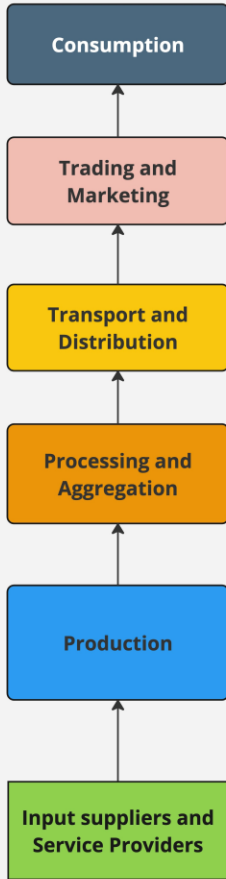
ENABLING ENVIRONMENT

Fisheries regulations (MCS Operations)

Government Policies/Framework/Strategies/Plans

Cross-Border Fish Trade & Marketing Policies (EAC Standards and COMESA)

CORE MARKET FUNCTIONS



Local Direct & Institutional Consumers (Approx. 30% of Total Fish Production)

Fisher households, Fish buyers, outlets, Hotels and Restaurants → Processing Plants, Supermarkets, Schools, Hospitals, Resorts and Lodges

Regional and International Export Markets (Approx. 70% of Total Fish Production)

Domestic and International markets (Nile perch products) → DRC market (mainly for salted and sun-dried fish)

Traders (Retailers and wholesalers) (>20,000 Traders: 75% women)

Transport and distribution to domestic markets in major towns e.g. Kakuma, Lodwar, Kitale, Kisumu, Eldoret, Nakuru, Nairobi etc.

Aggregation at Kalokol, Lowarengak, Kerio and Eliye Springs for Transport and Distribution in Busia and Isebania to DRC
Repackaging at Busia Cross Border Fish Market for Transit to DRC via Uganda.

Fresh & Fried Fish (35%)

Smoked Fish (1%)

Fish Maws (0.01%)

Sun-Dried Fish (9.9%)

Salted & Sun-Dried fish (54%)

Current Production (Approx. 15,000 - 18,000 Mt/yr); Exploitable Potential >120,000 Mt/yr

Marsabit County Fishers; 5100; Boats 221: Rafts 397

Turkana County (Fishers = 9,300; Boats (with engine 212, without = 997; Rafts > 1000

Total no. of Fishers (approx. 15,000); # of BMUs Marsabit = 12; Turkana = 35

Financial service providers (access to credit facilities and products)

Fishing equipment, oil and lubricants and cold storage equipment

Transport infrastructure and machinery

Cold storage and post-harvest technologies

Grants and Subsidies

MFIs and SACCOs

Loans and Investment facilities

Wooden and sail boats, gear, nets and hooks

Boat makers and Net repairers

Refrigerated trucks, solar fish dryers, jetties, landing sites, etc

Insulated cooler boxes and ice makers

Finance Service Providers (Banks, FDIs, Government, Donors)

Training, Research, and Outreach (KMFRU, Universities, NGOs, TVETs, FBOs, CBOs)

Transport Infrastructure, Cold Storage, Market Linkages (e.g., Digital Systems)

SUPPORTING FUNCTIONS

Next steps.....

Implement continuous monitoring to track long-term trends in fish biomass and productivity in Lake Turkana

Continue to engage local fishers in scientific data collection through collaborative trials in 30 BMUs

**Resource Knowledge Creation,
Dissemination and Monitoring**

Conduct a biannual lake-wide frame survey to fill critical information gaps (e.g. # of landing sites, boats, gears, processing facilities, and socioeconomics)

Conduct experimental trials on innovative harvesting technologies targeted at unexploited smaller pelagic species.

Years 1-2

Build capacity for ground truthing satellite data

- Automated sensor to measure lake 'colour' (reflectance spectrum) during hydroacoustic surveys
- Continue limnological data collection



Improve satellite water quality estimates

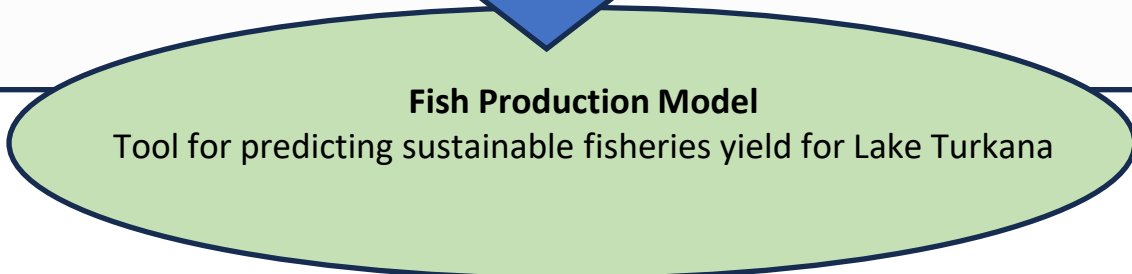
- Develop more accurate algorithms and better atmospheric correction



Years 2-10

Build up timeseries of data

- Biannual hydroacoustic surveys, experimental fisheries
- Satellite archive and water quality datasets





Lake Turkana Advisory Group



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Thank you

Questions, please contact:

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<https://www.agl-acare.org/advisory-groups>