

# AFRICAN GREAT LAKES CONFERENCE

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AFRICAN  
GREAT LAKES  
CONFERENCE  
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## Dynamics of Fish Stocks of Commercial Importance in Lake Victoria, East Africa: Implications for Management

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# INTRODUCTION

- Lake Victoria with a surface area of 68,800 sqkm is the world's second largest freshwater body
- It supports one of the world's most productive inland fisheries with the estimated total fish landings from the lake for the period of 2011 to 2014 have been about 1 million tons with a beach value increasing from about US\$ 550 Million in 2011 to about US\$ 840 million in 2014.
- It supports about 220,000 fishers (Frame Survey 2016)
- The fish stocks of Lake Victoria have changed dramatically since the introduction of Nile perch *Lates niloticus* during the late 1950s and early 1960s

# Fishery

## The Original Fish Fauna



*Haplochromines*



*Brycinus sp*



*Protopterus*



*Bagrus docmac*



*Schilbe intermedius*



*Synodontis victoriae*



*Oreochromis variabilis*



*Mormyrus spp*



*Rastrineobola*



*Barbus spp*



*Labeo*



*Clarias gariepinus*



*Oreochromis leucostictus*



# INTRODUCTION

Currently, the fisheries is dominated by four major commercial important species, these are;

- Nile perch
- Dagaa
- Nile tilapia
- Haplochromis



Apart from Nile tilapia only estimated through trawl and catch surveys, the other 3 are estimated through trawl, acoustics, and catch

# INTRODUCTION

This paper summarizes current knowledge of the status of the fish stocks and reviews the need for species specific management plans for the major commercial important fish species of Lake Victoria (Nile perch, Nile tilapia, dagaa and haplochromines).

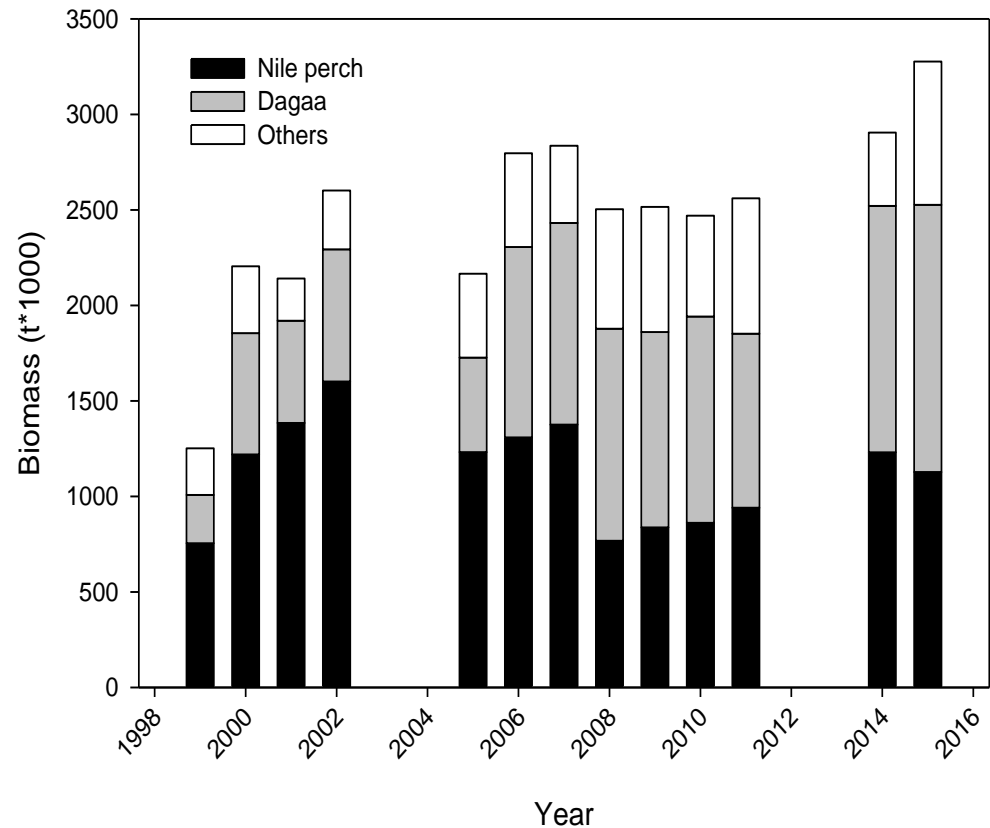
# Methods

- Fisheries dependent
  - Frame surveys
  - Catch assessment surveys
- Fisheries independent
  - Acoustic
  - Bottom trawl



# Biomass and relative abundance

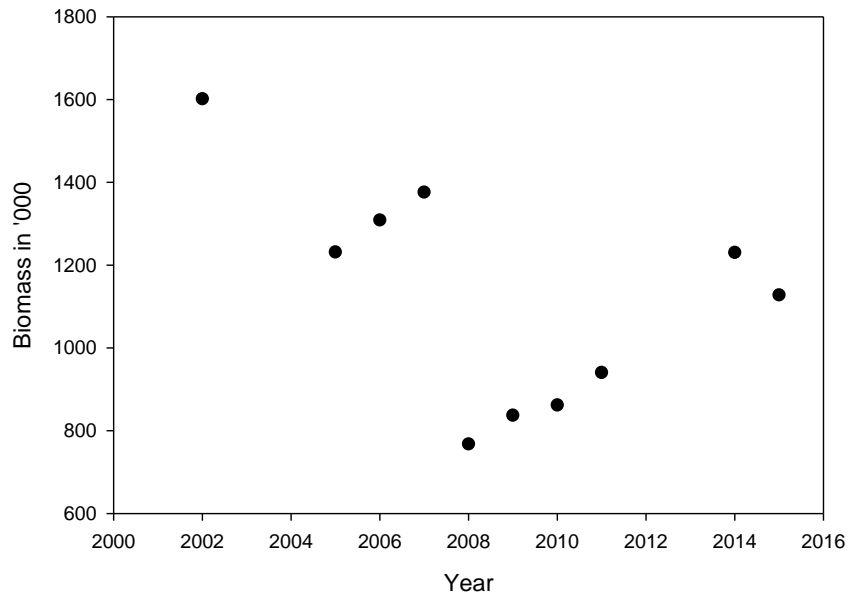
- Total biomass from the surveys remained fairly stable over time.
- November 2015 acoustic survey recorded an increase in the total biomass in the lake from 2.9 million tons in 2014 to almost 3.2 million tons.
- Changes in fish species composition in the lake was noted with an increase of small pelagics specifically Dagaa and Haplochrmonines and decrease of Nile perch.





# Nile perch

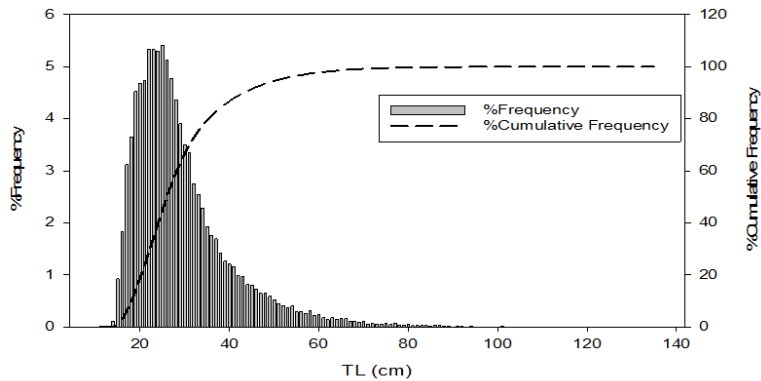
The biomass of Nile perch has generally decreased from 1.6mt in 2000 to 1.1mt in 2015



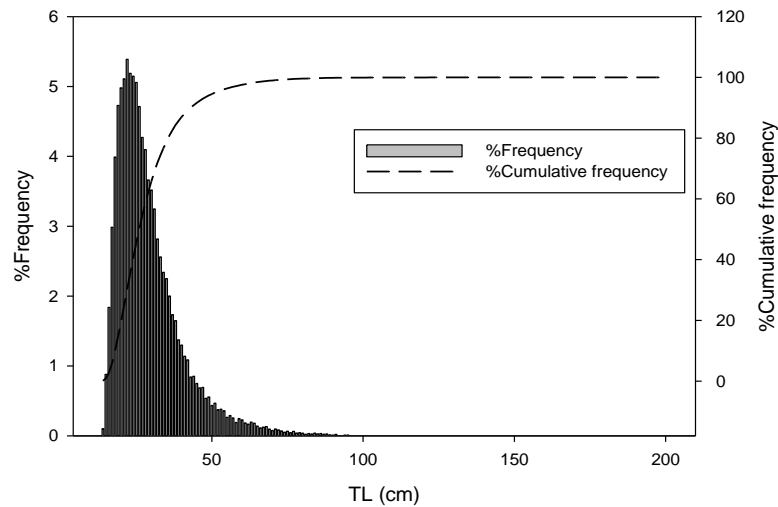


# POPULATION STRUCTURE OF NILE PERCH

**2014**



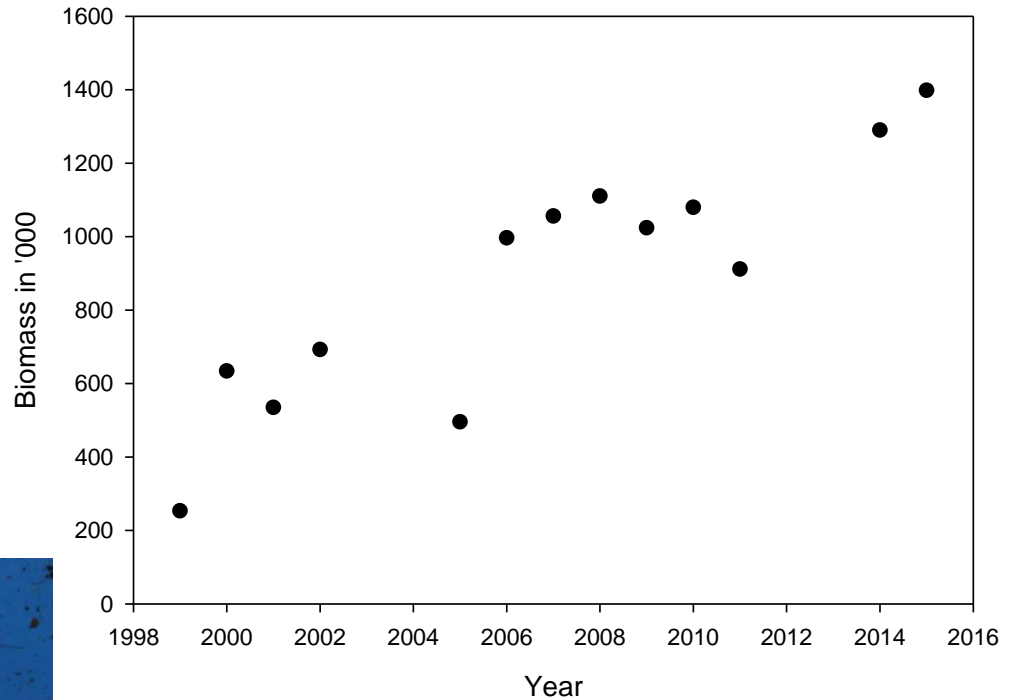
**2015**



In both 2014 and 2015, about 6% by number were above the lower limit of the slot size

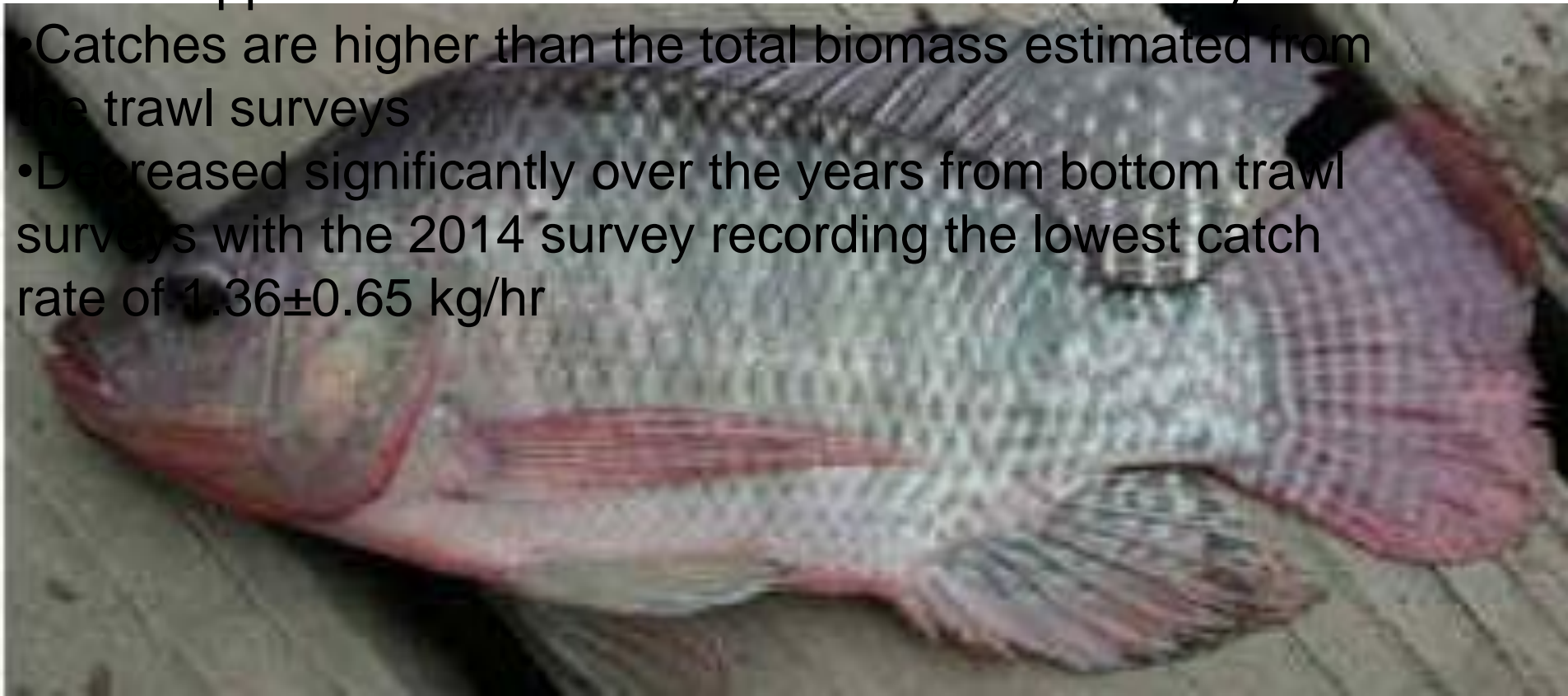
# Dagaa

The biomass of dagaa has risen considerably over the last decade  
In 1999 it made up only 20% of the stock although this rose to 41% in 2015



# Nile tilapia

- There has been very little stock assessment in this species
- Data on the stock biomass is limited
- There appears to be no trend within the trawl survey data
- Catches are higher than the total biomass estimated from the trawl surveys
- Decreased significantly over the years from bottom trawl surveys with the 2014 survey recording the lowest catch rate of  $1.36 \pm 0.65$  kg/hr





# Haplochromines

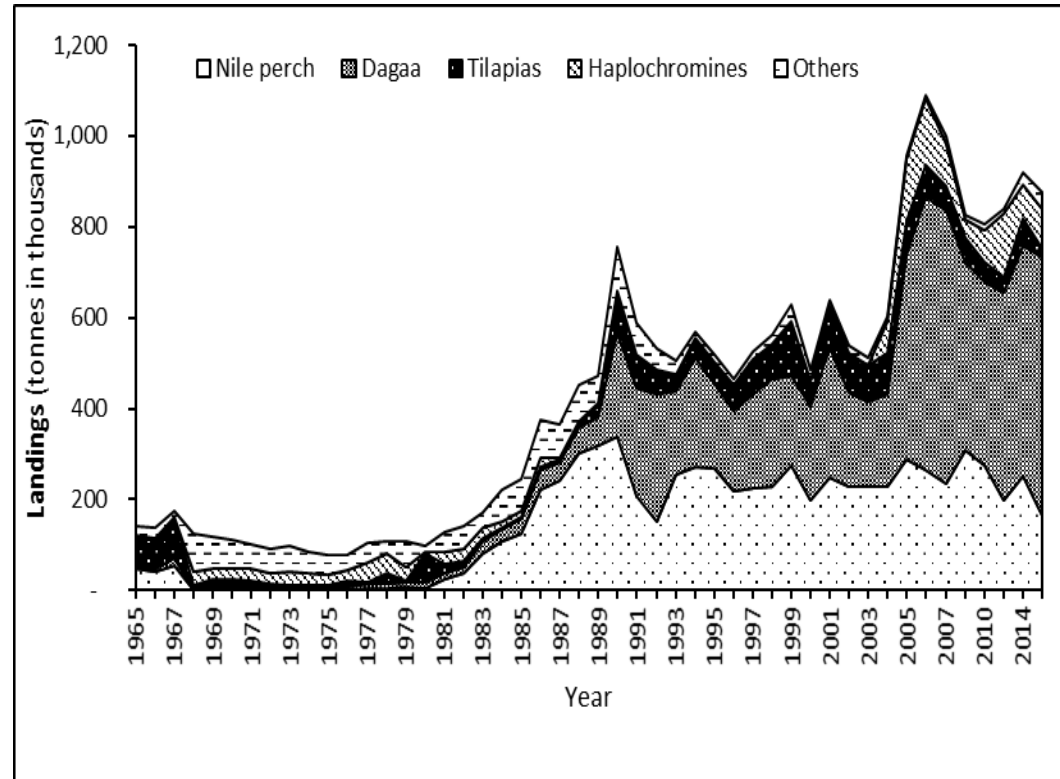
- Haplochromines accounted for about 19% of the total biomass in 1999, rose up to 27% in 2011, but in 2015 declined to 24%



# Trends in Total Fish Landings

In 2015 Nile perch contributed about 19% and Dagaa about 64%

Nile perch contributed the highest value to the Lake Victoria fishery, (52.2%) followed by Dagaa (31.7%) compared to 64.9 % and 16.1 % April 2014



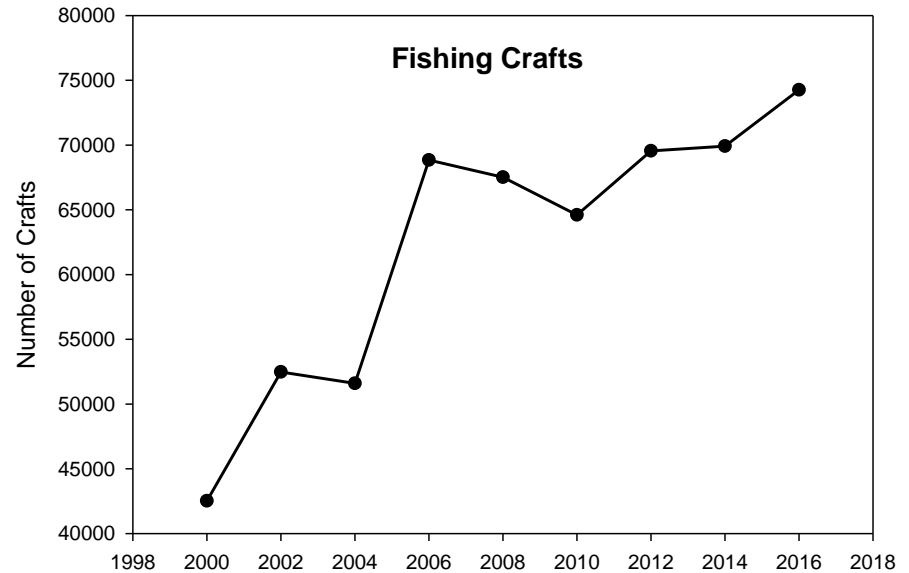
# Trends in Fishing Efforts

## *Number of fishers*

Increased by 6.5% from 2014 to 2016

## *Fishing Crafts*

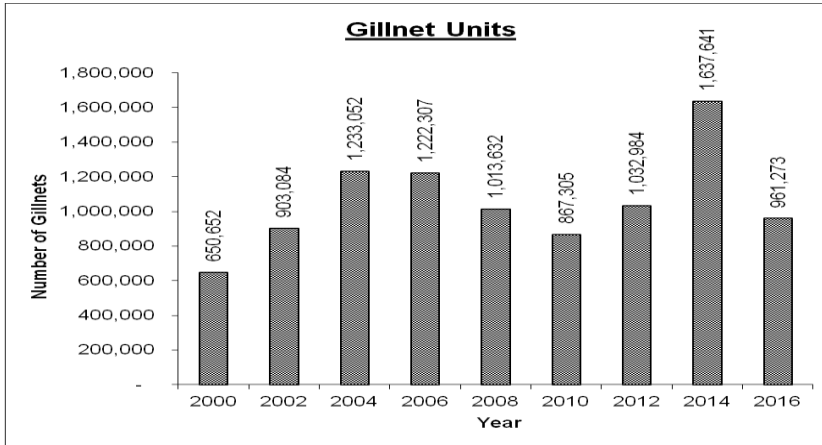
Total number of fishing crafts has been increasing over the years. In 2016 it increased by 4.8% from 69,912 in 2014 to 74,257



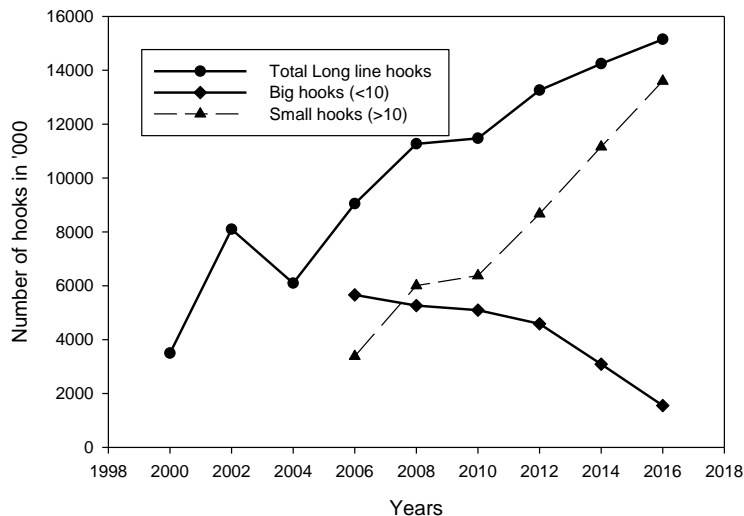


# Trends in Fishing Efforts

## Fishing Gears

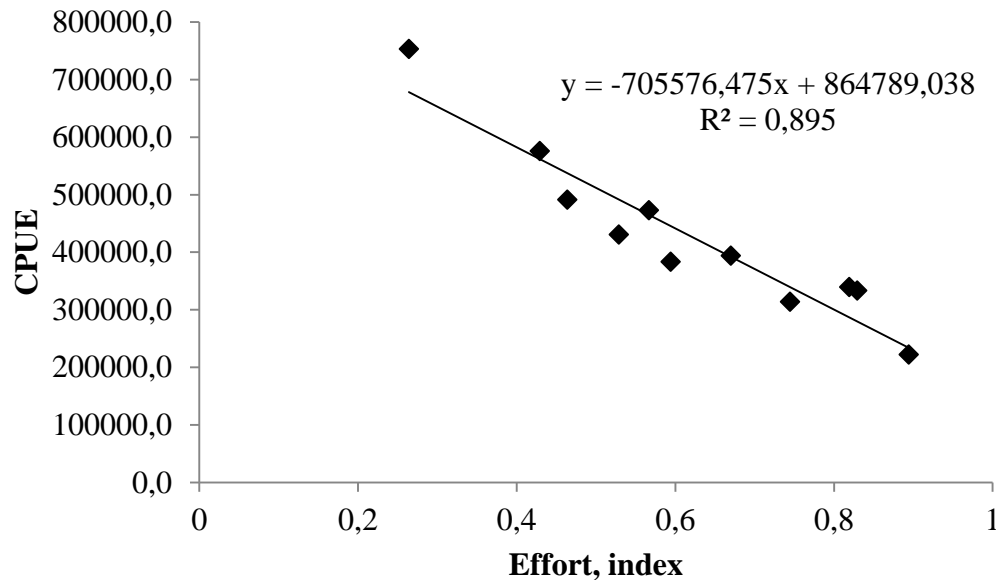


- Gillnets decreased to by 2% in 2016
- Majority of the gillnets in the lake are 6" constituting 39%
- About 60% are triple



Long line hooks increased from 3,496,247 in 2000 to 15,161,439 in 2016. But, this increment was mainly recorded in smaller size (>10) which are illegal

# Stock assessment of Nile perch- Schaefer Model



|                     |         |
|---------------------|---------|
| e_Current:          | 0.89    |
| e_MS <sub>Y</sub> : | 0.613   |
| q_MS <sub>Y</sub> : | 264,982 |
| Change:             | 40.6    |

- The target biomass should be 1.4 million tonnes and;
- The current effort as given by 2014 frame survey be reduced by 40%.

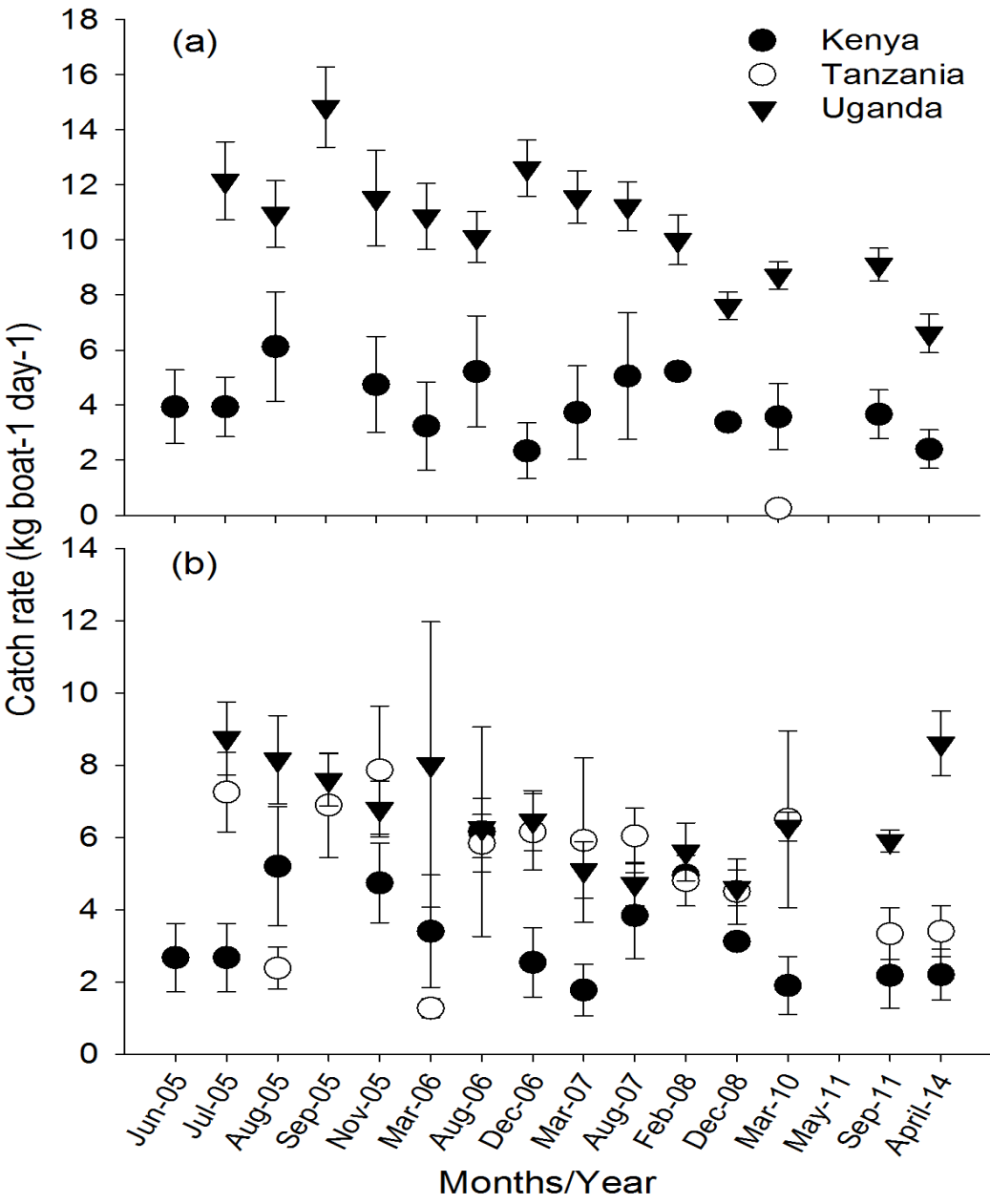
## Stock assessment of Dagaa- Cadima Model

| Year  | B         | Y          | MSY       | Y/MS<br>Y | Y/B  |
|-------|-----------|------------|-----------|-----------|------|
| 1999* | 253,054   | 236,500    | 371,304   | 0.64      | 0.93 |
| 2000  | 634,016   | 256,000    | 762,016   | 0.34      | 0.40 |
| 2001  | 534,831   | 289,500    | 679,581   | 0.43      | 0.54 |
| 2005* | 495,400   | 453,006.60 | 721,903   | 0.63      | 0.91 |
| 2006  | 1,011,500 | 602,295.60 | 1,312,648 | 0.46      | 0.60 |
| 2007  | 1,055,600 | 600,659.70 | 1,355,930 | 0.44      | 0.57 |
| 2008  | 1109969   | 413,352.30 | 1,316,645 | 0.31      | 0.37 |
| 2010* | 1,079,372 | 403,912.20 | 1,281,328 | 0.32      | 0.37 |
| 2011* | 911,328   | 456,721.20 | 1,139,689 | 0.40      | 0.50 |
| 2014* | 1,288,813 | 509,598.10 | 1,543,612 | 0.33      | 0.40 |
| 2015* | 1,127,774 | 566,570.6  | 1,411,059 | 0.40      | 0.50 |

- There is still room for expansion with yield being substantially lower than MSY
- Yield could be able to exceed the mean biomass
- 70% of the biomass is probably an appropriate precautionary approach.



# Nile Tilapia



Difficult to carry out any useful stock assessment at present due to a lack of data.

There is evidence of stock declines in some areas and there is an urgent need to obtain more data on tilapia stocks.

# Haplochromines

No stock assessment done due to the fact that the stock consists of a number of species, but treated as a single unit

# Management Plans

## Nile Perch Fishery

The target biomass should be 1.4 million t, with optimal catch is 264,000 t, but to reach there we will need to reduce the current catch to 223,000 t and then climb slowly to optimal catch

- Reduce the amount of immature Nile perch caught from currently 40% to 20%, by developing and implementing a regional strategy to prevent trading in immature fish
- From the analysis of this report, the main issue is increase in number of small hooks, therefore, deliberate efforts towards its eradication is important
- Riparian states should use species specific licensing with user rights as a means of controlling increasing fishing effort

- Establish and gazette new closed areas where no fishing is permitted and enforce compliance
- Strengthen enforcement to ensure compliance to fisheries regulations

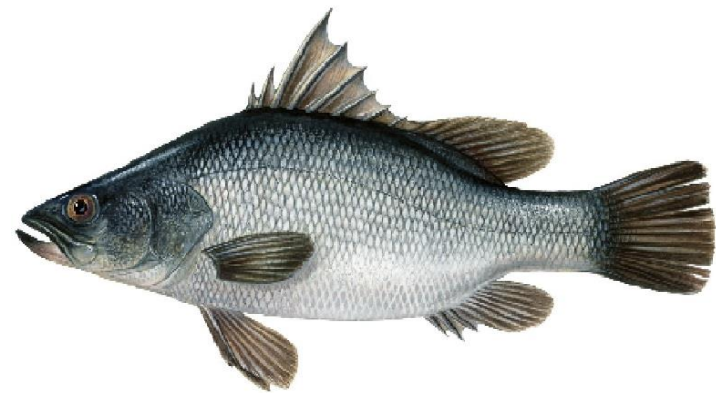
More details given in Nile perch Fisheries Management Plan II 2015-2019



EAST AFRICAN COMMUNITY  
Lake Victoria Fisheries Organization



NILE PERCH FISHERY MANAGEMENT PLAN  
for  
LAKE VICTORIA  
2015 - 2019



April 2015

With the support of:



# Dagaa fishery

The Dagaa stocks are increasing and due to their Rapid turn-over rate as the biomass production ratio is over 2.

The harvest can be 100% of the previous year biomass.

- At present there is no need to set limits for the dagaa fishery but as Nile perch recovers this should be re-visited as it can impact on the dagaa stocks
  - Mesh size restriction
  - Closed season and area
  - Fishing in shallow bays should be beyond 2 km from the shoreline to protect the other species caught as bycatch
- Put more emphasis towards improvement in quality and adding value so that its value could be increased
  - Monitor dagaa trade, both international and cross border (regional) trade. In addition, local consumption also should be monitored to enable per capita consumption of dagaa information to be provided



## Nile tilapia

- Affirmative action to eradicate illegal trade of undersized, immature Nile tilapia to neighbouring regional markets
- Protection of nursery areas.
- Gears that disrupt or damage nests should be regulated
- Closed areas
- The precautionary approach

## Haplochromines

The two species (*Yssichromis pyrrhocephalus* and *Yssichromis laparogramma*) that can easily be identified in the field, stock assessment should be conducted

Haplochromines are caught mainly as bycatch in dagaa fisheries, therefore dagaa fisheries should be restricted to 2 km from shoreline

Fishing activities in littoral waters impact the non-resurging haplochromines species, this particularly the case of rock restricted haplochromines that are heavily fished as bait for longline fisheries of Nile perch.

Restrict usage of haplochromines as bait. This restriction could be effective if the alternative sources of baits are promoted such as farmed clarias

**Thank you for listening**