National report of the frame survey 2010 on the Uganda side of Lake Victoria

THE REPUBLIC OF UGANDA

DEPARTMENT OF FISHERIES RESOURCES (DFR)
ENTEBBE, UGANDA.

MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES

NATIONAL REPORT OF THE FRAME SURVEY 2010 ON THE UGANDA SIDE OF LAKE VICTORIA

PREPARED BY THE FRAME SURVEY NATIONAL WORKING GROUP

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS

BMUs	Beach Management Units
CAS	Catch Assessment Surveys
DFR	Department of Fisheries Resources
DFO	District Fisheries Officer
EAC	East African Community
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FO/A	Fisheries Officer/Assistant
FS	Frame Survey
GEF	Global Environmental Facility
IFMP	Implementation of a Fisheries Management Plan Project
LVEMP	Lake Victoria Environmental Management Project
LVEMP II	Lake Victoria Environmental Management Project, Phase II
LVFO	Lake Victoria Fisheries Organization
LVFRP	Lake Victoria Fisheries Research Project
NaFIRRI	National Fisheries Resources Research Institute
NWGs	National Working Groups
RWGs	Regional Working Groups
SOPs	Standard Operating Procedures
UNDP	United Nations Development Programme

ACKNOWLEDGEMENT

This is a report on the results of the Frame Survey conducted in the Uganda side of Lake Victoria during August 2010 by the LVFO Institutions, namely: the Department of Fisheries Resources (DFR) Uganda and the National Fisheries Resources Research Institute (NaFIRRI) in close collaboration with the District Fisheries offices of Busia, Bugiri, Mayuge, Jinja, Mukono, Kampala, Wakiso, Mpigi, Masaka, Kalangala and Rakai. The authors are grateful to the LVEMP II, for providing funds for the survey and the LVFO secretariat coordination. The institutions appreciate the contribution of the local governments especially at district, sub-county levels and fisher communities through Beach Management Units (BMUs) in mobilization, publicity, enumeration and provision of information.

EXECUTIVE SUMMARY

Fisheries Frame surveys have been carried out on Lake Victoria biannually since 2000 to determine the number of fishers, fish landing sites, and facilities at the landing sites, as well as the composition of fishing crafts, their mode of propulsion, fishing gears and the fish species they target. This information is used to guide development and management of the lake's fisheries.

Following the reorganisation of landing sites into Beach Management Units (BMUs), the number of landing sites decreased from 597 in 2000 to 435 in 2008. The survey in 2010 showed an increase to 503 landing sites, an indication that new landing sites are coming up. The fish landing sites continue to have inadequate facilities such as fish shades, cold rooms to service the fisheries industry and very few (5%) have access to electricity and 32% had access to all weather roads. There has been some progressive improvement in the landing site coverage of basic hygiene and sanitation facilities, especially public toilet facilities from 17% in 2000 to 39% in 2010; and portable water from 4% to 17% respectively. However more effort is required to cover all landing sites. Most landing sites (83%) have access to mobile phone networks which eases communication. 46% of landing sites had access to a Health clinic and 64% had a Primary school within a radius of 2 km.

In the 2010 Frame survey some indicators of fishing effort including. number of fishers, fishing crafts increased; whereas others like the number of gillnets showed a decrease of 21.6% since the peak in 2006 to 2010. The other indicators of fishing effort, which showed decrease in 2010 included the number long line hooks, illegal beach seines and undersized gillnets (<5 inch mesh size). However, a large proportion (45%) of long line hooks recorded in the 2010 survey were in the smallest size range (hook size >10), which target small Nile perch. The number of other illegal gears, i.e. cast nets and monofilament gillnets showed modest increases (<10%) between 2008 and 2010. Recent crackdown on illegal fishing activities as part of measures for recovery of the Nile perch stocks which are faced with depletion appear to have had an impact but much more needs to be done to eradicate illegal fishing.

The fisheries in the Ugandan waters have remained predominantly near shore with 70% of all fishing crafts using paddles out of which 32.7% were tiny three plank, flat bottomed boats locally known as parachutes. The 2010 survey shows a further reduction in the number of fishing crafts using sails from 1,078 in 2008 to 682 in 2010. This is a reverse of what should be encouraged because by adopting sails fishers would be accessing distant fishing grounds using free wind power.

The Mukene fishery in the Ugandan waters of Lake Victoria remained underdeveloped comprising only 11.5% of all fishing crafts, only 1% of which were operated with either sails or motor which implies that the fishery was limited to near shore waters. The Catamarans (paired boats) encountered in 2008 using

lift nets to access the deep waters at Gerenge landing site near Entebbe, where the technology was being piloted by a private investor stopped. When the Tanzanian fishers who were operating the units left, the Ugandan fishers were not interested in taking over. Adoption of this technology was expected to boost the Mukene fishery in the Ugandan waters.

1. INTRODUCTION

1.1 Background

Lake Victoria is the second largest freshwater body in the World with a surface area of 68,800 km^2 of which 35,088 km^2 (51%) is in Tanzania, 29,584 km^2 (43%) is in Uganda, and 4,128 km^2 (6%) is in Kenya. It has a shoreline length of 3,450 km of which 550 km (16%) is in Kenya, 1,150 km (33%) in Tanzania, and 1,750 km (51%) in Uganda. The lake has a catchment area of 194,200 km^2 with a rapidly growing population estimated at over 30 million people. The lake is very important to the economies of the East African Community (EAC) Partner States. It is among the most productive fisheries in Africa, yielding approximately 1,000,000 tons of fish annually.

Frame Surveys are used to generate important information required both for management planning purposes and providing the sampling frame for secondary surveys. Frame Surveys involve direct and complete enumeration of all fish landing sites on a regular or *ad hoc* basis. The information recorded in the Frame Survey is used to identify primary and secondary sampling sites, and appropriate sampling strata for the Catch Assessment Surveys (CASs). Information relating to the total numbers of sampling units (crafts belonging to each craft-gear category) is used to raise sampled catch rates in CAS estimates of total catches.

The three East African Community (EAC) Partner States conducted Frame Surveys on Lake Victoria individually from the 1970s until 2000 when the first Lake wide harmonised survey was carried out. In Uganda, Frame Surveys were conducted on Lake Victoria in 1970, 1971, 1972 and 1988 (Frielink, 1989; Tumwebaze and Coenen, 1991). These four surveys included aerial counts of fishing crafts supported by on-water coverage checks for purposes of providing the estimate of the entire frame (Graham, 1970; Dhatemwa and Walker, 1972; Wetherall, 1972). In 1988 an on land survey was carried out but had a number of weaknesses and the results had to be applied with caution (Frielink, 1989). In 1990, the Uganda Fisheries Department supported by the FAO/UNDP Project (UGA/87/007) carried out a comprehensive Frame Survey in the Ugandan waters of the lake using the land and water approach (Tumwebaze & Coenen, 1991).

The first lake wide Frame Survey in all the three partner states was conducted on Lake Victoria in March, 2000 with the support of the GEF/World Bank funded Lake Victoria Environmental Management Project (LVEMP) and the EU funded Lake Victoria Fisheries Research Project Phase II (LVFRP II). The second regional Frame Survey was carried out in April, 2002; the third in April, 2004 also with funds from LVEMP. The fourth and fifth Regional Frame surveys were conducted with funds provided by the EU through the Implementation of a Fisheries Management Plan (IFMP) project under the Lake Victoria Fisheries Organization (LVFO) on 30th March -1st April 2006 and 17th-20th March 2008 respectively. The sixth Frame survey in 2010 was conducted on 16th -19th August

2010 in all Lake Victoria Partner states supported by GEF Funds under LVEMP II. All the six lake wide Frame Surveys so far conducted were coordinated by the LVFO Secretariat.

1.2. Objectives of the Frame Surveys

The overall objective of the Frame Surveys is to provide information on the facilities and services at landing sites; composition, magnitude and distribution of fishing effort to guide development and management of the fisheries resources of Lake Victoria.

The specific objectives are to provide information on:

a) The number of fish landing sites;
b) The facilities available at the fish landing sites to service the sector including primary schools, health clinics accessibility, road and telephone network;
c) The service providers, especially fisheries staff and Beach Management Units (BMUs) at the fish landing sites and HIV/AIDs related services;
d) The number of fishers;
e) The number and types of fishing crafts and their mode of propulsion;
f) The number, types and sizes of fishing gears used on the lake and their mode of operation.

1.3. Key Questions

The key management questions which the Frame Surveys seeks to answer include:

a) Are the number of landing sites and fishing crafts increasing or decreasing?
b) Are the numbers of fishers increasing or decreasing?
c) Are the types of gillnets and their mesh sizes changing?
d) Is the number of illegal fishing gears increasing or decreasing?
e) Are the facilities on the landing sites changing (toilets, banda, electricity, potable waters, cold rooms, fish stores, accessibility to all weather roads, designated net and boat repair facilities, and pantoons/jetties)?
f) Are basic health services including HIV/AIDs related services and primary education accessible to the fisher communities?
g) Are service providers adequate (Fisheries staff and BMUs)?
h) What is the situation of fishing crafts propulsion?

1.4. Expected Outputs

The outputs expected from the Frame Surveys are:

a) Information on the number of fish landing sites on the lake;
b) Information on the facilities available at the fish landing sites to service the fisheries sector including those landing sites that can be accessed by all weather roads;

c) Information on the status of basic service delivery to the fisher communities;
d) Information on the number of fishers and how the number changed since the last surveys;
e) Information on the number and types of fishing crafts and how the number changed since the previous Frame Surveys;
f) Information on the modes of propulsion of the fishing craft to provide an insight on how far the vessels can fish;
g) Information on the number, types and sizes of fishing gears especially the number of illegal fishing gears in the fishery;
h) Indicators of the impact of management measures e.g. enforcement of the legal fishing gears and methods;
i) Recommendations on development and management of the Lake Victoria fisheries.

2. METHODOLOGY

2.1. Preparation for the Frame Survey

Frame Surveys have been conducted bi-annually on Lake Victoria from 2000 to 2010 under the coordination of LVFO. The planning of the FS 2010 started at the Regional level with a RWG harmonisation meeting, which was followed by planning and implementation by the National Working Group (NWG) on Frame Surveys. At the National level, the planning and implementation of the FS 2010 involved the following steps:

a) Convening of the NWG/DFO review/planning meeting, which Identified Supervisors, Enumerators, adjusted budgets and suggested the required Inputs;
b) Procurement of inputs, Publicity and printing of materials. Under publicity, awareness programmes among all stakeholders were carried out before the start of the survey. This involved preparation and distribution of posters and radio programmes;
c) Convening of a Trainers of Trainers workshop, which involved all supervisors at district and sub-county levels (i.e. DFOs and Sub-county FO/As) of the riparian districts and sub-counties; to plan the actual survey and review national work-plan and budget, questionnaire forms, training manuals, and Standard Operating Procedures (SOPs);
d) Training of Enumerators, was carried out at the Sub-county level by DFOs and FO/As;
e) Implementation of the Frame Survey followed.

The above activities at the national level were coordinated by the Department of Fisheries Resources (DFR) assisted by the National Fisheries Resources Research Institute (NaFFIRI).

2.2. Conducting the Frame Survey

Before conducting the survey, supervisors and enumerators were identified during the NWG Planning meeting. Most enumerators were selected from BMUs. The survey was BMU based such that at least one enumerator was selected from each BMU. A one-day training session was conducted for the field supervisors. In every sub-county, another training session for enumerators was carried out during the week preceding the Survey, using standard field guides developed from the Frame survey SOPs.

The logistics for the survey were organised by the DFR and the NWG. There were senior supervisors at the district/county headquarters. Members of the Frame Survey NWG were in charge of areas within a district or portion of the district e.g. a set of islands. Supervisors were located at the lower administrative units i.e. the sub-county or the division in municipalities. Each supervisor was in charge of several enumerators, of which the numbers were proportional to the number of BMUs in the administrative zone.

In the financial year starting July 2010, three new districts became operational on the Uganda side of the lake. The new districts included Bwikwe and Buvuma curved off from Mukono district and Namayingo cut off from Bugiri district. If data capture and reporting were to include the new districts, their administrative structures from sub-county, to parish, village, BMUs and landing sites would have to be captured into the EAFish information system of LVFO. The latter would require a dedicated programming activity of EAFish for which there were no resources and time to do before implementation of the 2010 Frame survey. Additionally, staffing, office infrastructure and other district structures from the centre to grassroots at BMU level were not in place in the new districts at the beginning of the FS2010 planning. Therefore, for this survey, data in the new districts were captured under the parent district, i.e. Mukono district included the present Mukono, Bwikwe and Buvuma districts; and Bugiri district included the present Bugiri and Namayingo districts.

2.3. Data Collection

Enumerators did the direct recording of data by filling the Frame Survey Recording Forms (Appendix 1), which included tables with details of fishing crafts and gears. General information about the landing site, presence of a primary school and a health clinic within 2 km radius, and access to the HIV/AIDs services were recorded. The information on the landing site facilities included availability of Cell phone network, Banda, cold rooms, artisanal fish processing facilities (drying racks, and smoking kilns) pontoon or jetty, fish store, electricity supply, toilets, potable water, facilities for repair of crafts, engines and nets, shops selling fishing gears, presence and residence of fisheries staff, presence of BMU and whether it has an office, ownership of the land, factory agents, tax

collection method and fish movement permits.

The information recorded on crafts included both fishing and non fishing crafts. The crafts categories included: operational fishing crafts that are actively fishing; Derelict crafts that were damaged and not likely to be repaired; Fish carriers that solely transport fish; and transport crafts used for other purposes. The crafts types were classified in seven categories namely: Sesse flat at one end; Sesse pointed at both ends, Parachutes, Dugouts, Rafts, Foot fishers and Catamarans. The length of individual crafts was recorded in metres. The method of propulsion of the craft (Inboard/outboard engine, Paddle or sail) as well as the horsepower, where an engine was used were recorded. The number of crew in each craft was also recorded.

The type and size of fishing gears was recorded. These included gillnets (mono and multi filament), small seines for Mukene (*Rastrineobola argentea*), long line hooks, hand line hooks, beach seines, cast nets, traps and others which could not be classified in the above categories.

The main fish species, Nile perch (*Lates niloticus*), Tilapia, Mukene, *Clarias* sp*, Protopterus* sp, *Synodontis* sp, and Haplochromines targeted by the fishing crafts and gears were recorded.

2.4. Data entry, storage, analysis and reporting

After the last day of data recording the supervisors collected the filled in questionnaires and survey equipment from enumerators, compiled returns and submitted them to the national Frame Survey coordinator.

The Frame Survey data were entered into the Server based EAFish Information System/Database of LVFO. Data entry personnel were identified in DFR and NaFIRRI and trained on use of the EAFish information system. The training of data entry personnel was followed by data entry. Data entry was done in-house at DFR but later transferred to NaFIRRI. The data were backed up on the NaFIRRI servers cleaned and analysed.

This report outlines observations on key parameters at national and district levels in 2010. These observations are also compared with earlier bi-annual survey results from 2000 to 2008 (DFR, 2006, 2008).

3. RESULTS AND DISCUSSION

Below is the summary of observations of Frame Survey 2010 in the eleven riparian districts sharing the Ugandan side of Lake Victoria (Table 1) and trends of the national figures for biannual Frame surveys conducted from 2000 to 2010 (Table 2). The trends of Frame survey observations within each district are in Appendix 2(a-d).

Table 1. Summary of Frame Survey 2010 results on the Uganda side of Lake Victoria presented by riparian districts

		District											
	Item	**Bugiri**	**Busia**	**Jinja**	**Kalangala**	**Kampala**	**Masaka**	**Mayuge**	**Mpigi**	**Mukono**	**Rakai**	**Wakiso**	**Total**
1	**Landing sites**												
	Number of landing sites	72	4	10	64	6	22	58	25	193	7	42	503
	Landing sites with BMU center	56	3	6	62	5	16	42	20	154	6	30	400
	Landing sites with BMU office	33	3	4	37	3	6	22	1	62	5	15	191
	Landing sites without BUM centre	16	1	4	2	1	6	16	4	40	1	12	103
	Landing sites on islands	39	0	3	64	1	0	15	2	115	1	17	257
	Landing sites on mainland	33	4	7	0	5	22	43	23	78	6	25	246
	Landing site with fenced area for fish	3	1	0	8	0	3	4	1	6	1	2	29
2	**Landing site facilities (No. of landing sites with the facility)**												
	Toilet_facilities	16	2	7	49	3	15	13	15	55	5	18	198
	Potable_water	5	2	4	27	3	4	20	3	10	0	10	88
	Primary_school within 2km	61	3	10	41	3	14	42	16	97	2	32	321
	Health_clinic within 2km	42	3	10	27	3	12	29	10	64	4	28	232
	Mobile/telephone_network	66	4	10	57	6	18	51	15	141	7	42	417
	Banda	19	1	3	5	1	3	6	9	30	2	9	88
	Working Cold_room	0											0
	Fish drying_rack	2	0	0	29	1	8	4	0	11	0	4	59
	Fish smoking_kilns	7	1	1	43	1	11	12	9	87	5	20	197
	Fish_store	0	1	2	4	0	3	0	0	15	0	6	31
	Jetty	2	1	1	4	1	1	2	1	4	1	3	21
	Pontoon	0	0	0	0	0	0	0	0	0	0	0	0
	Mains Electricity_supply	1	2	2	0	3	5	0	0	2	1	5	21
	All_weather_road	14	3	4	21	3	12	18	13	52	3	20	163
	Net_repair_facilities	8	1	0	20	2	8	7	3	49	0	3	101
	Boat_repair_facilities	12	2	4	40	2	8	13	9	90	1	8	189
	Engine_repair facilities	7	0	2	19	1	5	5	1	35	1	4	80
	Fisheries staff												
	No. of landing sites with resident staff	9	0	8	6	0	9	3	0	18	1	2	56
3	**No of landing sites that accessed HIV/AIDS services in the last one year**												
	HIV awareness	52	4	9	59	4	20	35	10	113	6	28	340

	Item	District											Total
		Bugiri	Busia	Jinja	Kalangala	Kampala	Masaka	Mayuge	Mpigi	Mukono	Rakai	Wakiso	
	VCT services	52	3	9	60	4	20	30	11	81	6	23	299
	Provision of ARVs	29	2	2	54	1	19	17	12	44	5	16	201
	Help to orphans and widows	22	2	5	15	-	4	5	4	34	3	7	101
4	**None fishing crafts**												
	No. of Derelict crafts	461	17	74	517	26	179	398	150	2,173	71	324	4,390
	No. of General Transport crafts	98	2	40	75	74	14	99	22	353	10	253	1,040
	No. of Fish transport crafts	67	16	32	113	40	5	27	8	287	4	58	657
5	**Fishers**												
	Number of fishers	8,831	337	574	8,972	322	3,275	6,982	1,677	20,565	1,296	4,126	56,957
6	**Mode of propulsion (No. of crafts)**												
	Outboard motor	416		7	1,415	19	259	474	80	2,986	311	367	6,334
	Paddle	2,039	156	306	2,261	161	1,206	1,978	754	5,532	251	1,745	16,389
	Sail	477	3		2			165		31		4	682
7	**Fishing crafts by type (No. of crafts)**												
	Mechanised catamarans									3			
	Dug out	12			1			3	2	89			107
	Parachute	1,028	49	26	559	15	916	546	393	907	165	752	5,356
	Rafts	9	6				15	125		3	6	5	169
	Sesse flat at one end	768	51	159	3,077	166	536	1,280	430	6,799	391	1,265	14,922
	Sesse pointed at both ends	1,120	54	128	42		1	664	8	784	3	97	2,901
	Total fishing crafts	**2,937**	**160**	**313**	**3,679**	**181**	**1,468**	**2,618**	**833**	**8,612**	**565**	**2,119**	23,455
	No. of Foot Fishers	11	12	2	16		43	22	17	19	3	28	173
	Fishing gears (No. of gears)												
8	**Gillnets by mesh size**												
	< 2.5 inch	163	622		251	40	681	188	165	320	109	199	2,738
	2.5 inch	333	15		300		535	223	163	124	130	350	2,173
	3 inch	1,325	4	36	936	20	2,406	455	719	2,878	50	709	9,538
	3.5 inch	1,635	15	2	4,293	71	1,576	1,132	1,156	3,478	140	936	14,434
	4 inch	595	14	133	3,570	50	3,559	816	1,169	4,295	525	1,798	16,524
	4.5 inch	540		64	4,322	85	1,583	1,153	1,400	9,341	492	2,145	21,125
	Total gillnets <5 inch	**4,591**	**670**	**235**	**13,672**	**266**	**10,340**	**3,967**	**4,772**	**20,436**	**1,446**	**6,137**	66,532
	5 inch	2,507	24	814	7,737	324	1,922	2,353	5,023	18,219	1,613	5,397	45,933

	Item	District											Total
		Bugiri	Busia	Jinja	Kalangala	Kampala	Masaka	Mayuge	Mpigi	Mukono	Rakai	Wakiso	
	5.5 inch	1,063	4	62	11,170	60	1,897	1,788	3,508	12,607	1,046	2,243	35,448
	6 inch	6,994	10	174	33,478	241	2,747	9,468	1,489	44,032	7,673	7,137	113,443
	6.5 inch	1,740		40	2,745	70	275	654		42,052	470	861	48,907
	7 inch	4,617	20	104	6,189	105	575	3,488	400	17,370	1,339	2,697	36,904
	7.5 inch	88			745	150		210	30	1,418	106	191	2,938
	8 inch	706		105	5,530	340	185	358		9,955	701	1,257	19,137
	9 inch				275	189	49	75		1,622	25	470	2,705
	10 inch				290	95	40	50		100		117	692
	> 10 inch	20			55					870			945
	Total gillnets ≥5 inch	**17,735**	**58**	**1,299**	**68,214**	**1,574**	**7,690**	**18,444**	**10,450**	**148,245**	**12,973**	**20,370**	307,052
	Total gillnets	**22,326**	**728**	**1,534**	**81,886**	**1,840**	**18,030**	**22,411**	**15,222**	**168,681**	**14,419**	**26,507**	373,584
9	**Mukene fishing gears**												
	Small seine, mesh size <=5 mm	377	15	4	508		132	224	36	876	1	27	2200
	Small seine, mesh size 6-9 mm	58	1		175			56		48	1	97	436
	Small seine, mesh size 10 mm	1			24			2		11	5	20	63
	Total small seines	**436**	**16**	**4**	**707**	**-**	**132**	**282**	**36**	**935**	**7**	**144**	2,699
	Scoop net	49			148		4	9	1	84	3	4	302
	Lift net												
10	**Hooks**												
	Hand line hooks	2,535	375	730	750	404	288	3,588	590	5,300	391	2,120	17,071
	Long line hooks												
	Size < 4	7599			3480		1693			9030			21802
	Size 4-7	18154	60	3830	23127	1560	3763	7882	5715	51686	1750	10615	128142
	Size 8-10	112437	900	4520	289379	1340	38103	289233	13110	383397	51360	55825	1239604
	Size >10	280971	440	3000	120701		8500	110116	6200	478925	57970	102984	1169807
	Total no. of hooks	**421,696**	**1,775**	**12,080**	**437,437**	**3,304**	**52,347**	**410,819**	**25,615**	**928,338**	**111,471**	**171,544**	2,576,426
11	**Other fishing gears**												
	Lift nets												
	Traps	894	134	81	313	100	6,309	1,035	595	247	252	371	10,331

	Item	District											Total
		Bugiri	Busia	Jinja	Kalangala	Kampala	Masaka	Mayuge	Mpigi	Mukono	Rakai	Wakiso	
	Beach seines	101	17	2	105	35	128	233	107	541	20	162	1,451
	Cast nets	314	19	74	24	24	34	174	43	215		174	1,095
	Monofilament gillnets	2,826	286	92	1,357	19	2,635	1,943	116	2,139	70	632	12,115
	Others									5		17	22

Table 2. Trend of fishery variables in the bi-annual Frame Surveys for the Uganda side of Lake Victoria (2000-2010).

		YEAR					
	Item	**2000**	**2002**	**2004**	**2006**	**2008**	**2010**
1	**Landing sites**						
1.1	Number of landing sites	597	552	554	481	435	503
2	**Landing site facilities and services** (No. of landing sites with facility)						
2.1	A primary school within 2 km					253	321
2.2	A health clinic within 2 km					177	232
2.3	Mobile telephone network					345	417
2.4	Bandas (Fish shades)	56	33	21	54	68	88
2.5	Cold rooms (working)	7	4	--	5	1	0
2.6	Pontoon/Jetty	34	5	7	16	16	21
2.7	Fish stores	78	6	11	18	34	31
2.8	Electricity supply	16	10	19	17	20	21
2.9	Toilet facilities	--	95	41	171	196	198
2.1	Portable water	--	21	41	55	88	88
2.11	All weather roads	138	108	127	172	161	163
2.12	Boat repair facilities	221	40	23	141	143	189
2.13	Net repair facilities	181	23	4	49	64	101
3	**Fisheries staff**						
3.1	Landing sites with resident Fisheries staff		18		30	23	56
4	**Fishers**						
4.1	No. of fishers	34,889	41,674	37,721	54,148	51,916	56,957
5	**Fishing crafts**						
5.1	Total No. of fishing crafts	15,544	18,609	16,775	24,148	21,836	23,455
5.2	**Mode of Propulsion (No. crafts)**						
5.2.1	Crafts using engines	2,031	3,250	3,173	5,047	5,156	6,334
5.2.2	Crafts using paddles	12,848	14,262	12,506	17,475	15,602	16,389
5.2.3	Crafts using sails	665	1,074	1,096	1,466	1,078	682
5.3	**Craft types (No. of crafts)**						
5.3.1	Catamarans					3	
5.3.2	Dugout	269	164	122	132	163	107
5.3.3	Foot fishers				171	176	173
5.3.4	Parachute	5,342	5,580	5,450	5,064	4,807	5,356
5.3.5	Sesse flat at one end	8,107	10,666	9,067	15,883	13,709	14,922
5.3.6	Sesse pointed at both ends	1,797	2,197	1,979	2,816	3,016	2,901
5.3.7	Rafts		2	149	82	138	169
6	**Transport crafts (No. of crafts)**						
6.1	General transport crafts	910	790	593	966	919	1,040
6.2	Fish carriers					668	478
7	**Derelict crafts**						
7.1	No. of Derelict crafts	2,777	3,278	3,547	4,549	4,836	4,390
8	**Fishing gears (No. of gears)**						
8.1	**Gillnets by mesh size**						
8.1.1	< 2½" mesh size	675	1,013	359	809	1,557	2,738
8.1.2	2½" mesh size	321	345	263	601	1,215	2,173
8.1.3	3" mesh size	3,014	3,090	4,022	6,032	7,309	9,538
8.1.4	3½" mesh size	9,646	8,168	7,304	12,841	14,652	14,434
8.1.5	4" mesh size	20,366	16,244	15,059	25,442	23,784	16,524
8.1.6	4½" mesh size	20,432	23,986	29,239	46,015	28,391	21,125

	Item	YEAR					
		2000	2002	2004	2006	2008	2010
	No. of gillnets <5"	**54,454**	**52,846**	**56,246**	**91,740**	**76,908**	**66,532**
8.1.7	5" mesh size	51,479	90,298	81,283	120,664	64,947	45,933
8.1.8	5½" mesh size	16,294	23,448	30,189	69,506	55,736	35,448
8.1.9	6" mesh size	95,302	158,128	189,619	178,673	130,316	113,443
8.1.10	6½" mesh size	8,067	14,759	16,308	52,991	21,777	48,907
8.1.11	7" mesh size	54,459	68,069	51,578	45,854	28,221	36,904
8.1.12	7½" mesh size	1,398	1,285	2,093	5,256	4,102	2,938
8.1.13	8" mesh size	8,100	11,725	13,898	13,816	14,655	19,137
8.1.14	9" mesh size	1,776	1,729	12,763	9,242	6,069	2,705
8.1.15	10" mesh size	5,709	4,011	3,600	905	1,275	692
8.1.16	> 10" mesh size	625	1,190	1,020	1,130		945
	No. of gillnets ≥5"	**243,209**	**374,642**	**402,351**	**498,037**	**327,098**	**307,052**
	Total gillnets	**297,663**	**427,488**	**458,597**	**589,777**	**404,006**	**373,584**
8.2	**Mukene fishing gears**						
8.2.1	Lift net/Lampara		3	2		3	-
8.2.2	Small seine, mesh size <5 mm			867	1,467	1,785	**2200**
8.2.3	Small seine, mesh size 6-9 mm			273	108	361	**436**
8.2.4	Small seine, mesh size 10mm			39	33	188	**63**
	Total small seines	**2,452**	**1,296**	**1,181**	**1,608**	**2,334**	**2,699**
8.2.5	Scoop net		555	292	590	752	302
8.3	**Hooks**						
8.3.1	No. of Hook and line/Hand line hooks	4,585	6,547	8,335	15,860	19,629	17,071
8.3.2	No. of Long line hooks	254,453	926,959	968,848	2,285,609	2,763,799	2,576,426
8.4	**Other gears**						
8.4.1	Beach/Boat seine	811	880	954	1,425	1,649	1,451
8.4.2	Cast net	1,276	858	659	631	1,000	1,095
8.4.3	Monofilament			845	--	11,203	12,115
8.4.4	Traps/Baskets	11,349	5,781	5,361	499	7,615	10,331
8.4.5	Other/Unspecified	71	266	141	50	1	22

3.1 Landing Sites

The total number of landing sites on the Uganda side of Lake Victoria decreased from 597 in 2000 to the lowest (435) in 2008 and increased again to 503 in 2010. The decrease in number of landing sites in 2006 and 2008 can be attributed to their reorganisation into BMUs. The increase observed between 2008 and 2010 could be a result of break-away landing sites from mother BMUs or due to improved data capture.

In 2010, there were a total of 400 landing sites that were BMU centres. The remaining 103 landing sites were within BMUs centres at another larger landing site. Out of the 400 BMUs, only 191 (48%) had physical structures designated as BMU offices. A total of 257 landing sites (51%) were located on islands and therefore fall under the “hard to reach areas” in terms of service delivery from the mainland. Very few landing sites (29) had a fenced off area designated for fish handling.

3.2 Facilities and infrastructure at the fish landing sites

There has been slight improvement in physical infrastructure and facilities that support the fishing industry and activities of the fisher communities at landing sites. However, with the exception of rapid growth of mobile telephone network access coverage, others are growing by small margins.

3.2.1 Primary schools

64% of landing sites had primary schools within a distance of 2 km in 2010 compared with 58% in 2008. This implies that a large number of school going age children at landing sites can easily access school. However, the remaining 3 out every ten landing sites have no school within easy reach and children may have to walk long distances or miss out schooling. The lowest school coverage of 28 – 50% was in Rakai and Mukono districts respectively. There is need to increase school coverage near the landing sites for children from fishing communities to benefit fully from the Uganda government policy of Universal primary education.

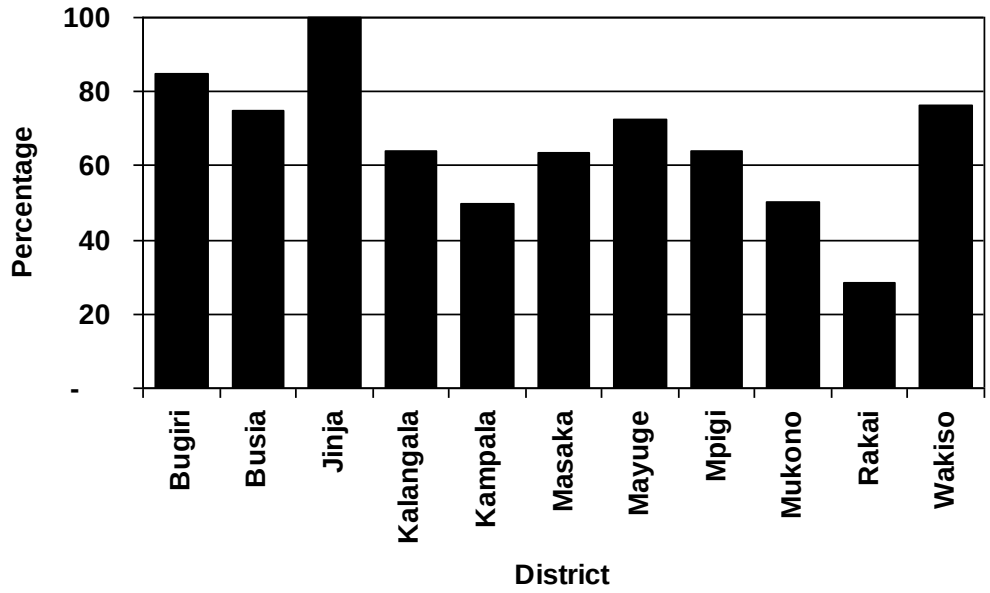

Figure 1. Percentage of landing sites with a primary school within 2 km distance on the Uganda side of Lake Victoria in 2010 by district.

3.2.2 Bandas (fish sheds)

The coverage of sheds for handling and display of fish at landing sites was 17% (88 landing sites) in 2010, a modest improvement from 11.2% recorded in the last survey in 2006. This is a sign of insufficient safe handling and display facilities during marketing of fresh and processed fish at the landing sites.

3.2.3 Cold rooms

No working cold room was recorded in 2010 and yet five landing sites were reported to have cold rooms in 2008. This shows that there was no new investment in cold storage facilities for ice and fresh fish at landing sites over the last couple of years. The lack of cold storage impacts negatively on the bargaining power of fishers when

they have to dispose off the catch in the absence of prime buyers.

3.2.4 Electricity

In the 2010 survey, the coverage of mains electricity supply, a major power source component for facilities like ice making machines and cooling facilities to fishing communities was registered at 21 landing sites as opposed to 20 landing sites in 2008, which is still dismal (4%) coverage of all landing sites.

3.2.5 Toilet facilities

Toilet facilities are important for proper sanitation and hygiene at landing sites. The public toilet coverage has consistently improved from 95 (17%) landing sites in 2002 to 171 (35.5%) landing sites in the 2006,196 (45%) landing sites in 2008 and 198 (39%) in 2010. Between 2008 and 2010 surveys, the proportion of landing sites with public toilets reduced in six districts, i.e. Bugiri, Busia, Mayuge, Mpigi, Mukono and Wakiso (Figure 2). In the other districts, apart from Kampala where there was no change, the toilet coverage increased with the highest increase registered in Jinja district. Communities at landing sites and local leaders should aim at achieving 100% coverage of all landing sites. In addition to construction, there should be sensitisation on proper utilisation of public toilet facilities at landing sites.

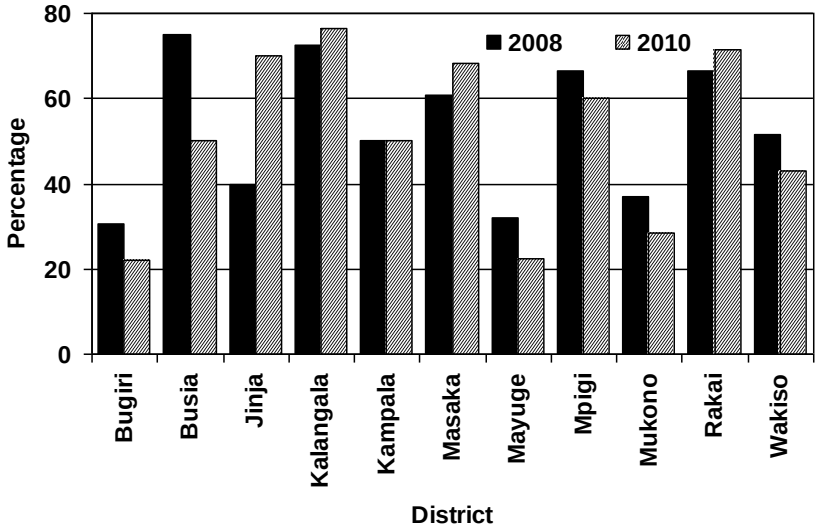

Figure 2. Percentage of landing sites with toilet facilities in the riparian districts of the Uganda side of Lake Victoria in 2008 and 2010.

3.2.6 Portable water

Portable water is another basic requirement to ensure good sanitation and hygiene at landing sites. It is also required for cleaning fish and fish handling facilities. The number of landing sites with portable water remained the same in 2008 and 2010 Frame surveys indicating no improvement in access to clean water. More effort need be put into mobilising communities to adopt use of portable water at landing sites to contribute to the general health of communities and reduce contamination of fish that results from use of contaminated water.

3.2.7 All weather roads

The number of landing sites accessible by all-weather roads decreased from 172 in 2006 to 161 in 2008 and a similar number (163) were recorded in 2010. This trend suggests reduced attention to rural feeder roads by the local governments.

3.2.8 Other facilities

There was decrease in landing site coverage of other important fisheries facilities like Pontoon/Jetties, and Fish stores between 2008 and 2010 Frame surveys. Generally, the facilities servicing fisheries sector at the landing sites are still inadequate and should be improved.

3.3 Fishers

3.3.1 The number of fishers

The number of fishers operating in the Uganda side of the lake increased by 9.7% from 51,916 in 2008 to 56,957 in 2010 (Figure 3). Thus the number of fishers is still growing and this undermines sustainable management as it is a sign of increasing fishing pressure.

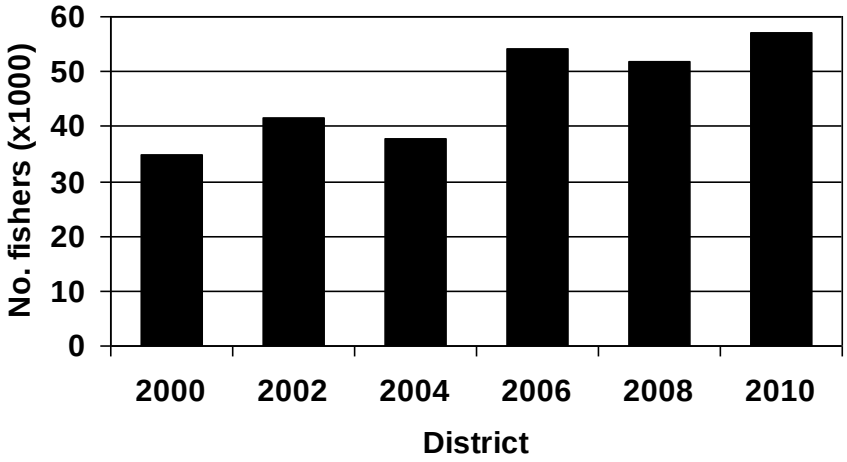

Figure 3. The number of fishers on the Uganda side of Lake Victoria in 2000 to 2010.

3.3.2 The distribution of fishers

In the 2010 Frame survey, the majority of fishers (36%) were at landing sites in Mukono district, followed by Kalangala (16%) and least in Busia, Jinja and Kampala, proportionate to fewer fish landing sites in these districts (Figure 4).

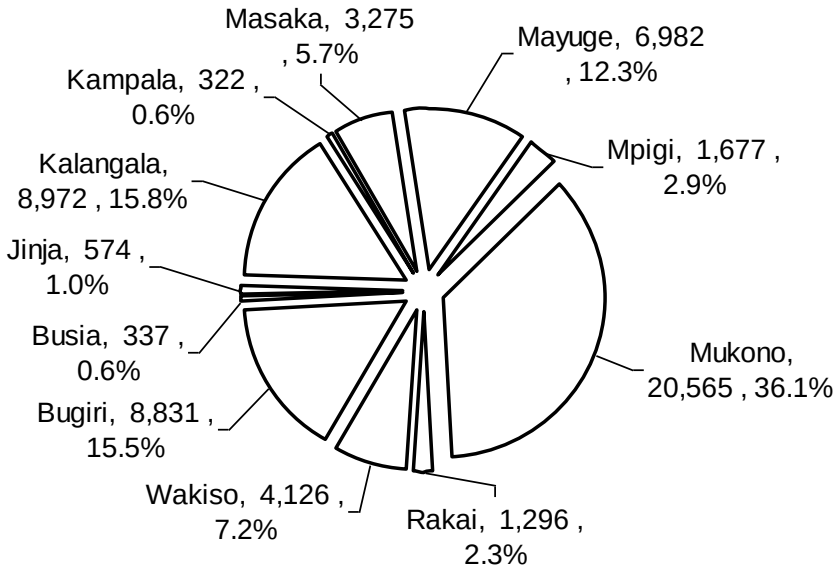

Figure 4. The distribution of fishers in the districts sharing the Uganda side of Lake Victoria in 2010.

3.4. Fishing Crafts

3.4.1 Number of fishing crafts

Over the last ten years, the number of fishing crafts on the Uganda side of Lake Victoria increased from 15,544 in 2000 to the peak of 24,148 in 2006. In the 2008 Frame survey, the number of fishing crafts decreased by 10% to 21,836 but increased slightly by 2% to 23,455 crafts in 2010. Like the number of fishers, the majority of fishing crafts were at landing sites in Mukono district followed by Kalangala, Bugiri, and Mayuge in 2010 (Figure 5)

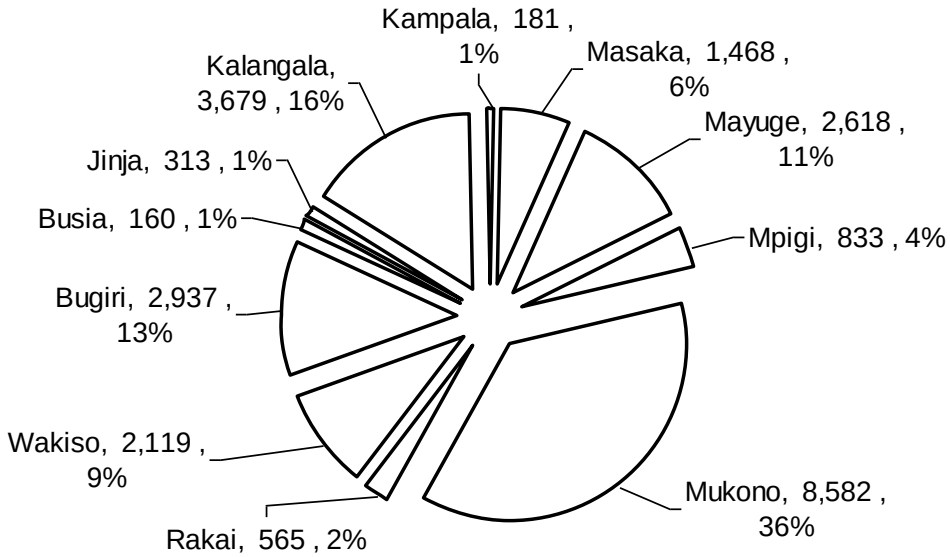

Figure 5. The distribution of fishing crafts in the districts sharing the Uganda side of Lake Victoria in 2010.

3.4.2 Number of fishing crafts by craft type

In the 2010 survey, the fishing crafts were composed of 5,356 (22.8%) parachute boats; 14,922 (63%) Sesse flat at one end; 2,901 (12.3%) Sesse pointed at both ends; 107 (0.4%) Dugouts; and 169 (0.7%) rafts; The parachute boats (small , unstable boats operating in sheltered near shore waters targeting tilapia) increased by 11.4% between 2008 and 2010 whereas the Sesse flat at one end, the main crafts in Nile perch fisheries, also increased by 8.8%. The above increase in effort, although small, is indicative of declining tilapia and Nile perch fisheries. The Sesse boats pointed at both ends, the craft type predominant in the Mukene fishery, which had consistently increased since 2000 as an indication of an expanding fishery, decreased by 3.8% between 2008 and 2010. This points to the need to examine the Mukene fishery.

3.4.3 Mode of Propulsion of Fishing Crafts

Most of the fishing crafts, 16,389 (69.8%) were using paddles whereas 6,321 (26.9%) used outboard motors and 682 (2.9%) used sails. Craft propulsion by paddles limits the distance the fishers can go leading to localised over fishing in near shore areas. The use of wind energy with sails has remained underdeveloped in the Ugandan waters of Lake Victoria.

The number of motorised crafts which had increased by 154% between 2000 and 2008 Frame surveys from 2,031 crafts to 5,156 crafts, increased again by 22% to 6,321 crafts in 2010. The motorised boats almost exclusively target Nile perch in distant waters and this trend suggests moderate change in this fishing effort category between the 2008 and 2010 surveys. The number of fishing crafts using paddles also increased by 5% from 15,602 to 16,389 respectively. On the other hand, the number of crafts using sails reduced by half from 1,078 in 2008 to 682 in 2010. It is not clear why there was such a large drop in the number of crafts using wind power for propulsion.

3.4.4 The target fish species by different types of fishing crafts

The small crafts, i.e. 84% of Parachute boats, 94% of Dugout boats, 88% of Rafts and 79% of foot fishers targeted Tilapia (Table 3). In contrast, 70% of Sesse flat at one end targeted Nile perch and a much smaller proportion, 8% and 20% targeted Tilapia and Mukene respectively. Approximately half of Sesse pointed at both ends targeted Mukene whereas 30 and 16% of this craft type targeted Mukene and Tilapia respectively. These results show that the Sesse boats are the main craft in the Nile perch and Mukene fisheries whereas the small relatively unstable dugouts, parachutes and rafts dominate the tilapia fisheries. Management interventions in specific fisheries can therefore be to some extent based on the craft type.

The observations on target fish species by different craft types in 2010 are similar to those in the 2006 and 2008 surveys indicating the structure of the fisheries did not change much. However, the proportion of crafts targeting Nile perch reduced from 57% in 2008 to 51% in 2010 whereas those targeting tilapia and Mukene increased from 33 to 36% and 9 to 12 respectively. The proportion of fishing crafts targeting

Mukene is undoubtedly very low in the Ugandan waters and is an area where expansion of fishing effort could be considered.

Table 3. The number of fishing craft by type targeting different fish species in the Uganda side of Lake Victoria in 2010.

	Target Species							
Craft Type	Nile perch	Mukene	Tilapiines	Clarias	Protopterus	Synodontis	Haplochromines	Total
Dug out	2		101		3		1	107
Foot Fishers	2		136	1	4		29	172
Parachute	611	57	4459	42	105	22	47	5343
Rafts			149				20	169
Sesse flat at one end	10426	1220	3071	9	32	30	20	14808
Sesse pointed at both ends	865	1526	474	2	5	27	2	2901
Total	11906	2803	8390	54	149	79	119	23500

3.4.5 The target fish species of crafts using different modes of propulsion

Most of crafts using an engine (92.3%) targeted Nile perch, whereas only 6.0% and 1.4% targeted Mukene and Tilapia respectively (Table 4). Similarly, 82.1% of crafts using sails targeted Nile perch. These are the two common means of propulsion by which the fishing crafts operating in Lake Victoria access distant offshore waters. The proportion of sailed or motorised boats operating in the Mukene fishery increased from 1% in 2008 to 5 to 6% in 2010. This may imply an increase in exploitation of Mukene stocks in distant waters away from the home landing site. A large proportion of paddled boats (33.9%) which ply near shore waters targeted Nile perch. Juvenile Nile perch predominate in these areas and these boats were likely to be targeting immature fish.

Table 4. The number of crafts by mode of propulsion targeting different fish species in the Uganda side of Lake Victoria in 2010.

Propulsion	Nile perch	Mukene	Tilapiines	Clarias	Protopterus	Synodontis	Haplochromines	Total
Outboard motor	5,808	380	87		1	10	6	6,292
Paddle	,5534	2,369	8,103	52	144	45	83	16,330
Sail	559	36	60	1		24	1	681
N/A (foot fishers)	5	18	140	1	4		29	197
Total	11,906	2,803	8,390	54	149	79	119	23,500

3.4.6 The target fish species by crafts of different sizes (length)

The proportion of boats targeting Nile perch and Mukene increased with the size of boat whereas the reverse was true for those targeting Tilapia (Table 5). For instance, only 13% and 5% of boats <6 m long targeted Nile perch and Mukene respectively whereas 56 of those boat sizes targeted tilapia. The smaller boats were also the main crafts in the *Clarias, Protopterus* and Haplochromine fisheries.

Table 5. The number of fishing crafts by size ranges targeting the different fish species on the Uganda side of Lake Victoria in 2010.

Craft length (m)	Nile perch	Mukene	Tilapiines	*Clarias*	*Protopterus*	*Synodontis*	Haplochromines	Blank	Total
<4	142	14	857	1	21	1	24	19	1,079
4 to 4.9	298	12	1,536	13	42	-	25	16	1,942
5 to 5.9	1,142	101	2,184	19	32	9	8	9	3,504
6 to 6.9	2,530	288	2,089	15	23	19	12	27	5,003
7 to 7.9	2,077	603	691	2	15	19	8	21	3,436
8 to 8.9	1,548	675	345	1	1	23	3	12	2,608
≥9	4,100	1,093	473	-	2	8	10	20	5,706
Total	11,837	2,786	8,175	51	136	79	90	124	23,278

3.5 Fishing gears

The main fishing gears recorded by all the five bi-annual frame surveys carried out in the lake from 2000 to 2010 included gillnets, small seines, scoop nets, beach seines, cast nets, long line hooks and hand line hooks.

3.5.1 **Gillnets**

The Frame surveys from 2000 to 2006 recorded continuous increase of number of gillnets from 297,663 to 589,777, an overall increase of 81% (Figure 6). However, the following two surveys in 2008 and 2010 registered decreases to 404,006 and 327,098 gillnets respectively. The decrease was in both nets of legal mesh sizes (≥5 inch) and illegal ones (<5 inch). Never the less, the decrease of the illegal gill nets were in 3½ to 4½ inch mesh sizes while those of very smaller mesh sizes <2½ to 3½ inch mesh size increased by 94% from 2006 to 2010. Gillnets with very small mesh sizes are often used in shallow near shore waters to catch haplochromine bait for the long line Nile perch fishery. Thus the increase observed may be related the large long line fishery in the lake. In the process of catching haplochromine bait, the small mesh gillnets catch large quantities of juveniles of other untargeted fishes like Nile perch and tilapia.

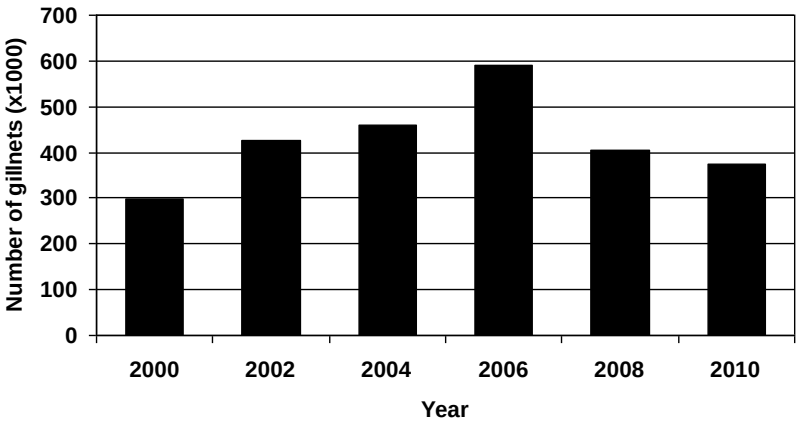

Figure 6. The number of gillnets in the Uganda side of Lake Victoria in 2000 to 2010.

Further to the reduction in numbers of gillnets, the 6 inch mesh size gillnets continued to dominate followed by 6.5 and 5 inch gillnets. The 6 inch though it reduced is still outstanding (Figure 7).

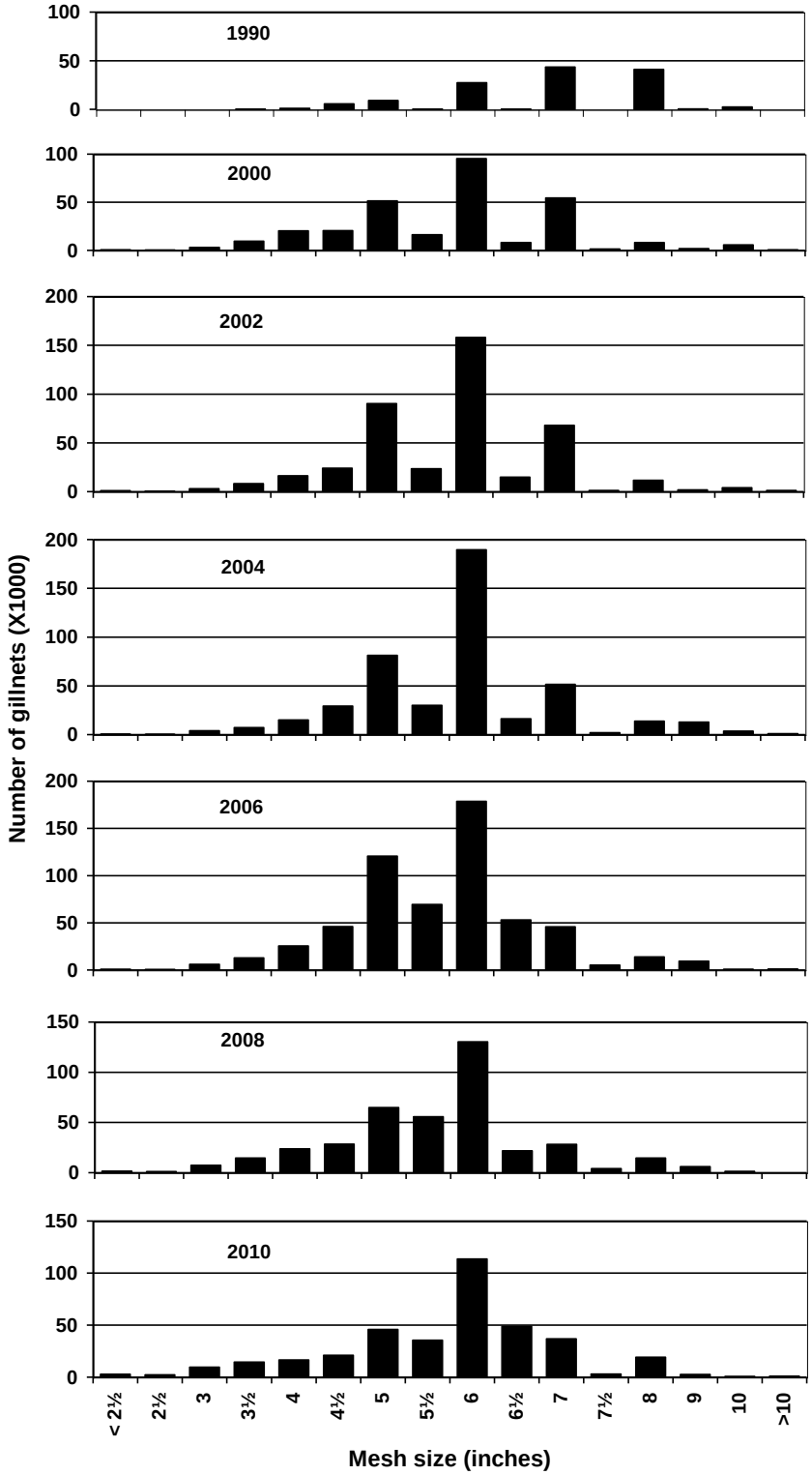

Figure 7. The number of gillnets by mesh size in the Uganda side of Lake Victoria in 1990, and biannual Frame surveys in 2000 to 2010.

One aspect that complicates the analysis of gillnet numbers and which has not been well documented in the earlier Frame surveys is the extent of vertical joining of gillnets. In the 2010 survey, 40% of all gillnets in use were of three depth panels, 23% were with two depth panels and only 37% were standard single panel nets of 26 meshes deep (Table 6). Thus while the number of gillnets were put at 327,098, the derived number of standard single panel nets would be 796,222. The vertical joining of gillnets has implications on the fishing effort imparted by the gillnet as it exposes more area in the water column for fish capture.

More than 95% of double and triple panel nets occurred in the mesh size range of 4 to 8 inches. The double and triple panel nets were most common in districts with large areas of deep waters, i.e. Bugiri, Kalangala, Mayuge and Mukono (Table 7).

Table 6. Number of gillnets by depth panels on the Uganda side of Lake Victoria in 2010.

Mesh Size (inches)	Depth panels			
	Single	**Double**	**Triple**	**Total**
< 2.5	2,413	62	256	2,731
2.5	2,360	13	80	2,453
3	9,024	541	398	9,963
3.5	12,479	1,572	371	14,422
4	11,027	4,925	629	16,581
4.5	15,970	6,841	891	23,702
5	30,292	13,277	2,624	46,193
5.5	17,195	8,580	9,367	35,142
6	22,003	31,292	63,082	116,377
6.5	2,784	6,380	39,942	49,106
7	7,402	8,435	24,102	39,939
7.5	502	886	1,490	2,878
8	1,956	4,528	12,753	19,237
9	921	419	1,365	2,705
10	1,392	150	150	1,692
>10	7,310	1,145	200	8,655
Total	**145,030**	**89,046**	**157,700**	**391,776**

Table 7. Distribution of gillnets of different depth panels in riparian districts on the Uganda side of Lake Victoria in 2010.

	Single	Double	Triple	Total
Bugiri	9,830	2,535	11,218	23,583
Busia	728			728
Jinja	1,336	198		1,534
Kalangala	16,405	22,528	43,503	82,436
Kampala	1,709	136	1	1,846
Masaka	8,716	7,718	1,650	18,084
Mayuge	7,437	12,551	2,553	22,541
Mpigi	12,379	2,365	548	15,292
Mukono	52,373	29,989	91,433	173,795
Rakai	8,383	7,247	5,070	20,700
Wakiso	25,734	3,779	1,724	31,237
Total	145,030	89,046	157,700	391,776

From 2008 to 2010, the proportion gillnets that were of illegal mesh size (<5 inch), increased in Bugiri, Busia and Masaka districts whereas there was a reduction in all other districts (Figure 8). Almost all gillnets in Busia (92%) were of illegal mesh sizes followed by Masaka (57%), and Mpigi (31%). The fishery in Busia waters at the mouth of River Sio has the indigenous fishes like *Labeo*, *Synodontis* and *Schilbe* which mature at a small size and are cropped with illegal small mesh size nets and this probably explains the prevalence of these nets in the area.

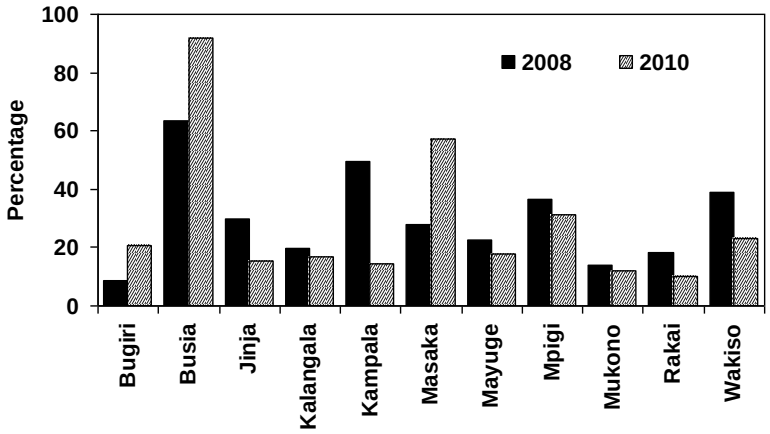

Figure 8. The proportion of gillnets that were of illegal mesh size within each of the riparian districts sharing the Uganda side of Lake Victoria in 2008 and 2010.

3.5.2 Hooks

From 2000 to 2008, the number of long line hooks continuously increased and for the first time decreased by 6.7% from 2,763,799 in 2008 to 2,576,426 in 2010. The numbers of hand lines also registered decreases from 19,629 in 2008 to 17,071 in 2010. Fishing with hooks is a major fishery in Lake Victoria which has been

expanding. The hooks in use have a large component of small sizes. The commonest hooks in use in the Uganda side of the lake, 48%, were in the 8-10 hook size range but more than one million hooks (45%) were of size >10, which target small size classes of Nile perch (Figure 10). Only about 5.8% of the hooks in use were of size 7 and below.

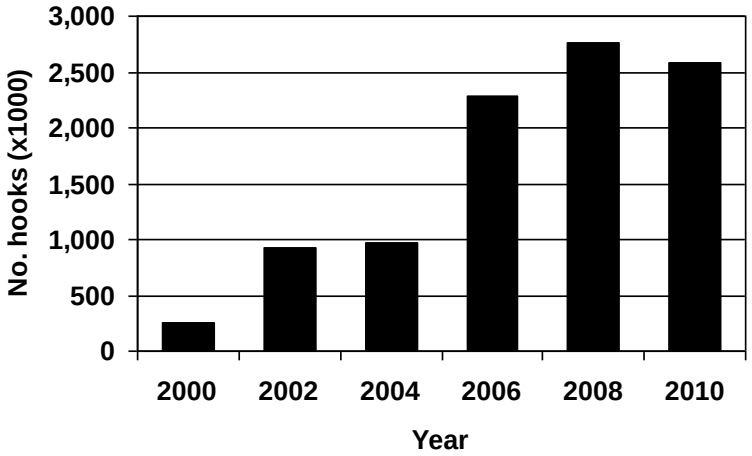

Figure 9. The number of long line hooks in the Uganda side of Lake Victoria in 2000 to 2010.

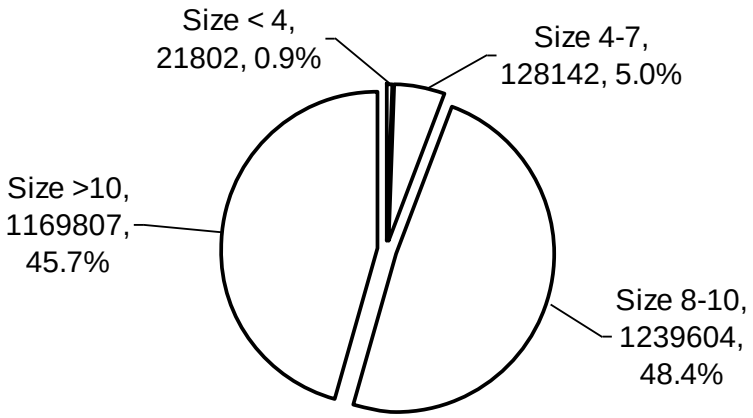

Figure 10. The proportions of different hook sizes in use in the Uganda side of Lake Victoria in 2010.

In the 2010 Frame survey, the intensity of use of hooks was highest in Rakai district with an average of 15,924 hooks per landing site (Figure 11). Bugiri district which had the highest extent of use of hooks in 2008, was overtaken by Kalangala, Mayuge and Rakai in 2010.

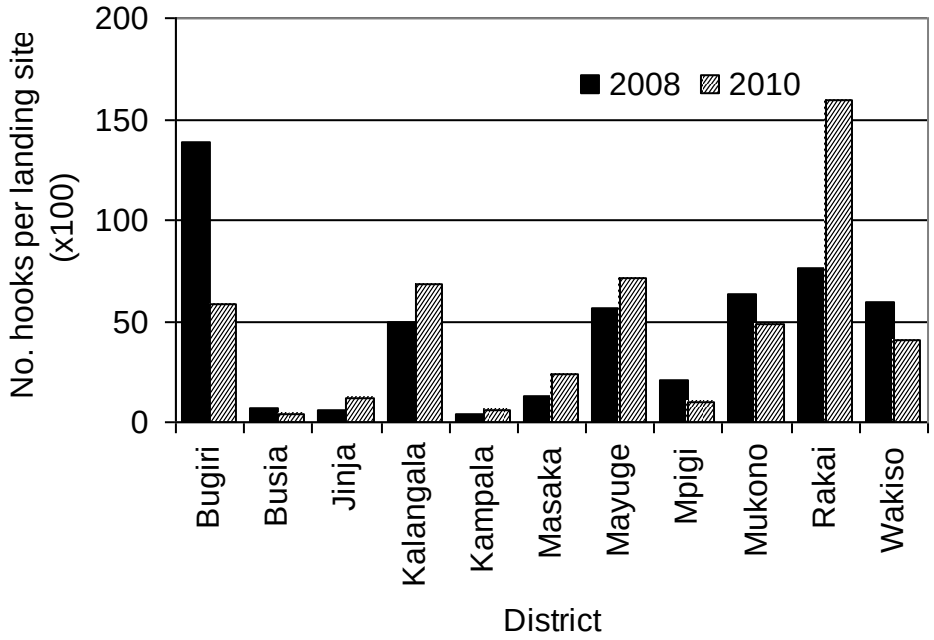

Figure 11. The average number of hooks per landing site in the districts sharing the Uganda side of Lake Victoria in 2008 and 2010.

3.5.3 Beach seines

The numbers of beach/boat seines increased persistently between 2000 and 2008 by 103%, overall. However, between the last two surveys, the number declined slightly from 1,649 to 1,451 (Figure 12). There was reduced density of beach/boat seines in all districts except Busia where it doubled (Figure 13). The least density of beach seines was in Jinja district where only 2 seines were encountered in 2010. Efforts to eradicate these very destructive illegal gears from the lake should be strengthened.

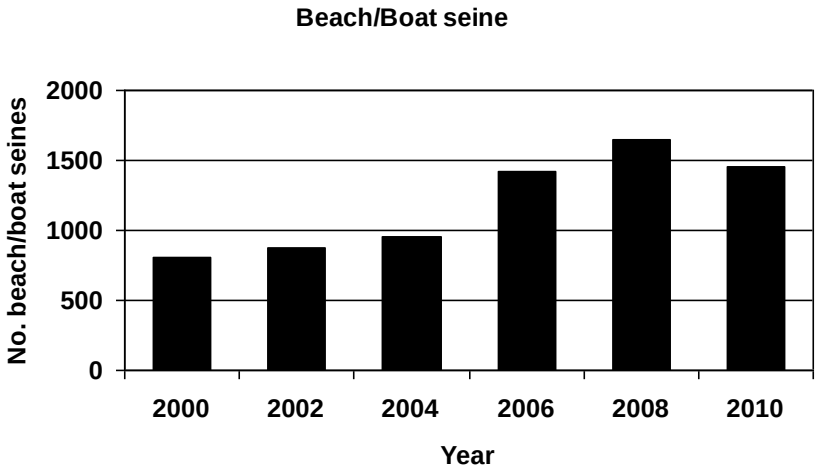

Figure 12. The number of beach/boat seines in the Uganda side of Lake Victoria in 2000 to 2010.

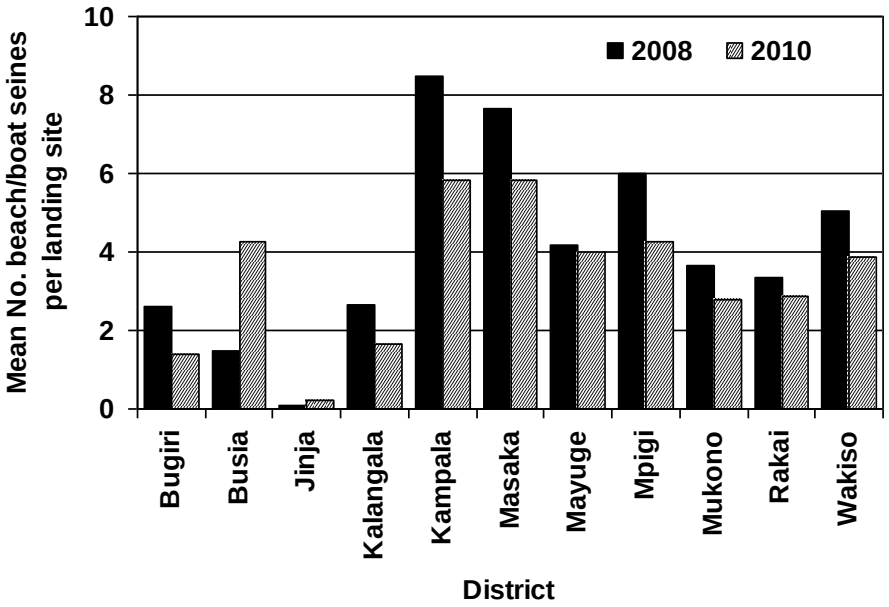

Figure 13. The average number of beach/boat seines per landing site in the districts sharing the Uganda side of Lake Victoria in 2008 and 2010.

3.5.4 Monofilament gillnets

A total of 845 monofilament gillnets were first recorded in the Ugandan waters of Lake Victoria in 2004. This category gear was also recorded in 2006 but its code was not in the queries used to obtain the data for analysis from the SAMAKI database. In the 2008 survey, 11,203 monofilament nets were recorded giving an increase of 1,226% since the 2004 survey. The 2010 Frame survey recorded 12,115 monofilament nets, an increase of 8.1% from 2008. The use of these nets is a very serious problem in the lake that should be decisively dealt with.

3.5.5 Small seines

The numbers of small seines, which target Mukene, increased by 45% from 1,608 in 2006 to 2,334 in 2008 and 2,699 in 2010, an increase of 15.6%. This number of small seines in the Ugandan waters appears to be still low in view of the potential of the Mukene fishery especially in the deep waters which are not accessed by the current fishery.

3.5.6. Scoop nets

The Scoop nets, another common fishing gear used to target Mukene in the Uganda side of the lake increased by 27% from 590 in 2006 to 752 in 2008 but decreased to 302 nets in 2010, a decrease by 60% over the last two years.

3.5.7 Lift nets

In the 2010 survey, no lift nets operated on paired boats (Catamaran) were recorded in the Ugandan waters of Lake Victoria. In 2008 they had been recorded at Gerenge landing site, near Entebbe in Wakiso district where this fishing technology was being

piloted by a private investor. Adoption of this technology, which is suitable for exploiting Mukene in deep waters, could in the long term boost the Mukene fishery in the Ugandan waters. What hampered adoption needs to be followed up and corrected.

3.5.8 Traps

These gears are used in shallow vegetated areas, floodplains and river mouths. They target tilapiines and riverine species. There was a significant drop in the use of traps between the 2004 and 2006 surveys from 5,361 to only 499 respectively. This enormous decrease of 974% was attributed to the receding water levels at that time, which had left the shallow vegetated areas dry. The 2008 survey recorded 7,615 traps indicating a recovery of use of this gear consistent with the recovery of the lake water levels. The upward trend of the number of traps continued in the 2010 survey with 36% increase to 10,331 traps since the 2008 survey. More than half of the traps (6,309) were in the Masaka area of the lake where there are large vegetated wetland areas suitable for fishing with traps.

3.5.9 Cast nets

Cast nets usually referred to as *'tupa tupa'* are commonly used in the littoral zone and target tilapiines. This gear is illegal and targeted by law enforcement activities. The number of cast nets in the Ugandan waters of Lake Victoria was continuously decreasing in the surveys between the 2000 and 2006 from 1,276 nets in 2000 to 631cast nets in 2006. In the 2008 survey, this trend reversed and 1,000 cast nets were recorded. This number increased further to 1,095 cast nets in 2010 which shows sustained resurgence of this undesirable fishing gear.

4. CONCLUSIONS AND RECOMMENDATIONS

1. The Frame surveys carried out on Lake Victoria every two years between 2000 and 2010 show improvement in some public facilities at the fish landing sites, e.g. access to primary schools and health clinics, but also little or no improvement in other facilities servicing the fisheries sector. In 2010, only 64% of landing sites had a primary school within a distance of 2 km. This still leaves a large number of children from fishing communities having to walk long distances to access school or completely miss school. The primary school coverage near fish landing sites needs to be increased for fisher communities to benefit fully from Universal primary education.

The public toilet coverage at landing sites improved from 17% in 2002 to 45% by 2008 but plummeted to 39% in 2010. The improvement of sanitation at landing sites appears to be reducing and should be rejuvenated. Much more needs to be done towards achieving full public toilet coverage of all landing sites. Another basic requirement to ensure proper hygiene and sanitation at landing sites is access to portable water. The number of landing sites with portable water remained the same (i.e. 88) in 2008 and 2010 indicating that no new investment was made in this area over the last two years. Effort should be put in to provide portable water at landing sites. There was a decrease in the number of landing sites accessible by all-weather roads, a trend that suggests reduced attention to rural feeder roads by local

governments. Local authorities should pay more attention to the roads leading to landing sites.

2. The 2010 Frame survey showed moderate changes in most fishing effort parameters observed in 2008. Apart from the number of fishers which increased by almost 10%, the increase in number of fishing crafts was only 2% and the major fishing gears (i.e. hooks and gillnets) actually reduced in numbers. This contrasts with surveys before 2008 when large increases were noted in these parameters. It appears the Nile perch and tilapia fisheries which are in a state of depletion were not encouraging new investments into fishing. 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 this fishery is likely to have contributed to increase in number of fishers because this fishery is more labour intensive, engaging three to five persons per boat, unlike the Nile perch and tilapia fisheries which normally engage two persons per boat.

Illegal beach/boat seines that target very small sizes of Nile perch were still encountered in the lake although their number decreased between 2008 and 2010. Similarly, illegal monofilament gillnets were encountered and they increased by 8% over the last two years. More dedicated efforts are required to eradicate these destructive gears from the lake.

3. The status of mode of propulsion of fishing crafts did not change much from 2008 to 2010. Paddles remained the main mode of propulsion with 70% of all crafts implying that the fishing effort is still concentrated in the near shore waters. Instead of adopting the use of sails to access distant fishing grounds, the number of crafts using sails actually decreased by half over the period and only 2.9% of fishing boats used sails in their operations in 2010. There is still need to reduce fishing effort in near shore areas by promoting the use of large fishing crafts with sails or a combination of sail and outboard motor.

4. The Mukene fishery in the Ugandan waters of Lake Victoria has remained underdeveloped with only 16% of all fishing crafts engaged in this fishery in 2010. Also only 2.9% of fishing crafts with sails or motor operated in this fishery which implies that it is limited to near shore waters. With this limited fishing effort for Mukene, its fishery contributes more than 50% of the fresh weight of fish landings in the Uganda side of the lake. Efforts should be made to develop this fishery as it appears to have high potential, especially in deep offshore waters which are hardly fished. The Catamaran (paired boats) and lift net technology mainly employed in the Tanzanian part of the lake to access the deep waters was being piloted by a private investor at Gerenge landing site near Entebbe two years. These trails have since stopped when the Tanzanian crew departed and Ugandan fishers were not keen on taking over. The issues preventing adoption of this technology on the Uganda side of the lake should be evaluated because in the long term it could boost the Mukene fishery in the Ugandan waters of the lake.

5. REFERENCES

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6. APPENDICES

Appendix 1: FRAME SURVEY RECORDING FORM (REVISED IN 2010)

PART A: DOCUMENT IDENTIFICATION AND LOCATION DETAILS

Date					1
Name of Enumerator					2
Telephone No.					3
Status/ rank of respondent (e.g. BMU chair, secretary or other –specify)					4
Country					5
District					6
Sub-county/ division					7
Location/ parish/ward					8
Sub-location (Ke)/LC1 (Ug)/Village (Tz)					9
Name of landing site					10
Name of BMU (if different from name of landing site)					11
Is the landing site on an island	Yes		No		12
If yes name the island					13
Is there a primary school within 2 km?	Yes		No		14
Is there a health clinic within 2 km?	Yes		No		15
Has this landing site received any of the following HIV/AIDS services the last one year?					
1. Awareness raising	Yes		No		16
2. Voluntary Counselling and Testing (VCT)	Yes		No		17
3. Provision of Anti Retroviral drugs (ARVs)	Yes		No		18
4. Help to orphans, widows	Yes		No		19

PART B: SUMMARY OF NUMBER OF NON-FISHING CRAFT AT LANDING SITE

VESSEL CATEGORY	NUMBER	
How many derelict/ irreparable fishing craft?		20
How many transport craft (for only fish/fish carriers)?		21
How many transport craft (other purposes)?		22

PART C: LANDING SITE FACILITIES

Is there any cell phone network access?			Yes	No	23
Is there a banda at the landing site?			Yes	No	24
Is there a cold room?			Yes	No	25
If yes, does the cold room work?			Yes	No	26
Does the landing site have any of the following fish processing facilities?					
1. Drying racks			Yes	No	27
2. Smoking kilns			Yes	No	28
3. Others (specify)					29
Is there a fish store?			Yes	No	30
Is there a jetty?			Yes	No	31
Is there pontoon?			Yes	No	32
Does the landing site have mains electricity?			Yes	No	33
If “No” how far to the nearest electricity supply (km)					
	< 1	1 - 5	6 - 10	> 10	34
Is there a public toilet facility?			Yes	No	35
Is there a potable water supply?			Yes	No	36
For how many years has this landing side had access to potable water?					37
Is the landing site accessible by all-weather road?			Yes	No	38
If “No” how far to the nearest all-weather road (km)?					
	<1	1-5	6-10	>10	39
Is there a net repair facility?			Yes	No	40
Is there a shop selling fishing gear?			Yes	No	41
Is there a boat repair facility?			Yes	No	42
Is there an engine repair facility?			Yes	No	43
Are fisheries staff resident at this site?			Yes	No	44
Is the BMU office at this site?			Yes	No	45
In which year was the BMU office built?					46
Is there a fenced area at this site for fish handling?			Yes	No	47
Is the land at this site privately owned?			Yes	No	48
Do fish factory agents buy fish from the site?			Yes	No	49
If yes, for which fish processing companies?					50
Is tax collection tendered to private organisations on behalf of local/central government at the site?			Yes	No	51
Are fish movement permits issued at this site daily?			Yes	No	52
Are fish landed at this site for:					
	< 5 months a year		> 5 months a year	All year-round	53

PART D: DETAILS OF ALL OPERATIONAL FISHING CRAFT AND GEARS

SHEET NUMBER	

District________________ Location/Parish/Ward___________________ Sub-location/LC1/Village_________________ Landing site name _________________

54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
CRAFT				PROPULSION					GILLNETS																	SMALL SEINE			LONG LINE HOOKS				OTHER GEAR TYPES						
										GILLNET MESH SIZES																MESH SIZE (mm)			HOOK SIZES										
S/N	Registration No.	Craft Type (Code)	Length (m)	Code	HP	Target Spp Code	No of Crew	Main Gear Type code	Gillnet oper. code	<2½	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	9	10	>10	≤5	6-9	10	<4	4-7	8-10	>10	BS	CN	HL	TR	MF	LN	BAIT TYPE for LL /HL

PART E: CODES

NOTES ON CRAFT

Operational Fishing Craft- craft that are fishing
Derelict Craft (non-operational)- damaged craft beyond repair
Transport Craft (for fish)- Craft solely for transporting fish
Transport Craft (other purpose) - craft used for transport only (and never for fishing)

EXPLANATION OF CODING

CRAFT TYPE (and CODES)

1. Sesse flat at one end (SF)
2. Sesse pointed at both ends (SP)
3. Parachute (PA)
4. Dugout (DO)
5. Raft (RA)
6. Foot Fishers
7. Catamarans

Length: Measured in metres using a tape measure or a knotted rope

PROP: Method of propulsion: - State main method

1. Inboard motor (I)
2. Outboard motor (O)
3. Paddles (P)
4. Sail (S)
5. Towed by Motorized boat (T)

HP: If PROP is inboard or outboard engine state the Horse power, e.g. 15

CREW: Number of crew who normally accompany the craft

GEAR TYPES:

GN Gill Net: State number per mesh size in inches
LL Long Lines: State number of hooks by sizes
BS Beach seine: state a complete set
CN Cast net: State number
HL Hand Line: State number of lines
TR Traps: State number
LN Lift net: State number
SN Scoop net: State number
SS Small seine: Targeting Dagaa/Omena/ Mukene: State number per mesh size in mm
MF Monofilament: State the number

GILLNET OPERATION MODE:

A Active
D Drift
ST Stationary

GILLNET VERTICAL PANEL CODE:	**SPECIES TARGETED**	**LONG/ HAND LINE BAITS**
S-Single Panel;	1.*Lates (*Mbuta*);*	1.*Clarias*
D-Double Panel;	2.*Rastrineobola(*Omena*)*	2.Haplochromines
T-Triple Panel;	3.Tilapiines (Ngege)	3.*Synodontis*
Q-Quadruple Panel	4.*Clarias*(Mumi*)*	4.*Mormyrus*
	5.*Protopterus(*Mamba*)*	5.*Rastrineobola*
	6.*Synodontis(Okoko)*	6.Earth Worms
	7.Haplochromines(Fulu, nkeje)	7.Algae

Note: Translate species names into local languages as in the example above.

Appendix 2a. Summary of Lake Victoria Frame survey time series data for Busia, Bugiri & Mayuge districts

	District	Busia						Bugiri						Mayuge					
	ITEM / YEAR	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010
1	**Landing sites**																		
1.1	Number of landing sites	4	4	4	4	4	4	74	59	66	66	59	72	63	51	55	48	53	58
2	**Landing site facilities**																		
2.1	Bandas	1	1	2	2	0	1	10	4	2	8	16	19	8	2	1	4	5	6
2.2	Cold rooms (working)	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	
2.3	Cold rooms (Non working)	0	0	0	0	0		0	0	4	1	0		0	0	0	1	0	
2.4	Pontoon/Jetty	1	0	0	0	0	1	4	0	0	2	2	2	0	0	0	2	0	2
2.5	Fish stores	1	1	1	1	1	1	4	0	0	0	2	0	3	0	0	0	3	0
2.6	Electricity supply	0	0	1	1	2	2	0	0	0	0	2	1	1	0	0	0	1	0
2.7	Toilet facilities	0	0	0	3	3	2	-	2	2	13	18	16	-	0	3	4	17	13
2.8	Potable water	0	0	0	0	0	2	-	0	2	6	7	5	-	0	2	8	22	20
2.9	All weather roads	4	3	3	3	3	3	5	7	4	19	8	14	30	10	23	18	24	18
2.1	Boat repair facilities	0	0	0	3	0	2	28	0	0	27	18	12	42	0	2	11	21	13
2.11	Net repair facilities	0	4	0	0	0	1	28	0	0	16	5	8	42	0	0	8	5	7
3	**Fisheries staff:**				0														
3.1	Fisheries staff resident	1	0		0		0	7	1		0		9	14	0	0	0		3
4	**Fishers:**																		
4.1	No. of fishers	388	470	292	276	323	337	5292	6,033	5,315	8,674	9,017	8,831	5744	5,444	5,367	5,427	5763	6,982
5	**BMU presence**																		
5.1	No. of landing sites with BMUs						3						56						42
6	**Fishing crafts**																		
6.1	Total No. of fishing crafts	177	197	136	153	144	160	2044	2,338	2,133	3,389	3,549	2,937	2428	2,213	2,251	2,211	2347	2,618
6.2	**Mode of Propulsion**																		
6.2.1	No. using outboard engines	4	5	6	6	1		323	591	517	862	1,017	416	150	158	140	251	245	474
6.2.2	No. using inboard engines	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
6.2.3	No. using paddles	173	184	123	83	143	156	1325	1,175	1,111	1,572	1,863	2,039	2093	1,764	1,799	1,620	1805	1,978
6.2.4	No. using sails	0	8	7	6	-	3	396	572	505	939	669	477	185	291	311	326	297	165
6.2.5	Blank/N/A Foot Fishers				58	-					16	-					14	-	

	District	Busia						Bugiri						Mayuge					
	ITEM / YEAR	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010
6.3	**Craft Types:**																		
6.3.1	Dugout	0	0	0	0	-		0	0	0	0	40	12	1	1	0	1	-	3
6.3.2	Foot Fishers	0	0	0	58	35	12				18	1	11				16	44	22
6.3.3	Parachute	157	171	120	28	35	49	950	771	746	601	666	1,028	1360	1239	119	668	613	546
6.3.4	Sesse flat at one end	13	15	10	42	56	51	531	776	692	1,515	1,590	768	396	354	424	906	950	1,280
6.3.5	Sesse pointed at both ends	7	10	6	25	38	54	551	768	688	1,255	1,253	1,120	665	606	542	562	670	664
6.3.6	Rafts	0	0	0	0	15	6	0	0	0	0	-	9	0	0	86	58	114	125
6.3.7	Other/Unspecified	0		0	0	0		0	0	0	0	-		0	0		0	0	
7	**Transport crafts**																		
7.1	No. Transport crafts (Non-Fishing)	3	3	6	4	9	18	120	100	58	105	153	165	60	65	51	67	129	126
8	**Derelict crafts**																		
8.1	No. Derelict crafts	7	16	29	6	9	17	324	399	546	685	600	461	519	369	432	393	444	398
9	**Fishing gears:**																		
9.1	**Gillnets by size**																		
9.1.1	Gill net, mesh size < 2½"	180	304	154	159	494	622	0	0	0	47	133	163	45	0	0	70	0	188
9.1.2	Gill net, mesh size 2½"	0	63	90	59	26	15	15	158	0	32	103	333	97	0	120	139	197	223
9.1.3	Gill net, mesh size 3"	106	94	166	21	17	4	163	1,416	1439	786	875	1,325	409	391	1672	728	597	455
9.1.4	Gill net, mesh size 3½"	142	107	90	11	22	15	1135	2,110	1709	1,049	1,520	1,635	3817	2,215	4448	1,416	1,447	1,132
9.1.5	Gill net, mesh size 4"	91	127	140	10	8	14	2114	2,340	2603	780	844	595	4912	2,411	3732	779	655	816
9.1.6	Gill net, mesh size 4½"	40	11	102	47	40		1268	6,453	2203	760	1,452	540	3540	1,549	2747	538	718	1,153
	Total No. of gillnets <5"	**559**	**706**	**742**	**307**	**607**	**670**	**4,695**	**12,477**	**7,954**	**3,454**	**4,927**	**4,591**	**12,820**	**6,566**	**12,719**	**3,670**	**3614**	**3,967**
9.1.7	Gill net, mesh size 5"	20	115	192	197	138	24	2796	5,658	7015	6,428	5,605	2,507	2941	6,287	5612	6,001	4,624	2,353
9.1.8	Gill net, mesh size 5½"	1	27	51	228	102	4	1399	26,778	2788	16,606	18,571	1,063	79	1,132	955	4,390	2,361	1,788
9.1.9	Gill net, mesh size 6"	295	121	281	234	83	10	15118	30,381	28555	29,002	20,373	6,994	6656	13,630	6239	3,823	3,138	9,468
9.1.10	Gill net, mesh size 6½"	20	0	0	120	8		3456	17,418	5531	3,578	3,250	1,740	125	220	418	1,516	120	654
9.1.11	Gill net, mesh size 7"	52	118	89	30	15	20	13116	13,247	11961	3,596	2,775	4,617	2425	2,891	926	1,038	527	3,488
9.1.12	Gill net, mesh size 7½"	0	0	0	0	-		247	678	45	235	115	88	6	14	89	52	20	210
9.1.13	Gill net, mesh size 8"	15	11	38	0	-		280	1,475	180	297	380	706	993	478	298	377	744	358
9.1.14	Gill net, mesh size 9"	0	9	0	0	-		90	1,652	90	139	44		343	123	119	130	450	75
9.1.15	Gill net, mesh size 10"	5	0	0	0	-		541	291	44	10	20		771	173	119	103	390	50

	District	Busia						Bugiri						Mayuge					
	ITEM / YEAR	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010
9.1.16	Gill net, mesh size > 10"	0	0	0	0	-		0	288	0	237	-	20	30	0	0	0	0	
	Total No. of gillnets ≥5"	**408**	**401**	**651**	**809**	**346**	**58**	**37,043**	**97,866**	**56,209**	**60,128**	**51,133**	**17,735**	**14369**	**24,948**	**14775**	**17,430**	**12,374**	**18,444**
	Total No. of all gillnets	**967**	**1,107**	**1,393**	**1,116**	**953**	**728**	**41,738**	**110,343**	**64,163**	**63582**	**56,060**	**22,326**	**27189**	**31514**	**27494**	**21100**	**15,988**	**22,411**
9.2	**Dagaa fishing gears:**																		
9.2.1	Scoopnet				0	-					1	16	49				4	1	9
9.2.2	Lift net/Lampara	0			0	-				0	0	-					0	0	
9.2.3	Small seine, mesh size <=5 mm	-			5	5	15				200	258	377				142	202	224
9.2.4	Small seine, mesh size 6-9 mm	1			0	-	1	436			4	2	58	138			3	55	56
9.2.5	Small seine, mesh size 10mm				0	-					0	37	1				2	5	2
9.3	**Hooks**																		
9.3.1	No. of Hook and line/Hand line hooks	452	666	392	582	665	375	1053	916	10,149	4,105	2,718	2,535	708	1,848	2,524	2,384	3,642	3,588
9.3.2	No. Long line hooks	6015	9,953	10570	2,272	1975	1400	92617	278,382	314,139	638,728	817,720	419,161	55710	123,864	174,520	204,753	294,338	407,231
9.4	**Other gears**																		
9.4.1	Beach/Boat seine	11	23	2	2	6	17	41	69	1	140	155	101	269	207	182	214	222	233
9.4.2	Cast net	17	23	9	8	18	19	133	92	45	145	205	314	265	209	140	120	170	174
9.4.3	Monofilament	0	0		0	25	286	-	13		0	2,520	2,826	-	1		0	627	1,943
9.4.4	Traps/Baskets	41	29	34	2	56	134	568	384	243	10	940	894	3796	1,644	1,313	60	1,372	1,035
9.4.5	Other/Unspecified	0	0			-		2	20	52	23	-		1	82		4	0	

Appendix 2b. Summary of Lake Victoria Frame survey time series data for Jinja, Mukono and Kampala districts

	District	Jinja						Mukono						Kampala					
	ITEM / YEAR	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010
1	**Landing sites:**																		
1.1	Number of landing sites	24	16	13	10	10	10	240	234	247	197	165	193	6	7	7	6	4	6
2	**Landing site facilities:**																		
2.1	Bandas (Fish sheds)	1	3	1	3	2	3	7	4	4	16	26	30	0	0	0	1	0	1
2.2	Cold rooms (working)	0	0	0	0	0			0	0	0	2		0	0	0	0	0	
2.3	Cold rooms (Non working)	0	1	0	0	0		3	0	0	0	0		0	0	0	0	0	
2.4	Pontoon/Jetty	1	2	0	1	1	1	12	1	2	2	6	4	0	0	0	1	1	1
2.5	Fish stores	1	3	1	1	2	2	4	0	1	5	9	15	0	0	0	0	0	0
2.6	Electricity supply	6	3	2	1	3	2	0	1	1	4	4	2	1	2	4	4	3	3
2.7	Toilet facilities	-	9	2	7	4	7	-	40	40	41	61	55	-	4	2	4	2	3
2.8	Portable water	-	3	2	2	4	4	-	9	3	3	17	10	-	3	2	4	2	3
2.9	All weather roads	-	7	6	6	6	4	35	25	20	62	50	52		2	5	5	3	3
2.1	Boat repair facilities	3	2	0	0	1	4	76	17	5	56	47	90	1	3	1	3	2	2
2.11	Net repair facilities	3	0	0	0	0	0	76	4	1	12	24	49	1	4	0	0	0	2
3	**Fisheries staff:**																		
3.1	Fisheries staff resident	1	2	-	1		8	13	7		18		18	1	1		0		0
4	**Fishers**																		
4.1	No. of fishers	678	754	659	507	548	574	11450	15,255	14,095	20,108	17743	20,565	200	233	293	273	266	322
5	**BMU presence**																		
5.1	No. of landing sites with BMUs		-	-			6						154		-	-			5
6	**Fishing crafts**																		
6.1	Total No. of fishing crafts	293	360	340	246	315	313	4865	6,543	5,842	8,735	7691	8,612	104	116	169	142	136	181
6.2	Mode of Propulsion																		
6.2.1	No. using outboard engines	0	18	1	1	3	7	700	1,151	1,382	1,960	2119	2,986	1	0	4	1	5	19
6.2.2	No. using inboard engines	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	
6.2.3	No. using paddles	293	342	334	240	312	306	4093	5,197	4,264	6,567	5463	5,532	103	116	165	141	131	161
6.2.4	No. using sails	0	1	5	5	0		72	195	196	182	109	31	0	0	0	0	0	
6.2.5	Blank/NA including Foot Fishers				0	0					26	0					0	0	

	District	Jinja						Mukono						Kampala					
	ITEM **YEAR**	**2000**	**2002**	**2004**	**2006**	**2008**	**2010**	**2000**	**2002**	**2004**	**2006**	**2008**	**2010**	**2000**	**2002**	**2004**	**2006**	**2008**	**2010**
6.3	**Craft types:**																		
6.3.1	Dugout	-	12	4	0	-		220	137	115	117	112	89	0	0	0	0	1	
6.3.2	Foot Fishers					-	2				27	5	19				0	-	
6.3.3	Parachute	-	173	230	52	82	26	722	230	969	880	907	907	14	12	30	6	6	15
6.3.4	Sesse flat at one end	-	154	49	112	133	159	3518	4,973	4,226	7,010	5894	6,799	89	104	139	135	128	166
6.3.5	Sesse pointed at both ends	-	21	57	82	100	128	401	639	531	691	776	784	0	0	0	1	1	
6.3.6	Rafts	-	-	0	0	0		-	0	1	10	2	3	-	0	0	0	0	
6.3.7	Other/Unspecified			0	0	0			0	0	0	0			0	0	0	0	
7	**Transport crafts**																		
7.1	No. Transport crafts (Non-Fishing)	76	47	36	51	16	72	312	271	172	373	595	640	50	17	57	120	101	114
8	**Derelict crafts**																		
8.1	No. Derelict crafts	73	73	76	70	55	74	960	1,217	1,434	1,856	2202	2,173	4	21	29	24	24	26
9	**Fishing gears:**																		
9.1	**Gillnets by size**																		
9.1.1	Gill net, mesh size < 2½"	0	0	0	0	6		9	14	0	230	335	320	35	0	25	0	30	40
9.1.2	Gill net, mesh size 2½"	0	2	0	0	0		84	33	48	121	142	124	0	10	89	1	40	
9.1.3	Gill net, mesh size 3"	9	26	37	87	48	36	788	1,224	1871	1,976	1,949	2,878	51	175	76	183	88	20
9.1.4	Gill net, mesh size 3½"	89	53	104	72	74	2	1812	1899	4413	4,916	4,056	3,478	99	49	38	5	196	71
9.1.5	Gill net, mesh size 4"	142	145	60	62	68	133	5559	5,104	9450	5,631	4,182	4,295	186	52	114	34	25	50
9.1.6	Gill net, mesh size 4½"	90	259	30	39	105	64	7139	6868	8826	9,152	6,124	9,341	173	104	190	14	108	85
	Total No. of gillnets <5"	**330**	**485**	**231**	**260**	**302**	**235**	**15,391**	**15,142**	**24,608**	**22,026**	**16,788**	**20,436**	**544**	**390**	**532**	**237**	**487**	**266**
9.1.7	Gill net, mesh size 5"	456	884	231	670	489	814	21212	27,772	20818	25,923	17,827	18,219	95	502	304	77	126	324
9.1.8	Gill net, mesh size 5½"	144	151	112	232	53	62	2520	4841	3597	9,697	7,236	12,607	0	0	13	0	37	60
9.1.9	Gill net, mesh size 6"	234	361	113	204	70	174	28662	69,466	54932	63,083	52,328	44,032	36	285	140	30	90	241
9.1.10	Gill net, mesh size 6½"	0	25	7	1	15	40	3326	5867	3501	17,904	10,108	42,052	0	0	0	0	0	70
9.1.11	Gill net, mesh size 7"	24	450	22	0	92	104	20317	31,097	22017	13,975	8,899	17,370	26	153	76	100	70	105
9.1.12	Gill net, mesh size 7½"	0	0	0	0	0		901	465	1679	1,978	619	1,418	0	0	0	0	75	150
9.1.13	Gill net, mesh size 8"	0	119	7	200	0	105	3730	5,119	8586	4,180	5,587	9,955	47	191	89	163	71	340
9.1.14	Gill net, mesh size 9"	0	50	0	8	0		774	524	7291	1,233	833	1,622	0	0	26	30	30	189
9.1.15	Gill net, mesh size 10"	0	100	7	1	0		2960	1,703	2734	589	770	100	15	28	63	0	0	95

	District	Jinja						Mukono						Kampala					
	ITEM YEAR	**2000**	**2002**	**2004**	**2006**	**2008**	**2010**	**2000**	**2002**	**2004**	**2006**	**2008**	**2010**	**2000**	**2002**	**2004**	**2006**	**2008**	**2010**
9.1.16	Gill net, mesh size > 10"	0	150	0	0	0		595	6	960	74	0	870	0	0	0	3	-	
	Total No. of gillnets ≥5"	**858**	**2,290**	**499**	**1,316**	**719**	**1,299**	**84,997**	**146,860**	**126,115**	**138,636**	**104,207**	**148,245**	**219**	**1,159**	**711**	**403**	**499**	**1,574**
	Total No. of all gillnets	**1,188**	**2,775**	**730**	**1,576**	**1021**	**1,534**	**100,388**	**162,002**	**150,723**	**160,662**	**120,995**	**168,681**	**763**	**1,549**	**1,243**	**640**	**986**	**1,840**
9.2	**Dagaa fishing gears:**																		
9.2.1	Lift net/Lampara				0	-					62	0	84				0	0	
9.2.2	Scoop net	0	0	0	2	-		0	223	177	81	243		0	0	0	0	5	
9.2.3	Small seine, mesh size <=5 mm				0	0	4				621	735	876				4	0	
9.2.4	Small seine, mesh size 6-9 mm				0	0					82	174	48				1	0	
9.2.5	Small seine, mesh size 10mm				0	0					19	23	11				0	7	
	Total small seines	**1**	**6**	**0**		**0**		**797**	**459**	**477**		**932**		**0**	**0**	**1**		**7**	
9.3	**Hooks**																		
9.3.1	No. of Hook and line/Handline hooks	313	554	958	539	1015	730	1594	2,024	2,406	5,393	7,013	5,300	44	0	357	121	336	404
9.3.2	No. Long line hooks	1305	5,952	3,280	5,983	5385	11,350	36714	251,288	273,672	910,992	1,043,120	923,038	0	1,821	1733	873	1365	2,900
9.4	**Other gears**																		
9.4.1	Beach/Boat seine	6	5	2	1	1	2	295	384	511	562	606	541	4	13	16	22	34	35
9.4.2	Cast net	92	54	81	28	79	74	428	264	242	169	262	215	22	19	14	1	12	24
9.4.3	Monofilament	0	0	0	0	6	92	0	4	0	0	843	2,139	0	0	0	0	12	19
9.4.4	Traps/Baskets	203	27	38	0	4	81	1911	402	16	30	11	247	92	92	219	0	152	100
9.4.5	Other/Unspecified	2	3	0	0	0		61	131	31	8	0	5	0	0	0	0	0	

Appendix 2c. Summary of Lake Victoria Frame survey time series data for Wakiso, Mpigi and Masaka districts

	District	Wakiso						Mpigi						Masaka					
	ITEM / YEAR	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010
1	**Landing sites**																		
1.1	Number of landing sites		59	44	34	31	42	57	21	19	23	18	25	30	20	21	24	23	22
2	**Landing site facilities**																		
2.1	Bandas		8	4	8	5	9	6	1	2	6	3	9	6	2	0	0	1	3
2.2	Cold rooms (working)		1	0	3	0		0	0	0	0	0		0	0	0	0	0	
2.3	Cold rooms (Non working)		1	0	0	0		3	0	0	0	0		0	0	0	0	0	
2.4	Pontoon/Jetty		2	4	5	4	3	5	0	1	0	1	1	1	0	0	0	0	1
2.5	Fish stores		2	6	4	3	6	4	0	0	0	0	0	0	0	0	4	1	3
2.6	Electricity supply		3	11	5	5	5	6	0	0	0	0	0	2	0	0	0	1	5
2.7	Toilet facilities		0	5	19	16	18	0	0	2	15	12	15	0	0	5	13	14	15
2.8	Portable water		0	5	10	13	10	0	0	2	1	2	3	0	0	5	4	3	4
2.9	All weather roads		19	25	14	15	20	30	11	7	14	12	13	12	7	13	11	10	12
2.1	Boat repair facilities		3	4	0	8	8	27	0	2	4	8	9	14	2	0	3	7	8
2.11	Net repair facilities		1	1	0	5	3	27	1	0	2	3	3	14	0	0	4	6	8
3	**Fisheries staff**																		
3.1	Fisheries staff resident		0		4		2	8	0	0	3		0	11			3		9
4	**Fishers**																		
4.1	No. of fishers		2,938	2,624	4,127	3,647	4,126	3,460	1,438	1,437	1,583	1,602	1,677	1,892	1,896	1,410	2,312	2,653	3,275
5	**BMU presence**																		
5.1	No. of landing sites with BMUs						30						20						16
6	**Fishing crafts**																		
6.1	Total No. of fishing crafts		1,539	1,340	2,022	1,862	2,119	1867	881	820	802	778	833	1000	896	889	1,182	1,313	1,468
6.2	Mode of Propulsion																		
6.2.1	No. using outboard engines		167	163	281	256	367	126	25	46	69	71	80	146	215	57	173	216	259
6.2.2	No. using inboard engines		0	0	0	0		0	0	0	0	0		0	0	0	0	0	
6.2.3	No. using paddles		1,371	1,171	1,712	1,605	1,745	1,736	856	768	730	707	754	854	277	732	1,001	1,095	1,206
6.2.4	No. using sails		1	7	6	1	4	5	0	6	1	-		0	4	0	0	2	
6.2.5	Blank/NA including Foot Fishers				23	-					2	-					8	-	

	District	Wakiso						Mpigi						Masaka					
	ITEM / YEAR	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010
6.3	**Craft types**																		
6.3.1	Dugout		1	0	1	2			4	2	3	0	2	0	0	0	3	1	
6.3.2	Foot Fishers				24	74	28				7	2	17				8	9	43
6.3.3	Parachute		151	479	618	667	752		586	435	354	342	393	636	489	632	723	714	916
6.3.4	Sesse flat at one end		216	79	1,265	1,111	1,265		285	369	425	422	430	343	387	250	429	587	536
6.3.5	Sesse pointed at both ends		16	71	114	77	97		6	11	9	13	8	16	19	1	9	7	1
6.3.6	Rafts		0	0	0	2	5		0	0	4	1		0	0	6	10	4	15
6.3.7	Other/Unspecified		0	0	0	0		1	0	3	0	0		5	0	0	0	0	
7	**Transport crafts**																		
7.1	No. Transport crafts		106	107	139	270	311	149	5	7	19	60	30	35	30	9	12	13	19
8	**Derelict crafts**																		
8.1	No. Derelict crafts		261	199	412	271	324	272	94	101	68	121	150	203	194	159	212	244	179
9	**Fishing gears**																		
9.1	**Gillnets by size**																		
9.1.1	Gill net, mesh size < 2½"		24	0	10	35	199	10	32	0	27	29	165	365	547	134	266	262	681
9.1.2	Gill net, mesh size 2½"		3	0	170	329	350	77	34	24	20	15	163	11	145	187	59	262	535
9.1.3	Gill net, mesh size 3"		319	715	471	890	709	754	193	720	543	1,052	719	445	301	695	676	353	2,406
9.1.4	Gill net, mesh size 3½"		1,104	1101	1,096	867	936	1279	425	1225	1,450	1,562	1,156	805	605	1497	1,539	1,184	1,576
9.1.5	Gill net, mesh size 4"		1,187	7107	1,461	3,282	1,798	3061	1,072	4154	3,015	2,909	1,169	1767	1,360	3502	2,610	1,592	3,559
9.1.6	Gill net, mesh size 4½"		2,834	1830	6,128	3,648	2,145	3223	1,363	4370	2,631	2,098	1,400	1819	3,588	7272	4,140	2,419	1,583
	Total No. of gillnets <5"		**5,471**	**10,753**	**9,336**	**9,051**	**6,137**	**8,404**	**3,119**	**10,493**	**7,686**	**7,666**	**4,772**	**5,212**	**6,546**	**13,287**	**9,290**	**6,072**	**10,340**
9.1.7	Gill net, mesh size 5"		7,384	2,860	8,255	6,988	5,397	6,338	5,519	14,563	4,483	6,090	5,023	7,198	6,577	7,807	6,352	4,803	1,922
9.1.8	Gill net, mesh size 5½"		3,659	1,030	2,774	1,878	2,243	1,446	786	1,393	2,850	3,538	3,508	5,327	3,269	2,059	874	3,116	1,897
9.1.9	Gill net, mesh size 6"		5,833	2,473	5,795	2,885	7,137	9,785	2,261	2,761	4,055	1,930	1,489	3,789	1,799	1,604	1,910	4,408	2,747
9.1.10	Gill net, mesh size 6½"		122	443	839	200	861	148	300	120	150	100		80	65	321	84	57	275
9.1.11	Gill net, mesh size 7"		2,169	772	2,221	1,273	2,697	4,137	789	697	1,405	1,149	400	516	2,432	267	1,096	2,600	575
9.1.12	Gill net, mesh size 7½"		0	0	355	35	191	116	20	0	70	210	30	0	0	27	70	78	
9.1.13	Gill net, mesh size 8"		8	315	2,071	769	1,257	822	330	192	850	210		231	710	294	382	442	185
9.1.14	Gill net, mesh size 9"		43	72	1,186	115	470	379	0	24	300	50		0	60	0	0	70	49
9.1.15	Gill net, mesh size 10"		418	114	0	65	117	837	0	0	2	30		0	0	0	0	0	40

	District	Wakiso						Mpigi						Masaka					
	ITEM / YEAR	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010
9.1.16	Gill net, mesh size > 10"		2	0	0	0		0	0	0	0	0		0	2	0	150	0	
	Total No. of gillnets ≥5"		**19,638**	**8,079**	**23,496**	**14,208**	**20,370**	**24,008**	**10,005**	**19,750**	**14,165**	**13,307**	**10,450**	**17,141**	**14,914**	**12,379**	**10,918**	**15,574**	**7,690**
	Total No. of all gillnets		**25,109**	**18,832**	**32,832**	**23,259**	**26,507**	**32,412**	**13,124**	**30,243**	**21,851**	**20,973**	**15,222**	**22,353**	**21,460**	**25,666**	**20,208**	**21,646**	**18,030**
9.2	Dagaa fishing gears																		
9.2.5	Scoop net		15	5	0	16	4	0	0	0	1	1	1	0	0	2	5	8	4
9.2.1	Lift net/Lampara				0	3					0	-					0	-	
9.2.2	Small seine, mesh size <=5 mm				96	86	27				0	48	36				113	172	132
9.2.3	Small seine, mesh size 6-9 mm				5	-	97				6	14					0	11	
9.2.4	Small seine, mesh size 10mm				6	-	20				2	-					0	0	
9.3	**Hooks**																		
9.3.1	No. of Hook and line/Handline hooks		160	164	1,788	2,112	2,120	100	8	14	112	575	590	39	2	60	16	146	288
9.3.2	No. Long line hooks		56,113	54,725	179,916	182,230	169,424	20,225	37,667	44,972	40,570	36,326	25,025	6,130	64,370	2,780	43226	29638	52,059
9.4	**Other gears**																		
9.4.1	Beach/Boat seine		73	59	122	157	162	94	30	26	47	108	107	25	8	14	83	176	128
9.4.2	Cast net		125	52	86	140	174	154	20	37	14	44	43	71	9	5	27	13	34
9.4.3	Monofilament		7	0	0	884	632	0	0	0	0	45	116	0	0	0	0	3,901	2,635
9.4.4	Traps/Baskets		582	257	79	486	371	1,494	598	694	0	152	595	2,685	2,016	2,471	234	4,390	6,309
9.4.5	Other/Unspecified				9	0	17				0	0					0	0	

Appendix 2d. Summary of Lake Victoria Frame survey time series data for Rakai & Kalangala districts.

	District	Rakai						Kalangala					
	ITEM / YEAR	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010
1	**Landing sites**												
1.1	Number of landing sites	7	7	10	7	6	7	92	82	68	62	62	64
2	**Landing site facilities**												
2.1	Bandas	1	1	1	1	1	2	16	9	4	5	9	5
2.2	Cold rooms (working)	0	0	0	0	0		0	0	0	0	0	
2.3	Cold rooms (Non working)	0	0	0	0	0		1	0	0	0	0	
2.4	Pontoon/Jetty	0	0	0	1	1	1	10	0	0	0	9	4
2.5	Fish stores	0	0	0	0	0	0	59	0	2	3	13	4
2.6	Electricity supply	0	0	0	0	0	1	0	1	0	2	1	0
2.7	Toilet facilities	-	0	0	5	4	5	-	40	20	47	45	49
2.8	Portable water	-	0	0	0	0	0	-	6	20	17	18	27
2.9	All weather roads	3	2	1	2	1	3	13	15	20	18	29	21
2.1	Boat repair facilities	5	0	0	3	3	1	53	13	9	23	28	40
2.11	Net repair facilities	5	0	0	0	3	0	53	14	2	7	13	20
3	**Fisheries staff**												
3.1	Fisheries staff resident	5	0	-	1		1	9	7	-	4		6
4	**Fishers**												
4.1	No. of fishers	657	1,002	831	1,155	1,327	1,296	5128	6,305	5,398	9,706	9027	8,972
5	**BMU presence**												
5.1	No. of landing sites with BMUs	-	-	-		-	6	0	0	0		-	62
6	**Fishing crafts**												
6.1	Total No. of fishing crafts	280	384	321	469	562	565	2486	3,145	2,534	4,797	3,139	3,679
6.2	Mode of Propulsion												
6.2.1	No. using outboard engines	111	216	149	261	257	311	470	704	608	1,182	966	1,415
6.2.2	No. using inboard engines	0	0	0	0	0		0	0	0	0	0	
6.2.3	No. using paddles	169	168	172	207	305	251	2009	2,438	1,866	3,602	2,173	2,261
6.2.4	No. using sails	0	0	0	1	0		7	2	59	0	-	2
6.2.5	Blank/NA including Foot Fishers				0	-					13	-	

	District	Rakai						Kalangala					
	ITEM / YEAR	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010
6.3	**Craft types:**												
6.3.1	Dugout	-	1	1	0	1		-	0	1	7	6	1
6.3.2	Foot Fishers				0	2	3				13	4	16
6.3.3	Parachute	141	122	88	95	182	165	437	589	516	1,039	593	559
6.3.4	Sesse flat at one end	137	256	227	372	378	391	1955	2,497	1,890	3,672	2,460	3,077
6.3.5	Sesse pointed at both ends	2	5	5	2	1	3	66	58	63	66	80	42
6.3.6	Rafts	0	0	0	0	-	6	0	0	55	0	-	
6.3.7	Other/Unspecified	0	0	0	0	-		0	0	5	0	-	
7	**Transport crafts**												
7.1	No. Transport crafts (Non-Fishing)	6	12	19	3	11	14	99	102	72	73	230	188
8	**Derelict crafts**												
8.1	No. Derelict crafts	86	39	86	55	52	71	377	515	456	768	814	517
9	**Fishing gears**												
9.1	**Gillnets by size**												
9.1.1	Gill net, mesh size < 2½"	31	32	0	0	17	109	0	68	64	0	216	251
9.1.2	Gill net, mesh size 2½"	29	74	434	0	20	130	8	20	0	0	81	300
9.1.3	Gill net, mesh size 3"	231	15	581	45	9	50	98	174	1270	516	1,430	936
9.1.4	Gill net, mesh size 3½"	137	0	727	63	67	140	332	425	2221	1,224	3,657	4,293
9.1.5	Gill net, mesh size 4"	401	176	1817	856	855	525	2106	3,741	4189	10,204	9,363	3,570
9.1.6	Gill net, mesh size 4½"	868	936	2761	3,093	3,002	492	2272	4,973	16884	19,473	8,677	4,322
	Total No. of gillnets <5"	**1,697**	**1,233**	**6,320**	**4,057**	**3,970**	**1,446**	**4,816**	**9,401**	**24,628**	**31,417**	**23,424**	**13,672**
9.1.7	Gill net, mesh size 5"	1378	10,633	12860	14,064	6,665	1,613	9045	19,375	31166	48,214	11,592	7,737
9.1.8	Gill net, mesh size 5½"	418	1,023	1526	1,217	1,533	1,046	4960	7,697	18978	30,638	17,311	11,170
9.1.9	Gill net, mesh size 6"	3985	2,198	3850	4,058	8,190	7,673	26742	35,997	37830	66,479	36,821	33,478
9.1.10	Gill net, mesh size 6½"	500	1,105	73	0	0	470	412	2,744	2412	28,799	7,919	2,745
9.1.11	Gill net, mesh size 7"	2986	1,545	0	836	1,302	1,339	10860	13,300	6919	21,557	9,519	6,189
9.1.12	Gill net, mesh size 7½"	118	0	0	0	0	106	10	758	63	2,496	2,950	745
9.1.13	Gill net, mesh size 8"	1056	1,169	363	260	177	701	926	1,518	635	5,036	6,275	5,530
9.1.14	Gill net, mesh size 9"	0	0	73	90	40	25	190	195	1650	6,126	4,437	275
9.1.15	Gill net, mesh size 10"	184	200	0	0	0		396	1,101	0	200	0	290

	District	Rakai						Kalangala					
	ITEM / YEAR	2000	2002	2004	2006	2008	2010	2000	2002	2004	2006	2008	2010
9.1.16	Gill net, mesh size > 10"	0	0	0	0	0		0	1,030	0	666	0	55
	Total No. of gillnets ≥5"	**10,625**	**17,873**	**18,745**	**20,525**	**17,907**	**12,973**	**53,541**	**83,715**	**99,653**	**210,211**	**96,824**	**68,214**
	Total No. of all gillnets	**12,322**	**19,106**	**25,065**	**24,582**	**21,877**	**14,419**	**58,357**	**93,116**	**124,281**	**241,628**	**120,248**	**81,886**
9.2	Dagaa fishing gears:												
9.2.5	Scoop net	0	0	0	1	0	3	0	0	107	433	462	148
9.2.2	Small seine, mesh size <=5 mm				0	0					286	279	
9.2.3	Small seine, mesh size 6-9 mm				3	0	1				4	105	508
9.2.4	Small seine, mesh size 10mm				0	0	1				4	116	175
9.2.1	Lift net/Lampara				0	0	5					-	24
9.3	**Hooks**												
9.3.1	No. of Hook and line/Handline hooks	12	30	34	26	533	391	270	171	277	739	874	750
9.3.2	No. Long line hooks	3680	11,890	9,172	34,591	38950	111,080	32057	85,825	79,285	239,510	306,352	436,687
9.4	**Other gears:**												
9.4.1	Beach/Boat seine	10	12	34	10	20	20	56	68	107	217	164	105
9.4.2	Cast net	1	0	0	4	-		93	52	34	29	57	24
9.4.3	Monofilament	0	0	0	0	559	70	-	0	0	0	1,781	1,357
9.4.4	Traps/Baskets	0	0	60	84	3	252	559	7	16	0	49	313
9.4.5	Other/Unspecified	1	0	0	6	-		0	2	2	0	0	