



## REPORT OF THE FRAME SURVEY OF LAKE ALBERT CONDUCTED IN MAY 2012



September 2012

Report prepared by:

*Taabu-Munyaho A., A. Bakunda, D. Mbabazi, J. I. Nyeko, H. Nakiyende, E. Rukunya, S. Bassa, E. Muhumuza, M. Nsega, R. Amiina, and J. S. Balirwa*

## TABLE OF CONTENTS

TABLE OF CONTENTS.....	i	
LIST OF TABLES.....	i	
LIST OF FIGURES .....	ii	
Executive Summary.....	ii	
1. INTRODUCTION .....	1	
1.1 Objective of the Frame Survey .....	1	
2. METHODOLOGY .....	1	
2.1 Preparation and Conducting of the Frame Survey.....	1	
2.2 Data Capture .....	2	
3. DATA ENTRY, STORAGE AND ANALYSIS .....	2	
4. RESULTS .....	2	
4.1 Landing Sites .....	2	
4.2 Facilities at the fish landing sites .....	3	
4.3 Fishers.....	6	
4.4 Fishing Crafts.....	9	
4.5 Fishing Gears .....	9	
4.6 Gill nets.....	9	
4.7 Long line hooks.....	12	
4.8 Small seines .....	12	
4.9 Comparison of 2002 Frame survey results with previous surveys .....	13	
5. 0 DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS.....	13	
6. ACKNOWLEDGEMENTS.....	15	
7. REFERENCES .....	15	
Annex 1. FRAME SURVEY QUESTIONNAIRE - LAKE ALBERT/ALBERT NILE 2012 .....	SHEET 1	16
NOTES ON CRAFT.....	16	
EXPLANATION OF CODING.....	16	
MO: Mode of operation of gillnets A-Active, P- Passive, D- Drift (Tembea).....	16	
GEAR TYPES .....	16	
GN Gill Net: State number per mesh size in inches .....	16	
FRAME SURVEY: LAKE ALBERT/ALBERT NILE 2012 SHEET 2.....	18	
SUMMARY OF NUMBERS OF CRAFT ON BEACH AND OTHER FACILITIES....	18	
Annex 2. List of landing sites .....	21	

## LIST OF TABLES

Table 1: Summary of results of the Lake Albert – Albert Nile Frame survey, May 2012	4
Table 4: Changes in numbers of long line hooks operating on Lake Albert as estimated in May 2012 compared to January 2007 .....	12
Table 5: Comparison of the 2012 Frame survey of Lake Albert and Albert Nile with previous surveys.....	13

## **LIST OF FIGURES**

Figure 1. Map showing locations of fish landing sites on the Ugandan part of Lake Albert and Albert Nile.....	3
Figure 2: The lake-wide mesh size composition of multifilament gillnets recorded on Albert Nile 2012, and Lake Albert 2007 and 2012.....	10
Figure 3. The gillnet mesh size composition in the riparian districts of the Ugandan part of Lake Albert in and Albert Nile as estimated during the May 2012 Frame survey.	11

## **EXECUTIVE SUMMARY**

## **1. INTRODUCTION**

Lake Albert and Albert Nile are a major source of fisheries resources sustaining the riparian communities in Uganda and the Democratic Republic of Congo (DRC). Like all shared bodies of Uganda Lake Albert and Albert Nile fisheries are faced with immense exploitation pressure one time described as the tragedy of the commons. In Uganda, the lake is shared by five riparian districts namely: Buliisa, bundibugyo, Hoima, Kibaale and Nebbi. The lake covers a total estimated surface area of 5,270 km<sup>2</sup> with approximately 60% within Ugandan waters (Walker, 1972). It is located in the western part of the great rift-valley at an altitude of 618 m above Sea level. The central parts of the lake are characterized by steep escarpments whereas the northern and southern parts lie in a plain of the rift valley. The plains are gently sloping, resulting in shallow swampy inshore waters in many places. The major inflowing rivers are the Semliki and Kafu in the south, and the Victoria Nile at the northern tip. The lake has a diverse fish fauna with a gradient of multi-species fisheries in different parts of the lake.

With funding support provided by the National Environment Management Authority (NEMA), a comprehensive Frame survey was conducted out by the Department of Fisheries Resources (DFR) and the National Fisheries Resources Research Institute (NAFIRRI) covering the Ugandan portion of Lake Albert and Albert Nile in May 2012. The frame survey captured the main characteristics of the fisheries and facilities supporting the fisheries and provides baseline information for reference of other studies as well as management interventions.

### **1.1 Objective of the Frame Survey**

The overall objective of the Frame Survey was to provide information on the facilities and services at landing sites and the composition, magnitude and distribution of fishing effort to guide development and management of the fisheries resources of Lake Albert and Albert Nile.

The specific objectives were 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 accessibility;
- c) The service providers especially fisheries staff at fish landing sites
- 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.

## **2. METHODOLOGY**

### **2.1 Preparation and Conducting of the Frame Survey**

The frame survey covered the Ugandan part of Lake Albert and the portion of Albert Nile

from Lake Albert to the Uganda – South Sudan border. It was a complete enumeration (count) of all landing sites and the facilities available, fishers, fishing crafts and fishing gears by type and size. For effective coverage and operational reasons, five groups were comprised and distributed along the whole stretch of the lake and river. Three covered the main lake, while two went on the river. The first group covered the district of Ntoroko and Kibaale, the second traversed Hoima district while the 3<sup>rd</sup> covered Buliisa. Fourth team covered Nebbi and Arua districts. The 5<sup>th</sup> and last group covered the districts of Moyo and Adjumani. All these teams used a fish landing site as the access point for enumeration. The landing sites were accessed either by road (Vehicles, motor bikes, bicycles, or by foot) or water transport (motorised boats or paddled canoes).

## **2.2 Data Capture**

Frame Survey Recording Forms (Annex 1) that included details of the operational fishing crafts and gears; and the landing site facilities, i.e. availability of a fish shade (banda), cold rooms, pontoon/jetty, fish store, electricity supply, public toilets, potable (piped) water, a designated area for repair of boats and nets, presence of resident fisheries staff and the name of the fish market in which most of the catch is sold.

The numbers of both fishing and non-fishing crafts including the details on the number of operational fishing crafts that were actively fishing; derelict crafts that were damaged and not operational; and transport crafts that were used to transport only fish (fish carriers) and those for other purposes. Further details on fishing crafts, i.e. craft type, length of individual crafts, method of propulsion, and the number of crew of each craft were also recorded.

The number, type and size of fishing gear carried by each fishing crafts, which included multifilament gillnets, monofilament gillnets, small seines used to catch Ragoogi & Muziri, long line hooks, Boat/beach seines, cast nets, , traps and Others (not classified in the above categories) were recorded. The main fish species targeted by the fishing craft and gear was also recorded.

## **3. DATA ENTRY, STORAGE AND ANALYSIS**

The data were input, stored and analysed in MS Excel at by both DFR and NAFIRRI staff. Analysis was done following the protocols designed and agreed regionally for Frame survey on Lake Victoria and other major lakes in the standard Operating Procedures (SOP, LVFO 2007).

## **4. RESULTS**

Results of the May 2012 Frame survey of Lake Albert and Albert Nile show The findings of the Frame Survey of Lake Albert in January 2007 are summarized in Table 1.

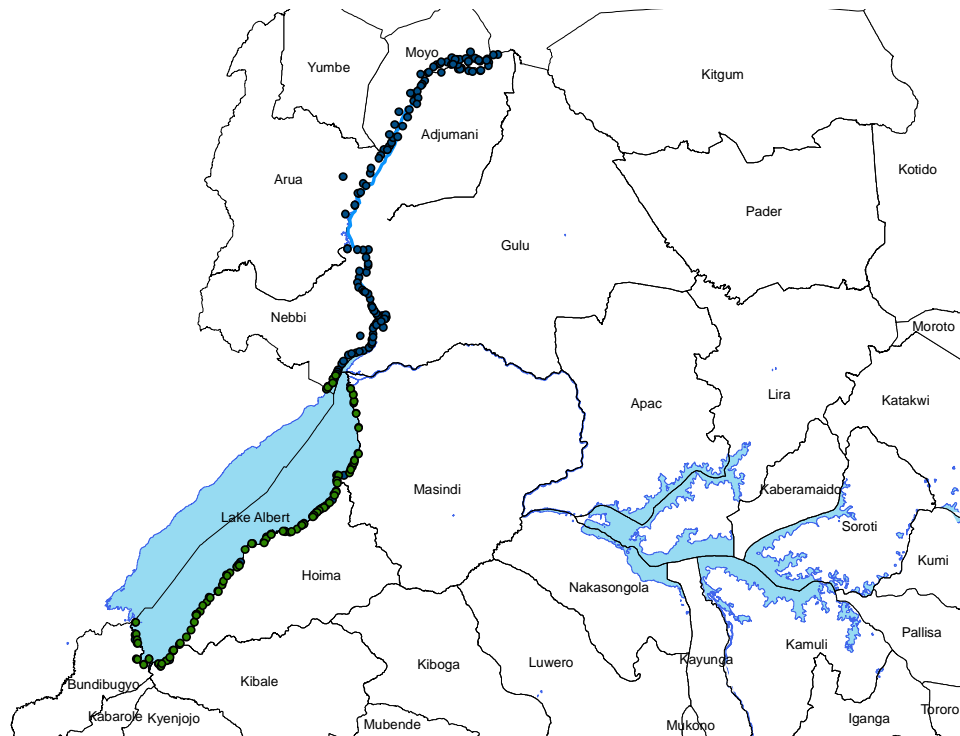
### **4.1 Landing Sites**

A total of 70 landing sites were recorded in the Ugandan part of Lake Albert (Figure 1). The landing sites were distributed in the riparian districts as follows distributed as

follows: Nebbi 6, Buliisa 14, Hoima 36, Kibaale 7 and Bundibugyo 7. The full list of landing sites is Annex 2.

#### 4.2 Facilities at the fish landingsites

The facilities examined included landing sheds (*bandas*), cold rooms, pontoon/ jetties, fish stores, potable water, toilet facilities, designated areas for boat and net repair, access to the fish landing site by all-weather roads and electricity supply.



**Figure 1.** Map showing locations of fish landing sites on the Ugandan part of Lake Albert and Albert Nile

Electricity supply was not accessible at all landing sites on the lake and the nearest supply was more than 10 km away at all landing sites. None of the landing sites had a cold room, only three had fish shades, three had Jetties, and two had permanent fish stores. Only 19 out of the 70 landing sites (27%) had public toilets and none had access to piped water supply. A mere 15 landing sites (21%) were accessible by all-weather road and for up to 40 (57%) landing sites all weather roads were more than 10 km away. An area designated for net repair was available at only one landing site (Butiaba) and only seven landing sites had areas designated for boat construction and repair. Throughout the whole lake, only seven landing sites had resident Fisheries Officers.

**Table 1:** Summary of results of the Lake Albert – Albert Nile Frame survey, May 2012

	Albert Nile					Lake Albert						Albert & Albert Nile
	Adjumani	Arua	Moyo	Nebbi	overall	Buliisa	Hoima	Kibaale	Nebbi	Ntoroko	overall	Combined
Landing sites	25	17	33	51	126	16	29	8	18	7	78	204
BMUs	18	17	27	51	113	16	29	8	17	7	77	190
<b>Craft type</b>											-	
CB		5		564	569	1,901	2,170	545	510	911	6,037	6,606
DO	498	459	467	119	1,543	1	8			1	10	1,553
FF						2	4	6		6	18	18
PA	3	73	59	410	545							545
SF		5	15	4	24	15	98	5		33	151	175
<b>Total craft</b>	<b>501</b>	<b>542</b>	<b>541</b>	<b>1,097</b>	<b>2,681</b>	<b>1,919</b>	<b>2,280</b>	<b>556</b>	<b>510</b>	<b>951</b>	<b>6,216</b>	<b>8,897</b>
Outboard Engines				3	3	52	137	45	38	39	311	314
Paddle	501	542	541	1,094	2,678	1,865	2,139	505	472	906	5,887	8,565
<b>Fishers/Crew</b>	<b>526</b>	<b>1,028</b>	<b>702</b>	<b>2,245</b>	<b>4,501</b>	<b>4,935</b>	<b>5,895</b>	<b>1,392</b>	<b>1,254</b>	<b>1,948</b>	<b>15,424</b>	<b>19,925</b>
<b>Mono, Gill net (MF)</b>	<b>155</b>	<b>28</b>	<b>137</b>	<b>66</b>	<b>386</b>	<b>2,236</b>	<b>1,123</b>	<b>348</b>	<b>58</b>	<b>9</b>	<b>3,774</b>	<b>4,160</b>
Gill net type (MU)												
< 2½"	165	239	475	3,181	4,060	1,056	5,477	1,914	1,858	14,536	24,841	28,901
2½"	556	995	1,062	4,651	7,264	6,512	6,800	12,395	3,536	10,885	40,128	47,392
3"	1,085	69	905	1,228	3,287	2,567	2,693	1,021	1,998	72	8,351	11,638
3½"	921	74	1,329	1,316	3,640	3,320	1,616	309	5,120	521	10,886	14,526
4"	2,471	106	1,272	4,291	8,140	5,496	1,419	2,216	6,104	424	15,659	23,799
4½"	863	63	409	1,027	2,362	2,126	479	1,913	264	3,546	8,328	10,690
5"	258	33	50	543	884	539	602	1,451	108	2,648	5,348	6,232
5½"		6	30	60	96	184	51	164	108	283	790	886
6"	80	40	27	418	565	211	617	1,173	1,105	1,802	4,908	5,473
6½"				5	5	4	5			4	13	18
7"	185		27	91	303	125	1,398	140	72	697	2,432	2,735

	Albert Nile					Lake Albert						Albert & Albert Nile
	Adjumani	Arua	Moyo	Nebbi	overall	Buliisa	Hoima	Kibaale	Nebbi	Ntoroko	overall	Combined
7½"						115					115	115
8"			10	1	11	182	2,298	60	36	62	2,638	2,649
9"						68	100			12	180	180
10"	30		10	18	58	619	613	30		62	1,324	1,382
> 10"	94				94	496	78		60		634	728
<b>Tota gill nets</b>	<b>6,708</b>	<b>1,625</b>	<b>5,606</b>	<b>16,830</b>	<b>30,769</b>	<b>23,620</b>	<b>24,246</b>	<b>22,786</b>	<b>20,369</b>	<b>35,554</b>	<b>126,575</b>	<b>157,344</b>
<b>Long line</b>	37,779	17,080	42,127	48,352	145,338	160,900	451,779	43,042	22,900	67,085	745,706	891,044
Beach/Boat seine	1	19	1	25	46	8	8	6			22	68
Cast net (CN)	49	190	28	36	303	52	39	18	15	1	125	428
Hand line (HL)	36	90	9	140	275	350	36	13	12	36	447	722
Traps	38	286	18	593	935	90	77	263	195	120	745	1,680
<b>Lift nets</b>	<b>2</b>				<b>2</b>							<b>2</b>
Small Seines (SS)												
≤5 mm						796	924	44	7	72	1,843	1,843
6-9 mm		3		10	13		127	50	97	5	279	292
Other						-					-	-
≥10 mm						76	62	37			175	175
<b>Total Seines</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>10</b>	<b>13</b>	<b>872</b>	<b>1,113</b>	<b>131</b>	<b>104</b>	<b>77</b>	<b>2,297</b>	<b>2,310</b>
<b>Sum of Panel (Small seines)</b>		6		42	48	5,063	7,919	605	606	363	14,556	14,604
Average no of panels small seines		2		4	4	6	7	5	6	5	6	6
Average no. of boats/landing	20	32	16	22	21	120	79	70	28	136	80	44
Average no. of fishers per landing	21	60	21	44	36	308	203	174	70	278	198	98
Average number of landing sites /staff	12	6	10	13	11	8	9	9	7	7	6	



### 4.3 Fishers

The total number of fishers (boat crew) operating on the Ugandan part of Lake Albert was 15,424 just about the same number recorded in 2007 (15,364). The number of fishers on Albert Nile was 4,500 giving an average number of fishers per landing site of 36 compared to about 200 fishers per landing on the main Lake Albert (Table 1). Majority (38%) of the fishers on the main lake were recorded in in Hoima district followed by Buliisa (32%), Ntoroko (13%), Kibaale (9%) and least in Nebbi (8%), (Table2). 48% of the fishers on the Albert Nile were from Nebbi district, followed by Arua (23%), Moyo (17%), and lastly Adjumani (13%).

The largest number of fishers on the river are engaged in the gillnet fishery (52%), followed by the long line fishery (21%) and the cast net fishery (14%). The rest of the gears on the river recorded less than 10% (Table 2). However, on the lake, majority of fishers, 45.2% were employed in the small seine fishery for Ragoogi/Muziri followed by the multifilament gillnet fishery (36%) and the long line fishery (8%). At 6.9% of the fishers on the main lake still using Monofilament gillnets, their use on the lake is still significant. A notable reduction was observed in the use of beach/boat seines on the main lake from about 3% to less than 1% over the period 2007 to 2012.

Table 2. The numbers and distribution of fishers by gear type on Albert Nile and the Ugandan part of Lake Albert May 2012. BS – Beach/Boat seine, CN-Cast net, TR – Traps, GN (Multifilament gillnets, MF – Monofilament gillnets, SS- Small seines, LL-Long line hooks, HL – Hand line hooks, others – any other gear including perforated basins

	Albert Nile						Lake Albert							Combined	
	Adjumani	Arua	Moyo	Nebbi	Total	%	Buliisa	Hoima	Kibaale	Nebbi	Ntoroko	Total	%	Total	%
BS	1	68	2	113	184	<b>4.1</b>	30	41	64			135	<b>0.9</b>	319	<b>1.6</b>
CN	54	419	91	71	635	<b>14.3</b>	103	62	36	30	1	232	<b>1.5</b>	867	<b>4.4</b>
HL	3	4	1	8	16	<b>0.4</b>	4	9	5	2	3	23	<b>0.2</b>	39	<b>0.2</b>
TR	8	85	12	145	250	<b>5.6</b>	3	11	30	55	6	105	<b>0.7</b>	355	<b>1.8</b>
MF	19	15	24	33	91	<b>2.0</b>	550	398	92	6	6	1,052	<b>6.9</b>	1,143	<b>5.8</b>
SS		5	-	22	27	<b>0.6</b>	2,609	3,322	390	360	229	6,910	<b>45.2</b>	6,937	<b>35.2</b>
LL	153	158	216	391	918	<b>20.7</b>	391	623	98	63	122	1,297	<b>8.5</b>	2,215	<b>11.2</b>
GN	328	248	412	1,333	2,321	<b>52.3</b>	1,127	1,324	685	685	1,673	5,494	<b>35.9</b>	7,815	<b>39.6</b>
others	-	-	-	-	-	-	14	-	-	28	-	42	<b>0.3</b>	42	<b>0.2</b>
	566	1,002	758	2,116	4,442		4,831	5,790	1,400	1,229	2,040	15,290		19,732	
	<b>12.7</b>	<b>22.6</b>	<b>17.1</b>	<b>47.6</b>			<b>31.6</b>	<b>37.9</b>	<b>9.2</b>	<b>8.0</b>	<b>13.3</b>				

Table 3: The number of fishing crafts using the different types of fishing gears on Lake Albert and Albert Nile as estimated from the May 2012 Frame survey. Note: Some crafts had no gear and others used more than one fishing gear

Gill net type (MU)	Albert Nile						Lake Albert								Combined	
	Adjumani	Arua	Moyo	Nebbi	Total	%	Buliisa	Hoima	Kibaale	Nebbi	Ntoroko	Total	%	Grand Total	%	
MU	318	145	349	627	1439	<b>53.8</b>	511	599	302	294	826	2532	<b>41.4</b>	3971	<b>45.1</b>	
LL	144	112	178	227	661	<b>24.7</b>	146	252	35	26	68	527	<b>8.6</b>	1188	<b>13.5</b>	
MF	14	8	20	17	59	<b>2.2</b>	275	192	46	3	3	519	<b>8.5</b>	578	<b>6.6</b>	
SS	0	3	0	10	13	<b>0.5</b>	872	1119	131	104	77	2303	<b>37.6</b>	2316	<b>26.3</b>	
TR	8	47	6	80	141	<b>5.3</b>	3	5	18	24	6	56	<b>0.9</b>	197	<b>2.2</b>	
CN	49	190	28	36	303	<b>11.3</b>	52	30	18	15	1	116	<b>1.9</b>	419	<b>4.8</b>	
HL	3	4	1	6	14	<b>0.5</b>	2	5	4	1	2	14	<b>0.2</b>	28	<b>0.3</b>	
BS	1	19	1	25	46	<b>1.7</b>	8	8	6			22	<b>0.4</b>	68	<b>0.8</b>	
						<b>0.0</b>	5			28		33	<b>0.5</b>	33	<b>0.4</b>	
Total	537	528	583	1028	2676		1874	2210	560	495	983	6122		8798		
%	<b>20.1</b>	<b>19.7</b>	<b>21.8</b>	<b>38.4</b>			<b>30.6</b>	<b>36.1</b>	<b>9.1</b>	<b>8.1</b>	<b>16.1</b>					

#### **4.4 Fishing Crafts**

The total number of fishing crafts operating on Albert Nile was 2,676 of which 1028 (38%) were in Nebbi district. The other three districts sharing the river (Arua, Moyo and adjumani) sharing the remaining 60% of the fishing canoes in almost equal proportions (Table 3). The other district that covers the south-eastern part of Albert Nile is Amuria. However, the part of Amuria reaching the river is a gazetted game part so no fishing activities occur there. Just like the numbers of fishers on Albert Nile, majority of the canoes are engaged in the multifilament gillnet fishery (54%), followed by long line (25%) and cast nets (11%).

There were 6,216 fishing crafts on Lake Albert out of which 2,210 (36%) were in Hoima district, 1,874 (31%) in Buliisa, 983 (16%) in Ntoroko, 560 (9.1%) in Nebbi and the least, 495 boats (8.1%) in Kibaale. Majority (41%) of the fishing crafts were engaged in multifilament gill net fishery, followed by small seine fisheries 38% (Table 3).

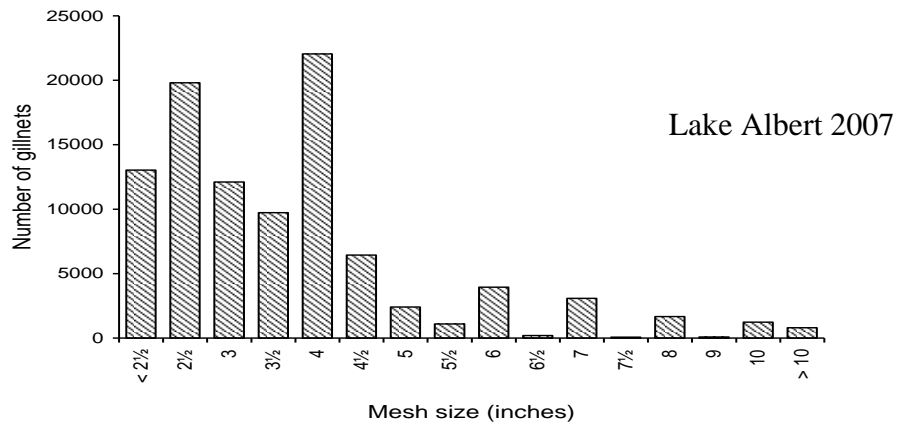
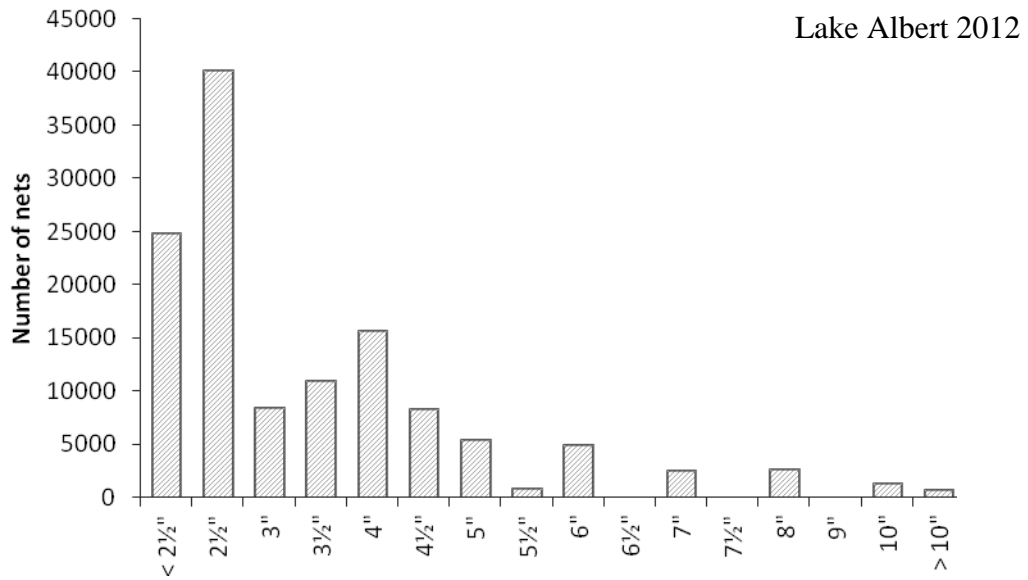
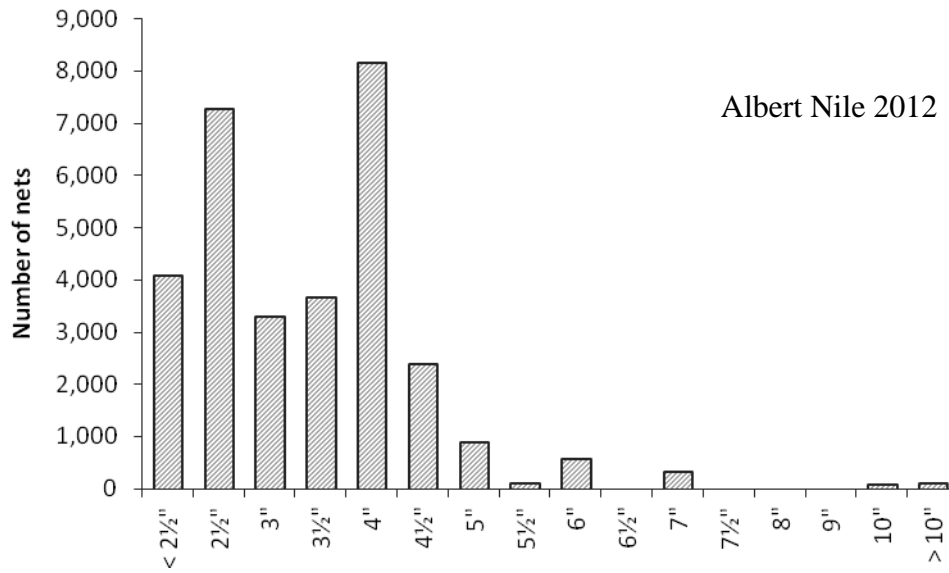
The main fishing craft type on Lake Albert were the flat bottomed type called *Congo barque*, which constituted 97% of the 6,216 fishing crafts operating on the lake. The other craft types, which included Dugouts, Parachutes, Rafts, and Sesse boats, were encountered in negligible numbers.

#### **4.5 Fishing Gears**

The fishing gears recorded in the Frame survey included gillnets, long line hooks, beach/boat seines, cast nets, hand line hooks, traps, and small seines for Muziri & Ragoogi fisheries. The most prominently used fishing gears were the Multifilament gillnets with which 54% and 41% of the fishing crafts operated on the river and main lake respectively (Table 3). The other prominent fishing gears were the Muziri & Ragoogi small seines with 38% fishing crafts on the main lake, but insignificant on the river. Long line hooks with 25% on the river and 8.6% of the fishing crafts on the lake were the 3<sup>rd</sup> dominant gear used. Cast nets and monofilament gillnets were common gears on both the river and lake.

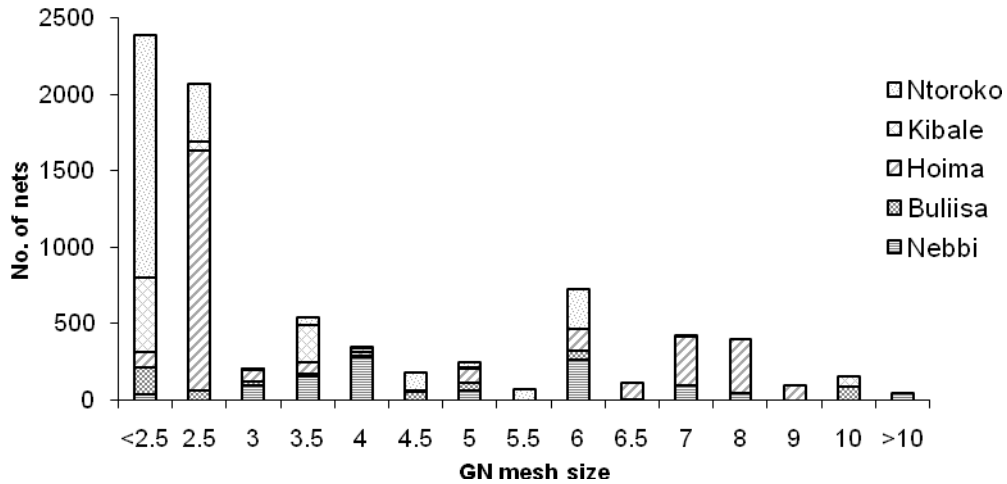
#### **4.6 Gill nets**

A total of 126,575 multifilament gillnets representing 31% increase from 96,655 recorded in 2007 Frame survey were enumerated on the main lake during the May 2012 Frame survey. Albert Nile had a total of 30,769 multifilament gillnets 93% of them below 5" (Table 1). Likewise, 85% of the multifilament gill nets fall below 5" stretched mesh size. In addition, 386 and 3774 monofilament gillnets were recorded on Albert Nile and Lake Albert respectively. The 2½ inch mesh size gillnets were the most common constituting 30% of the multifilament gillnets (Figure 2). The 4 inch mesh size was also the most common among monofilament gillnets constituting 43%.

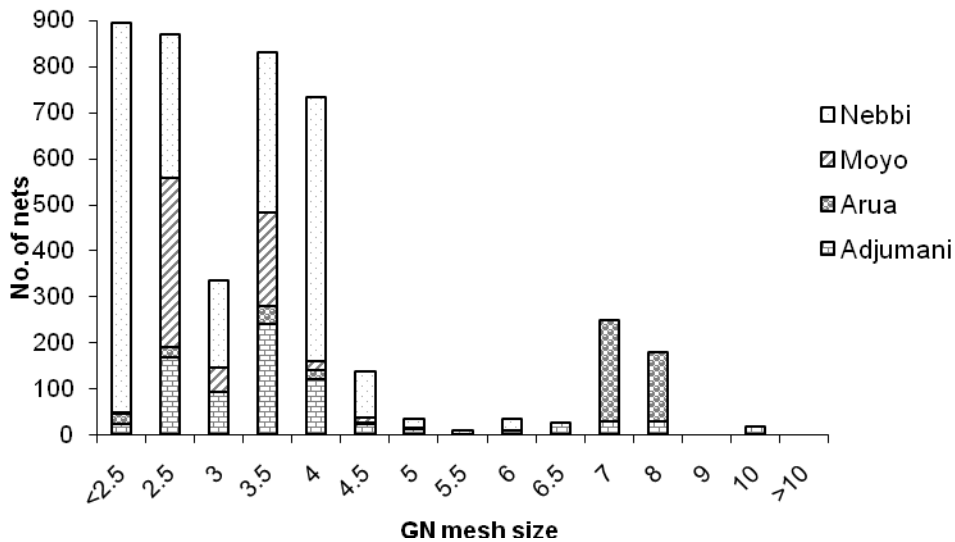


**Figure 2:** The lake-wide mesh size composition of multifilament gillnets recorded on Albert Nile 2012, and Lake Albert 2007 and 2012.

### Lake Albert 2012



### Albert Nile 2012



**Figure 3.** The gillnet mesh size composition in the riparian districts of the Ugandan part of Lake Albert in and Albert Nile as estimated during the May 2012 Frame survey. Note dominance of <2.5” mesh size gillnets both on the river and lake.

The contribution of undersized gillnets <4 inch mesh size to gillnet fleets in the riparian districts was as follows: 57% in Nebbi, 21% in Buliisa 28% in Hoima, 72% in Kibaale and 85% in Ntoroko (Figure 3). In the southern part of the lake, the  $\leq 2\frac{1}{2}$  inch gillnet mesh sizes, which are mainly used in the *Ragoogi* fishery, were quite common constituting 76% and 50% of gillnets in Ntoroko and Kibaale respectively.

#### 4.7 Long line hooks

The long line fishery was quite an important fishery in Lake Albert in 2007 involving 28% of all crafts on the lake but its contribution dropped to only 8.6% of the fishing crafts in May 2012. This reduction is also evident in the number of long line hooks that reduced from 1.9 million in 2007 to 750,000 in 2012. Hoima district area contained approximately 1.6 million hooks in 2007 but reduced to about 450,000 in 2012 (Table 4). There has been a general shift in the fishing effort, most of the gillnet fishing boats operate together with the light fishery at night and early morning long lines fishers set out for day time fishing. In addition, it is a common practice in the northern portion of the lake in areas around Butiaba, Wanseko, and Bugoigo for *Ragoogi* fishers to do day time seine fishing using bait to attract and concentrate fish before being hauled into canoes.

The long line fishery however, remains the second most important fishery on Albert Nile probably because of low influence of small seine fishery on the river.

**Table 4:** Changes in numbers of long line hooks operating on Lake Albert as estimated in May 2012 compared to January 2007

District	Buliisa	Ntoroko	Hoima	Kibaale	Nebbi	Total
Albert January 2007	256,301	74,630	1,600,593	37,500	9,200	1,978,224
Albert may 2012	160,900	67,080	451,779	43,042	22,900	745,706
Change (increase/reduction)	- 95,401	-7,550	-1,148,814	+5,542	+13,700	-1,232,518
Percentage change	-37.2	-10.1	-71.8	14.8	148.9	-62.3

#### 4.8 Small seines

A total of 2,297 small seines, which are used to fish *Ragoogi* and *Muziri* were encountered on Lake Albert compared in the 1,619 in 2007. In addition, during the survey of 2007 no seine net was recorded in the districts of Nebbi and Bundibujjo (currently Ntoroko). The current survey recorded seine nets in all the riparian districts of Lake Albert further illustrating the expanding trend of the small pelagic fishery for *Muziri* and *Ragoogi*. Only 13 small seines were encountered on Albert Nile occurring in Nebbi district that has a lake-river interphase with wide part of the river that can allow maneuvering the seine fishing technique. Across the rest of the river, small seines are

negligible.

#### 4.9 Comparison of 2002 Frame survey results with previous surveys

The results of the current frame survey and those of previous surveys are provided in Table 5. The cause of drastic fluctuation in the number of landing sites reported by the different Frame surveys from 219 in 1970 to 82 in 1988, 140 in 1991 to 70 in 2007 now 78 in 2012 are difficult to explain. Most of the landing sites on Lake Albert stretch over a wide area and often have several landing places. Probably, the 1970 and 1991 surveys recorded the landing places within one landing site as different sites.

Since 1991, the number of fishing boats on the lake has increased approximately 3 times from 1,971 to 6,216 in 2012, which is evidence of large increase in overall fishing effort.

**Table 5:** Comparison of the 2012 Frame survey of Lake Albert and Albert Nile with previous surveys. Note the presence of large number of dugout canoes on Albert Nile

Year	Water body	FS Executor	No. of landings sites	No. Fishing canoes	No. Planked canoes	Dugout canoes
1965	Lake Albert	UFD	-	764	244	520
1966	Lake Albert	UFD	-	1,140	262	878
1970	Lake Albert	Wildlife Services Ltd	219	826	327	499
1988	Lake Albert	MAAIF	82	1,479	1,401	78
1991	Lake Albert	UFD/FAO	140	1,971	1,971	58
2007	Lake Albert	NAFIRRI	70	5,766	5,766	--
2012	Lake Albert	DFR/NaFIRRI	78	6,198	6,188	10
2012	Albert Nile	DFR/NaFIRRI	126	2,681	1,543	1,138

## 5. 0 DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Frame surveys are a preferred form of assessing fishing effort due to the use direct enumeration method that includes face to face interaction of the resources users and the surveyors. During these interactions reasons why particular gears of fishing vessels are preferred in a given system are easily established. For example, it came out that the *Congo barque* (locally termed *barike*) is most preferred boat on the main lake and the dugout canoe the commonest on the river. The choice of fishing craft type is partly influenced by the stability requirements, manoeuvrability and the capacity to carry the right quantities of fishing gears carried for the fishing operations in the different waters bodies. The *Congo barque* type of fishing craft appears to be the most preferred for navigation of the Lake Albert waters which are characterised by frequent extreme rough weather. The *Congo barque* is a flat bottomed planked canoe relatively large than the parachute that makes it most stable in the rough weather characteristic of Lake albert.

On the river however, the fishery is still primitive and mainly done for subsistence home consumption but slowly evolving into the commercial venture. This development is also witnessed in the distribution of the various boat types along the lake and river. The



*Congo barques* are commonest on the lake and the beginning portion of the river (Lake-river interphase, slowly evolving into parachutes around Nebbi area of the river then into dugouts through Arua, Moyo and Adjumani.

Similarly, the evolution in the fishing gears continue to be evident on both Lake Albert and Albert Nile. Well, developed methods such as multifilament gillnets, long lines and small seines operated with either light or bait attraction are common on the lake. On the river, primitive methods such as basket/built traps made of papyrus or wires are still prevalent. Another factor that could contribute to the continued use of traps on the river is the lotic nature of the river system with characteristic fishes that follow streams such as *Clarias* and *Barbus* spp. During Frame surveys some gears especially outlawed ones may be hidden. For instance, up to 6.8% of the fishing crafts on the main lake were identified to have been using monofilament gillnets but the number of these crafts were probably much high because of the tendency to hide away the illegal gear from the enumerators. Similarly, the fishing crafts using beach/boat seines are likely to have been under reported as the fishers tended to hide away information on these crafts. In addition, the May 2012 Frame survey was conducted at the time when intense operation to curb illegal fishing was going on. The implication is that many of the illegal gears could have been already confiscated or hidden by the time of enumeration. This could partly explain why a large number of boats were recorded with no fishing gears.

The frame surveys carried out on Lake Albert in in 2012 went into great depth of the characteristics of the fisheries and facilities supporting the fisheries and provides a strong baseline for future reference of management interventions in the lake. The results show that:

- a) There is acute shortage of facilities servicing the fisheries sector at the fish landings and deliberate efforts should be made to improve them.
- b) There was no electricity or piped water at any one landing site and basic sanitation facilities, especially public toilets were lacking at most landing sites. Also a limited number of landing sites were accessible by an all-weather road. Effort should be made to improve basic infrastructure and sanitation at landing sites Central government, local governments, the grassroots leadership at BMUs, and Community Based Organisations should strive to provide these amenities.
- c) There was a large number of gillnets of illegal mesh sizes and illegal monofilament nets on the lake. The use monofilament gillnets is wide spread and efforts should be made to stop them. The under sized gillnets are in some cases used to target the small species (Ragoogi, Angara & Ngasia). Their impacts on larger species like Nile perch when used to target small species is not well understood. A specific study to analyze selectivity and impacts of these nets is a gap.
- d) Long line hooks are a major gear used to target Nile perch and *Bagrus* (Munama). The common sizes in use are 14 and 16 which catch immature fish. A specific study to analyze best selectivity of hooks could improve understanding of their impact on the fisheries

- e) The main method of obtaining live bait for hooks was by using small seines in shallow inshore waters which are breeding and nursery grounds of fish and caught juveniles of large species. Alternative sources of bait should be sought and encouraged.
- f) The results indicate that on average one fisheries staff in the districts on the river serve up to 11 landing sites and on the lake up to 6 yet the number of fishers per landing is 40 and 200 for river and lake respectively. This gives a high fisheries staff: fisher ratio and need to be improved. Currently Fisheries staff are recruited based on local govern units but would be appropriate to take care of the fisher ratios characteristic of size of large sites.

## **6. ACKNOWLEDGEMENTS**

The Frame survey of conducted in May 2012 was supported by funding provided by the National Environmental Management Authority (NEMA) through the intervention for sensitivity analysis of the Albertine rift and implemented by the Department of Fisheries Resources (DFR) and the National FisheriesResources Research Institute (NaFIRRI).

## **7. REFERENCES**

- Walker, R. S. 1972. A Statistical Analysis of the Aerial Survey Carried out by Uganda Fisheries Department (6th June – 13th June 1972). *Fish. Dept. Uganda (Unpublished)*: 26p.
- NaFIRRI 2007: Report of the Frame survey conducted on the Ugandan part oflake Albert in January 2007. pp 21

**Annex 1.FRAME SURVEY QUESTIONNAIRE - LAKE ALBERT/ALBERT NILE  
2012 SHEET 1**

**NOTES ON CRAFT**

Fishing craft	=	all crafts that are fishing
Derelict craft	=	all damaged craft not repaired for one year or more
Fish carrier	=	all crafts solely for transporting fish
Transport craft	=	craft used for transport only (and never for fishing)

**EXPLANATION OF CODING**

**CRAFT TYPE**

- |                               |           |
|-------------------------------|-----------|
| 1. Sesse flat at one end      | <b>SF</b> |
| 2. Sesse pointed at both ends | <b>SP</b> |
| 3. Parachute                  | <b>P</b>  |
| 4. Dugout                     | <b>DO</b> |
| 5. Rafts                      | <b>R</b>  |
| 6. Congo baki (CB)            | <b>CB</b> |
| <b>7. Foot Fisher</b>         | <b>FF</b> |

**Length:** Measured in metres using a tape measure or a rope with knots tied at 1 metre intervals

**PROPULSION:** Method of propulsion: - State main type

- |                   |          |
|-------------------|----------|
| 1. Outboard motor | <b>O</b> |
| 2. Paddles        | <b>P</b> |
| 3. Sail           | <b>S</b> |

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

**CREW:** Number of crew who normally accompany the boat on a fishing trip

**MO:** Mode of operation of gillnets **A**-Active, **P**- Passive, **D**- Drift (Tembea)

**GEAR TYPES**

**GN** Gill Net: State number per mesh size in inches

**LL** Long Lines: State number of hooks

**BS** Beach seine: state number of complete sets

**CN** Cast net: State number

**HL** Hook and Line: State number of lines

**TR** Traps: State number

**MF** Monofilament: state number of complete sets

**SN** Scoop net: State number

**SS** Small seine / Lampara targeting Muzuri: State number of complete sets by mesh size range (mm)

**Others** Other gear not specified above: State type and Number

**SPECIES TARGETED**

- |                                   |                                       |
|-----------------------------------|---------------------------------------|
| 1. <i>Lates</i> (Mputa)           | 11. Malapterurus                      |
| 2. <i>Neobola</i> (Muziri)        | 12. <i>Alestes</i> (Angara)           |
| 3. <i>Tilapines</i> (Ngege)       | 13. <i>Brycinus</i>                   |
| 4. <i>Clarias</i> (Male)          | 14. <i>Bagrus</i> (Ssemutundu/Munama) |
| 5. <i>Protopterus</i> (Mamba)     | 15. <i>Mormyrus</i>                   |
| 6. <i>Synodontis</i> (Nkolongo)   | 16. <i>Distichodus</i>                |
| 7. <i>Haplochromines</i> (Nkejje) | 17. <i>Hydrocynus</i> (Ngassia)       |
| 8. <i>Labeo</i> (Ningu)           | 18. <i>Auchenoglanis</i>              |
| 9. <i>Barbus</i>                  | 19. <i>Polypterus</i>                 |
| 10. <i>Schilbe</i>                | 20. Others                            |

**FRAME SURVEY: LAKE ALBERT/ALBERT NILE 2012**

**SHEET 2**

**SUMMARY OF NUMBERS OF CRAFT ON BEACH AND OTHER FACILITIES**

1. NAME OF RECORDER (AS IN ID) -----TeL-----
2. STATUS/ RANK OF RESPONDENT -----
3. DATE -----
4. DISTRICT -----
5. SUB-COUNTY/ DIVISION -----
6. PARISH/WARD -----
7. NAME OF LANDING SITE -----
8. NAME OF BMU

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

**CRAFT SUMMARY**

- 9 DERELICT CRAFTS -----
- 10 ISH CARRIER -----
- 11 TRANSPORT CRAFTS (NON-FISHING) -----
- 12 FISHING CRAFTS WITH OUTBOARD ENGINE -----
- 13 FISHING CRAFTS WITH IN-BOARD ENGINE -----
- 14 FISHING CRAFTS USING PADDLES ONLY -----
- 15 FISHING CRAFTS USING SAILS -----

**FACILITIES SUMMARY**

- 16 FISH WEIGHING SLAB [1] YES [2] NO
- 17 COLD ROOM [1] WORKING [2] NOT-WORKING  
[3] NONE
- 18 JETTY [1] YES [2] NO
- 19 ICE BOX [1] WORKING [2] NOT-WORKING
- 20 FISH STORE [1] YES [2] NO
21. ELECTRICITY SUPPLY [1] YES [2] NO
22. IF "NO" HOW FAR TO NEAREST SUPPLY (KM)?  
[1] <1 [2] 1-5 [3] 6 - 10 [4] > 10
23. TOILET FACILITY [1] YES [2] NO
24. POTABLE WATER [1] YES [2] NO  
IF "YES" SPECIFY SOURCE
25. IS BEACH ACCESSIBLE BY ALL WEATHER ROAD? [1] YES [2] NO
26. IF "NO" HOW FAR TO NEAREST ALL WEATHER ROAD (KM)  
[1] <1 [2] 1-5 [3] 6 - 10 [4] > 10
27. DESIGNATED NET REPAIR FACILITY [1] YES [2] NO
28. DESIGNATED BOAT REPAIR FACILITY [1] YES [2] NO
29. IS FISHERIES STAFF RESIDENT? [1] YES [2] NO
30. IS THE BMU BASED AT THE LANDING BEACH? [1] YES [2] NO

16	
17	

18	
19	
20	
21	
22	
23	
24	
25	

26.	
NO 27	
NO 28	
29	
30	

**ADDITIONAL INFORMATION**

31 NAME THE NEAREST MARKET (WHERE MOST OF THE FISH IS FIRST SOLD)

31	
----	--

-----  
32 DO FISHERMEN LAND AT THIS BEACH FOR MORE THAN 5 MONTHS IN A YEAR

32	
----	--

- [1] YES
- [2] NO

**FRAME SURVEY: LAKE ALBERT/ALBERT NILE – MONTH ----- 2012**  
**DEPARTMENT OF FISHERIES RESOURCES (DFR)**  
**SHEET 3: DETAILS OF EACH FISHING CRAFT AND THE FISHING GEARS IT USES**

**Name of Landing site (Beach) -----**

33	33	35	36	37	37	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69			
CRAFT DETAILS							Target Fish Species	Gill net MO/MU	GEAR TYPE																				Other gears specify										
S/N	Reg. No.	Craft Type	Length (m)	PROPULSION		Crew			GN - MESH SIZES (inches)													OTHER GEARS					SS-mesh size (mm)												
				Type	HP if Engine				<2.5	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	9	10	>10	LL	BS	CN	HL		TR	MF	LN	SN	5	6-9	>10			
1																																							
2																																							
3																																							
4																																							
5																																							
6																																							
7																																							
8																																							
9																																							
10																																							
11																																							
12																																							
13																																							
14																																							
15																																							
16																																							
17																																							
18																																							
19																																							
20																																							

**NOTE:** Use more than one sheet if there are more than 20 fishing crafts at one fish landing site (Beach)

**Annex 2.** List of landing sites

DISTRICT	SUB-COUNTY	PARISH	s/n	NAME OF LANDING	FISHING CRAFTS
Buliisa	Biiso	Butiaba	1	Boma	19
			2	Bugoigo	171
			3	Butiaba- piida. A	158
			4	Butiaba- piida. B	177
			5	Kamagongolo	35
			6	Kawaibanda	28
			7	Nyamukuta	79
			8	Sonsio	41
			9	Walukuba	139
	Buliisa	Kigwera	10	Kalolo	59
			11	Wankende	22
			12	Wanseko	220
		Kisiabi	13	Kabolwa	103
			14	Karakaba-Songalendu	94
Bundibugyo	Kanara	Ntoroko	15	Kanara	41
			16	Ntoroko	218
		Rwangara	17	Kachwankumu	38
			18	Kamuga	60
			19	Katanga	39
			20	Mulango	38
			21	Rwangara	78
Hoima	Buseruka	Tonya	22	Buhuma	16
			23	Fofu	63
			24	Hoimo-Uganda	63
			25	Kabanda	10
			26	Kaiso	416
			27	Kijangi	184
			28	Kiryamboga	57
			29	Mbegu	211
			30	Nana	32
			31	Rwantale	17
			32	Tonya	52
			Kabwooya	Nkondo	33
	34	Nkondo I			109
	35	Nkondo II			226
	36	Nyawaiga			141
	37	Sebagoro			129
	Kigorobyia	Buikya	38	Hoimo-Kenya	30
		Kapapi	39	Nyamusoga	33
		Kibiro	40	Bikunyu	54
			41	Kabahwa	36
			42	Kibiro	24
			43	Kyabarangwa	47
44			Petye	18	
45			Runga	163	
46			Songagage	51	



DISTRICT	SUB-COUNTY	PARISH	s/n	NAME OF LANDING	FISHING CRAFTS
			47	Waaki	139
	Kyangwali	Buhuka	48	Busigi	36
			49	Kachunde	35
			50	Kiina	86
			51	Kyabashambu	30
			52	Kyakapere	81
			53	Kyanyanja	20
			54	Nsonga(Bugoma)	124
			55	Nsunzu (Bugoma)	70
			56	Ssenjojo(Songa Rao)	63
					57
Kibaale	Mpeefu	Ndaiga	58	Kabukanga	36
			59	Kamina	45
			60	Kitebere	240
			61	Ndaiga	11
			62	Nguse	41
			63	Nyamasoga	33
			64	Rwebigongoro	28
Nebbi	Panyimur	Nyakagei	65	Angumu	30
			66	Dei. B	44
			67	Dei.A	73
			68	Dei.C	96
			69	Kayonga	92
			70	Singla	101
Grand Total					5766