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IMPLEMENTATION OF A FISHERIES MANAGEMENT PLAN
(IFMP) PROJECT FOR LAKE VICTORIA

A REPORT OF THE FISHERIES CATCH ASSESSMENT SURVEY IN THE UGANDAN WATERS OF LAKE VICTORIA FOR THE MARCH 2007 SURVEY

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CATCH ASSESSMENT SURVEYS ARE JOINTLY CONDUCTED BY THE NATIONAL FISHERIES RESOURCES RESEARCH INSTITUTE (NAFIRRI), THE DEPARTMENT OF FISHERIES RESOURCES (DFR), AND THE DISTRICTS OF BUSIA, BUGIRI, MAYUGE, JINJA, MUKONO, WAKISO, KAMPALA, MPIGI, MASAKA, KALANGALA AND RAKAI.

1 FOREWORD

The fisheries of Lake Victoria have been characterised by shifts in abundance of different fish species and changes in fishing effort in the recent past. In this dynamic state, monitoring of the fish stocks as well as the magnitude, distribution and trends of fishing effort and fish catches is necessary for sound fisheries resources management. One of the avenues to collect information to support the above process is through conducting regular Catch Assessment Surveys (CASs).

The EU funded Implementation of a Fisheries Management Plan (IFMP) project for Lake Victoria through the Lake Victoria Fisheries Organisation (LVFO) is supporting the implementation of regionally harmonised CASs in Lake Victoria. The CASs under IFMP are following a statistical design laid down in Standard Operating Procedures (SOPs) agreed by the three partner states of the East African Community sharing the lake. In the Ugandan part of the lake, the CASs are carried out at 54 fish landing sites selected in the eleven riparian districts sharing the lake. The National Fisheries Resources Research Institute (NAFIRRI), Jinja; the Department of Fisheries Resources (DFR), Entebbe; and the Districts of Busia, Bugiri, Mayuge, Jinja, Mukono, Wakiso, Kampala, Mpigi, Masaka, Kalangala and Rakai jointly conduct the surveys. The CAS enumerators are recruited from the fishing communities and work under direct supervision of subcounty Fisheries Officers. NaFIRRI seeks to continue strengthening the engagement of the recently formed Beach Management Units (BMUs) and other fisheries Co-management Institutions in fisheries data collection.

This report presents findings of the CAS conducted in the Ugandan waters of Lake Victoria in March 2007. The results of the previous seven CASs conducted under the same programme in July/August/September/November 2005, and March/August/December 2006 are included to show the emerging trends.

Through regular CASs, information is building up to show the new picture of fish production in the Ugandan waters of the lake. Similar surveys are simultaneously conducted in the Kenyan and Tanzanian parts of the lake, which provide the lake wide perspective of fisheries production. These data can now be integrated with the outputs of other ongoing Resource monitoring and socio-economic surveys to do a stock assessment for the lake, which will provide good basis for planning and management of the fisheries. The institute is very appreciative of the funding by the IFMP project, which is supporting the CAS programme and other Resource and Socio-economics monitoring activities. We are now considering options for sustaining these programmes beyond the life of the IFMP project.

J.S. Balirwa
Director

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6 SUMMARY

Between July 2005 and March 2007, eight Catch Assessment Surveys (CASs) have been conducted at 54 pre-selected fish landing sites in the Ugandan part of Lake Victoria comprising approximately 10% of all landing sites in each of the 11 districts sharing the lake. The CASs were conducted following regionally harmonised Standard Operating Procedures (SOPs). This report covers the CAS conducted in March 2007 and puts into context the trends generated by results of the previous surveys.

The catch rates of Nile perch in gillnetting boats with motor/sail, which are able to operate in distant waters, decreased from 30.6 kg boat^{-1} day^{-1} observed in the December 2006 survey to 21.5 kg boat^{-1} day^{-1} in March 2007. The Nile perch catch rates of gillnetting boats using paddles also decreased, but slightly from 10.8 to 9.9 kg boat^{-1} day^{-1} respectively. The Nile perch catch rates of long lining boats decreased as well from 21.1 to 19.9 kg boat^{-1} day^{-1} in paddle boats and 38.3 to 33.6 in boats with motor/sail. However, it is noted that the period of the preceding survey (November/December) is a peak season, thus the decrease of Nile perch catch rates could be a normal seasonal pattern.

The catch rates in the tilapia fishery reduced in all the main categories of boat-gear types between the December 2006 and March 2007, i.e. 16.5 to 10.2 kg boat^{-1} day^{-1} in parachute boats using cast nets; 12.6 to 11.6 kg boat^{-1} day^{-1} in parachute boats using gillnets, and 6.5 to 5.1 kg boat^{-1} day^{-1} in paddle Sesse boats using gillnets. The estimated total monthly tilapia catch (1,923.4 t) was the lowest since the beginning of the surveys in July 2005.

The mukene catch rates increased in both boats using scoop nets from 73.4 to 240.9 kg boat^{-1} day^{-1} and those using small seines from 269.0 to 318.9 kg boat^{-1} day^{-1} between the December 2006 and March 2007.

The total monthly catch estimates for March 2007, indicate that Nile perch contributed 6,710.6 t; which was 32.1% of the overall catches. Tilapias contributed 1,923.4 t (9.2%), Mukene contributed 11,994.6 t (57.5%) and all other species 24t (1.2%). The overall total catch estimate for all fish species was 20,875.6 t. There was a slight improvement in overall total catch from 20,860.9 t estimated in December 2006. However, this resulted from substantial increase of Mukene catches as the other major species, i.e. Nile perch and Tilapia showed decreased catches.

The total gross revenue from the catches at the beach level for March 2007 was estimated at shs 14.3 billion contributed by Nile perch shs 10.8 billion; Tilapia shs 1.8 billion; Mukene shs 1.5 billion and other fishes shs 0.2 billion. The total gross revenue from the catches was lowest compared with the previous estimates due to the increase in catches of the low value Mukene versus decrease in catches of the highly priced fishes (Nile perch and Tilapias). The Mukene fishery in Uganda remained a near shore fishery that has room for expansion by accessing the offshore stocks. Whereas there expansion of the Mukene fishery may be desirable, the Nile perch and Tilapia fisheries appear to be under stressed and regulation of effort should be considered.

7 INTRODUCTION

Lake Victoria, with a surface area of 68,800 km^2, is the second largest freshwater body in the World. The largest part of the lake, i.e. 35,088 km^2 (51%) is in Tanzania, followed by the Ugandan part 29,584 km^2 (43%), and the Kenyan part 4,128 km^2 (6%). The lake has a shoreline length of 3,450 km: 1,150 km (33%) in Tanzania, 1,750 km (51%) in Uganda and 550 km (16%) in Kenya. The lakes' fisheries support a vibrant fish export industry, which is one of the major foreign exchange earners of the Partner States sharing the lake. The lake is also a very important source of high protein food, and employment for the peoples of the Partner States of the East African Community (EAC).

The Partner states of the EAC through the Lake Victoria Fisheries Organisation (LVFO) are monitoring exploitation of the fisheries resources Lake Victoria. The LVFO has harmonised fisheries data collection around the lake including collection of information on trends of fishing effort and fish catches through Catch Assessment Surveys (CASs). The data generated by CASs provide Catch per unit effort (CPUE), which, together with fishing effort information obtained from regular biannual Frame surveys is used to estimate total catches. Data from CASs also provide a rough index of stock size. The monthly total catches in this report, covering the period between July 2005 and March 2007 are estimated using raising factors from the 2006 Frame survey data.

This CAS report provides the estimates of the quantities of fish landed in the riparian districts sharing the Ugandan waters of Lake Victoria; the monetary value of the fish catches; the contribution of different fish species to the total catches; and the trends of fish catch rates, and the total monthly catches for the sampled month since the beginning of the current CAS activities, from July 2005 to March 2007.

8 METHODOLOGY

8.1 The Catch Assessment Survey Design

The CASs conducted in the Ugandan waters of Lake Victoria follow a design laid out in the approved Standard Operating Procedures for Catch Assessment Surveys for Lake Victoria (LVFO, 2005a). This is a two-stage stratified sampling design whereby: within each district, a sample of primary sampling units (PSUs) i.e. the fish landing sites were first selected, and then, at each PSU, stratified samples of Secondary Sampling Units (SSUs) i.e. the Vessel gear type, are randomly selected by the field enumerator for sampling.

8.2 Sampling Units

Landing sites are the primary sampling unit (PSU) and the vessel-gear (VG) types landing at each site are the secondary sampling unit (SSU). Within each of the eleven districts sharing the Ugandan part of the lake, 10% of all landing sites (PSUs) were selected for sampling. A total of 54 PSUs (Appendix 1) were selected for sampling in the Ugandan waters of Lake Victoria. The landing sites were selected randomly with Probability Proportional to Size (PPS), where size refers to the total number of vessels landing at the site.

During the sampling period, the enumerators identify the numbers of all Vessel-Gear (VG) types at each landing site that land or are expected to land during the sampling day and allocate sampling effort among the SSUs and VG types in proportion to the number of vessels to be sampled. The maximum sample per day per PSU was set at 20 vessels. Sampling is done in four days in the month, staggered to two consecutive days in the first and third weeks of the month.

8.3 Data capture

Regionally harmonised data forms were used to record field data. The enumerators were trained and provided with a *Field Guide* containing the data recording instructions to ensure effective data capture. Provision for close supervision of enumerators by the Sub-county Fisheries Officers and spot checks by District Fisheries Officers and Officers from the National Fisheries Authorities, i.e. the National Fisheries Resources Research Institute (NAFIRRI), and the Department of Fisheries Resources (DFR) were made to ensure that data collection was according to the laid down procedures and to eliminate fabricated records.

8.4 Estimation of CAS-based Indicators

Data were stored and analysed using Microsoft Excel. The fishing crafts were segregated into effort groups (Vessel-gear combinations) and the CAS indicators estimated for each effort group.

(i) The mean fish catch rates (kg boat^{-1} day^{-1}) were estimated for each effort group by species.

(ii) The total fish catches were estimated using the mean fish catch rates and the 2006 Frame survey data. For each effort group, the Boat activity coefficient (*B),* i.e. the probability that a fishing vessel of each vessel-gear type *g* would be active on any day during the month. This was estimated as the mean number of days boats in each effort group fished in a week divided by the number of days in a week. The total catch (*C)* of each effort group was then estimated.

(iii) The beach value of the catch, i.e. the gross income to the fishers, was estimated by raising the estimated total catch in each effort group by the mean unit price of each fish species landed.

9 RESULTS

Details of the results, i.e. fish catch rates and the estimated total fish catches are in Appendices 2&3.

9.1 Fish catch rates

9.1.1 Nile perch catch rates

Sesse boats propelled by paddles or motor/sail using gillnets or long lines are the most important fishing units in the Nile perch fishery, i.e. four main vessel gear combinations target the species.

Gillnetting boats

The Nile perch catch rates of paddled Sesse gillnetting boats decreased from 10.8 ± 1.1 kg boat^{-1} day^{-1} in December 2006 to 9.9 ± 1.0 kg boat^{-1} day^{-1} in March 2007 (Figure 1). The catch rates of boats with motor/sail also showed a reduction from 30.6 ± 2.0 kg boat^{-1} day^{-1} in December 2006 to 21.5 ± 1.3 kg boat^{-1} day^{-1} in March 2007. The latter was similar to the catch rate observed in August 2006.

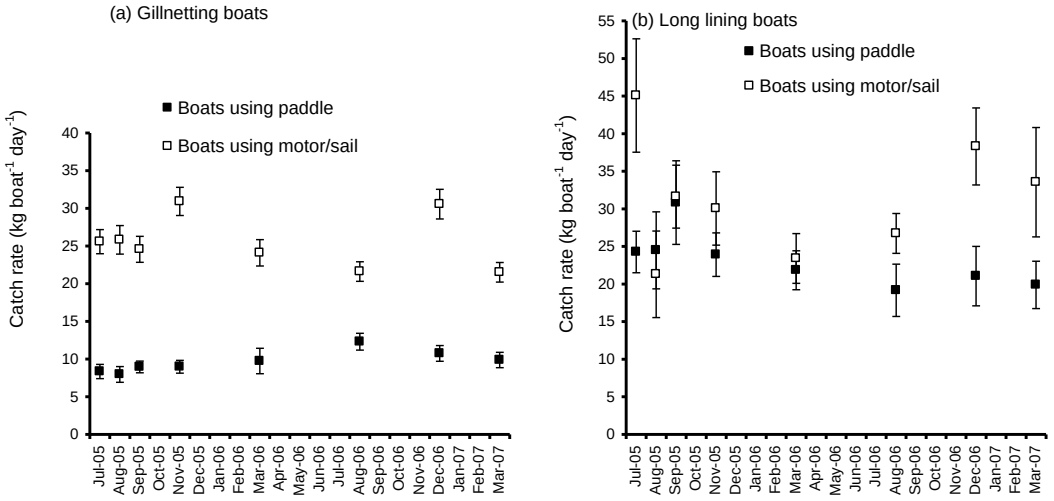


Figure 1. Trends of Nile perch catch rates of the main effort groups targeting the species in the Ugandan part of Lake Victoria between July 2005 and March 2007 (error bars = 95%CL).

Long lining boats

In March 2007, the Nile perch catch rates of long lining boats were 19.9 ± 3.2 kg boat^{-1} day^{-1}, down from 21.1 ± 4.0 kg boat^{-1} day^{-1}in December 2006 for boats using paddles. The Nile perch catch rates of boats using motor/sail also reduced from 38.3 ± 5.1 kg boat^{-1} day^{-1} in December 2006 to 33.6 ± 7.2 kg boat^{-1} day^{-1} in March 2007. The Nile perch catch rates of long lining boats with motor/sail remained significantly higher than those of paddled boats.

9.1.2 Tilapia catch rates

The parachute boats (*bawo tatu*) are the main craft in the tilapia fishery in the Ugandan waters of Lake Victoria; paddled Sesse boats, to some extent also operate in the Tilapia fishery; and gillnets and cast nets are the most common gears used to target tilapia. The other gears used in the tilapia fishery that are less common include basket traps and hand line hooks. In March 2007, the tilapia catch rates of parachute boats using cast nets reduced from 16.5 ± 3.5 kg boat^{-1} day^{-1} observed in December 2006 to 10.2 ± 5.2 kg boat^{-1} day^{-1} (Figure 2). The catch rates of parachute boats using gillnets reduced from 12.6 ± 1.0 kg boat^{-1} day^{-1} in December 2006 to 11.6 ± 1.0 kg boat^{-1} day^{-1} in March 2007. The tilapia catch rates of paddle sesse boats using gillnets also reduced from 6.5 ± 0.8 kg boat^{-1} day^{-1} in December 2006 to 5.1 ± 0.8 kg boat^{-1} day^{-1}in March 2007, the lowest value compared with all the previous surveys.

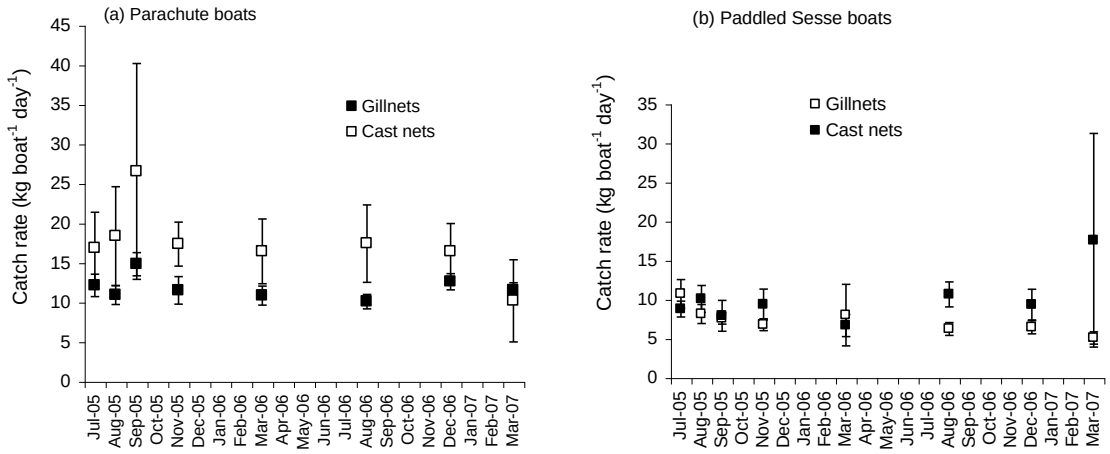


Figure 2. Trends of Tilapia catch rates of the main effort groups targeting the tilapia in the Ugandan part of Lake Victoria between July 2005 and March 2007 (error bars = 95%CL).

9.1.3 Mukene/Dagaa catch rates

The mukene fishery is dominated by paddled Sesse boats using either small seines (Lampala) or scoop nets. There was an increase in the catch rates of scoop nets from 73.4 ± 21.8 kg boat^{-1} day^{-1} in December 2006 to 240.9 ± 85.3 kg boat^{-1} day^{-1} in March 2007 (Figure 3). The catch rates of boats using small seines also increased from 269.0 ± 95.5 kg boat^{-1} day^{-1} in December 2006 to 318.9 ± 87.7 kg boat^{-1} day^{-1} in March 2007. The observations were however characterised by large confidence intervals arising from large differences in catches of fishing boats.

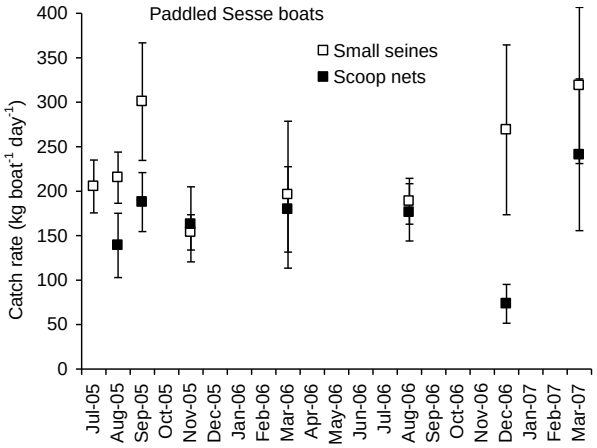


Figure 3. Trends of Mukene/Dagaa catch rates of the main effort groups targeting the species in the Ugandan part of Lake Victoria between July 2005 and March 2007 (error bars = 95%CL).

9.2 National Estimates of total fish catches of the main commercial species

The trends of estimated national total monthly catch for the sampled months between July 2005 and March 2007 are summarised in Table 1. The details for

each month segregated by district and species are in Appendices 4-11.

Table 1. Estimated total monthly fish catches (tones) in the Ugandan part of Lake Victoria between July 2005 and March 2007

Month	Nile perch	Tilapia	Mukene	Other spp	Total
Jul-05	8031.2±1242.4	2828.9±526.7	9445.0±3239.0	2300.3±752.3	22605.4±5760.4
Aug-05	6633.9±1268.9	2346.0±469.0	8142.6±1252.5	102.1±134.9	17224.6±3125.3
Sep-05	8322.8±1268.0	2401.9±586.9	11494.2±2450.2	101.1±96.8	22320.0±4401.9
Nov-05	8646.3±1100.8	2214.4±425.1	6384.7±1087.4	101.6±98.1	17347.0±2711.4
Mar-06	7099.1±1098.3	2331.2±921.4	8430.8±3311.3	224.6±204.3	18085.7±5535.3
Aug-06	7367.7±1058.7	2206.2±512.9	8587.0±1275.2	176.4±162.8	18337.3±3009.6
Dec-06	8371.0±1066.5	2371.3±416.9	9948.3±3629.1	170.3±154.0	20860.9±5266.6
Mar-07	6710.6±998.1	1923.4±472.5	11994.6±3541.0	247.0±185.2	20875.6±5196.8

9.2.1 Nile perch

The estimated Nile perch total catches in March 2007 (6,710.6±998.1 t); was the second lowest monthly catch estimate following the lowest record of 6,633.9 ± 1,268.9 t in August 2005 since the beginning of the surveys in July 2005.

9.2.2 Tilapia

The Tilapia total catch estimates were the lowest at 1,923.4±472.5 in March 2007 compared with more than 2000 t in all the previous records between in July 2005 and December 2006.

9.2.3 Mukene/Dagaa

The Mukene total catch estimate increased from 9,948.3 ± 3,629.1 t in December 2006 to 11,994.6 ± 3541.0 t in March 2007, the highest catch estimate since the beginning of the surveys in July 2005.

9.2.4 Other fish species

The contribution of fishes other than Nile perch, tilapiines and Mukene remained low at 247.0 ± 185.2 t in March 2007 although there was an increase from 170.3 ± 154.0 t in the last survey of December 2006.

9.2.5 All fish species

The total catch estimates for all fish species was 20,875.6 ± 5,196.8 t in March 2007, slightly up from 20,860.9 ± 5,266.6 t in December 2006. The high overall total catches were the result of increased Mukene catches as the other major species, i.e. Nile perch and Tilapia showed a decrease.

9.3 District Estimates of monthly total fish catches and beach value of the main commercial species

The distribution of the number of fishing crafts in the riparian districts (Table 1) determines the proportional distribution of the total catch estimates for the districts. Further to the number of crafts, the finer details of the craft-gear characteristics, determine the differences in the estimates for each fish species

among the districts. Thus, Mukono district with 36% of all fishing crafts in the Ugandan part of the lake (Frame survey, 2006) had the largest share of the total fish catch estimates for all species, followed by Kalangala, Bugiri, and Mayuge and the least in Busia and Kampala districts district (Tables 3-7). Likewise, the estimate of the gross income from the sale of fish catches at the beach is unevenly distributed in the riparian districts.

Table 2. Distribution of fishing crafts in the riparian districts of the Ugandan part of Lake Victoria (Frame survey 2006 data)

District	No. fishing crafts	%ge
Kampala	142	0.6
Busia	153	0.6
Jinja	246	1.0
Rakai	469	1.9
Mpigi	802	3.3
Masaka	1182	4.9
Wakiso	2022	8.4
Mayuge	2211	9.2
Bugiri	3389	14.0
Kalangala	4797	19.9
Mukono	8735	36.2
Total	24148	100.0

9.3.1.1.1 **Table 3.** Estimated monthly total catches and beach value of Nile perch in the Ugandan part of Lake Victoria presented by district between July 2005 and March 2007.

Month	Tota catch and Value	Busia	Bugiri	Mayuge	Jinja	Mukono	Kampala	Wakiso	Mpigi	Masaka	Kalangala	Rakai	Total
Jul-05	Total catch (tonnes)	29.0	1589.0	757.1	48.2	3074.4	47.4	546.8	160.2	200.8	1390.3	187.9	8,031.2
	Beach Value (Mill.shs)	55.9	3060.9	1458.4	92.8	5922.2	91.2	1053.3	308.6	386.9	2678.2	361.9	15,470.4
Aug-05	Total catch (tonnes)	17.4	1102.7	572.3	41.2	2633.2	42.3	467.2	143.4	174.6	1269.1	170.7	6,633.9
	Beach Value (Mill.sh s)	33.5	2124.1	1102.3	79.3	5072.3	81.4	900.0	276.2	336.3	2444.7	328.9	12,778.9
Sep-05	Total catch (tonnes)	28.3	1392.0	748.1	54.3	3362.7	63.3	593.5	161.7	216.8	1516.9	185.2	8,322.8
	Beach Value (Mill.shs)	54.5	2681.4	1441.1	104.6	6477.5	122.0	1143.3	311.5	417.6	2922.1	356.7	16,032.2
Nov-05	Total catch (tonnes)	24.8	1589.3	792.4	50.8	3348.6	51.1	576.0	170.2	221.0	1599.3	222.9	8,646.3
	Beach Value (Mill.shs)	47.8	3061.5	1526.3	97.8	6450.4	98.4	1109.5	327.8	425.7	3080.7	429.3	16,655.3
Mar-06	Total catch (tonnes)	23.5	1204.5	642.6	44.2	2810.2	49.0	488.3	152.5	186.2	1323.7	174.3	7,099.1
	Beach Value (Mill.shs)	45.3	2320.3	1237.8	85.1	5413.2	94.4	940.7	293.7	358.7	2549.9	335.8	13,674.8
Aug-06	Total catch (tonnes)	48.0	1217.3	639.3	50.6	2924.7	57.6	527.2	168.3	197.0	1368.5	169.3	7,367.7
	Beach Value (Mill.shs)	92.4	2344.9	1231.6	97.4	5633.7	110.9	1015.6	324.3	379.4	2636.0	326.1	14,192.2
Dec-06	Total catch (tonnes)	20.3	1599.9	763.7	41.7	3193.2	50.5	543.3	171.4	214.3	1548.0	224.6	8,371.0
	Beach Value (Mill.shs)	32.7	2570.5	1227.1	67.0	5130.5	81.1	872.9	275.4	344.4	2487.2	360.9	13,449.7
Mar-07	Total catch (tonnes)	17.9	1,231.3	594.6	41.6	2,637.4	45.5	466.0	139.2	164.6	1,215.1	157.5	6,710.6
	Beach Value (Mill.shs)	28.7	1,978.3	955.3	66.8	4,237.5	73.2	748.8	223.6	264.4	1,952.3	253.0	10,782.0

Table 4. Estimated total catches and beach value of Tilapia in the Ugandan part of Lake Victoria presented by district between July 2005 and March 2007.

Month	Tota catch and Value	Busia	Bugiri	Mayuge	Jinja	Mukono	Kampala	Wakiso	Mpigi	Masaka	Kalangala	Rakai	Total
Jul-05	Total catch (tonnes)	19.4	272.1	269.9	39.1	869.0	20.2	300.5	167.5	246.3	572.0	52.9	2,828.9
	Beach Value (Mill.shs)	18.7	262.8	260.7	37.8	839.5	19.5	290.3	161.8	238.0	552.6	51.1	2,732.8
Aug-05	Total catch (tonnes)	22.6	193.1	359.3	57.7	787.0	25.8	180.7	135.1	203.7	361.9	32.8	2,359.8
	Beach Value (Mill.shs)	21.7	184.8	343.9	55.2	753.2	24.7	172.9	129.3	194.9	346.3	31.4	2,258.3
Sep-05	Total catch (tonnes)	12.3	238.3	226.9	31.2	696.7	14.9	259.6	148.3	234.7	492.4	46.4	2,401.9
	Beach Value (Mill.shs)	11.9	230.2	219.2	30.2	673.0	14.4	250.8	143.3	226.7	475.7	44.8	2,320.2
Nov-05	Total catch (tonnes)	13.3	217.4	219.4	32.0	664.5	16.6	240.9	129.5	205.4	434.3	41.3	2,214.4
	Beach Value (Mill.shs)	12.8	210.0	211.9	30.9	641.9	16.1	232.7	125.1	198.4	419.5	39.9	2,139.1
Mar-06	Total catch (tonnes)	16.6	247.4	233.1	30.9	732.4	17.5	234.5	131.4	192.7	453.1	41.6	2,331.2
	Beach Value (Mill.shs)	16.0	239.0	225.2	29.8	707.5	16.9	226.6	127.0	186.1	437.7	40.2	2,251.9
Aug-06	Total catch (tonnes)	11.7	231.6	241.7	31.2	667.0	17.0	232.8	123.7	191.6	420.7	37.2	2,206.2
	Beach Value (Mill.shs)	11.3	223.7	233.4	30.2	644.3	16.4	224.9	119.5	185.1	406.4	36.0	2,131.2
Dec-06	Total catch (tonnes)	13.0	232.4	253.1	34.6	688.6	17.2	261.9	138.3	229.3	462.0	40.8	2,371.3
	Beach Value (Mill.shs)	12.4	221.9	241.7	33.1	657.4	16.5	250.0	132.0	218.9	441.1	39.0	2,263.9
Mar-07	Total catch (tonnes)	9.1	188.2	196.4	28.4	555.1	13.5	225.7	111.9	183.5	376.5	35.2	1,923.4
	Beach Value (Mill.shs)	8.7	179.6	187.5	27.1	530.0	12.9	215.4	106.9	175.1	359.4	33.6	1,836.3

Table 5. Estimated total catches and beach value of Mukene in the Ugandan part of Lake Victoria presented by district between July 2005 and March 2007.

Month	Tota catch and Value	Busia	Bugiri	Mayuge	Jinja	Mukono	Kampala	Wakiso	Mpigi	Masaka	Kalangala	Rakai	Total
Jul-05	Total catch (tonnes)	19.0	744.2	570.6	6.2	3436.5	7.6	446.1	30.4	450.2	3722.8	11.4	9445.0
	Beach Value (Mill. shs)	3.7	145.1	111.3	1.2	670.1	1.5	87.0	5.9	87.8	725.9	2.2	1841.8
Aug-05	Total catch (tonnes)	21.0	822.0	621.6	2.5	3436.9	8.4	461.8	33.6	479.5	2242.8	12.6	8142.6
	Beach Value (Mill. shs)	4.1	160.3	121.2	0.5	670.2	1.6	90.0	6.5	93.5	437.4	2.5	1587.8
Sep-05	Total catch (tonnes)	29.3	1148.9	869.5	4.1	4821.1	11.7	648.5	47.2	670.9	3225.3	17.7	11494.2
	Beach Value (Mill. shs)	5.7	224.0	169.5	0.8	940.1	2.3	126.5	9.2	130.8	628.9	3.5	2241.4
Nov-05	Total catch (tonnes)	14.4	561.4	427.8	3.6	2477.0	5.9	327.3	24.2	332.9	2201.4	9.0	6384.7
	Beach Value (Mill. shs)	2.8	109.5	83.4	0.7	483.0	1.2	63.8	4.7	64.9	429.3	1.7	1245.0
Mar-06	Total catch (tonnes)	19.7	792.1	590.0	3.9	3349.1	7.9	444.3	32.2	454.2	2722.6	14.9	8430.8
	Beach Value (Mill. shs)	3.8	154.5	115.1	0.8	653.1	1.5	86.6	6.3	88.6	530.9	2.9	1644.0
Aug-06	Total catch (tonnes)	19.6	766.4	583.3	4.2	3360.6	7.8	444.0	31.3	454.8	2903.1	11.7	8587.0
	Beach Value (Mill. shs)	3.8	149.5	113.7	0.8	655.3	1.5	86.6	6.1	88.7	566.1	2.3	1674.5
Dec-06	Total catch (tonnes)	28.1	1103.4	831.8	2.4	4476.5	11.9	611.0	45.9	633.2	2187.2	16.9	9948.3
	Beach Value (Mill. shs)	5.4	212.4	160.1	0.5	861.7	2.3	117.6	8.8	121.9	421.0	3.3	1915.1
Mar-07	Total catch (tonnes)	28.6	1127.0	864.9	5.8	4800.6	11.8	639.4	50.2	655.3	3793.3	17.8	11994.6
	Beach Value (Mill. shs)	3.6	140.9	108.1	0.7	600.1	1.5	79.9	6.3	81.9	474.2	2.2	1499.3

Table 6. Estimated total catches and beach value of other fish species (Haplochromines, *Bagrus*, *Protopterus*, *Clarias* and others) in the Ugandan part of Lake Victoria presented by district between July 2005 and March 2007.

Month	Tota catch and Value	Busia	Bugiri	Mayuge	Jinja	Mukono	Kampala	Wakiso	Mpigi	Masaka	Kalangala	Rakai	Total
Jul-05	Total catch (tonnes)	7.6	278.8	201.3	2.2	1,061.2	4.1	151.7	21.0	147.7	413.5	11.3	2,300.3
	Beach Value (Mill. shs)	7.9	300.5	221.7	1.3	1,160.6	3.8	163.7	18.2	165.4	442.4	8.4	2,493.9
Aug-05	Total catch (tonnes)	10.5	8.2	7.1	0.9	37.6	0.7	9.1	5.2	4.3	16.9	1.6	102.1
	Beach Value (Mill. shs)	8.9	6.4	5.7	0.7	26.7	0.5	7.2	3.9	3.2	12.7	1.2	77.0
Sep-05	Total catch (tonnes)	2.3	13.8	10.5	1.9	36.2	0.9	11.0	4.2	4.0	14.8	1.5	101.1
	Beach Value (Mill. shs)	1.9	10.9	8.3	1.5	27.5	0.7	8.9	3.3	3.2	11.4	1.2	78.8
Nov-05	Total catch (tonnes)	0.4	12.1	9.2	1.0	32.7	0.9	11.3	6.2	5.6	20.0	2.2	101.6
	Beach Value (Mill. shs)	0.3	9.2	7.1	0.7	23.2	0.6	8.7	4.7	4.5	14.8	1.7	75.6
Mar-06	Total catch (tonnes)	3.1	21.8	19.9	2.2	91.6	2.0	22.0	9.5	8.1	41.2	3.2	224.6
	Beach Value (Mill. shs)	1.9	15.2	14.3	1.6	65.5	1.4	16.5	6.9	5.8	29.5	2.1	160.6
Aug-06	Total catch (tonnes)	0.6	16.0	13.6	1.5	64.4	1.4	16.8	7.7	6.7	45.3	2.4	176.4
	Beach Value (Mill. shs)	0.5	13.1	11.3	1.2	53.2	1.1	14.1	6.5	5.7	42.1	1.9	150.8
Dec-06	Total catch (tonnes)	0.8	14.6	13.2	1.7	71.1	1.9	15.8	7.8	7.1	33.7	2.5	170.2
	Beach Value (Mill. shs)	0.6	11.4	10.1	1.2	53.1	1.4	12.0	5.8	5.3	24.9	1.9	127.9
Mar-07	Total catch (tonnes)	0.8	24.2	22.0	2.7	103.7	2.3	25.0	9.3	7.9	46.0	3.0	247.0
	Beach Value (Mill. shs)	0.6	17.3	15.7	1.9	73.7	1.6	17.8	6.8	5.8	32.9	2.1	176.3

Table 7. Estimated total catches and beach value (all fish species pooled) in the Ugandan part of Lake Victoria presented by district between July 2005 and March 2007.

Month	Total catch and value	Busia	Bugiri	Mayuge	Jinja	Mukono	Kampala	Wakiso	Mpigi	Masaka	Kalangala	Rakai	Total
Jul-05	Total catch (tonnes)	75.0	2884.0	1798.9	95.8	8441.2	79.3	1445.2	379.0	1045.1	6098.6	263.4	22605.4
	Beach Value (Mill. shs)	86.3	3769.3	2052.1	133.1	8592.4	116.0	1594.3	494.5	878.0	4399.1	423.7	22538.8
Aug-05	Total catch (tonnes)	71.5	2126.0	1560.3	102.2	6894.7	77.2	1118.8	317.3	862.1	3890.7	217.7	17238.4
	Beach Value (Mill. shs)	68.2	2475.5	1573.1	135.6	6522.4	108.3	1170.2	416.0	627.9	3241.0	363.9	16702.1
Sep-05	Total catch (tonnes)	72.2	2793.0	1855.0	91.5	8916.7	90.9	1512.7	361.4	1126.4	5249.5	250.8	22320.0
	Beach Value (Mill. shs)	74.0	3146.6	1838.1	137.1	8118.2	139.3	1529.4	467.2	778.4	4038.1	406.2	20672.6
Nov-05	Total catch (tonnes)	52.9	2380.2	1448.7	87.4	6522.8	74.5	1155.4	330.1	764.9	4254.9	275.3	17347.0
	Beach Value (Mill. shs)	63.7	3390.2	1828.8	130.1	7598.5	116.2	1414.7	462.4	693.6	3944.3	472.6	20115.0
Mar-06	Total catch (tonnes)	62.9	2265.8	1485.6	81.2	6983.3	76.3	1189.1	325.6	841.2	4540.7	234.0	18085.6
	Beach Value (Mill. shs)	67.0	2729.0	1592.3	117.3	6839.2	114.2	1270.3	433.8	639.2	3548.0	381.0	17731.3
Aug-06	Total catch (tonnes)	79.8	2231.3	1477.9	87.5	7016.7	83.8	1220.8	331.0	850.1	4737.6	220.6	18337.2
	Beach Value (Mill. shs)	107.9	2731.2	1590.0	129.6	6986.6	130.0	1341.2	456.3	658.9	3650.7	366.3	18148.7
Dec-06	Total catch (tonnes)	62.3	2950.3	1861.8	80.4	8429.5	81.5	1432.0	363.3	1083.9	4231.0	284.9	20860.9
	Beach Value (Mill. shs)	51.2	3016.2	1639.0	101.7	6702.8	101.2	1252.5	422.0	690.5	3374.3	405.1	17756.6
Mar-07	Total catch (tonnes)	56.4	2570.7	1677.9	78.5	8096.8	73.1	1356.1	310.7	1011.3	5430.8	213.4	20875.6
	Beach Value (Mill. shs)	41.6	2316.1	1266.6	96.6	5441.3	89.2	1062.0	343.5	527.3	2818.8	291.0	14293.8

9.4 Relative contribution of the main fish species to the monthly total catches and the beach value.

In March 2007, Mukene contributed 57.5% of the total fish catches in the Ugandan part of the lake, followed by Nile perch contributed 32.1%, Tilapia 9.2% and other fishes 1.2% (Figure 4). Compared with the December 2006 CAS results, the proportion of Mukene of the total catches in March 2007 increased by 10%, whereas Nile perch and Tilapia reduced by 8% and 2% respectively. However the proportional contribution of the species to the gross income of the fishers remained unchanged, a result of higher prices for Nile perch and Tilapia.

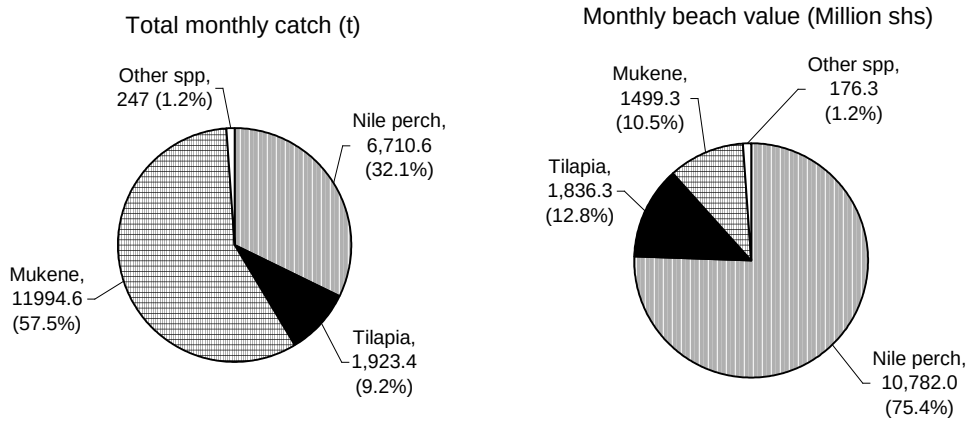


Figure 4. Relative contribution to the total monthly catches and beach value of the main fish species in the Ugandan part of Lake Victoria in March 2007**.**

10 DISCUSSION

Seasonality is evident in the fish catch rates, more so for the Nile perch fishery with peaks in the period November to December. Earlier catch assessment studies in the Ugandan part of the lake (Muhoozi, 2002) showed two Nile perch recruitment pulses, a weak one representing about 20% of the annual recruitment in the first half of the year in (February to March) and the strong one representing 60% of annual recruitment in the second part of the year (July – September). In view of the seasonal changes, the comparison of the March 2007 and the previous survey in December 2006 may not show the correct picture of the state of the different fisheries. Comparing the March 2007 results with those of the survey conducted in the same month in March 2006 could be a better indicator. In this respect, the Nile perch showed a 5.5% decrease in total monthly catch estimates from 7,099.1 t in March 2006 to 6,710.6 t in March 2007. Similarly, the monthly tilapia catch estimates decreased from 2,331.3 in March 2006 to 1,923.4 t in March 2007 a decrease of 17.5%. On the other hand, the Mukene monthly catches increased by 42% from 8,430.8 t in March 2006 to 11,994.6 in March 2007. The increase in the overall total monthly catch estimates for all fish species by 15.4% from 18,085.6 t in March 2006 to 20,875.6 t in March 2007, is therefore only attributed to Mukene. Despite the reduction in catches of Nile perch and tilapia, their proportional contribution of to the gross value of the catches at the beach remained unchanged probably due increase of unit prices.

The results of the March 2006 survey suggest substantial improvement in the catches of Mukene, no significant change in the Nile fishery and quite a decrease in the Tilapia fishery when compared with results of a similar period in March 2006. Thus the trend of Tilapia fishery which previously showed more or less general stability of catch estimates showed a noticeable decrease in March 2007. This is probably due to the long term effects of the low water levels in 2006 which could have affected tilapia productivity in their favoured near shore habitats. However, now that the lake water level has returned to normal the possible effects of low water levels in 2006 on the are likely to ease and the tilapia fishery can be expected recover.

Despite the increase in catches, the Mukene/Dagaa fishery in the Ugandan waters of Lake Victoria remained a near shore fishery in which paddle sesse boats were the dominant craft. Development of this fishery in the offshore waters, with efficient fishing methods suitable for open waters, continues to be an option to expand the fishery and further increase the catches of Mukene beyond the current levels.

11 REFERENCES

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LVFO (2005) Standard operating procedures for catch assessment surveys. 42pp.

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12 APPENDICES

Appendix 1. List of fish landing sites selected and sampled in Catch Assessment surveys in the Ugandan waters of Lake Victoria

District	Laning site
Bugiri	Golofa
	Bumeru A
	Butanila B
	Mwango
	Maruba
	Hama 'B'
Busia	Madwa
Jinja	Owen Falls Dam
	Wanyange
Kampala	Luzira Port Bell
Masaka	Nakigga
	Makonzi
Mayuge	Khaaza
	Maganda
	Malindi
	Nakirimira
	Ntinkalu
Rakai	Kasensero
Wakiso	Kinywante
	Kagulube
	Nsonga-Kava
	Nakiwogo
	Kasenyi
Mukono	Buwagajjo
	Namugambe
	Bukaali
	Kibulwe-Ziiru

District	Laning site
Mukono	Nantwalantya
	Kawunguli-Bulago
	Malija-Wabuziba
	Maala
	Kiruguma
	Lufu
	Kisu
	Gunda
	Kinaggaba
	Kawafu
	Zinga
	Kachanga-Bulago
	Luwero
	Kaziru
	Nambula
	Namugombe
	Kalega
	Nyenda
	Kiyindi
Mpigi	Katebo Lwazi
	Nakaziba
Kalangala	Banda
	Kakyanga
	Kasenyi
	Luku-Nabisukiro
	Mweena
	Kyagalanyi
Total	**54**

Appendix 2. Fish catch rates (kg boat^{-1} day^{-1}) in the Ugandan part of of Lake Victoria presented by effort group (Vessel-gear type) and species for March 2007

	VG type	BOAT AYS	NP Wt.	CL	TL Wt.	CL	DA Wt.	CL	HA Wt.	CL	BD Wt.	CL	PA Wt.	CL	CG Wt.	CL	OT Wt.	CL
Parachute																		
	PA-GN	546	0.74	0.35	11.55	0.95	-	-	0.00	0.00	0.01	0.01	0.08	0.07	0.02	0.02	0.00	0.00
	PA-LL	21	16.71	9.89	2.10	3.01	-	-	-	-	-	-	4.24	3.34	0.24	0.35	-	-
	PA-HL	107	5.01	1.87	5.60	1.67	-	-	-	-	-	-	0.32	0.47	-	-	-	-
	PA-CN	43	0.05	0.07	10.20	5.20	-	-	-	-	-	-	-	-	-	-	-	-
	PA-TR	28	-	-	9.21	2.26	-	-	-	-	-	-	-	-	-	-	-	-
	PA-BS	9	13.57	5.71	4.73	8.38	14.68	-	0.00	-	0.01	-	0.38	-	0.05	0.09	0.01	-
	PA-OT	23	0.35	0.72	11.09	3.45	-	-	-	-	-	-	-	-	-	-	-	-
Sesse Paddle																		
	SP-GN	781	9.88	1.02	5.09	0.78	0.44	0.58	0.00	0.00	0.03	0.02	0.22	0.13	0.06	0.05	0.29	0.13
	SP-LL	206	19.89	3.15	0.19	0.16	-	-	-	-	0.04	0.05	1.31	0.92	0.04	0.06	0.00	0.01
	SP-SS	157	0.01	0.02	-	-	318.85	87.70	0.48	0.47	-	-	-	-	-	-	-	-
	SP-SN	37	0.08	0.12	-	-	240.89	85.27	-	-	-	-	-	-	-	-	-	-
	SP-HL	258	4.73	1.40	3.04	0.56	-	-	-	-	0.03	0.05	0.09	0.17	-	-	0.13	0.09
	SP-CN	68	0.21	0.22	17.58	13.66	-	-	-	-	-	-	0.38	0.55	-	-	0.15	0.22
	SP-TR	38	0.26	0.53	6.43	3.02	-	-	-	-	-	-	0.45	0.50	-	-	0.08	0.12
	SP-BS	348	28.58	4.49	6.29	1.25	-	-	0.00	0.00	-	-	0.69	0.40	0.06	0.08	0.09	0.07
	SP-OT	24	2.17	2.07	16.68	8.23	-	-	3.92	3.83	-	-	-	-	-	-	-	-
Sesse motor/sail																		
	SMS-GN	862	21.51	1.30	0.43	0.42	-	-	-	-	0.02	0.01	-	-	0.01	0.01	0.07	-
	SMS-LL	244	33.55	7.27	0.35	0.63	-	-	-	-	0.03	0.06	-	-	-	-	0.00	-
	SMS-HL	5	22.20	29.32	1.00	2.15	-	-	-	-	-	-	-	-	-	-	1.00	-
	SMS-OT	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other craft																		
	OT-GN	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.56
	OT-LL	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	OT-HL	18	-	0.47	1.00	5.00	1.31	-	-	-	-	-	-	-	-	-	-	-
	OT-TR	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 3. Estimated total fish landed (tonnes) in the Ugandan part of Lake Victoria presented by effort group (Vessel-gear type) and species for March 2007

	VG type	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CA	±	OT	±	**TOTAL**	±
Parachute boats																			
	PA-GN	48.8	23.2	762.2	63.0	-	-	0.0	0.0	0.5	0.5	5.5	4.9	1.5	1.5	0.1	0.1	**818.6**	**93.2**
	PA-LL	99.9	59.1	12.5	18.0	-	-	-	-	-	-	25.3	20.0	1.4	2.1	-	-	**139.2**	**99.2**
	PA-HL	85.3	31.8	95.5	28.4	-	-	-	-	-	-	5.4	8.1	-	-	-	-	**186.2**	**68.3**
	PA-CN	0.3	0.4	69.3	35.3	-	-	-	-	-	-	-	-	-	-	-	-	**69.7**	**35.8**
	PA-TR	-	-	3.0	0.7	-	-	-	-	-	-	-	-	-	-	-	-	**3.0**	**0.7**
	PA-BS	41.6	17.5	14.5	25.7	45.0	-	0.0	-	0.0	-	1.2	-	0.2	0.3	0.0	-	**102.6**	**43.5**
	PA-OT	0.2	0.4	6.0	1.9	-	-	-	-	-	-	-	-	-	-	-	-	**6.2**	**2.3**
	SUB-TOTAL	**276.1**	**132.5**	**963.0**	**173.0**	**45.0**	**-**	**0.0**	**0.0**	**0.6**	**0.5**	**37.5**	**33.0**	**3.0**	**3.8**	**0.1**	**0.1**	**1,325.4**	**342.9**
Sesse Paddle																			
	SP-GN	1,013.0	105.0	522.2	79.7	45.5	59.3	0.2	0.3	2.7	1.8	22.5	13.7	6.2	4.9	29.8	13.8	**1,642.1**	**278.5**
	SP-LL	1,171.7	185.7	11.2	9.3	-	-	-	-	2.3	3.1	77.2	54.3	2.3	3.3	0.3	0.6	**1,264.9**	**256.3**
	SP-SS	0.3	0.5	-	-	9,251.8	2,544.6	13.9	13.7	-	-	-	-	-	-	-	-	**9,265.9**	**2,558.8**
	SP-SN	0.9	1.3	-	-	2,647.4	937.1	-	-	-	-	-	-	-	-	-	-	**2,648.3**	**938.4**
	SP-HL	112.0	33.2	72.1	13.3	-	-	-	-	0.8	1.1	2.0	4.0	-	-	3.0	2.2	**189.9**	**53.8**
	SP-CN	1.0	1.1	89.2	69.3	-	-	-	-	-	-	1.9	2.8	-	-	0.7	1.1	**92.9**	**74.3**
	SP-TR	0.1	0.2	2.3	1.1	-	-	-	-	-	-	0.2	0.2	-	-	0.0	0.0	**2.6**	**1.5**
	SP-BS	882.5	138.8	194.2	38.6	-	-	0.1	0.1	-	-	21.3	12.3	1.8	2.5	2.8	2.0	**1,102.6**	**194.3**
	SP-OT	1.6	1.5	12.1	6.0	-	-	2.8	2.8	-	-	-	-	-	-	-	-	**16.6**	**10.3**
	SUB-TOTAL	**3,183.0**	**467.4**	**903.3**	**217.3**	**11,944.7**	**3,541.0**	**16.9**	**16.8**	**5.8**	**6.0**	**125.1**	**87.3**	**10.3**	**10.6**	**36.7**	**19.8**	**16,225.8**	**4,366.2**

Sesse motorised or sail																			
	SMS-GN	2,045.5	123.5	40.6	40.3	-	-	-	-	1.7	1.4	-	-	0.6	1.1	7.1	-	**2,095.4**	**166.2**
	SMS-LL	1,195.4	259.0	12.4	22.5	-	-	-	-	1.2	2.3	-	-	-	-	0.1	-	**1,209.0**	**283.8**
	SMS-HL	10.6	14.0	0.5	1.0	-	-	-	-	-	-	-	-	-	-	0.5	-	**11.6**	**15.1**
	SMS-OT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
	SUB-TOTAL	**3,251.5**	**396.5**	**53.5**	**63.8**	**-**	**-**	**-**	**-**	**2.9**	**3.7**	**-**	**-**	**0.6**	**1.1**	**7.6**	**-**	**3,316.0**	**465.1**
Other crafts																			
	OT-GN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.4	**-**	**2.4**
	OT-LL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
	OT-HL	-	1.7	3.7	18.4	4.8	-	-	-	-	-	-	-	-	-	-	-	**8.5**	**20.2**
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**	**-**
	SUB-TOTAL	**-**	**1.7**	**3.7**	**18.4**	**4.8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.4**	**8.5**	**22.6**
GRAND TOTAL		**6,710.6**	**998.1**	**1,923.4**	**472.5**	**11,994.6**	**3,541.0**	**17.0**	**16.8**	**9.2**	**10.2**	**162.5**	**120.3**	**13.9**	**15.5**	**44.4**	**22.4**	**20,875.6**	**5,196.8**

Appendix 4. Estimated total fish landed (tonnes) in the Ugandan part of Lake Victoria presented by district and species for July 2005

DISTRICT	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	**TOTAL**	±
Busia	29.0	9.9	19.4	6.2	19.0	2.8	6.3	1.6	0.1	0.1	0.1	0.2	0.0	0.0	1.1	1.0	**75.0**	**21.8**
Bugiri	1,589.0	243.6	272.1	59.1	744.2	111.4	245.2	63.2	1.4	1.9	4.4	5.7	0.5	0.7	27.2	24.6	**2,884.0**	**510.2**
Mayuge	757.1	136.3	269.9	75.8	570.6	92.5	183.9	47.5	1.0	1.2	4.2	5.6	0.5	0.7	11.7	9.8	**1,798.9**	**369.4**
Jinja	48.2	9.6	39.1	6.6	6.2	4.5	0.0	0.0	0.1	0.1	0.3	0.5	0.1	0.1	1.7	1.2	**95.8**	**22.6**
Mukono	3,074.4	451.3	869.0	165.4	3,436.5	800.5	965.3	248.3	5.4	6.5	7.2	7.8	1.5	1.8	81.8	67.1	**8,441.2**	**1,748.8**
Kampala	47.4	8.4	20.2	4.1	7.6	1.1	2.5	0.7	0.1	0.1	0.3	0.3	0.0	0.0	1.2	0.8	**79.3**	**15.6**
Wakiso	546.8	95.4	300.5	44.7	446.1	91.5	132.8	34.4	0.9	1.1	4.0	4.1	0.4	0.6	13.6	10.6	**1,445.2**	**282.4**
Mpigi	160.2	32.6	167.5	24.2	30.4	4.5	10.1	2.8	0.3	0.3	2.5	2.4	0.3	0.3	7.8	5.7	**379.0**	**72.9**
Masaka	200.8	45.9	246.3	34.0	450.2	81.5	140.1	36.1	0.6	0.8	1.6	1.6	0.2	0.4	5.1	4.6	**1,045.1**	**205.0**
Kalangala	1,390.3	188.6	572.0	97.9	3,722.8	2,046.8	359.1	92.6	2.4	2.9	5.4	5.0	0.8	1.0	45.8	37.8	**6,098.6**	**2,472.7**
Rakai	187.9	20.9	52.9	8.5	11.4	1.7	3.8	1.0	0.2	0.2	0.6	0.5	0.1	0.1	6.6	6.0	**263.4**	**39.0**
TOTAL	**8,031.2**	**1,242.4**	**2,828.9**	**526.7**	**9,445.0**	**3,239.0**	**2,049.1**	**528.1**	**12.5**	**15.3**	**30.6**	**33.8**	**4.4**	**5.8**	**203.8**	**169.3**	**22,605.4**	**5,760.4**

Abbreviations: NP= Nile perch, TL=Tilapiines, DA= Mukene/Dagaa, HA=Haplochromines, BD=Bagrus, PA= Protopterus, CA= Clarias, OT=Other spp

Appendix 5. Estimated total fish landed (tonnes) in the Ugandan part of Lake Victoria presented by district and species for August 2005.

	NP	95%CL	TL	95%CL	DA	95%CL	HA	95%CL	BD	95%CL	PA	95%CL	CG	95%CL	OT	95%CL	**TOTAL**	**95%CL**
Busia	17.4	3.9	11.9	2.6	21.0	2.8	0.0	0.0	0.0	0.0	6.2	17.4	3.5	17.4	0.8	1.1	**60.8**	**45.3**
Bugiri	1,102.7	203.7	233.2	55.8	822.0	110.3	0.4	0.5	1.0	1.3	3.5	3.7	1.1	1.5	2.2	1.6	**2,166.1**	**378.3**
Mayuge	572.3	135.1	226.5	52.3	621.6	84.3	0.3	0.5	0.8	1.0	3.3	3.6	1.1	1.5	1.6	1.2	**1,427.4**	**279.5**
Jinja	41.2	10.2	34.9	7.4	2.5	0.6	0.0	0.0	0.1	0.1	0.3	0.4	0.1	0.1	0.3	0.2	**79.4**	**19.2**
Mukono	2,633.2	476.8	757.2	162.0	3,436.9	485.9	0.6	1.0	5.1	6.6	10.1	11.9	5.4	7.9	16.4	16.1	**6,864.8**	**1,168.3**
Kampala	42.3	10.3	20.0	4.5	8.4	1.2	0.0	0.0	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.1	**71.4**	**16.7**
Wakiso	467.2	106.2	241.1	43.3	461.8	64.1	0.5	0.7	0.9	1.3	4.3	4.4	1.3	1.6	2.1	1.5	**1,179.2**	**223.1**
Mpigi	143.4	35.3	130.9	19.8	33.6	4.6	0.3	0.4	0.3	0.3	2.3	2.1	0.6	0.7	1.8	1.5	**313.1**	**64.7**
Masaka	174.6	49.9	190.9	29.7	479.5	65.5	0.3	0.5	0.2	0.3	1.7	1.8	0.5	0.6	1.7	2.0	**849.2**	**150.2**
Kalangala	1,269.1	216.3	458.4	83.7	2,242.8	431.6	0.6	0.9	2.1	2.6	5.8	5.5	2.6	3.0	5.8	4.1	**3,987.2**	**747.7**
Rakai	170.7	21.2	41.1	7.9	12.6	1.7	0.1	0.1	0.2	0.2	0.7	0.8	0.2	0.2	0.5	0.3	**226.0**	**32.3**
TOTAL	**6,633.9**	**1,268.9**	**2,346.0**	**469.0**	**8,142.6**	**1,252.5**	**3.0**	**4.7**	**10.8**	**13.9**	**38.4**	**51.9**	**16.5**	**34.7**	**33.4**	**29.7**	**17,224.6**	**3,125.2**

Abbreviations: NP= Nile perch, TL=Tilapiines, DA= Mukene/Dagaa, HA=Haplochromines, BD=Bagrus, PA= Protopterus, CG= Clarias, OT=Other spp

Appendix 6. Estimated total fish landed (tonnes) in the Ugandan part of Lake Victoria presented by district and species for September 2005

District	NP	95%CL	TL	95%CL	DA	95%CL	HA	95%CL	BD	95%CL	PA	95%CL	CG	95%CL	OT	95%CL	**TOTAL**	**95%CL**
Busia	28.3	6.2	12.3	3.2	29.3	6.4	0.1	0.1	0.0	0.0	1.8	1.2	0.1	0.1	0.3	0.3	**72.2**	**17.7**
Bugiri	1,392.0	209.3	238.3	105.2	1,148.9	253.1	0.2	0.2	4.8	5.3	6.2	6.2	0.7	1.0	1.9	1.7	**2,793.0**	**581.9**
Mayuge	748.1	126.0	226.9	64.3	869.5	191.6	0.1	0.2	1.6	1.8	5.8	5.9	0.9	1.1	2.1	3.2	**1,855.0**	**394.1**
Jinja	54.3	9.5	31.2	6.4	4.1	1.1	0.0	0.0	0.1	0.1	1.1	1.0	0.3	0.4	0.4	0.2	**91.5**	**18.7**
Mukono	3,362.7	504.5	696.7	180.1	4,821.1	1,048.6	0.3	0.3	4.3	4.6	20.2	18.5	1.8	2.4	9.6	6.4	**8,916.7**	**1,765.4**
Kampala	63.3	10.7	14.9	2.7	11.7	2.6	0.0	0.0	0.0	0.0	0.6	0.5	0.0	0.0	0.2	0.1	**90.9**	**16.8**
Wakiso	593.5	101.8	259.6	53.6	648.5	143.1	0.2	0.2	0.6	0.7	6.6	5.9	1.7	2.1	1.9	1.8	**1,512.7**	**309.2**
Mpigi	161.7	22.9	148.3	18.2	47.2	10.6	0.1	0.1	0.2	0.2	2.4	2.4	0.5	0.6	1.0	0.7	**361.4**	**55.6**
Masaka	216.8	41.2	234.7	41.1	670.9	146.9	0.0	0.1	0.2	0.2	2.9	3.6	0.3	0.4	0.6	0.4	**1,126.4**	**233.9**
Kalangala	1,516.9	215.6	492.4	100.4	3,225.3	641.9	0.2	0.2	1.6	1.5	8.7	8.3	0.7	1.0	3.6	2.1	**5,249.5**	**971.1**
Rakai	185.2	20.3	46.4	11.7	17.7	4.0	0.0	0.0	0.3	0.3	0.8	0.8	0.2	0.2	0.3	0.2	**250.8**	**37.5**
TOTAL	**8,322.8**	**1,268.0**	**2,401.9**	**586.9**	**11,494.2**	**2,450.2**	**1.2**	**1.5**	**13.7**	**14.6**	**57.0**	**54.3**	**7.3**	**9.4**	**21.8**	**17.1**	**22,320.0**	**4,401.9**

Abbreviations: NP= Nile perch, TL=Tilapiines, DA= Mukene/Dagaa, HA=Haplochromines, BD=Bagrus, PA= Protopterus, CA= Clarias, OT=Other spp

Appendix 7. Estimated total fish landed (tonnes) in the Ugandan part of Lake Victoria presented by district and species for November 2005

District	NP	95%CL	TL	95%CL	DA	95%CL	HA	95%CL	BD	95%CL	PA	95%CL	CG	95%CL	OT	95%CL	**TOTAL**	**95%CL**
Busia	24.8	3.8	13.3	3.7	14.4	2.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.2	0.1	**52.9**	**9.8**
Bugiri	1,589.3	202.3	217.4	50.9	561.4	76.7	0.3	0.5	1.4	1.9	6.4	6.5	0.6	1.3	3.5	3.1	**2,380.2**	**343.3**
Mayuge	792.4	123.7	219.4	48.1	427.8	60.2	0.3	0.5	0.7	0.9	5.3	4.8	0.6	1.7	2.4	1.9	**1,448.7**	**241.6**
Jinja	50.8	8.8	32.0	5.9	3.6	1.8	0.0	0.0	0.0	0.1	0.3	0.3	0.0	0.5	0.6	0.4	**87.4**	**17.7**
Mukono	3,348.6	403.1	664.5	129.0	2,477.0	371.4	0.4	0.7	3.2	3.9	13.4	12.7	1.9	4.1	13.8	9.4	**6,522.8**	**934.3**
Kampala	51.1	8.4	16.6	3.2	5.9	1.1	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.1	0.4	0.2	**74.5**	**13.4**
Wakiso	576.0	85.6	240.9	44.6	327.3	50.4	0.4	0.7	0.6	0.7	6.5	5.1	0.8	2.9	3.1	2.2	**1,155.4**	**192.3**
Mpigi	170.2	26.6	129.5	19.8	24.2	5.4	0.2	0.4	0.2	0.2	3.6	2.6	0.4	0.9	1.7	1.1	**330.1**	**57.1**
Masaka	221.0	36.1	205.4	34.8	332.9	45.3	0.4	0.7	0.2	0.2	3.3	2.6	0.6	0.9	1.1	1.0	**764.9**	**121.6**
Kalangala	1,599.3	182.9	434.3	76.8	2,201.4	471.2	0.6	1.0	1.4	1.7	9.7	7.8	1.3	2.0	7.0	5.0	**4,254.9**	**748.4**
Rakai	222.9	19.4	41.3	8.5	9.0	1.9	0.1	0.1	0.2	0.2	1.2	1.1	0.1	0.3	0.7	0.6	**275.3**	**32.1**
TOTAL	**8,646.3**	**1,100.8**	**2,214.4**	**425.1**	**6,384.7**	**1,087.4**	**2.5**	**4.6**	**7.9**	**9.9**	**50.3**	**43.8**	**6.4**	**14.7**	**34.5**	**25.1**	**17,347.0**	**2,711.5**

Abbreviations: NP= Nile perch, TL=Tilapiines, DA= Mukene/Dagaa, HA=Haplochromines, BD=Bagrus, PA= Protopterus, CG= Clarias, OT=Other spp

Appendix 8. Estimated total fish landed (tonnes) in the Ugandan part of Lake Victoria presented by district and species for March 2006

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	**TOTAL**	**±**
Busia	23.5	9.4	16.6	9.4	19.7	8.4	0.0	0.0	0.1	0.1	0.2	0.2	0.5	0.6	2.4	3.7	**62.9**	**31.8**
Bugiri	1,204.5	177.0	247.4	96.8	792.1	347.2	0.2	0.4	1.6	2.2	6.8	6.2	2.9	2.9	10.2	9.3	**2,265.8**	**642.0**
Mayuge	642.6	121.1	233.1	91.2	590.0	251.5	0.2	0.4	1.2	1.6	6.9	6.2	3.1	3.2	8.5	8.5	**1,485.6**	**483.8**
Jinja	44.2	9.5	30.9	10.5	3.9	1.1	0.0	0.0	0.2	0.2	0.6	0.4	0.5	0.4	1.0	0.5	**81.2**	**22.8**
Mukono	2,810.2	438.9	732.4	349.4	3,349.1	1,384.8	1.1	1.6	5.6	5.4	26.1	20.5	18.1	16.0	40.7	35.2	**6,983.3**	**2,251.9**
Kampala	49.0	7.8	17.5	9.4	7.9	3.4	0.0	0.0	0.1	0.1	0.6	0.5	0.3	0.3	0.9	0.5	**76.3**	**22.1**
Wakiso	488.3	74.8	234.5	79.2	444.3	186.0	0.3	0.5	1.6	2.1	9.0	8.2	3.7	3.6	7.4	5.5	**1,189.1**	**360.0**
Mpigi	152.5	28.5	131.4	42.6	32.2	14.5	0.1	0.2	0.7	1.1	3.8	3.8	1.1	1.3	3.8	2.9	**325.6**	**94.8**
Masaka	186.2	34.1	192.7	46.6	454.2	190.4	0.1	0.1	0.4	0.6	3.6	3.4	0.6	0.8	3.5	4.6	**841.2**	**280.6**
Kalangala	1,323.7	178.1	453.1	171.1	2,722.6	915.1	0.5	0.8	2.8	3.2	13.4	11.8	6.6	6.4	17.8	13.2	**4,540.7**	**1,299.6**
Rakai	174.3	18.9	41.6	15.2	14.9	8.9	0.0	0.1	0.3	0.3	0.9	0.9	0.2	0.3	1.8	1.3	**234.0**	**46.0**
TOTAL	**7,099.1**	**1,098.3**	**2,331.2**	**921.4**	**8,430.8**	**3,311.3**	**2.6**	**4.1**	**14.6**	**17.0**	**71.8**	**62.1**	**37.7**	**35.8**	**97.8**	**85.3**	**18,085.6**	**5,535.3**

Abbreviations: NP= Nile perch, TL=Tilapiines, DA= Mukene/Dagaa, HA=Haplochromines, BD=Bagrus, PA= Protopterus, CG= Clarias, OT=Other spp

Appendix 9. Estimated total fish landed (tonnes) in the Ugandan part of Lake Victoria presented by district and species for August 2006

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	**TOTAL**	**±**
Busia	48.0	11.5	11.7	2.6	19.6	2.7	0.0	0.1	0.1	0.1	0.3	0.2	0.0	0.0	0.2	0.2	**79.8**	**17.4**
Bugiri	1,217.3	165.6	231.6	98.7	766.4	104.9	1.2	1.6	2.3	2.5	9.3	8.3	0.9	1.0	2.3	1.7	**2,231.3**	**384.4**
Mayuge	639.3	120.8	241.7	111.2	583.3	80.2	1.1	1.5	1.2	1.4	8.7	7.6	0.8	1.0	1.7	1.2	**1,477.9**	**324.8**
Jinja	50.6	11.0	31.2	5.4	4.2	0.8	0.1	0.1	0.2	0.2	0.8	0.6	0.1	0.2	0.3	0.2	**87.5**	**18.5**
Mukono	2,924.7	397.1	667.0	134.8	3,360.6	475.6	6.4	7.9	5.6	5.1	36.5	31.1	5.4	6.5	10.5	6.7	**7,016.7**	**1,064.8**
Kampala	57.6	9.2	17.0	3.1	7.8	1.1	0.1	0.1	0.1	0.1	0.8	0.6	0.1	0.1	0.3	0.2	**83.8**	**14.5**
Wakiso	527.2	89.4	232.8	35.5	444.0	62.1	1.5	2.1	1.0	0.9	11.3	9.5	1.1	1.3	1.9	1.2	**1,220.8**	**202.0**
Mpigi	168.3	30.9	123.7	23.2	31.3	4.3	0.7	1.0	0.5	0.4	5.0	4.0	0.6	0.6	0.9	0.5	**331.0**	**64.9**
Masaka	197.0	33.4	191.6	28.6	454.8	63.0	0.8	1.1	0.3	0.3	4.3	4.0	0.6	1.0	0.8	0.5	**850.1**	**131.9**
Kalangala	1,368.5	173.3	420.7	64.0	2,903.1	479.0	17.1	21.0	2.5	2.1	18.5	15.5	2.5	2.7	4.7	2.9	**4,737.6**	**760.4**
Rakai	169.3	16.5	37.2	5.6	11.7	1.6	0.2	0.3	0.3	0.2	1.3	1.0	0.3	0.3	0.4	0.3	**220.6**	**25.8**
TOTAL	**7,367.7**	**1,058.7**	**2,206.2**	**512.9**	**8,587.0**	**1,275.2**	**29.2**	**36.7**	**14.1**	**13.2**	**96.8**	**82.5**	**12.4**	**14.9**	**23.9**	**15.6**	**18,337.2**	**3,009.6**

Abbreviations: NP= Nile perch, TL=Tilapiines, DA= Mukene/Dagaa, HA=Haplochromines, BD=Bagrus, PA= Protopterus, CG= Clarias, OT=Other spp

Appendix 10. Estimated total fish landed (tonnes) in the Ugandan part of Lake Victoria presented by district and species for December 2006

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	**TOTAL**	±
Busia	20.3	2.7	13.0	2.9	28.1	10.2	0.1	0.1	0.0	0.0	0.2	0.2	0.1	0.2	0.4	0.2	**62.3**	**16.4**
Bugiri	1,599.9	216.1	232.4	58.5	1,103.4	401.6	1.2	1.0	0.7	0.7	6.2	6.2	3.3	4.7	3.2	2.2	**2,950.3**	**690.9**
Mayuge	763.7	143.0	253.1	68.4	831.8	305.1	0.9	0.8	0.4	0.4	6.5	6.5	2.4	3.3	3.1	2.0	**1,861.8**	**529.5**
Jinja	41.7	7.1	34.6	5.6	2.4	2.5	0.2	0.2	0.0	0.0	0.7	0.5	0.3	0.3	0.5	0.3	**80.4**	**16.4**
Mukono	3,193.2	378.8	688.6	127.1	4,476.5	1,657.5	6.5	5.6	2.1	1.9	31.9	28.6	11.8	15.3	18.9	11.5	**8,429.5**	**2,226.3**
Kampala	50.5	6.5	17.2	3.3	11.9	5.4	0.2	0.1	0.0	0.0	0.9	0.6	0.2	0.3	0.5	0.3	**81.5**	**16.6**
Wakiso	543.3	72.5	261.9	35.1	611.0	229.7	1.2	1.1	0.4	0.4	7.6	6.4	3.0	3.5	3.5	2.2	**1,432.0**	**350.9**
Mpigi	171.4	27.4	138.3	18.9	45.9	18.0	0.9	0.7	0.2	0.2	3.4	3.5	1.4	1.7	1.9	1.1	**363.3**	**71.4**
Masaka	214.3	28.8	229.3	27.4	633.2	225.8	0.3	0.3	0.2	0.2	3.9	5.3	1.0	2.0	1.7	1.1	**1,083.9**	**290.9**
Kalangala	1,548.0	164.7	462.0	64.4	2,187.2	767.0	3.4	2.9	1.1	1.0	15.4	13.0	5.4	6.3	8.4	5.2	**4,231.0**	**1,024.5**
Rakai	224.6	18.9	40.8	5.4	16.9	6.2	0.3	0.2	0.1	0.1	1.0	0.8	0.5	0.6	0.6	0.4	**284.9**	**32.7**
TOTAL	**8,371.0**	**1,066.5**	**2,371.3**	**416.9**	**9,948.3**	**3,629.1**	**15.0**	**13.0**	**5.3**	**4.9**	**77.8**	**71.5**	**29.4**	**38.1**	**42.7**	**26.6**	**20,860.9**	**5,266.6**

Abbreviations: NP= Nile perch, TL=Tilapiines, DA= Mukene/Dagaa, HA=Haplochromines, BD=Bagrus, PA= Protopterus, CG= Clarias, OT=Other spp

Appendix 11. Estimated total fish landed (tonnes) in the Ugandan part of Lake Victoria presented by district and species for March 2007

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	**TOTAL**	±
Busia	17.9	3.0	9.1	2.3	28.6	8.1	0.0	0.0	0.0	0.0	0.5	0.4	0.0	0.0	0.2	0.3	**56.4**	**14.3**
Bugiri	1,231.3	201.5	188.2	69.2	1,127.0	309.1	2.4	2.4	1.4	1.8	14.6	11.2	1.2	1.5	4.6	1.6	**2,570.7**	**598.4**
Mayuge	594.6	110.5	196.4	70.1	864.9	235.3	2.1	2.1	0.7	0.9	15.1	11.4	1.1	1.4	3.0	1.5	**1,677.9**	**433.2**
Jinja	41.6	7.7	28.4	9.8	5.8	2.6	0.0	0.0	0.1	0.1	1.8	1.6	0.1	0.1	0.7	0.4	**78.5**	**22.4**
Mukono	2,637.4	369.4	555.1	139.7	4,800.6	1,371.5	7.6	7.5	3.8	4.2	68.4	49.3	5.3	5.9	18.5	10.3	**8,096.8**	**1,957.8**
Kampala	45.5	7.3	13.5	2.8	11.8	3.7	0.0	0.0	0.1	0.1	1.6	1.1	0.1	0.2	0.5	0.3	**73.1**	**15.5**
Wakiso	466.0	75.9	225.7	58.3	639.4	182.3	1.1	1.1	0.7	0.8	18.1	14.0	1.4	1.6	3.7	2.1	**1,356.1**	**336.1**
Mpigi	139.2	23.3	111.9	20.6	50.2	16.0	0.2	0.2	0.3	0.2	6.2	4.6	0.7	0.8	2.0	1.1	**310.7**	**66.7**
Masaka	164.6	26.8	183.5	23.1	655.3	182.4	1.0	0.9	0.2	0.2	5.1	3.8	0.6	0.7	1.0	0.7	**1,011.3**	**238.6**
Kalangala	1,215.1	156.4	376.5	68.2	3,793.3	1,224.2	2.6	2.6	1.6	1.6	29.6	21.7	2.9	3.1	9.3	3.9	**5,430.8**	**1,481.6**
Rakai	157.5	16.3	35.2	8.3	17.8	5.8	0.0	0.0	0.2	0.2	1.5	1.2	0.2	0.3	1.0	0.3	**213.4**	**32.3**
TOTAL	**6,710.6**	**998.1**	**1,923.4**	**472.5**	**11,994.6**	**3,541.0**	**17.0**	**16.8**	**9.2**	**10.2**	**162.5**	**120.3**	**13.9**	**15.5**	**44.4**	**22.4**	**20,875.6**	**5,196.8**

Abbreviations: NP= Nile perch, TL=Tilapiines, DA= Mukene/Dagaa, HA=Haplochromines, BD=Bagrus, PA= Protopterus, CG= Clarias, OT=Other spp