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

FINAL REPORT OF THE FISHERIES CATCH ASSESSMENT SURVEY IN THE UGANDAN WATERS OF LAKE VICTORIA FOR THE MARCH 2010 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 monitoring of fish stocks as well as the magnitude, distribution and trends of fishing effort and fish catches is required for sound fisheries resources management. Conducting regular Catch Assessment Surveys (CASs) in Lake Victoria is one of the ways through which the partner states sharing the lake are generating information to contribute to the above process.

The EU funded Implementation of a Fisheries Management Plan (IFMP) project for Lake Victoria through the Lake Victoria Fisheries Organisation (LVFO) has supported the implementation of regionally harmonised CASs in Lake Victoria. The CASs under IFMP have followed 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 11 (currently 13) 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 considers the strengthening of participation of the Beach Management Units (BMUs) and other fisheries Co-management Institutions in fisheries data collection as one of the avenues for sustainable data collection.

This report presents findings of the CAS conducted in the Ugandan waters of Lake Victoria in March 2010. The results of the previous ten CASs conducted under the same programme in July, August, September and November 2005; in March, August and December 2006; in March, and August 2007; in February and December 2008 are included to show the emerging trends. The report also presents total annual catch estimates for the Ugandan part of the lake from 2005 to 2010.

Through these CASs, information is building up to show the emerging 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 thus provide the lake wide perspective of fisheries production. These data can now be utilised together with other Resource and Socio-economic monitoring survey data for a stock assessment of the lake to provide a firm basis for planning and management of the fisheries resources.

The institute is very appreciative of the funding by the IFMP project, which has supported the CAS programme and other Resource and Socio-economics monitoring activities. We are also very keen and supportive of all efforts being made to sustain resource monitoring programmes beyond the life of the IFMP project and have incorporated in NaFIRRI work plans a project on Monitoring of fish stocks and development of appropriate harvesting technologies in all the five major water bodies. This report is circulated to key stakeholders who are expected to provide feed back to NaFIRRI and engage policy in measures that illustrate response to scientific outputs.

On a sad note NaFIRRI ended the year in misery with loss of two senior staff (husband and wife) in a tragic accident along Masaka – Kampala high way, in which the man was none other than the late Dr. Muhoozi Ivor Levi (RIP) the pioneer of CAS activities at the institute. The late Dr. Muhoozi led this March CAS activity, analysed and used the

analyses with those of Kenya and Tanzania to prepare a Regional CAS Report that he had already been submitted to LVFO four months before he passed on. Thanks to Dr. Mbabazi Dismas for taking lead in finalizing the compilation of the late Muhoozi's national CAS analyses into the National CAS Report. NaFIRRI family will always miss them and may the Almighty rests their souls in eternal piece. Amen.

J.S. Balirwa
Director

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6 SUMMARY

Between July 2005 and March 2010, 12 Catch Assessment Surveys (CASs) were 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 former 11 (currently 13 districts) sharing the lake. The CASs' were conducted following regionally harmonised Standard Operating Procedures (SOPs) (LVFO, 2005). This report covers the CAS conducted in March 2010 and puts into context the trends generated by results of the previous surveys.

In the Nile perch fishery, both paddle and motor/sail boats using long lines, maintained higher catch rates than gillnetting boats but the overall catch rates were slightly lower in March 2010 compared with December 2010. There was a however downward trend in the Nile perch catch rates of boats using gillnets, and this correlates with the information of declining stocks from the recent Acoustics Surveys; the catch rates in the long line fishery remained stable and even somewhat increasing in the last five surveys. The factors that maintain high catches against reduction of fish biomass in the long line fishery and their effects on sustainability of the Nile perch fishery need to be investigated further.

The parachute and paddle Sesse boats operated with gill nets target the tilapia fishery. The total annual tilapia catches in 2010 dropped to a level that was almost half of the catches estimated in 2005. The low tilapia and Nile perch catches corresponded with high unit price to the extent that the slightly higher gross income was still obtained in the two fisheries in 2010 even when the catches in 2005 were higher. The price incentive is likely to be the main factor keeping fishers in business against declining catches. The annual estimates for 2005, 2006, 2007, 2008 and 2010 indicated a decreasing trend in the two fisheries (Nile perch and tilapia).

The Mukene fishery which had shown some stability in catches between 95,000 t and 113,000 t in 2005 to 2007, showed a considerable decrease to 58,717 t in 2010 the lowest ever recorded since 2005. This is presumed to be partly the result of inconsistent sampling since Mukene is a short lived fish whose abundance is likely to be characterised by strong seasonal variations. The Mukene catch rates have been characterised by large unexplained fluctuations in the catch rates in the surveys so far conducted. This fishery also remained concentrated in near shore areas of the Ugandan waters of the lake in which paddle Sesse boats using small seines or scoop nets were the dominant craft.

Information from the 2010 Frame survey indicated rampant use of illegal gears, especially beach seines and under sized (<5 inch mesh) gillnets that capture immature fish and monofilament gillnets which are mainly used to target tilapia. These practices that mostly contribute to the declining catches of Nile perch and

tilapia should be eradicated to ensure quick recovery of the Nile perch and tilapia fisheries.

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 lake's 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 of 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 catches. Data from CASs also provide a rough index of stock size. The monthly catches in this report, covering the period between July 2005 and December 2008 are estimated using raising factors from the 2008 Frame Survey data while those covering March 2010 are estimated using the 2010 Frame Survey.

This CAS report provides 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 catches; and the trends of fish catch rates, and the monthly catches for the sampled month since the beginning of the current CAS activities, from July 2005 to March 2010. The report also compares the annual catch and gross beach value of the catch in 2005, 2006, 2007, 2008 and 2010. However it should be noted that the annual catch estimate for the year 2010 was based on one sampling covering the rainy season and may not capture changes in dry season. There is need to include dry season information in future surveys.

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 (SOPs) for Catch Assessment Surveys for Lake Victoria (LVFO, 2005). 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 units (PSUs) and the vessel-gear (VG) types landing at each site are the secondary sampling units (SSUs). Within each of the formerly eleven districts sharing the Ugandan part of the lake, 10% of all landing sites (PSUs) selected for sampling at the beginning of the surveys in 2005 were maintained but implementation of the CAS activities were done by new districts. A total of 54 PSUs (Appendix 1) were sampled in the Ugandan part of Lake Victoria. The landing sites were selected randomly with Probability Proportional to Size (PPS), where size is based on the number of vessels landing at the site. There have been changes in district boundaries that resulted in formation of new districts with corresponding changes in location of some CAS landing sites (Appendix 2). However for purposes of maintaining the SOPs the formerly eleven districts were considered during the estimation of monthly and annual estimates using because the 2010 Frame survey was based on the former eleven districts.

During the sampling period, the enumerators identified the numbers of all Vessel-Gear (VG) types at each landing site that landed or were expected to land during the sampling day and allocated 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 was done in four days in the month, staggered to two consecutive days in the first and third weeks of the month.

4.3 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 done according to the laid down procedures and to eliminate fabricated records.

8.3 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 fish catches were estimated using the mean fish catch rates and the 2010 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 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 catch in each effort group by the mean unit price of each fish species landed.

(iv) The data used to estimate the annual catch of 2005 was based on the data collected in July and November 2005 and the estimates for 2006 and 2007 were based on the Annual programme estimates period of the IFMP project (October to September of the following year) rather than the calendar year. Thus the data collected in the period October 2005 to September 2006 were used to estimate the catches for 2006 and the data collected in the period October 2006 to September 2007 used to estimate the catches for 2007. In 2008, CAS data were collected in February and December and the two data points were used to estimate the annual catches. The mean monthly estimates in each period were raised through 12 months to obtain the annual catch estimates. However no CAS was undertaken in 2009 and only one was u

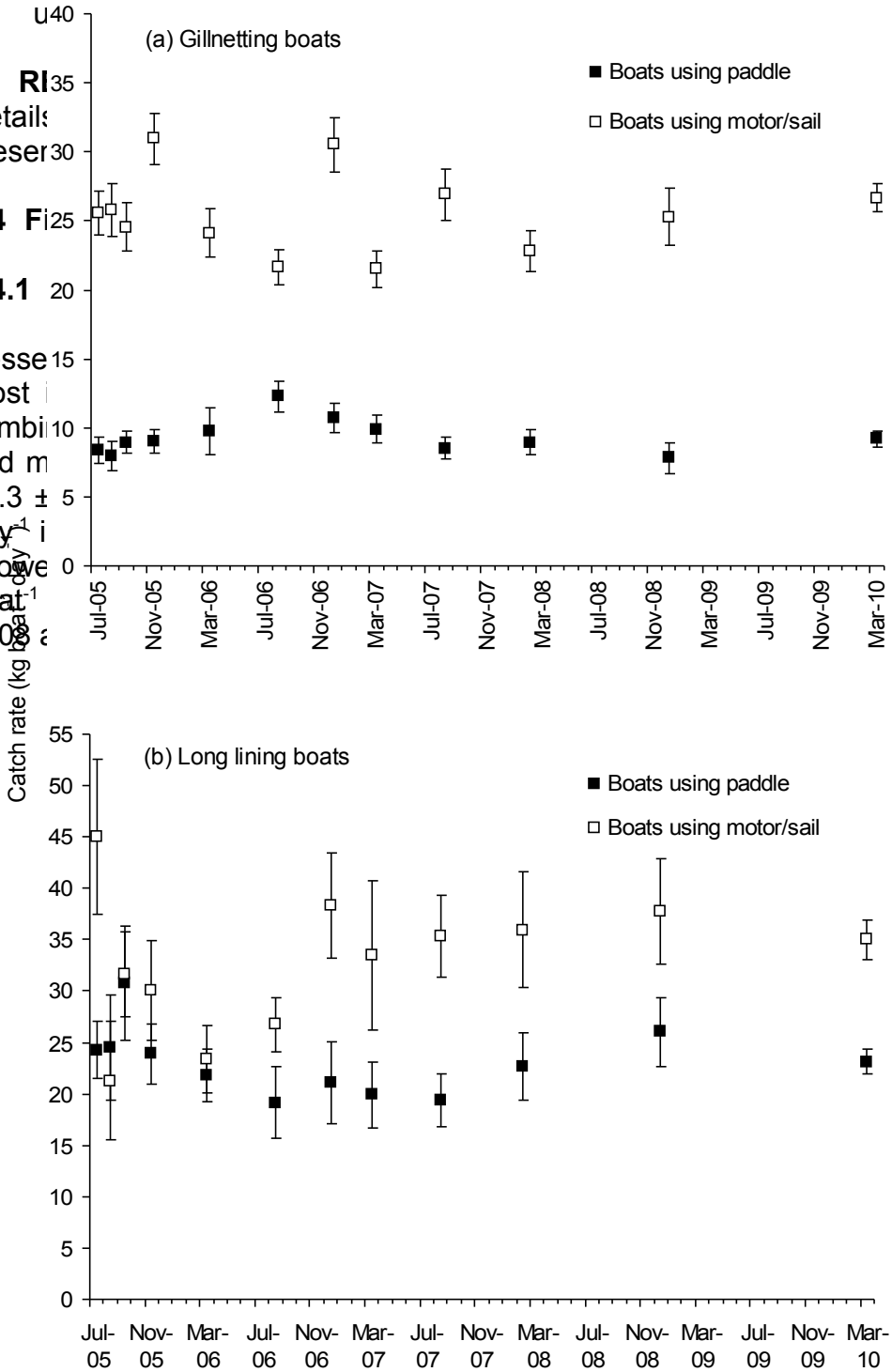

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Figure 1. Monthly trends of Nile perch catch rates of the main effort groups targeting the species in the Ugandan part of Lake Victoria between July 2005 and March 2010 (error bars = 95%CL).

8.4.2 Tilapia catch rates

The parachute boats (*bawo tatu*) are the main craft in the tilapia fishery in the U rate
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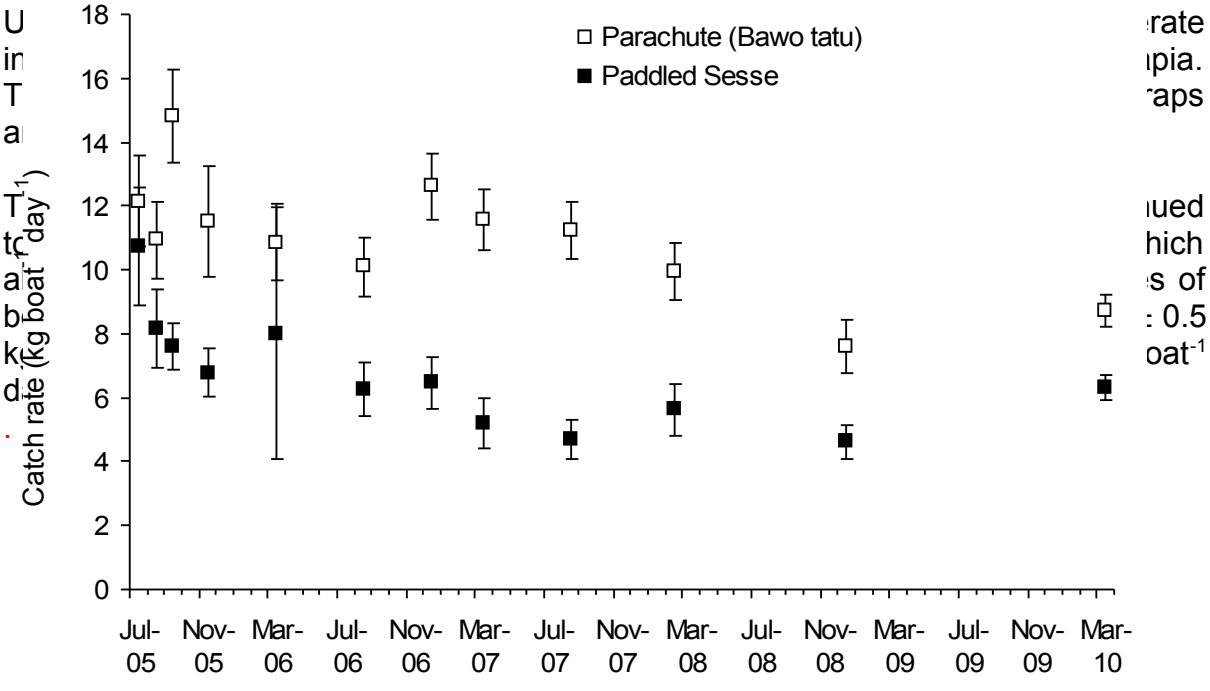

Figure 2. Monthly trends of Tilapia catch rates of the main effort groups targeting the tilapia in the Ugandan part of Lake Victoria between July 2005 and March 2010 (error bars = 95%CL).

8.4.3 Mukene/Dagaa catch rates

The Mukene fishery is dominated by paddled Sesse boats using either small seines (Lampala) or scoop nets. In both small seines and scoop net was a continued decrease in catch rates from 164.2 ± 15.3 and 74.0 ± 33.8 kg boat^{-1} day^{-1} in December 2008 to 129.1 ± 16.8 and 47.5 ± 14.6 kg boat^{-1} day^{-1} respectively in March 2010 (Figure 3). Based on error bars, the catch rates od paddled Sesse significantly decreased from 2006 and appear to have hown a small increase from March 09 to March 2010.

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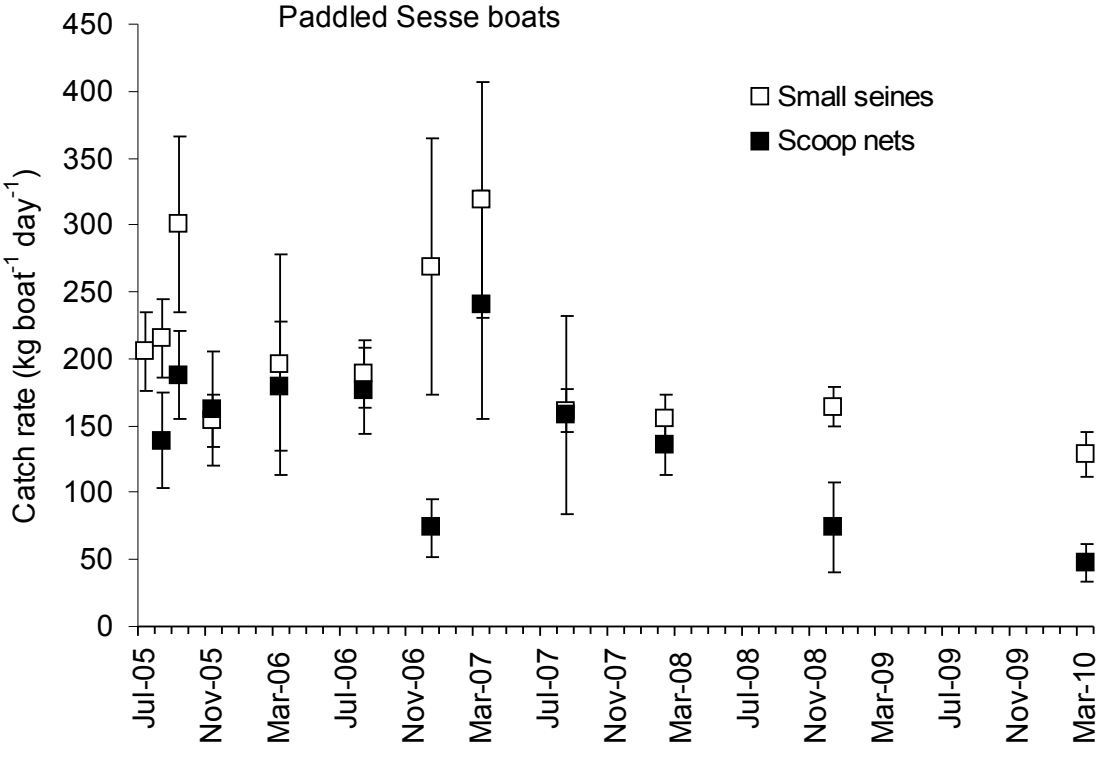

Figure 3. Monthly trends of Mukene catch rates of the main effort groups targeting the species in the Ugandan part of Lake Victoria between July 2005 and March 2010 (error bars = 95%CL).

8.5 National Estimates of monthly fish catches of the main commercial species

The trends of estimated national monthly catch for the sampled months between July 2005 and March 2011 are summarised in Table 1. The details for each month segregated by district and species are in Appendices 5-15. The estimated Nile perch catches in March 2011 was 6005.1 ± 481.1 t lower than the March 2010 and was the lowest monthly catch estimate since the beginning of the surveys in July 2005. The Tilapia catch estimates increased steadily from 1,390.2 ± 400.4 t in December 2008 the lowest ever recorded since July 2005 to 1414.3 ± 169.4 t in March 2010. The Mukene catch estimate at 4,893.1 ± 790.9 t in March 2010 was the lowest ever recorded since July 2005.

Table 1. Estimated monthly fish catches in the Ugandan part of Lake Victoria between July 2005 and March 2010

Month	Nile perch	Tilapia	Mukene	Other spp	
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
Aug-07	6,965.4 ± 807.3	1,908.0 ± 332.4	6,660.1 ± 1,270.6	236.3 ± 170.4	15,769.9 ± 2,580.6
Feb-08	6,569.0 ± 894.6	1,869.2 ± 424.6	5,582.4 ± 721.6	294.9 ± 178.7	14,315.5 ± 2219.5
Dec-08	6,927.1 ± 946.3	1,390.2 ± 400.4	6,084.4 ± 959.0	120.0 ± 101.1	14,521.7 ± 2,406.8
March-10	7080.8 ± 433.7	1414.3 ± 169.4	4,893.1 ± 790.9	189.2 ± 55.3	13577.4 ± 1449.4

8.6 Monthly fish catch estimates by district and beach value of the main commercial species

The distribution of the number of fishing crafts in the riparian districts (Table 2) determines the proportional distribution of the 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 36.4% of all fishing crafts in the Ugandan part of the lake (Frame survey, 2010) had the largest share of the fish catch estimates for all species, followed by Kalangala, Bugiri, and Mayuge and the least in Busia and Kampala districts (Tables 3-7). Similary, the estimate of the gross income from the sale of fish catches at the beach was unevenly distributed in the riparian districts.

Table 2. Distribution of fishing crafts including rafts and foot fishers in the riparian districts of the Ugandan part of Lake Victoria (Frame survey 2010 data).

District	No. fishing crafts	%ge
Busia	172	0.7
Kampala	181	0.8
Jinja	315	1.3
Rakai	568	2.4
Mpigi	850	3.6
Masaka	1511	6.4
Wakiso	2147	9.1
Mayuge	2640	11.2
Bugiri	2948	12.5
Kalangala	3695	15.6
Mukono	8601	36.4
Grand	23628	100.0

Table 3. Estimated monthly catches (tones) and beach value (Mill.shs) of Nile perch in the Ugandan part of Lake Victoria by district (July 2005 to March 2010).

Month	Total catch /BeachValue	Busia	Bugiri	Mayuge	Jinja	Mukono	Kampala	Wakiso	Mpigi	Masaka	Kalangala	Rakai	
Jul-05	Catch	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
	Value	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	Catch	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
	Value	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	Catch	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
	Value	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	catch	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
	Value	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	Catch	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
	Value	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	Catch	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
	Value	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	Catch	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
	Value	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	Catch	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
	Value	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
Aug-07	Catch	19.2	1,349.2	615.8	42.9	2,689.4	42.2	470.0	139.1	163.9	1,257.7	176.0	6,965.4
	Value	35.8	2521.8	1151.0	80.2	5026.8	78.9	878.5	260.0	306.4	2350.8	328.9	13019.1
Feb-08	Catch	18.3	1,170.4	562.6	43.0	2,589.3	42.5	461.9	134.4	169.1	1,218.3	159.3	6,569.0
	Value	40.6	2,594.8	1,247.3	95.3	5,740.5	94.1	1,024.1	297.9	374.9	2,700.9	353.1	14,563.5
Dec-08	Catch	20.8	1,286.1	593.5	42.1	2,633.5	44.2	448.5	175.6	274.5	1,215.7	192.5	6,927.1
	Value	46.9	2,892.5	1,334.8	94.6	5,922.8	99.4	1,008.7	395.0	617.4	2,734.1	432.9	15,579.0
March-10	Catch	49.6	885.1	793.1	92.1	2577.4	56.6	644.4	254.9	453.2	1104.6	169.9	7080.8
	Value	173.3	3,094.2	2,772.4	32.2	9,010.4	198.0	2,252.6.	891.1	1,584.3	3,861.6	594.1	24,735.4

Table 4. Estimated monthly catches (tones) and beach value (Mill.shs) of Tilapia in the Ugandan part of Lake Victoria by district (July 2005 to March 2010).

Month	Total catch and Beach Value	Busia	Bugiri	Mayuge	Jinja	Mukono	Kampala	Wakiso	Mpigi	Masaka	Kalangala	Rakai	
Jul-05	Catch	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
	Value	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	Catch	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
	Value	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	Catch	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
	Value	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	Catch	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
	Value	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	Catch	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
	Value	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	Catch	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
	Value	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	Catch	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
	Value	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	Catch	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
	Value	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
Aug-07	Catch	10.5	162.7	188.5	22.6	569.6	14.1	216.3	112.8	195.4	381.8	33.8	1908.0
	Value	12.8	198.2	229.6	27.6	693.8	17.1	263.5	137.4	238.1	465.1	41.2	2324.4
Feb-08	Catch	10.7	166.6	180.3	25.7	567.8	13.7	210.7	111.3	178.9	370.1	33.4	1869.2
	Value	13.5	209.9	227.1	32.4	715.4	17.3	265.5	140.3	225.4	466.3	42.0	2355.2
Dec-08	Catch	18.2	176.1	145.4	34.5	377.4	11.4	191.5	79.2	110.3	217.3	29.0	1,390.2
	Value	29.6	287.2	237.2	56.3	615.5	18.6	312.3	129.2	180.0	354.4	47.3	2,267.5
March-10	Catch	9.9	176.8	158.4	18.4	514.8	11.3	128.7	50.9	90.5	220.6	33.9	1414.3
	Value	21.5	384.6	344.6	40.0	1,120.1	24.6	280.0	110.8	196.9	480.0	73.9	3,077.2

Table 5. Estimated monthly catches (tonnes) and beach value (Mill. shs) of Mukene in the Ugandan part of Lake Victoria by district (July 2005 to March 2010).

Month	Total catch and Beach Value	Busia	Bugiri	Mayuge	Jinja	Mukono	Kampala	Wakiso	Mpigi	Masaka	Kalangala	Rakai	AAA	Overall
Jul-05	Catch	19.0	744.2	570.6	6.2	3436.5	7.6	446.1	30.4	450.2	3722.8	11.4	-	9445.0
	Value	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	Catch	21.0	822.0	621.6	2.5	3436.9	8.4	461.8	33.6	479.5	2242.8	12.6	-	8142.6
	Value	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	Catch	29.3	1148.9	869.5	4.1	4821.1	11.7	648.5	47.2	670.9	3225.3	17.7	-	11494.2
	Value	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	Catch	14.4	561.4	427.8	3.6	2477.0	5.9	327.3	24.2	332.9	2201.4	9.0	-	6384.7
	Value	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	Catch	19.7	792.1	590.0	3.9	3349.1	7.9	444.3	32.2	454.2	2722.6	14.9	-	8430.8
	Value	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	Catch	19.6	766.4	583.3	4.2	3360.6	7.8	444.0	31.3	454.8	2903.1	11.7	-	8587.0
	Value	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	Catch	28.1	1103.4	831.8	2.4	4476.5	11.9	611.0	45.9	633.2	2187.2	16.9	-	9948.3
	Value	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	Catch	28.6	1127.0	864.9	5.8	4800.6	11.8	639.4	50.2	655.3	3793.3	17.8	-	11994.6
	Value	3.6	140.9	108.1	0.7	600.1	1.5	79.9	6.3	81.9	474.2	2.2	-	1499.3
Aug-07	Catch	15.4	602.0	457.8	3.2	2626.5	6.1	347.6	24.6	356.6	2211.1	9.2	-	6660.1
	Value	3.4	134.3	102.1	0.7	585.7	1.4	77.5	5.5	79.5	493.1	2.1	-	1485.2
Feb-08	Catch	12.8	500.4	380.7	2.7	2,190.5	5.1	289.6	20.4	296.8	1,875.6	7.7	-	5,582.4
	Value	3.4	134.6	102.4	0.7	589.2	1.4	77.9	5.5	79.8	504.5	2.1	-	1,501.7
Dec-08	Catch	9.6	864.6	531.2	-	2,038.9	2.8	243.5	62.6	518.1	1,813.1	-	-	6,084.4
	Value	2.6	237.8	146.1	-	560.7	0.8	67.0	17.2	142.5	498.6	-	-	1,673.2
March-10	Catch	34.0	607.1	544.0	63.1	1,767.9	38.9	442.0	174.8	310.8	757.7	116.6	36.2	4893.1
	Value	9.3	167.0	149.6	17.4	486.2	10.7	121.5	48.1	85.5	320.6	32.	10.0	1,345.6

Table 6. Estimated monthly catches (tones) and beach value (Mill. Shs.) 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 2010

Month	Total Catch/ Beach Value	Busia	Bugiri	Mayuge	Jinja	Mukono	Kampala	Wakiso	Mpigi	Masaka	Kalangala	Rakai	Overall
Jul-05	Catch	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
	Value	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	Catch	10.5	8.2	7.1	0.9	37.6	0.7	9.1	5.2	4.3	16.9	1.6	102.1
	Value	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	Catch	2.3	13.8	10.5	1.9	36.2	0.9	11.0	4.2	4.0	14.8	1.5	101.1
	Value	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	Catch	0.4	12.1	9.2	1.0	32.7	0.9	11.3	6.2	5.6	20.0	2.2	101.6
	Value	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	Catch	3.1	21.8	19.9	2.2	91.6	2.0	22.0	9.5	8.1	41.2	3.2	224.6
	Value	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	Catch	0.6	16.0	13.6	1.5	64.4	1.4	16.8	7.7	6.7	45.3	2.4	176.4
	Value	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	Catch	0.8	14.6	13.2	1.7	71.1	1.9	15.8	7.8	7.1	33.7	2.5	170.2
	Value	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	Catch	0.8	24.2	22.0	2.7	103.7	2.3	25.0	9.3	7.9	46.0	3.0	247.0
	Value	0.6	17.3	15.7	1.9	73.7	1.6	17.8	6.8	5.8	32.9	2.1	176.3
Aug-07	Catch	0.79	22.09	19.72	2.98	109.48	2.37	21.76	6.92	5.78	42.38	2.01	236.30
	Value	0.78	21.94	20.02	2.87	106.16	2.30	21.38	6.84	6.38	41.43	1.96	232.06
Feb-08	Catch	1.0	23.8	21.6	3.4	133.6	3.0	27.3	11.1	7.5	59.2	3.4	294.9
	Value	1.0	24.2	22.2	3.5	136.1	3.1	27.8	11.1	7.6	60.1	3.4	300.1
Dec-08	Catch	0.9	13.7	13.0	1.6	45.8	1.0	11.5	5.1	5.3	19.1	2.9	120.0
	Value	1.4	21.4	20.4	2.4	71.5	1.6	18.1	7.8	8.3	29.6	4.5	186.9
March-10	Catch	1.3	23.7	21.2	2.5	68.9	1.5	17.2	6.8	12.1	29.5	4.5	189.2
	Value	2.6	46.6	41.8	4.9	135.9	3.0	34.0	13.4	23.9	58.2	9.0	373.2

Table 7. Estimated Catches and value (all fish species pooled) in the Ugandan part of Lake Victoria presented by district (July 2005 to March 2010).

Month	Catch / Beach value	Busia	Bugiri	Mayuge	Jinja	Mukono	Kampala	Wakiso	Mpigi	Masaka	Kalangala	Rakai	
Jul-05	Catch	75.0	2884.0	1798.9	95.8	8441.2	79.3	1445.2	379.0	1045.1	6098.6	263.4	22605.4
	Value	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	Catch	71.5	2126.0	1560.3	102.2	6894.7	77.2	1118.8	317.3	862.1	3890.7	217.7	17238.4
	Value	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	Catch	72.2	2793.0	1855.0	91.5	8916.7	90.9	1512.7	361.4	1126.4	5249.5	250.8	22320.0
	Value	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	Catch	52.9	2380.2	1448.7	87.4	6522.8	74.5	1155.4	330.1	764.9	4254.9	275.3	17347.0
	Value	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	Catch	62.9	2265.8	1485.6	81.2	6983.3	76.3	1189.1	325.6	841.2	4540.7	234.0	18085.6
	Value	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	Catch	79.8	2231.3	1477.9	87.5	7016.7	83.8	1220.8	331.0	850.1	4737.6	220.6	18337.2
	Value	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	Catch	62.3	2950.3	1861.8	80.4	8429.5	81.5	1432.0	363.3	1083.9	4231.0	284.9	20860.9
	Value	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	Catch	56.4	2570.7	1677.9	78.5	8096.8	73.1	1356.1	310.7	1011.3	5430.8	213.4	20875.6
	Value	41.6	2316.1	1266.6	96.6	5441.3	89.2	1062.0	343.5	527.3	2818.8	291.0	14293.8
Aug-07	Catch	45.8	2136.0	1281.8	71.7	5994.9	64.8	1055.8	283.4	721.7	3892.9	221.0	15769.9
	Value	52.8	2876.2	1502.7	111.4	6412.5	99.8	1240.9	409.7	630.3	3350.4	374.1	17060.7
Feb-08	Catch	42.8	1861.3	1145.3	74.8	5481.2	64.3	989.6	277.2	652.2	3523.2	203.7	14315.5
	Value	58.5	2963.6	1599.0	131.9	7181.2	115.9	1395.3	454.8	687.8	3731.8	400.6	18720.4
Dec-08	Catch	42.8	1861.3	1145.3	74.8	5481.2	64.3	989.6	277.2	652.2	3523.2	203.7	14315.5
	Value	58.5	2963.6	1599.0	131.9	7181.2	115.9	1395.3	454.8	687.8	3731.8	400.6	18720.4
March-10	Catch	94.8	1692.7	1516.6	176.0	4929.0	108.3	1232.3	487.5	866.6	2112.4	325.0	13577.4
	Value	206.7	3692.5	3308.5	384.0	10752.5	236.3	2688.1	1063.4	1890.6	4608.2	709.0	29549.9

8.7 Annual Fish Catches and Value

The annual fish Catch estimates based on the sample month estimates from 2005 to 2010 are in Table 8 and details by district are in Appendix 15.

The overall annual Catch of Nile perch in the Ugandan part of the lake has decreased over the years from 94,903 t in 2005 to 84,969 in 2010; a 10% reduction in 6 years. Despite the reduction in Nile perch catches; the gross revenue from the Catches has almost doubled to around shs 297 billion. The annual Catch estimates for tilapia reduced by 42% from 29,415.0 t in 2005 to 16,971 in 2010 the lowest ever recorded since July 2005 surveys but like for the Nile perch, the gross revenue from the tilapia catches has almost doubled to approximately shs 37 billion. The annual Catch estimate for Mukene of 58,717 t was the lowest ever recorded since July 2005.

Table 8. Estimated Annual catches (tones) and value (Million shs) in 2005 to 2010

	2005		2006		2007		2008		2010	
	Catch (t)	value	Catch (t)	value	Catch (t)	value	Catch (t)	value	Catch (t)	value
Nile perch	94,903	182,810	91,039	175,368	86,655	147,454	80,977	180,855	84,969	297,048
Tilapia	29,415	28,351	27,061	26,141	24,356	25,515	19,557	27,736	16,971	36,926
Mukene	106,400	20,748	95,734	18,668	113,791	19,176	70,001	19,049	58,717	16,147
Other species	7,815	8,176	2,109	1,628	2,685	2,221	2,489	2,922	2,270	4,478
Overall	238,533	240,085	215,943	221,805	227,487	194,366	173,024	230,562	162,929	354,599

9 DISCUSSION

The total catch estimates of Nile perch for the sampled months recorded the lowest catch in February 2008 but had a slight improvement in March 2010 (Table 1). Earlier catch surveys in the Ugandan part of the lake (Muhoozi, 2002) indicated peak Nile perch catches in the November-December period and a higher Nile perch catch estimate would be expected. The tilapia total catches continued to drop and by March 2010, to a level that was less than half of the catches estimated in 2005 (Table 1). The low tilapia and Nile perch catches corresponded with high unit price to the extent that almost double the amount of gross income was still obtained in the two fisheries in 2010 as compared to when the catches were higher in 2005.

The ready market and price incentive is likely to be the main factor keeping fishers in business against declining catches. The annual estimates for between 2005 and 2010 generally indicated a decreasing trend for the Nile perch fisheries with a slight increase in 2010 but still lower than catches recorded 2005 and

2007. These results were consistent with Acoustic Survey of March 2009 which also indicated the lowest biomass of Nile perch of about 345,000 t compared with more than 500,000 t in 2005 and 2006.

The general out concerns of low catches in the fishery and closure of fish processing factories are other indicators of the depletion of the Nile perch and tilapia fisheries.

The Mukene fishery which had shown some stability in catches in the 2005 to 2007 surveys, showed a large decrease in the 2008 and 2010 surveys. Mukene is a short lived fish that is likely to have strong seasonal variations in abundance. Inconsistence in sampling periods could be one of the reasons for the observed erratic changes in catches. The intended quarterly sampling contained in the Standard Operating Procedures for CASs was not closely followed because of funding gaps leading to inconsistent coverage of seasonal variations in catches.

The 2010 Frame survey indicated changes in the fishing effort in Lake Victoria observed 2008 probably as a response of fishers to the status of the Nile perch and tilapia fisheries which declining. Apart from the number of fishers which increased by 10% the increase in the number of fishing crafts was only 2% and the other major fishing gears like hooks and gill nets actually reduced in numbers. However there was a noted increase in the very smaller mesh sizes <2.5 to 3.5 sizes of 94% from 2006 to 2010. The Mukene fishery was the only one where there was substantial expansion of effort indicated by increase of small seines by 16% from 2008 to 2010. Expansion of the Mukene fishery is the likely reason for the increased number of fishers because this fishery is labour intensive engaging three to five persons per boat unlike the two persons used in the Nile perch and Nile tilapia fisheries.

On the other hand, the illegal and most destructive fishing gears, i.e. seines, monofilament gillnets, basket traps and cast nets increased substantially. Illegal monofilament gillnets also increased by 8% between 2008 and 2010. The Nile perch catch rates of boats using long line continued decreasing compared increasing trends in the last four surveys probably due to reduction of hook size. Another factor of the hook fishery that is not sufficiently documented is their impacts on the Nile perch and other fishes during bait collection in the lake using mosquito seines. The impacts of the long line fishery in the Nile perch fishery should be evaluated and the fishery regulated accordingly.

The use of Monofilament gillnets is a major threat in the tilapia fishery where they are most commonly used. They are being preferred by fishers because of their higher efficiency of catching fish than the ordinary multifilament gillnets as the tilapia catches continue to decrease. This trend is likely to rapidly worsen the status of the tilapia fishery if the proliferation of monofilament gillnets continues unabated. The elimination of the rampant use of illegal gears, especially seines and under sized gillnets that capture immature fish and monofilament gillnets should be given priority to reverse the trends of declining catches of Nile perch and tilapia. Other management interventions that would ensure quick recovery of the Nile perch and tilapia fisheries i.e. closed seasons/areas, regulation and reduction of the fishing effort targeting the species should be considered.

The Mukene fishery in the Ugandan waters of Lake Victoria remained a near shore fishery in which paddle Sesse boats using small seines or scoop nets were the dominant craft. Development of this fishery in the offshore waters, with the more efficient fishing methods suitable for open waters, remains an option to be explored to further increase the catches of Mukene beyond the current levels. Trials of the lift net and paired boat (catamaran) technology, which is prominent in the Tanzanian part of the lake, are being conducted around Ssesse Islands by some fishers under support of the FAO funded project under the Department of Fisheries Resources, Entebbe. The policy on the exploitation of the sustainable exploitation the light fishery is also being developed under the same project. The successful results of these trials might result in transformation of this fishery in the Ugandan waters of Lake Victoria.

10 CONCLUSIONS AND RECOMMENDATIONS

Catch Assessment Surveys provide a realistic indication of the status of the fisheries in relation to catch, value of the catch, number of fishers, type and quantities of fish crafts and gears in use in a particular period. Trends in these factors tend to vary and quarterly assessments (i.e. every three months) provide early signals in the direction of the fisheries and what measure may be taken, enhanced or activated upon in the March 2010.

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 former districts 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
	Ziiru (Kibulwe)

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
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Appendix 2. Distribution of fish landing sites selected and sampled in Catch Assessment surveys in the current districts Ugandan waters of Lake Victoria.

District	Landing site
Namayingo	Golofa
	Butanila 'B'
	Mwango
	Hama 'B'
	Maruba
	Bumeru 'A'
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
	Kitufu
	Kigungu
	Kasenyi
Buvuma	Bukaali
	Ziiru (Kibulwe)
	Zinga

District	Landing site
Buvuma	Luwero
	Lufu
	Namugombe
	Gunda
	Kiruguma
	Kaziru
	Nyenda
	Malija-Wabuziba
	Kisu
Mukono	Maala
	Kawafu
	Kimmi
	Kachanga-Bulago
	Namugambe
	Kinaggaba
	Nantwalantya
Buikwe	Kalega
	Buwagajjo
	Kiyindi
	Nambula
Mpigi	Nakaziba
	Nabisukiro
Kalangala	Banda
	Kakyanga
	Kasenyi
	Luku-Nabisukiro
	Mweena
	Kyagalanyi
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Appendix 3. Fish Catch rates (kg boat^{-1} day^{-1}) in the Ugandan part of Lake Victoria presented by effort group (Vessel-gear type) and species for March 2010 (Boat days = number of times the vessel-gear type was sampled after a fishing trip of one day)

VG TYPE	Boat days	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±
Paracute																	
PA-GN	356	1.5	0.3	8.7	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
PA-LL	17	15.4	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	1.8	0.0	0.0	0.0	0.0
PA-HL	85	4.0	1.0	6.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PA-CN	60	0.7	0.4	10.8	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PA-TR	61	0.0	0.0	10.7	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PA-BS	10	14.9	4.1	2.1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PA-OT	11	0.0	0.0	2.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Sesse Paddle																	
SP-GN	738	9.2	0.6	6.3	0.4	0.0	0.0	0.0	0.0	0.1	0.0	0.4	0.1	0.1	0.0	0.3	0.1
SP-LL	336	23.1	1.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.3	0.1	0.0	0.0	0.0
SP-SS	253	0.0	0.0	0.0	0.0	129.1	16.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SP-SN	3	0.0	0.0	0.0	0.0	47.5	14.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SP-HL	229	7.6	1.0	3.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1
SP-CN	69	0.8	0.3	8.9	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SP-BS	190	25.9	2.0	3.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.2	0.1	0.0	0.0
SP-OT	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.1	-	-
Sesse Motor/Sail																	
SMS-BS	1	43.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-
SMS-GN	826	26.6	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
SMS-LL	391	35.0	1.9	0.7	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0
SMS-HL	21	24.2	7.7	0.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3
SMS-SS	4	0.0	0.0	0.0	0.0	253.0	106.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SMS-OT	0	56.0	14.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Craft																	
OT-GN	2	0.0	0.0	6.3	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
OT-HL	13	0.0	0.0	5.3	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 4. Estimated Monthly fish landed in the Ugandan part of Lake Victoria presented by effort group (Vessel-gear type) and species for March 2010.

VG TYPE	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	TOTAL	±
PARACUTE																		
PA-GN	60.1	12.9	357.8	21.2	0.0	0.0	0.0	0.0	0.0	0.0	4.4	2.3	0.9	0.4	0.1	0.1	423.2	36.9
PA-LL	64.3	16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.2	7.6	0.0	0.0	0.0	0.0	81.5	24.1
PA-HL	93.8	23.0	150.8	22.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	244.8	45.7
PA-CN	6.4	3.9	96.8	10.7	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	103.3	14.8
PA-TR	0.0	0.0	29.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0	3.1
PA-BS	36.1	10.0	5.1	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.2	12.5
SESSE PADDLE																		
SP-GN	642.9	41.9	440.9	28.2	0.0	0.0	0.0	0.0	7.1	2.0	25.8	4.3	6.4	1.4	23.7	3.8	1146.9	81.6
SP-LL	1005.4	53.0	11.7	5.4	0.0	0.0	0.0	0.0	1.9	1.0	53.0	11.9	2.4	0.9	0.3	0.3	1074.7	72.4
SP-SS	0.0	0.0	0.0	0.0	4065.8	528.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4065.8	528.9
SP-SN	0.0	0.0	0.0	0.0	631.9	194.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	631.9	194.9
SP-HL	185.5	24.3	89.1	18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	1.8	281.5	44.7
SP-CN	5.8	2.3	63.3	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	69.1	11.0
SP-TR	0.0	0.0	7.6	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.0	8.0	1.3
SP-BS	787.9	60.2	100.8	24.9	0.0	0.0	0.0	0.0	0.0	0.0	9.5	3.0	5.3	2.1	1.4	1.1	904.9	91.2
SP-OT	-	-	-	-	-	-	-	-	-	-	-	-	1.7	0.6	-	-	1.7	0.6
SESSE MOTOR/SAIL																		
SMS-BS	1231.1	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	1231.1	0.0
SMS-GN	1514.2	57.0	12.6	2.6	0.0	0.0	0.0	0.0	0.8	0.6	2.1	1.0	6.9	2.2	1.0	0.8	1537.6	64.2
SMS-LL	1249.6	66.2	26.2	10.6	0.0	0.0	0.0	0.0	2.7	1.9	0.0	0.0	4.1	1.6	0.0	0.0	1282.6	80.3
SMS-HL	197.8	62.6	4.7	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	2.1	205.4	68.1
SMS-SS	0.0	0.0	0.0	0.0	159.1	67.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	159.1	67.1
OTHER CRAFT																		
OT-GN	0.0	0.0	8.2	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.2	4.3
OT-HL	0.0	0.0	9.5	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.5	1.6
Grand Total	**7080.8**	**433.8**	**1414.3**	**169.4**	**4856.9**	**790.9**	**0.1**	**0.1**	**12.5**	**5.5**	**112.2**	**30.3**	**27.9**	**9.4**	**36.5**	**10.0**	**13541.2**	**1449.4**

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

Appendix 5. Estimated fish landed 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**
	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, + = Standard Error

Appendix 6. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for August 2005.

	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	**Total**	±
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**
	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*, CA= *Clarias*, OT=Other spp, + = Standard Error

Appendix 7. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for September 2005

±	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	**Total**	±
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**
	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, + = Standard Error

Appendix 8. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for November 2005

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	**Total**	±
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**
	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*, CA= *Clarias*, OT=Other spp, + = Standard Error

Appendix 9. Estimated fish landed 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**
	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*, CA= *Clarias*, OT=Other spp, + = Standard Error

Appendix 10. **Estimated fish landed 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**
	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*, CA= *Clarias*, OT=Other spp, + = Standard Error

Appendix 11. **Estimated fish landed 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**
	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=Nileperch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=Bagrus, PA=*Protopterus*, CG=*Clarias*, OT=Other spp

Appendix 12. Estimated fish landed 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**
	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*, CA= *Clarias*, OT=Other spp, + = Standard Error

Appendix 13. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for August 2007

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	**Total**	±
Busia	19.2	3.6	10.5	4.1	15.4	1.6	0.1	0.1	0.0	0.0	0.3	0.2	0.1	0.1	0.3	0.2	**45.8**	**9.8**
Bugiri	1,349.2	151.3	162.7	30.2	602.0	60.8	1.7	2.6	2.3	2.4	11.9	9.8	2.3	1.9	3.9	2.5	**2,136.0**	**261.6**
Mayuge	615.8	83.4	188.5	36.0	457.8	48.5	1.5	2.3	0.9	1.1	11.6	8.4	2.7	2.4	3.0	2.0	**1,281.8**	**184.2**
Jinja	42.9	7.3	22.6	4.0	3.2	1.5	0.2	0.3	0.0	0.0	1.6	0.9	0.3	0.3	0.9	0.5	**71.7**	**14.7**
Mukono	2,689.4	310.7	569.6	126.2	2,626.5	358.9	3.9	6.2	3.0	2.9	69.8	43.1	12.4	10.2	20.4	13.5	**5,994.9**	**871.7**
Kampala	42.2	5.6	14.1	2.9	6.1	0.6	0.0	0.0	0.0	0.0	1.4	0.8	0.4	0.3	0.6	0.3	**64.8**	**10.7**
Wakiso	470.0	60.0	216.3	30.7	347.6	43.2	0.6	1.0	0.6	0.5	13.4	8.6	3.0	2.5	4.1	2.6	**1,055.8**	**149.1**
Mpigi	139.1	18.5	112.8	14.3	24.6	2.5	0.2	0.4	0.2	0.2	3.3	2.2	1.1	0.9	2.0	1.0	**283.4**	**39.9**
Masaka	163.9	20.3	195.4	23.8	356.6	40.6	0.7	1.1	0.3	0.3	2.6	1.8	1.3	0.9	0.9	0.5	**721.7**	**89.4**
Kalangala	1,257.7	131.5	381.8	56.0	2,211.1	711.4	1.4	2.2	1.4	1.2	25.1	15.7	5.6	4.4	8.9	5.3	**3,892.9**	**927.8**
Rakai	176.0	15.2	33.8	4.2	9.2	0.9	0.0	0.1	0.2	0.2	0.8	0.6	0.3	0.2	0.7	0.3	**221.0**	**21.7**
	6,965.4	**807.3**	**1,908.0**	**332.4**	**6,660.1**	**1,270.6**	**10.4**	**16.3**	**9.0**	**8.9**	**141.7**	**92.0**	**29.4**	**24.2**	**45.8**	**28.9**	**15,769.9**	**2,580.6**

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

Appendix 14. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for February 2008

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	**Total**	±
Busia	18.3	3.5	10.7	9.0	12.8	1.5	0.1	0.1	0.0	0.0	0.4	0.3	0.1	0.1	0.3	0.1	**42.8**	**14.6**
Bugiri	1,170.4	170.1	166.6	36.0	500.4	57.6	1.6	2.2	0.5	0.7	12.9	7.1	3.2	2.5	5.6	3.2	**1,861.3**	**279.6**
Mayuge	562.6	87.2	180.3	43.5	380.7	44.2	1.6	2.3	0.3	0.4	12.9	7.3	3.0	2.3	3.8	1.9	**1,145.3**	**189.0**
Jinja	43.0	6.9	25.7	5.5	2.7	0.5	0.2	0.3	0.1	0.1	1.9	1.1	0.5	0.3	0.8	0.3	**74.8**	**14.9**
Mukono	2,589.3	337.7	567.8	177.3	2,190.5	264.6	6.2	7.5	2.1	2.6	79.5	42.5	18.6	13.3	27.3	12.1	**5,481.2**	**857.6**
Kampala	42.5	5.4	13.7	2.8	5.1	0.6	0.2	0.2	0.0	0.0	1.7	0.9	0.5	0.3	0.6	0.3	**64.3**	**10.5**
Wakiso	461.9	69.0	210.7	36.5	289.6	34.4	1.2	1.4	0.4	0.5	16.7	9.3	3.8	3.0	5.2	2.3	**989.6**	**156.3**
Mpigi	134.4	19.2	111.3	19.4	20.4	2.4	0.6	0.6	0.1	0.1	5.1	2.8	1.7	1.2	3.6	1.3	**277.2**	**47.0**
Masaka	169.1	28.4	178.9	29.0	296.8	34.8	0.7	1.0	0.1	0.1	4.1	2.5	1.1	0.9	1.4	0.7	**652.2**	**97.3**
Kalangala	1,218.3	150.6	370.1	60.9	1,875.6	280.2	4.6	6.9	0.9	1.1	30.8	16.5	8.3	5.9	14.5	6.4	**3,523.2**	**528.4**
Rakai	159.3	16.5	33.4	4.7	7.7	0.9	0.2	0.2	0.1	0.1	1.3	0.7	0.5	0.4	1.3	0.7	**203.7**	**24.2**
	6,569.0	**894.6**	**1,869.2**	**424.6**	**5,582.4**	**721.6**	**17.1**	**22.7**	**4.7**	**5.7**	**167.4**	**90.8**	**41.3**	**30.2**	**64.5**	**29.3**	**14,315.5**	**2,219.5**

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

Appendix 15. **Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for December 2008**

District	NP	±	TL	±	DA	±	HA	±	BD	±	PA	±	CG	±	OT	±	**Total**	±
Busia	20.8	3.8	18.2	8.5	9.6	1.4	0.1	0.2	0.0	0.0	0.4	0.3	0.1	0.1	0.3	0.2	**49.6**	**14.5**
Bugiri	1,286.1	164.0	176.1	41.8	864.6	87.2	0.3	0.8	0.2	0.3	9.2	7.7	1.6	2.0	2.4	1.4	**2,340.6**	**305.2**
Mayuge	593.5	92.4	145.4	64.3	531.2	53.1	0.2	0.5	0.2	0.3	9.2	7.3	1.4	1.7	1.9	1.1	**1,283.1**	**220.8**
Jinja	42.1	9.0	34.5	8.9	-	-	0.0	0.1	0.0	0.1	0.9	0.7	0.2	0.3	0.4	0.2	**78.1**	**19.3**
Mukono	2,633.5	351.7	377.4	123.7	2,038.9	267.2	1.2	3.6	0.6	0.8	30.6	22.7	5.8	6.8	7.6	4.5	**5,095.6**	**781.1**
Kampala	44.2	7.2	11.4	3.3	2.8	0.3	0.0	0.0	0.0	0.0	0.6	0.5	0.1	0.1	0.3	0.2	**59.4**	**11.6**
Wakiso	448.5	73.1	191.5	54.5	243.5	25.4	0.2	0.4	0.2	0.2	8.5	6.7	1.1	1.3	1.6	1.0	**895.0**	**162.5**
Mpigi	175.6	29.0	79.2	14.5	62.6	8.0	0.1	0.3	0.1	0.2	3.2	2.4	0.4	0.5	1.2	0.7	**322.6**	**55.7**
Masaka	274.5	42.6	110.3	22.9	518.1	94.4	0.1	0.5	0.1	0.2	3.7	3.0	0.4	0.5	0.9	0.7	**908.2**	**164.9**
Kalangala	1,215.7	150.7	217.3	51.0	1,813.1	421.9	0.4	0.9	0.3	0.5	12.4	9.6	2.2	2.5	3.7	2.0	**3,265.2**	**639.1**
Rakai	192.5	22.9	29.0	6.8	-	-	0.1	0.1	0.0	0.0	2.1	1.7	0.2	0.2	0.5	0.3	**224.3**	**32.1**
	6,927.1	**946.3**	**1,390.2**	**400.4**	**6,084.4**	**959.0**	**2.9**	**7.5**	**1.9**	**2.6**	**80.8**	**62.7**	**13.4**	**16.2**	**21.0**	**12.2**	**14,521.7**	**2,406.8**

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

Appendix 16. Estimated fish landed in the Ugandan part of Lake Victoria presented by district and species for March 2010

	NP .	±	TL .	±	DA .	±	HA .	±	BD .	±	PA .	±	CG .	±	OT .	±	Total	±
Busia	49.6	3.0	9.9	1.2	34.0	5.5	0.0	0.0	0.1	0.0	0.8	0.2	0.2	0.1	0.3	0.1	**94.8**	10.1
Bugiri	885.1	54.2	176.8	21.2	607.1	98.9	0.0	0.0	1.6	0.7	14.0	3.8	3.5	1.2	4.6	1.3	**1692.7**	181.2
Mayuge	793.1	48.6	158.4	19.0	544.0	88.6	0.0	0.0	1.4	0.6	12.6	3.4	3.1	1.0	4.1	1.1	**1516.6**	162.3
Jinja	92.1	5.6	18.4	2.2	63.1	10.3	0.0	0.0	0.2	0.1	1.5	0.4	0.4	0.1	0.5	0.1	**176.0**	18.8
Mukono	2577.4	157.9	514.8	61.7	1767.9	287.9	0.1	0.1	4.6	2.0	40.8	11.0	10.1	3.4	13.3	3.6	**4929.0**	527.6
Kampala	56.6	3.5	11.3	1.4	38.9	6.3	0.0	0.0	0.1	0.0	0.9	0.2	0.2	0.1	0.3	0.1	**108.3**	11.6
Wakiso	644.4	39.5	128.7	15.4	442.0	72.0	0.0	0.0	1.1	0.5	10.2	2.8	2.5	0.9	3.3	0.9	**1232.3**	131.9
Mpigi	254.9	15.6	50.9	6.1	174.8	28.5	0.0	0.0	0.5	0.2	4.0	1.1	1.0	0.3	1.3	0.4	**487.5**	52.2
Masaka	453.2	27.8	90.5	10.8	310.8	50.6	0.0	0.0	0.8	0.4	7.2	1.9	1.8	0.6	2.3	0.6	**866.6**	92.8
Kalangala	1104.6	67.7	220.6	26.4	757.7	123.4	0.0	0.0	2.0	0.9	17.5	4.7	4.3	1.5	5.7	1.6	**2112.4**	226.1
Rakai	169.9	10.4	33.9	4.1	116.6	19.0	0.0	0.0	0.3	0.1	2.7	0.7	0.7	0.2	0.9	0.2	**325.0**	34.8
Arrow Aquaculture	-	-	-	-	36.2	-	-	-	-	-	-	-	-	-	-	-	**36.2**	**-**
Total	**7080.8**	**433.8**	**1414.3**	**169.4**	**4893.1**	**790.9**	**0.1**	**0.1**	**12.5**	**5.5**	**112.2**	**30.3**	**27.9**	**9.4**	**36.5**	**10.0**	**13577.4**	**1449.4**

Abbreviations: NP=Nile perch, TL=Tilapiines, DA=Mukene/Dagaa, HA=Haplochromines, BD=*Bagrus*, PA= *Protopterus*, CA= *Clarias*, T=Other spp, + = Standard Error

Appendix 17. Estimated annual fish catches in the Ugandan part of Lake Victoria presented by district and species for 2006 to 2010

(a) Nile perch

	2006		2007		2008		2010	
DISTRICT	Catch	Value	Catch	Value	Catch	Value	Catch	Value
Busia	396.0	762.7	227.7	388.5	234.9	524.70	594.8	2,079.3
Bugiri	15,666.4	30,178.0	16,411.8	27,962.0	14,739.3	32,923.92	10621.3	37,130.9
Mayuge	8,145.8	15,691.1	7,737.9	13,159.6	6,936.7	15,492.67	9516.6	33,269.3
Jinja	578.8	1,114.9	505.3	862.6	510.2	1,139.26	1104.6	3,861.6
Mukono	35,852.5	69,062.3	33,550.4	57,081.1	31,337.0	69,979.81	30929.1	108,125.3
Kampala	632.9	1,219.1	546.4	927.8	519.8	1,160.92	679.8	2376.4
Wakiso	6,297.8	12,131.3	5,842.0	9,941.3	5,462.53	12,196.53	7732.3	27,031.3
Mpigi	1,954.1	3,764.2	1,766.4	3,002.3	1,859.97	4,157.28	3058.9	10,693.7
Masaka	2,387.3	4,598.7	2,121.1	3,601.5	2,661.75	5,953.80	5438.1	19,011.0
Kalangala	16,912.7	32,578.8	15,771.7	26,825.5	14,603.90	32,610.27	13255.3	46,339.4
Rakai	2,214.9	4,266.5	2,174.5	3,701.6	2,110.59	4,716.13	2039.3	7,129.1
	91,039.1	175,367.7	86,655.3	147,453.8	80,976.67	180,855.29	84970.1	297,047.5

(b) Tilapia

	2006		2007		2008		2010	
DISTRICT	Catch	Value	Catch	Value	Catch	Value	Catch	Value
Busia	166.8	161.1	127.1	133.8	173.1	258.6	118.8	258.5
Bugiri	2,807.6	2,712.1	2,276.2	2,366.0	2,056.4	2,983.0	2,121.4	4,615.7
Mayuge	2,794.6	2,699.6	2,491.3	2,601.9	1,954.0	2,785.8	1,900.8	4135.7
Jinja	375.3	362.5	333.7	345.5	361.5	532.4	220.6	480.0
Mukono	8,290.7	8,008.8	7,126.8	7,479.3	5,671.0	7,985.5	6,177.5	13440.9
Kampala	205.0	198.0	175.7	184.4	150.8	215.3	1,355.8	295.4
Wakiso	2,825.7	2,729.6	2,774.6	2,905.4	2,413.0	3,466.6	1,544.4	3360.2
Mpigi	1,536.5	1,484.3	1,425.9	1,495.1	1,143.5	1,617.2	2011.0	1329.3
Masaka	2,345.6	2,265.8	2,392.9	2,516.2	1,735.3	2,432.1	1088.1	2363.2
Kalangala	5,235.2	5,057.2	4,798.3	5,033.7	3,523.9	4,923.8	2647.5	5760.4
Rakai	478.5	462.2	433.0	453.5	374.0	535.8	407.3	886.2
	27,061.4	26,141.3	24,355.6	25,514.8	19,556.6	27,736.0	16971.1	36925.7

(c) Mukene

	2006		2007		2008		2010	
DISTRICT	Catch	Value	Catch	Value	Catch	Value	Catch	Value
Busia	219.7	42.8	282.2	47.7	134.4	36.5	408.0	112.2
Bugiri	8,697.5	1,696.0	11,090.9	1,875.3	8,190.5	2,234.4	7285.4	2003.5
Mayuge	6,563.0	1,279.8	8,447.7	1,426.3	5,471.7	1,491.0	6527.7	1795.1
Jinja	47.2	9.2	47.3	7.8	16.2	4.4	757.7	208.4
Mukono	37,624.8	7,336.8	46,851.3	7,921.2	25,376.2	6,899.6	21215.0	5834.1
Kampala	88.4	17.2	116.4	19.7	47.2	12.8	466.3	128.2
Wakiso	4,979.2	970.9	6,274.6	1,061.4	3,198.7	869.2	5303.7	1458.5
Mpigi	358.3	69.9	474.1	79.4	497.9	136.2	2098.2	577.0
Masaka	5,089.5	992.4	6,453.3	1,092.2	4,889.4	1,333.9	3730.1	1025.8
Kalangala	31,920.0	6,224.4	33,581.2	5,615.6	22,132.4	6,018.9	9092.1	2500.3
Rakai	146.5	28.6	172.2	29.0	46.0	12.4	1398.8	384.7
Arrow Aquaculture	-	-	-	-	-	-	434.4	119.5
	95,734.1	18,668.1	113,791.3	19,175.6	70,000.5	19,049.2	58717.3	16147.3

(d) Other fish species

	2006		2007		2008		2010	
DISTRICT	Catch	Value	Catch	Value	Catch	Value	Catch	Value
Busia	18.2	11.4	9.8	8.0	11.6	14.4	15.9	31.3
Bugiri	206.1	155.1	252.2	210.6	225.2	273.6	283.9	559.8
Mayuge	178.1	136.3	227.5	190.8	207.6	255.2	254.3	501.6
Jinja	19.7	14.6	30.6	25.2	29.9	35.1	29.5	58.2
Mukono	800.3	604.0	1,172.5	968.6	1,076.4	1,245.4	826.6	1630.0
Kampala	17.9	13.3	26.6	21.8	24.4	28.0	18.2	35.8
Wakiso	208.4	163.9	257.9	212.5	232.9	276.0	206.6	407.5
Mpigi	96.0	74.4	96.6	78.8	97.3	113.8	81.8	161.2
Masaka	83.4	65.1	83.2	70.8	76.5	95.3	145.3	286.6
Kalangala	449.2	366.5	498.6	409.5	469.8	537.8	354.3	698.6
Rakai	31.7	23.3	30.0	24.2	37.6	47.2	54.5	107.5
	2,109.0	1,627.9	2,685.5	2,221.0	2,489.3	2,921.6	2270.9	4478.1

(e) All fish species pooled

	2006		2007		2008		2010	
DISTRICT	Catch	Value	Catch	Value	Catch	Value	Catch	Value
Busia	800.6	978.1	646.9	578.1	554.0	834.2	1137.5	2481.4
Bugiri	27,377.6	34,741.3	30,031.1	32,413.9	25,211.3	38,414.9	20311.9	44309.9
Mayuge	17,681.5	19,806.8	18,904.3	17,378.6	14,570.1	20,024.6	18199.4	39701.7
Jinja	1,021.0	1,501.2	917.0	1,241.1	917.9	1,711.1	2112.4	4608.2
Mukono	82,568.3	85,011.9	88,701.1	73,450.3	63,460.7	86,110.3	59148.2	129030.4
Kampala	944.1	1,447.6	865.1	1,153.7	742.2	1,417.1	1300.0	2835.8
Wakiso	14,311.0	15,995.8	15,149.1	14,120.7	11,307.1	16,808.3	14787.0	32257.6
Mpigi	3,945.0	5,392.8	3,763.1	4,655.6	3,598.7	6,024.5	5849.8	12761.2
Masaka	9,905.8	7,922.0	11,050.5	7,280.7	9,362.9	9,815.1	10399.7	22686.7
Kalangala	54,517.2	44,226.9	54,649.8	37,884.3	40,730.0	44,090.7	25349.2	55298.7
Rakai	2,871.6	4,780.6	2,809.7	4,208.3	2,568.1	5,311.4	3899.9	8507.5
Arrow Aquaculture							4334.4	119.5
	215,943.6	221,805.1	227,487.7	194,365.2	173,023.1	230,562.1	162929.3	354598.6