

REPUBLIC OF KENYA

STATUS REPORT ON LAKE VICTORIA FRAME SURVEYS FOR 2000, 2002 AND 2004

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ACNONYMS

BMUs	Beach Management Units
DFOs	District Fisheries Officers
EU	European Union
FAO	Food and Agriculture Organization
FS-NTC	Frame Survey-National Technical Committee
FS-RTF	Frame Survey-Regional Task Force
FS	Frame Survey
GEF	Global Environmental Facility
IFIP	Inland Fisheries Project
KARI	Kenya Agricultural Research Institute
KMFRI	Kenya Marine and Fisheries Research Institute
LBDA	Lake Basin Development Authority
LVEMP	Lake Victoria Environmental Management Project
LVFO	Lake Victoria Fisheries Organization
LVFRP	Lake Victoria Fisheries Research Project
RIAT	Ramogi Institute of Advanced Technology
RWG	Regional Working Group
SOPs	Standard Operating Procedures

ACKNOWLEDGEMENTS

Like the previous two Frame surveys (2000 and 2002), 2004 survey was similarly undertaken with financial input from Lake Victoria Environment Management Project (LVEMP) which is a regional programme supported by GEF/World Bank. We appreciate the National Project Coordinator – Kenya Agricultural Research Institute (KARI) and Fisheries Management Component Coordinator for ensuring that the funds were released in advance hence the smooth implementation of the exercise. We would wish to appreciate this gesture, without which the survey would not have been undertaken.

The Lake Victoria Fisheries Organization (LVFO) played a vital role particularly in facilitating the training of Task Leaders in the use of SAMAKI database for data entry, analysis and survey reporting. The Department of fisheries is grateful to all individuals and stakeholders (KMFRI, LBDA, Moi University, Co operative Department, Beach Management Units (BMUs) and Ramogi Institute of Advanced Technology (RIAT) who contributed in one way or another towards the success of the Frame Survey. Special mention is made of the Frame Survey National Technical Committee (FS-NTC) whose members put in a lot of their time and effort during preparation, implementation, data entry, analysis and report writing.

Last but not least, we thank the Director of Fisheries for the support given during the planning, implementation, data entry, analysis and report writing.

EXECUTIVE SUMMARY

Lake Victoria Frame Survey is a major activity under Statistical data collection systems of Fisheries Management Component of Lake Victoria Environment Management Program (LVEMP). It plays a vital role in the management of Lake Victoria Fisheries resources and supports various research activities. The survey is a complete census of crafts, gears, and fishers operating in the lake and all landing site facilities. Frame Surveys have been carried out in Lake Victoria from 1970 – 1998 but remained uncoordinated until the year 2000. At present, it is a biannual activity in the lake's three riparian countries from the year 2000. In the year 2004, the survey was carried out between 27th and 30th April 2004 with reference to 27th April.

This activity has been coordinated and overseen by Frame Survey National Technical Committee (FS-NTC) and Frame Survey Regional Task Force (FS-RTF) at National and Regional levels respectively.

The results in Kenya show that there were 304 fish landing sites compared to 306 in 2002 and 297 in 2000. The number of fishers was 37,348 operating 12,284 fishing crafts in 2004 as opposed to 38,431 and 54,163 fishers, and 11,515 and 12,209 fishing crafts in the years 2000 and 2002 respectively.

The number of gill nets has increased over the years from 130,708 in the year 2000 to 133,365 and 190,756 in the years 2002 and 2004 respectively. There were 2,045,605 long line hooks in the year 2004 compared to 1,039,893 and 2,562,066 in the years 2000 and 2002 respectively.

The number of beach seines was 869; about 24.9% and 80.1% reduction from the previous figures of 1,157 and 5803 in the years 2002 and 2000 respectively. Small seines (Mosquito seines) were 3,048 having increased from 2,097 in the year 2002 and this figure in year 2002 had decreased from 12,387 in the year 2000.

Twenty five percent (25%) of the landing sites had fish bandas while 22% were accessible by all weather roads. Electricity supply and potable water were found in 4% and 7% of the landing sites respectively. The proportion of landing sites with pontoon/jetty, toilets, and fish store were 4%, 58%, and 4% respectively. On average, one fisheries staff manned 8 fish landing sites.

With the current social and economic dependency on Lake Victoria resources, the ratio of staff to landing site should be matched to improve development and

management efforts. Fish handling facilities and access to fish landing sites should be improved. The implication of the increases in fishing effort on the fish stocks should be assessed and appropriate measures taken. Specific and concerted efforts should be made to remove illegal sizes of gill nets and beach seines from the lake.

Adequate and timely availability of logistics is mandatory for effective implementation of such a survey. A committee that will be charged with coordination of future Frame Surveys should have better definition of their roles and empowered to execute the said roles without undue interferences.

This report presents detailed results of the survey.

1.0 INTRODUCTION

1.1 Background

The management of Lake Victoria fishery has had a number of problems because the lake is subjected to three different management regimes of Kenya, Uganda and Tanzania as data collection has been carried out by each country on none harmonized basis. Management implementation by government institutions has been severely constrained by lack of accurate and regularly updated information as a basis for decision-making. The main reasons for this include difficulties associated with the design and implementation of appropriate fisheries data systems, lack of suitable methodologies and extremely limited funding for data collection.

Frame Surveys were conducted in the Kenyan part of Lake Victoria in 1972, 1990, 1994 and 1998. The 1972 Frame Survey was an Aerial Survey Supported by spot checks on the ground by Fisheries Research and Fisheries Department field staff and it lasted three months. In 1990, the Fisheries Department undertook another Frame Survey, which lasted approximately three months with the assistance of FAO channeling funds through Inland Fisheries Project (IFIP) based in Bujumbura at that time. Reports are available for the two surveys above. In 1994 and 1998 further Frame Surveys were conducted in the Kenyan part of the lake by Kenya Marine Fisheries Research Institute (KMFRI) and Fisheries Department staff but implementation was not well coordinated and no reports were produced. None of these surveys were conducted lake wide.

The first lake wide Frame Survey was conducted on Lake Victoria from 22nd to 25th March, 2000 with the support of the GEF/World Bank funded Lake Victoria Environmental Management Project (LVEMP) and the European Union (EU) funded Lake Victoria Fisheries Research Project (LVFRP). The second survey was carried out from 10th to 13th April 2002 with funds from LVEMP. Both surveys were coordinated by the Secretariat of the Lake Victoria Fisheries Organization (LVFO). The third lake wide Frame Survey was conducted from 27th to 30th April 2004 and the results of the survey are contained in this report.

1.2 Objectives

The overall objective of conducting Frame Survey is to provide current information on the facilities and service providers at the landings and on the composition, magnitude and distribution of fishing effort to guide development and management

of the fishery. The specific objectives of Frame Survey are to provide information on:

- The number of fish landing sites;
- The facilities available at the fish landing sites to service the sector including accessibility to the landing sites;
- The service providers especially fisheries staff and Beach Management Units (BMUs) at fish landing sites;
- The number of fishers;
- The number and types of fishing crafts and their modes of propulsion;
- The types and sizes of fishing gears used on the lake and their mode of operation for gillnets; and
- Make specific recommendations on development and management of the fishery.

The information collected would also be used as a raising factor in estimation of fish stocks and fish catches in the lake e.g. in relation to Catch Assessment Survey (CAS) data and sampling frames; for National planning in Fisheries sub-sector investments and developments as well as revenue collection at Local and Central Governments.

1.3 Expected Output

The major results of the survey will include information on:

Distribution of gear types and sizes by administrative boundaries,

Distribution of gear types and sizes by boat types;

Distribution of boats by types and sizes;

Distribution of boats by types and gear types;

Distribution of facilities by landing sites;

Distribution of beach facilities by distances,

2.0 METHODOLOGY

2.1 Planning For the Survey

The planning of the survey started with a Regional Working Group (RWG) meeting held at Tom Mboya Labour College, Kisumu from 5th to 8th April 2004. The main agenda items for this meeting were to:-

- Synthesize the 2000 and 2002 Frame Survey Regional Reports;
- Prepare a Summary Report of the two Frame Surveys for fisheries management adoption;
- Prepare a draft Standard Operating Procedures (SOPs) document to be used to conduct all future Frame Surveys;
- Plan for the 2004 Frame Survey taking into account the lessons and recommendations from the previous Frame Surveys and the draft SOPs.

During this meeting a draft Standard Operating Procedures (SOPs) document for conducting Frame Surveys and an implementation plan for the 2004 Frame Survey was developed. At the same meeting questionnaires and training manual were harmonized and the budgets agreed upon. The dates for conducting the survey were agreed upon to be 27th to 30th April 2004. It was also agreed that data capture, analysis and Frame Survey 2004 report would be undertaken using the SAMAKI database programme.

A National Technical Committee (NTC) on the Frame Survey 2004 had been formed before this RWG meeting and charged with the responsibility of strengthening the implementation of the survey. The membership of the National Technical Committee on the FS 2004 was as follows;

Peter Nzungi	-Fisheries Department -Task Leader Frame Surveys
David Mboya	-Fisheries Department – Secretary
Andrew Othina	- KMFRI – Chairman
Julius Manyala	-Member – Moi University
Richard Abila	- Member - KMFRI
Pamela Achieng	-Member -LBDA
Richard KÓbiero	-Member- Cooperative Department
Simon Wekesa	- Member –Fisheries Department
Cyrus Mageria	- Member – Fisheries Department
District Fisheries Officers	

The task for the NTC included:-

- Printing of survey questionnaire
- Printing of posters for publicity
- Radio announcement
- Public Barazas (meetings) on the survey
- Training of supervisors
- Training of enumerators
- Frame Survey enumeration
- Purchase of stationery for training and survey

Among the other activities to be arranged in advance was securing of training venues in Nyando, Homa Bay, Bondo, Migori and Mbita. A total of 16 vehicles were required for use during the survey and at least 20 motorized canoes were to be hired as water transport to facilitate the movement of trainers, trainees and for actual Frame Survey exercise.

2.2 Conducting the Survey

The survey was preceded by a one day training workshop for supervisors and a two days one for enumerators. The survey was conducted for four days from 27th to 30th April 2004. It was a complete enumeration of all landing sites, fishers, fishing crafts, landing site facilities and fishing gears by type and size. The survey approach was both on land and water. Beach leaders, fishers and crafts owners were interviewed along the entire shore line (Kenyan side) of the lake to gather the required information. To achieve the survey objectives, the harmonized questionnaires were used.

3.0 RESULTS AND DISCUSSIONS

The results indicate an increase in fishing effort during 2000, 2002 and 2004 as relative parameters that directly influence to fishing effort, e.g. the numbers of boats and numbers of fishing gears increased although there were fluctuations in the number of fishers. The least increase in numbers of boats was in the paddled boats, which operate inshore. The crafts using sails and outboard engines that dominate the Nile perch fishery in offshore waters showed steady increases in numbers in the 2000, 2002 and 2004 surveys. Similarly, one of the predominant fishing gears in the Nile perch fishery i.e. gillnets showed large increases in numbers compared with other gears while long line hooks decreased by over 500,000. There was a large increment in the number of gill nets of mesh sizes between 5 inches and 6.5 inches. This observation implies that the fishing effort targeting Nile perch increased tremendously between 2002 and 2004. In 2000 the effort targeting Nile perch may have been low because the survey was carried out soon after the lifting of the ban on Nile perch exports to Europe. Nevertheless, the observed rise in fishing effort targeting the species is alarming.

Detailed results of the Frame survey 2004 are presented in Table 1 and Figures 1 to 16 that follow. Table also compares the 2000, 2002 and 2004 results. The results are given by districts and separated into six major sections, viz: Landing sites, Fishers, Fishing crafts, Propulsion methods, Gears and Landing site facilities.

Table 1: Lake Victoria March 2000, April 2002 and April 2004 Frame Survey National summary

Summary of the 2000, 2002 and 2004 Lake Victoria Fisheries Frame Surveys												
ITEM		YEAR	BUSIA	BONDO	KISUMU	NYANDO	RACHUONYO	HOMA BAY	SUBA	MIGORI	TOTAL	
No. of Landing sites		2000	23	67	32	6	38	7	97	27	297	
		2002	19	73	33	7	39	6	100	29	306	
		2004	18	73	30	9	38	5	104	27	304	
No. of Fishers		2000	2,748	8,383	3,925	512	3,774	568	14,782	3,649	38,431	
		2002	4,901	13,040	4,813	702	5,923	749	16,727	7,308	54,163	
		2004	3,286	11,054	2,793	482	3,377	483	11,639	4,234	37,348	
No. of fishing crafts		2000	771	2,607	1,372	185	1,247	181	4,051	1,101	11,515	
		2002	1,067	3,646	1,147	235	1,201	142	3,267	1,504	12,209	
		2004	1,049	3,678	1,070	209	1,200	169	3,575	1,334	12,284	
Sesse Flat		2000	185	159	71	10	30	2	365	138	951	
		2002	307	196	262	124	54	2	378	302	1,625	
		2004	237	260	87	58	48	7	591	157	1,445	
Sesse pointed		2000	275	2,151	649	81	967	99	3,125	556	7,903	
		2002	636	3,064	543	102	974	101	2,459	620	8,499	
		2004	584	2,744	725	80	809	133	2,604	625	8,304	
Dugout		2000	-	1	-	-	2	-	-	-	3	
		2002	1	2	-	1	1	-	1	23	29	

Summary of the 2000, 2002 and 2004 Lake Victoria Fisheries Frame Surveys												
ITEM			YEAR	BUSIA	BONDO	KISUMU	NYANDO	RACHUONYO	HOMA BAY	SUBA	MIGORI	TOTAL
			2004	2	5	-	-	-	-	-	-	7
	Karua/Parachute		2000	124	262	103	5	24	80	528	357	1,501
			2002	123	342	342	8	171	39	420	521	1,966
			2004	225	610	256	71	343	29	373	487	2,394
	Rafts		2000	-	-	-	-	-	-	-	-	-
			2002	-	-	-	-	-	-	-	-	-
			2004	-	55	2	0	-	-	6	65	128
	Others		2000	169	34	549	70	224	1	33	50	1,127
			2002	-	42	-	-	1	-	9	38	90
			2004	-	-	-	-	-	-	-	-	-
Propulsion	In board		2000	-	6	-	-	5	-	4	-	15
			2002	-	-	-	-	-	-	-	-	-
			2004	-	-	-	-	-	-	-	-	-
	Out board		2000	35	90	35	-	14	-	308	144	626
			2002	119	90	18	-	-	1	335	129	692
			2004	96	113	21	-	5	4	503	118	860
	Paddles		2000	488	1,691	867	150	550	131	2,891	793	7,561
			2002	612	2,064	681	156	269	89	2,088	861	6,820
			2004	473	2,156	594	143	240	73	2,111	770	6,560

Summary of the 2000, 2002 and 2004 Lake Victoria Fisheries Frame Surveys												
ITEM			YEAR	BUSIA	BONDO	KISUMU	NYANDO	RACHUONYO	HOMA BAY	SUBA	MIGORI	TOTAL
	Sails		2000	248	820	470	35	678	51	848	164	3,313
			2002	336	1492	448	79	932	52	844	514	4,697
			2004	479	1,405	455	66	955	92	960	446	4,858
Gill nets	<2.5		2000	423	226	384	69	604	190	28	2,389	4,313
			2002	476	125	636	809	383	3	60	631	3,123
			2004	552	462	1,575	495	571	18	18	1,373	5,064
	2.5		2000	601	594	2,021	129	992	140	357	432	5,266
		2002	553	547	4,189	481	604	174	491	868	7,907	
		2004	627	716	4,177	222	1,056	222	262	559	7,841	
	3		2000	920	937	2,033	190	3,405	195	518	214	8,412
		2002	477	541	1,342	198	358	173	123	605	3,817	
		2004	270	563	1,168	238	550	76	318	406	3,589	
	3.5		2000	597	1,577	1,288	317	1,663	88	1,077	219	6,826
		2002	138	539	769	195	198	58	82	283	2,262	
		2004	441	579	778	510	234	45	287	49	2,923	
	4		2000	393	916	2,109	465	941	168	566	267	5,825
		2002	277	924	1,128	315	760	90	521	460	4,475	
		2004	728	779	726	328	448	105	843	235	4,192	
	4.5		2000	480	624	457	96	566	85	504	90	2,902

Summary of the 2000, 2002 and 2004 Lake Victoria Fisheries Frame Surveys												
ITEM			YEAR	BUSIA	BONDO	KISUMU	NYANDO	RACHUONYO	HOMA BAY	SUBA	MIGORI	TOTAL
			2002	629	1,738	748	250	1,833	100	1,376	269	6,943
			2004	802	1,244	616	379	525	165	1,508	148	5,387
		5	2000	296	1,099	1,990	122	2,602	290	1,240	446	8,085
			2002	2,951	10,017	1,926	222	4,054	349	5,631	1,044	26,194
			2004	3,478	7,413	2,206	498	5,254	551	5,832	2,071	27,303
		5.5	2000	213	4,582	1,536	41	2,706	196	1,969	434	11,677
			2002	1,069	6,717	1,345	152	3,838	386	5,339	1,453	20,501
			2004	1,464	6,326	1,573	353	3,689	886	10,287	2,829	27,407
		6	2000	1,397	3,431	3,309	151	3,768	341	15,153	4,597	32,147
			2002	3,663	6,924	1,143	290	2,682	1,020	7,497	4,877	28,096
			2004	4,621	13,489	3,572	341	3,193	673	27,774	3,511	57,174
		6.5	2000	235	3,264	862	48	934	-	2,470	1,435	9,249
			2002	236	3,080	153	49	469	41	1,849	2,164	8,039
			2004	303	4,823	275	97	386	498	14,813	779	21,974
		7	2000	1,128	2,748	2,076	105	1,440	5	11,556	5,235	24,293
			2002	3,149	2,452	368	165	735	67	4,313	3,530	14,779
			2004	1,911	2,613	291	124	770	80	11,486	1,146	18,421
		7.5	2000	78	359	178	-	353	-	1,034	224	2,226

Summary of the 2000, 2002 and 2004 Lake Victoria Fisheries Frame Surveys												
ITEM			YEAR	BUSIA	BONDO	KISUMU	NYANDO	RACHUONYO	HOMA BAY	SUBA	MIGORI	TOTAL
			2002	24	173	27	20	159	-	497	81	981
			2004	158	106	27	45	90	2	567	41	1,036
		8	2000	375	217	191	69	521	-	609	519	2,501
			2002	474	107	77	171	357	-	802	432	2,420
			2004	503	104	58	80	300	-	704	61	1,810
		9	2000	1,779	27	306	24	322	-	46	9	2,513
			2002	60	27	66	50	40	-	16	5	264
			2004	61	69	135	16	-	-	189	-	470
		10	2000	3,474	34	3	1	15	-	-	-	3,527
			2002	339	76	50	52	152	-	-	-	669
			2004	66	102	149	25	152	-	2	1	497
		>10	2000	2,431	51	-	621	100	-	400	-	3,603
			2002	35	-	65	9	129	-	-	-	238
			2004	5	5,529	32	26	60	-	14	2	5,668
Total Gill nets			2000	14,820	20,686	18,743	2,448	20,932	1,698	37,527	16,510	133,365
			2002	14,550	33,,989	14,032	3,427	16,751	2,461	28,797	16,701	130,708
			2004	15,990	44,917	17,358	3,777	17,278	3,321	74,904	13,211	190,756
Long lines hooks			2000	88,397	259,373	68,652	15,921	220,514	21,770	280,798	84,468	1,039,893

Summary of the 2000, 2002 and 2004 Lake Victoria Fisheries Frame Surveys												
ITEM			YEAR	BUSIA	BONDO	KISUMU	NYANDO	RACHUONYO	HOMA BAY	SUBA	MIGORI	TOTAL
			2002	276,798	728,106	180,344	43,040	395,620	27,750	511,978	398,430	2,562,066
			2004	237,820	607,006	152,740	9,480	387,990	10,300	403,249	237,020	2,045,605
Beach Seines			2000	631	1,241	856	61	188	13	1,443	1,370	5,803
			2002	74	299	30	16	46	2	565	125	1,157
			2004	50	169	32	5	26	3	491	93	869
Cast Nets			2000	173	205	3,425	-	18	-	176	551	4,548
			2002	6	43	17	-	-	2	13	21	102
			2004	12	24	1	-	1	-	29	11	78
Hand lines			2000	694	4,061	5,016	-	86	426	23,021	1,009	34,313
			2002	500	5,466	2,017	43	8	53	1,778	2,307	12,172
			2004	732	8,320	1,396	7	28	13	1,947	989	13,432
Traps			2000	19	656	196	1,274	692	144	195	-	3,179
			2002	39	101	520	871	476	28	82	194	2,311
			2004	122	275	93	611	553	17	79	96	1,846
Small seines			2000	171	1,621	1,220	204	1,775	160	5,182	2,054	12,387
			2002	162	501	200	52	189	30	674	289	2,097
		<=5mm	2004	127	446	103	17	149	-	446	232	1,520
		6-9mm	2004	-	96	68	1	33	43	1,218	43	1,502

Summary of the 2000, 2002 and 2004 Lake Victoria Fisheries Frame Surveys												
ITEM			YEAR	BUSIA	BONDO	KISUMU	NYANDO	RACHUONYO	HOMA BAY	SUBA	MIGORI	TOTAL
		10mm	2004	-	6	-	3	7	-	10	-	26
Total Small seines			2004	127	548	171	21	189	43	1,674	275	3,048
Lift nets			2000	-	-	-	-	-	-	-	-	-
			2002	6	-	-	-	-	-	-	5	11
			2004	-	-	-	-	-	-	-	-	-
Scoop nets			2000	-	-	-	-	-	-	-	-	-
			2002	-	7	-	-	-	-	5	-	12
			2004	-	14	-	-	-	-	-	-	14
Monofilament			2000	-	-	-	-	-	-	-	-	-
			2002	-	-	-	-	-	-	-	-	-
			2004	6	45	-	-	1	-	5	1	58
Other gears			2000	-	1,517	-	95	4	-	3	30	1,649
			2002	-	-	-	-	-	-	-	-	-
			2004	-	-	-	-	-	-	-	-	-
Total Crafts			2000	1,131	3,160	1,630	234	1,488	216	4,592	1,349	13,790
			2002	1,407	4,267	1,535	327	1,496	175	4,102	1,885	15,184
			2004	1,277	4,297	1,317	264	1,442	206	4,212	1,527	14,709
Derelict Crafts			2000	225	432	244	46	212	35	448	234	1,876
			2002	233	499	319	76	277	31	710	332	2,467

Summary of the 2000, 2002 and 2004 Lake Victoria Fisheries Frame Surveys												
ITEM			YEAR	BUSIA	BONDO	KISUMU	NYANDO	RACHUONYO	HOMA BAY	SUBA	MIGORI	TOTAL
			2004	170	532	179	43	226	27	547	182	1,906
Transport Crafts			2000	135	121	14	3	29	-	93	14	409
			2002	107	122	69	16	18	2	125	49	508
			2004	58	87	68	12	16	10	90	11	352
Fish carriers			2004									167
Fishing Crafts			2000	771	2,607	1,372	185	1,247	181	4,051	1,101	11,505
			2002	1,067	3,646	1,147	235	1,201	142	3,267	1,504	12,209
			2004	1,049	3,678	1,070	209	1,200	169	3,575	1,334	12,284
Landing facilities												
Bandas			2000	3	19	8	2	12	2	19	15	80
			2002	3	14	7	2	6	2	24	12	72
			2004	4	22	10	2	11	3	12	12	76
Cold rooms working			2000	-	-	-	-	-	-	1	-	1
			2002	-	-	-	-	-	-	-	-	-
			2004	1	1	-	-	-	-	1	-	3
Cold rooms non- working			2000	-	-	-	-	-	-	1	-	1
			2002	-	-	-	1	-	-	1	-	2
			2004	1	2	-	-	-	-	2	-	6
Pontoon/Jetty			2000	-	2	-	-	-	-	4	3	9
			2002	-	1	1	-	-	-	1	2	5

Summary of the 2000, 2002 and 2004 Lake Victoria Fisheries Frame Surveys												
ITEM			YEAR	BUSIA	BONDO	KISUMU	NYANDO	RACHUONYO	HOMA BAY	SUBA	MIGORI	TOTAL
			2004	2	3	2	-	-	-	2	2	11
Fish stores			2000	-	3	1	-	-	1	9	2	16
			2002	2	4	1	1	1	-	2	1	12
			2004	-	3	3	-	1	-	5	1	13
All weather roads			2000	17	4	2	-	16	4	12	5	60
			2002	13	15	9	3	11	2	36	13	102
			2004	8	12	8	-	12	-	23	5	68
Designated Net repair facility			2000	14	-	-	-	1	-	20	16	51
			2002	-	-	-	-	-	-	-	-	-
			2004	9	35	11	2	5	-	37	8	107
Designated crafts repair facility			2000	13	-	-	-	-	-	26	12	51
			2002	-	-	-	-	-	-	-	-	-
			2004	13	48	13	3	12	-	50	10	149
Electricity			2000	16	3	4	-	-	3	-	3	29
			2002	7	2	5	-	-	-	-	1	15
			2004	2	3	6	-	-	-	1	-	12
BMU Based at the landing site			2000	-	-	-	-	-	-	-	-	-
			2002	-	-	-	-	-	-	-	-	-
			2004									

Summary of the 2000, 2002 and 2004 Lake Victoria Fisheries Frame Surveys												
ITEM			YEAR	BUSIA	BONDO	KISUMU	NYANDO	RACHUONYO	HOMA BAY	SUBA	MIGORI	TOTAL
Residency of staff			2000	-	-	-	-	-	-	-	-	-
			2002	2	5	1	-	1	1	9	3	22
			2004	4	24	2	-	2	-	5	2	39
Potable water			2000	-	-	-	-	-	-	-	-	-
			2002	5	10	4	2	2	1	5	-	29
			2004	3	2	2	1	4	1	8	1	22
Toilet facility			2000	-	-	-	-	-	-	-	-	-
			2002	8	29	15	2	30	5	49	12	150
			2004	11	37	16	4	33	3	62	13	179

3.1 Landing Sites

The total number of landing sites decreased slightly from 306 in 2002 to 304 in 2004 after having increased from 297 in 2000, (Table 1). The changes were as follows by districts; in Busia District there was a decrease of one landing site from 19 to 18, in Bondo they were the same at 73, in Kisumu they decreased from 33 to 30, in Nyando they increased from 7 to 9, in Rachuonyo they decreased from 39 to 38, in Homa bay they decreased from 6 to 5, in Suba they increased from 100 to 104 while in Migori district they decreased from 29 to 27. The observed decreases could possibly be a result of merging of certain landing sites. A landing site was defined as a landing site where 5 or more fishing (non-derelict) crafts land fish on daily basis

Most of the landing sites were found in Suba District (33%), Bondo (24%) with Nyando and Homa Bay having the least at 3% and 2% respectively, Figure 1.

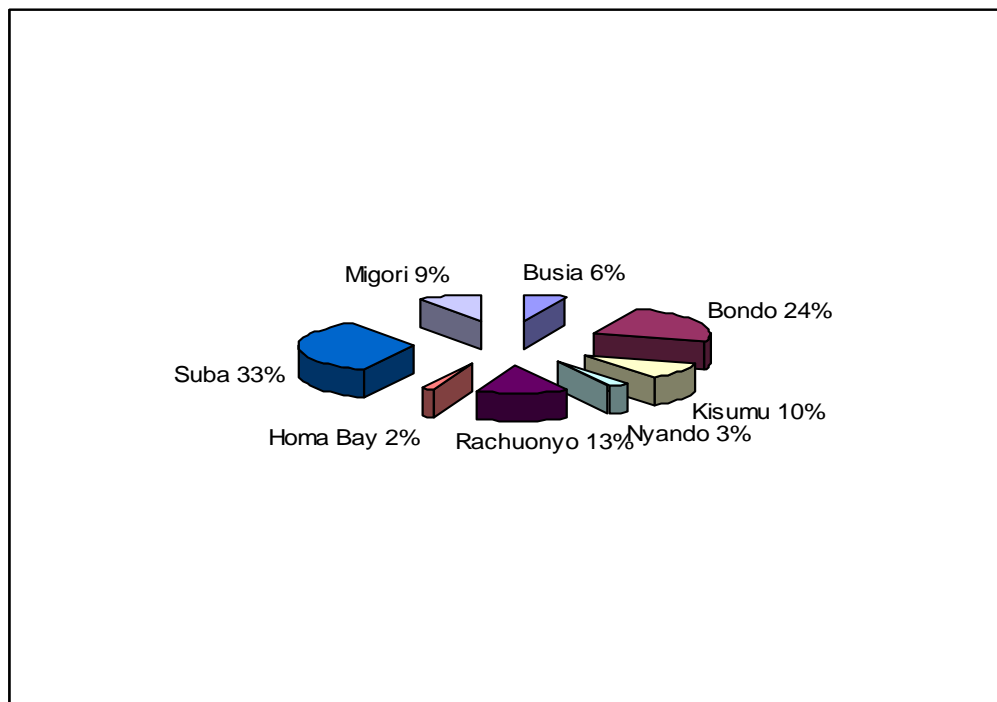


Figure 1: Distribution of landing sites by Districts

3.2 Facilities at the landing sites

Facilities observed included Bandas (Fish shed), cold rooms, pontoons/jetties, potable water, Electricity supply, fish stores, all weather roads, boat repair, net repair

and toilet facilities. Twenty five percent (25%) of the landing sites had fish bandas while 22% were accessible by all weather roads. Electricity supply and potable water were found at 4% and 7% of the landing sites respectively. The proportion of crafts with pontoon/jetty, toilets, and fish store were 4%, 58%, and 4% respectively. On average, one fisheries staff manned 8 fish landing sites. There is need to increase the number of fisheries staff to improve supervision of fishery activities at the landing sites. This also calls for empowerment of Beach Management Units (BMUs) to assist with fisheries development and management activities at the fish landing sites.

3.3 Number of Fishers

The number of fishers was 37,348 as opposed to 38,431 in 2000 and 54,163 in 2002, a decrease of 3% and 31% from 2000 and 2002 figures respectively. The density of fishers was 9.0 per square km compared to 13.1 fishers in 2002 and 9.3 in 2000. During the last Frame Survey 2002, the total number of people who were hauling beach seines were enumerated as fishers while in 2004 Frame Survey, only people who took part in the setting of the beach seines were enumerated as fishers, hence the big reduction in the number of fishers between the two surveys. The fishers were distributed within the eight riparian districts of Lake Victoria (Kenya) waters.

In 2004 Frame Survey like the other past surveys, Suba District had the highest number of fishers at 11,639, followed by Bondo with 11,054, Migori with 4,234, Rachuonyo with 3,377, Busia with 3,286 and Kisumu with 2,793. Nyando District had the least number of fishers at 472 just exceeded by Homa Bay with 483 fishers, (Figure 2). The overall mean number of fishers per landing site was 123 down from 177 in 2002 and 129 in the year 2000. Busia District had the highest mean number of fishers per landing site at 182 followed by Migori 156, Bondo 151, Suba 112, Homa bay 97, Kisumu 93, Rachuonyo 89 and the least concentration at 53 fishers per landing site was in Nyando District in 2004.

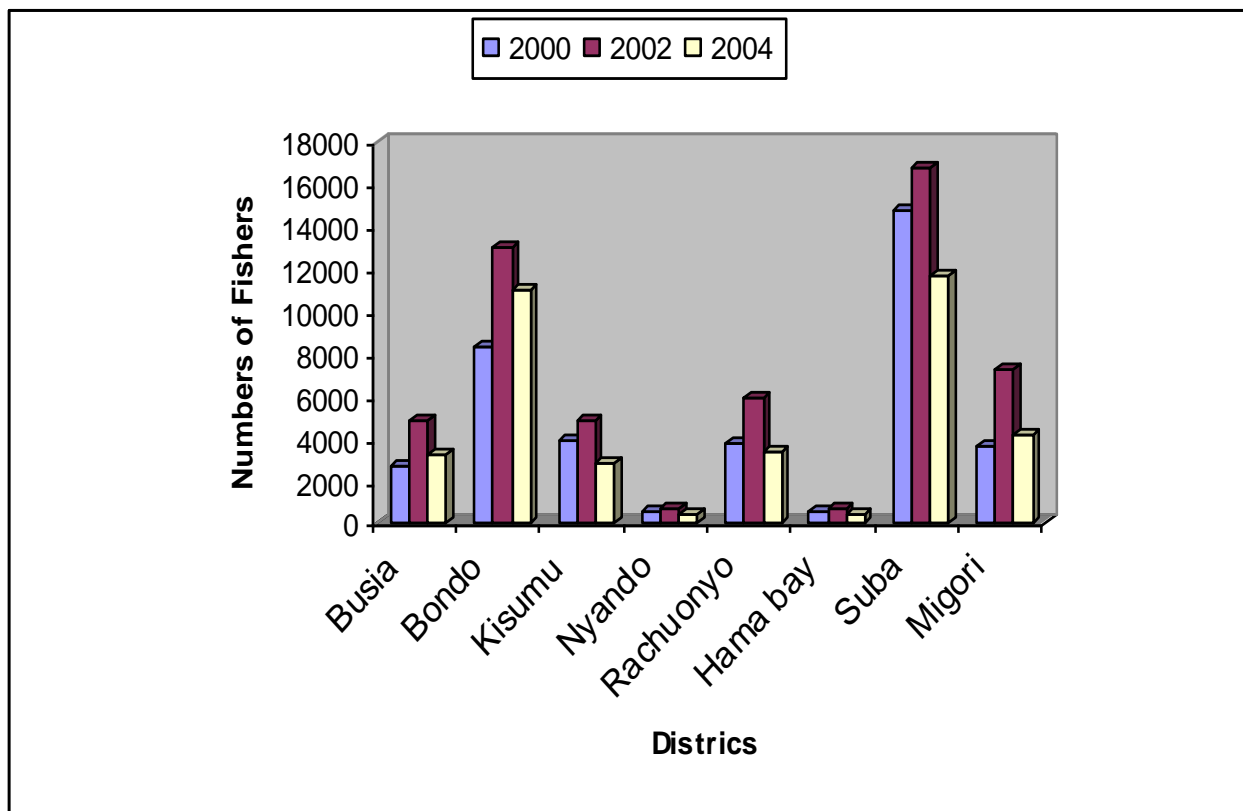


Figure 2: Distribution of Fishers by Districts 2000, 2002 and 2004 Frame surveys

3.4 Fishing crafts and mode of propulsion

During the 2000, 2002 and 2004 Frame Surveys the fishing craft types were dominated by Sesse crafts pointed at both ends with a contribution of 68.6% in 2000, 69.6% in 2002 and 67.6% in 2004. These were followed by Taruma/Parachute crafts, Sesse crafts, flat at one end and last were rafts with a mere contribution of 1.0%., (Figure 3). There were a total of 13,790 crafts for all of the landing sites, out of which 1,876 were derelict, 409 transport crafts and 11,515 active fishing crafts in the fishery of Lake Victoria Kenya, waters in 2000. In 2002 there were 15,184 crafts of which 2,467 were derelict, 508 transport crafts and 12,209 fishing crafts while in 2004 the total number of crafts was 14,709 out of which 1,906 were derelict, 352 transport, 167 fish carriers and 12,284 fishing crafts. In 2004, just like in the distribution of fishers, most fishing crafts were found in Bondo District (3,678) followed by Suba (3,575) with Homa Bay and Nyando districts having least at 169 and 209 respectively, (Figure 4).

Derelict crafts were highest in Suba and Bondo Districts with 547 and 532 crafts respectively while the lowest numbers of derelict crafts were observed at Homa Bay and Nyando districts with 27 and 43 derelict crafts respectively (Table 1).

Suba District had the highest number of transport crafts (90) followed closely by Bondo with 87 transport crafts. Homa Bay District had the least, with 10 transport crafts.

Distribution of mean number of active fishing crafts per landing site indicated that Busia District had the highest number with 58 active fishing crafts per landing site followed by Bondo with 50, Migori 49, Homa bay 39, Kisumu 35, Suba 35, Rachuonyo 32 and the least were observed in Nyando with only 23. Lake wide (Kenya side), the average number of active fishing crafts per landing site was 40.

Fishing crafts of different modes of propulsion i.e. sails and motors increased but paddled crafts had a slight decrease in 2004 compared to 2002 Frame Survey. Majority of the active fishing crafts (6,560) in Kenya waters of Lake Victoria were found to use paddles (53.4%) while 4,858 fishing crafts (40.4) used sails. The rest, 860 (7.0%) fishing crafts were motorized with outboard engines, (Figure 5). Majority of the motorized crafts were found in Suba District (503 crafts) followed by Migori (118 crafts), Bondo (113), Busia (96), Kisumu (21), Rachuonyo () and Homa bay (4). Nyando District had none.

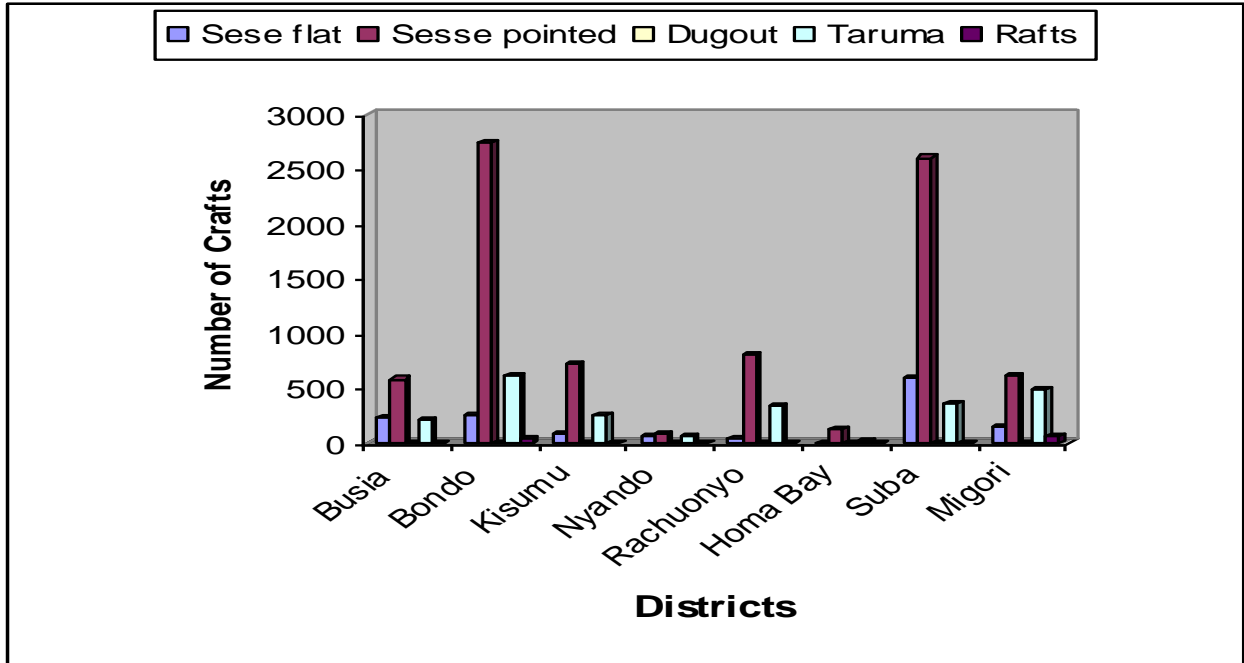


Figure 3: Distribution of Fishing Craft type by Districts 2004 Frame Survey

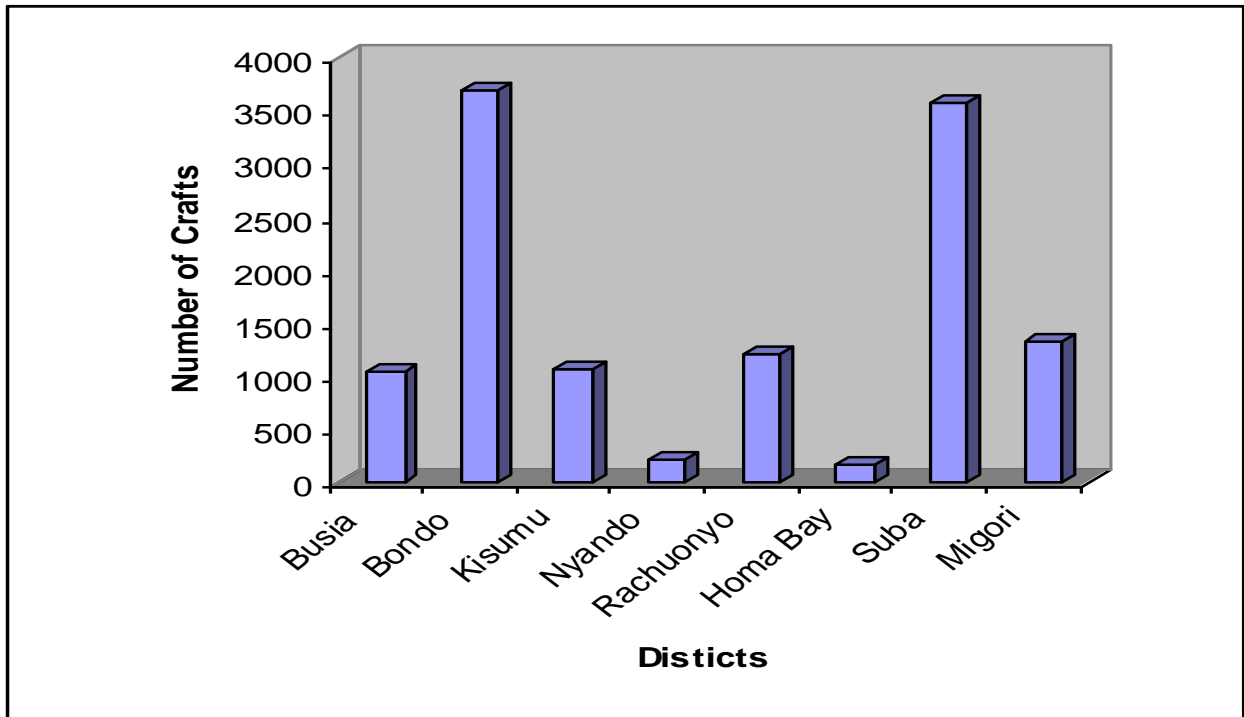


Figure 4: Distribution of Fishing Crafts by Districts during 2004 Frame Survey

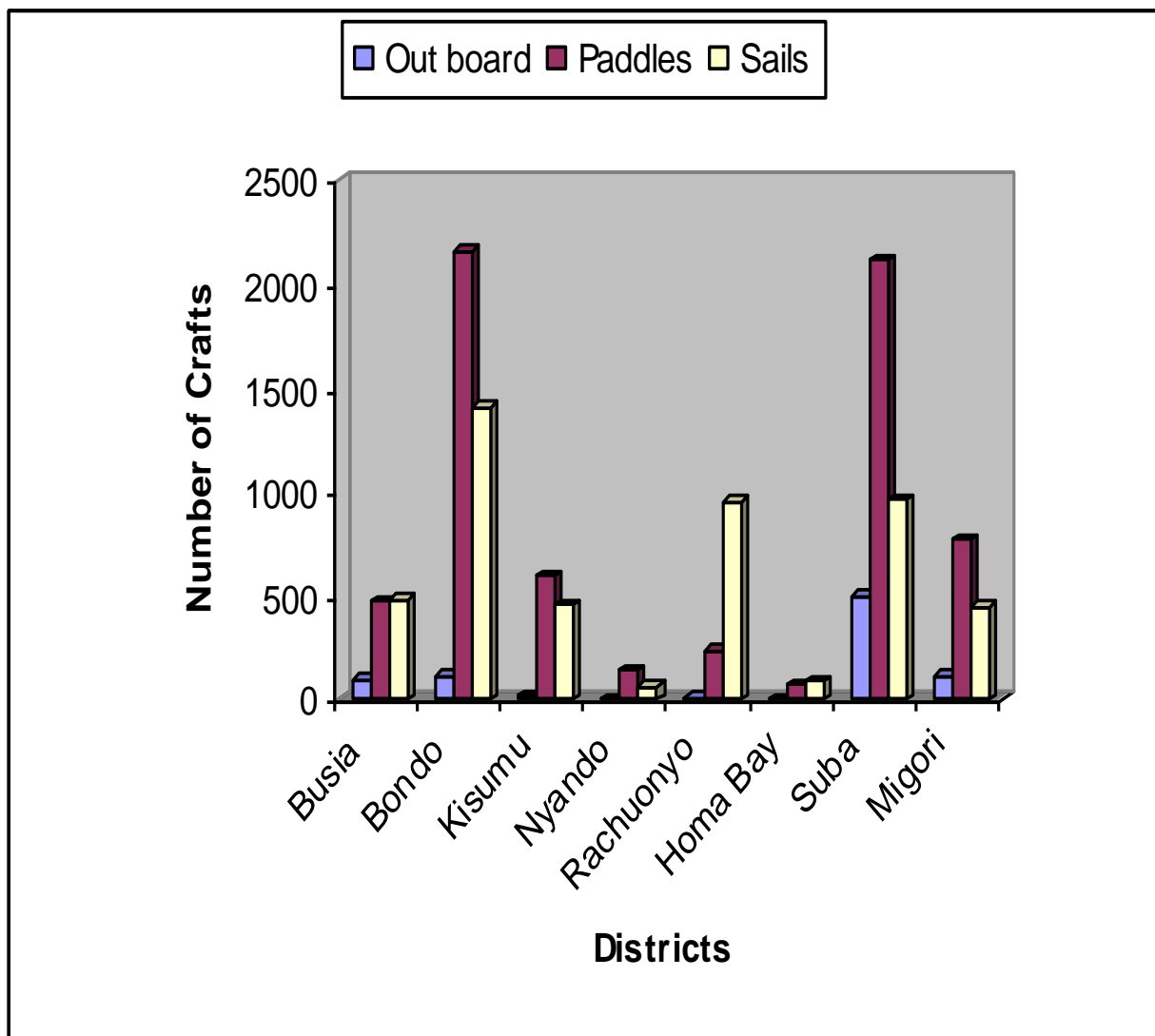


Figure 5: Distribution of Fishing Crafts by mode of Propulsion 2004 Frame Survey

3.5 Fishing Gears

The main fishing gears observed in 2000, 2002 and 2004 Frame Surveys included gillnets, beach seines, long line hooks, hand line and small seines. Other gears included traps, lift nets, scoop nets, cast nets and monofilament nets.

3.5.1 Gillnets

There was a decrease and a substantial increase in the number of gill nets from 133,365 to 130,708 and 190,756 in 2000, 2002 and 2004 respectively, a decrease of 2.0% and an increase of 45.9% between the three Frame surveys. Out of the total

number of gill nets during 2004 FS, 29,198 (or 15.3%) were found to be below 5'' (127mm) as compared to 28,527 (or 21.8%) in 2002 and 33,240 (or 24.9%) in the year 2000 (Figure 14). This represents a reduction of 9.6% of under size gill nets considering the three surveys.

During the FS 2004 the highest concentration of the under size mesh gill nets were recorded in Nyando District with 57.5% followed by Kisumu 52.1%, Busia 21.4%, Migori 21.0%, Rachuonyo 19.6%, Homa bay 19.0%, Bondo 9.7% and the least concentration was found in Suba district with only 4.3%, (Figures 6 to 13).

Closely looking at the number of fishing crafts and under size mesh gill nets, on average Nyando District had the highest concentration of under size gill nets at 10 under size mesh gill nets per fishing craft followed by Kisumu with 8, Homa Bay with 4, Rachuonyo and Busia with 3 each, Migori with 2 and finally Bondo and Suba with one each. The species targeted in the gill nets fishery were found to be *Lates niloticus* and *Tilapia* spp.

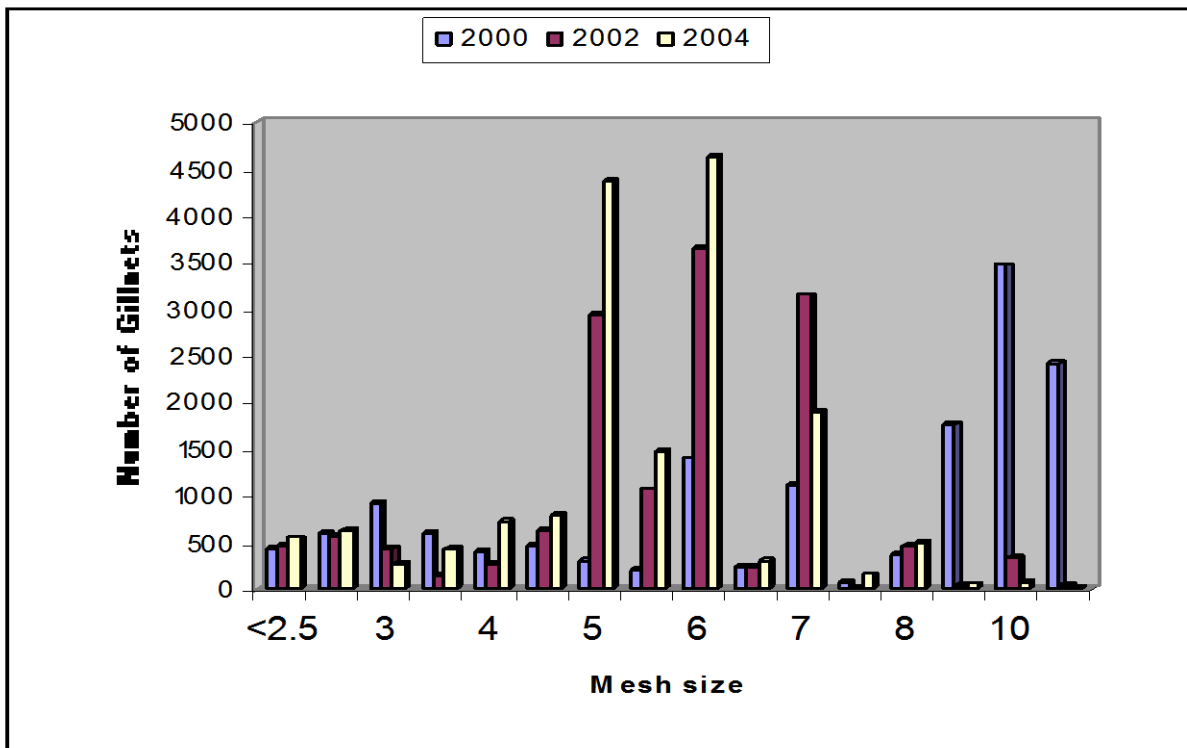


Figure 6: Distribution of Gill nets by mesh sizes- Busia District 2000, 2002 and 2004 FS

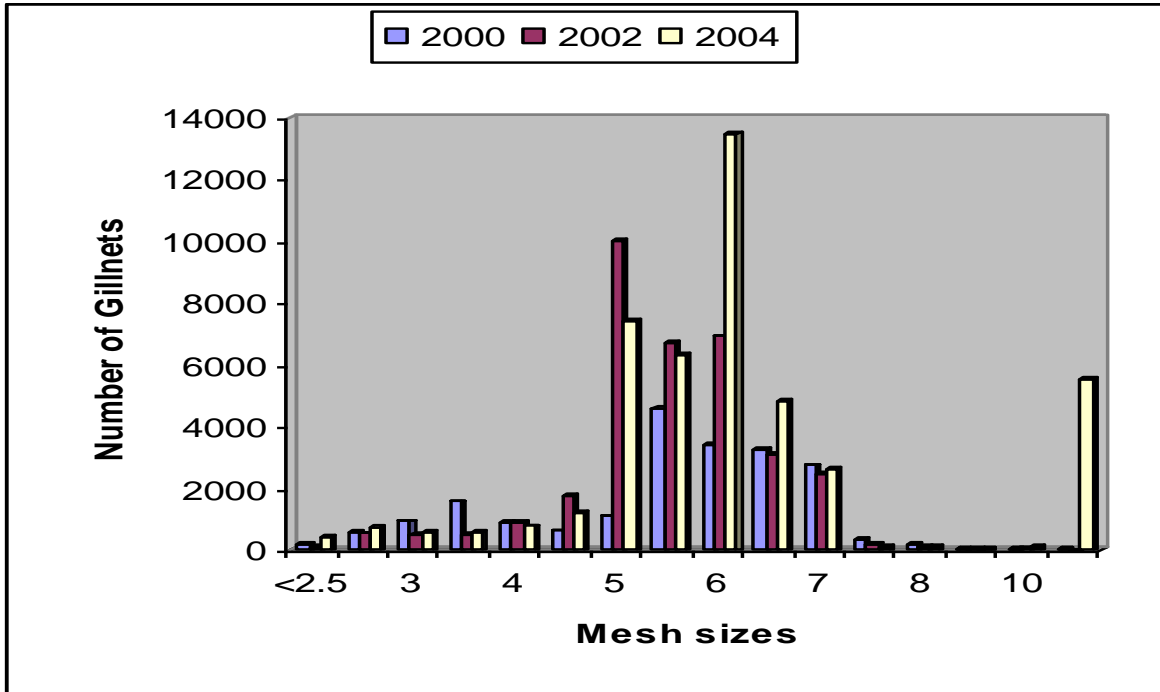


Figure 7: Distribution of Gill nets by mesh sizes - Bondo District 2000, 2002 and 2004 Frame Survey

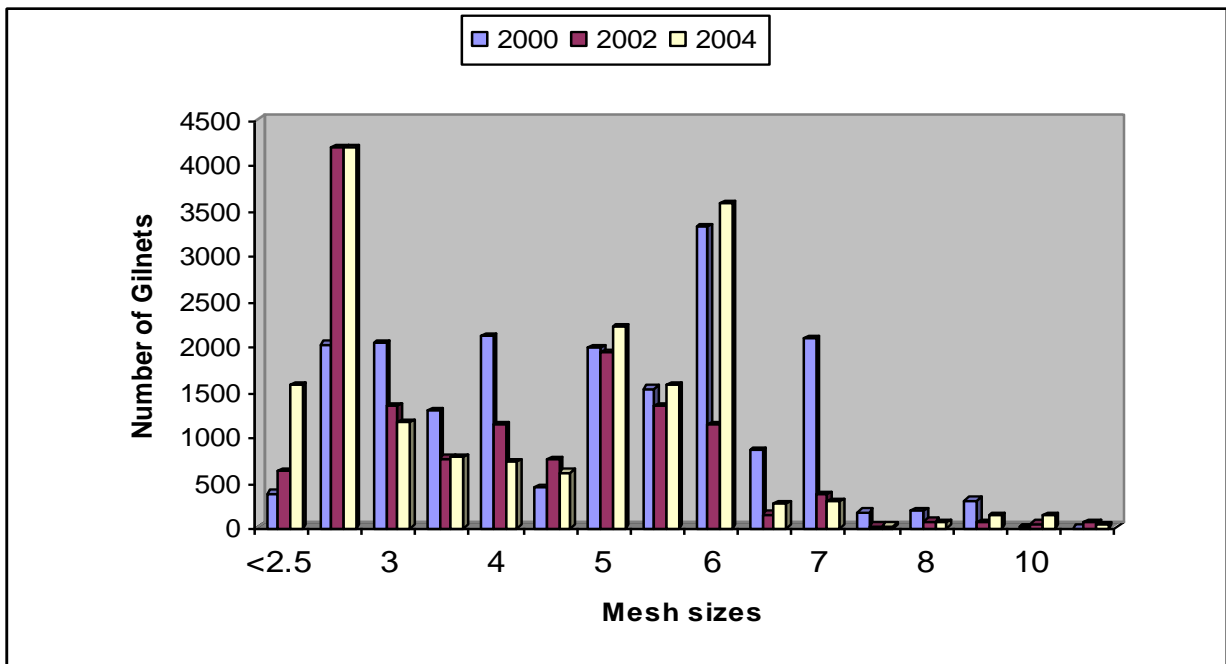


Figure 8: Distribution of Gill nets by mesh sizes - Kisumu District 2000, 2002 and 2004 Frame Survey

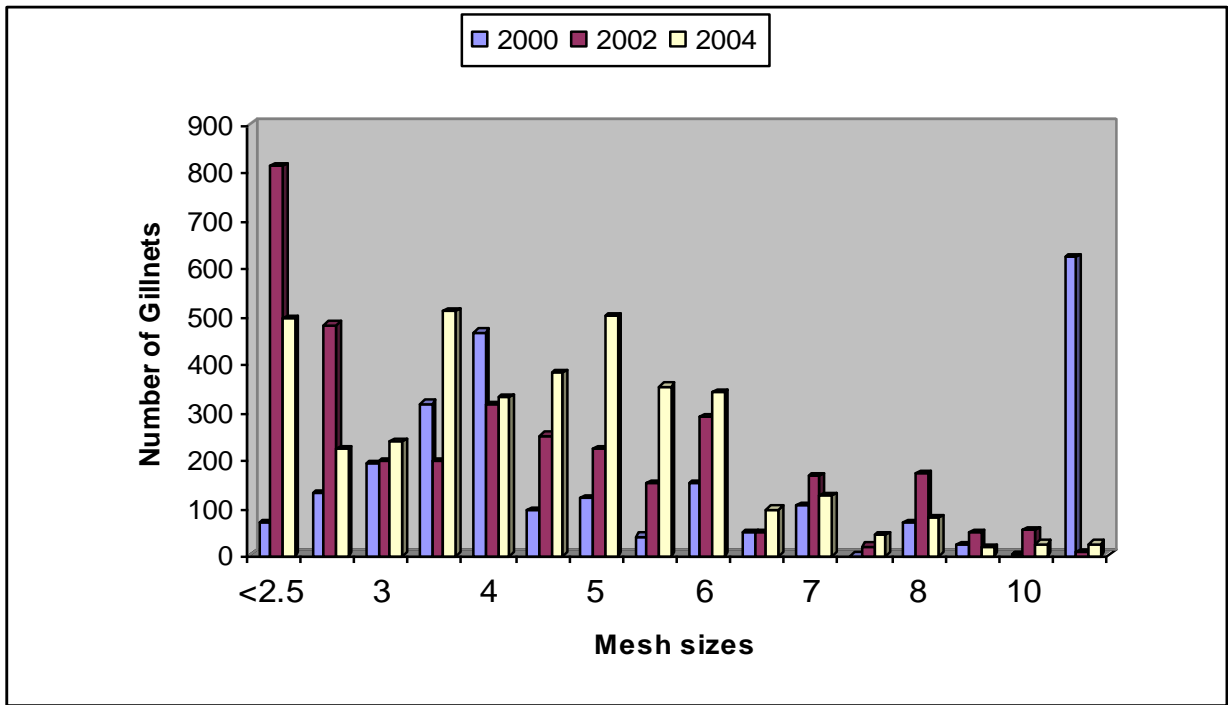


Figure 9: Distribution of Gill nets by mesh sizes -Nyando District 2000, 2002 and 2004 Frame Survey

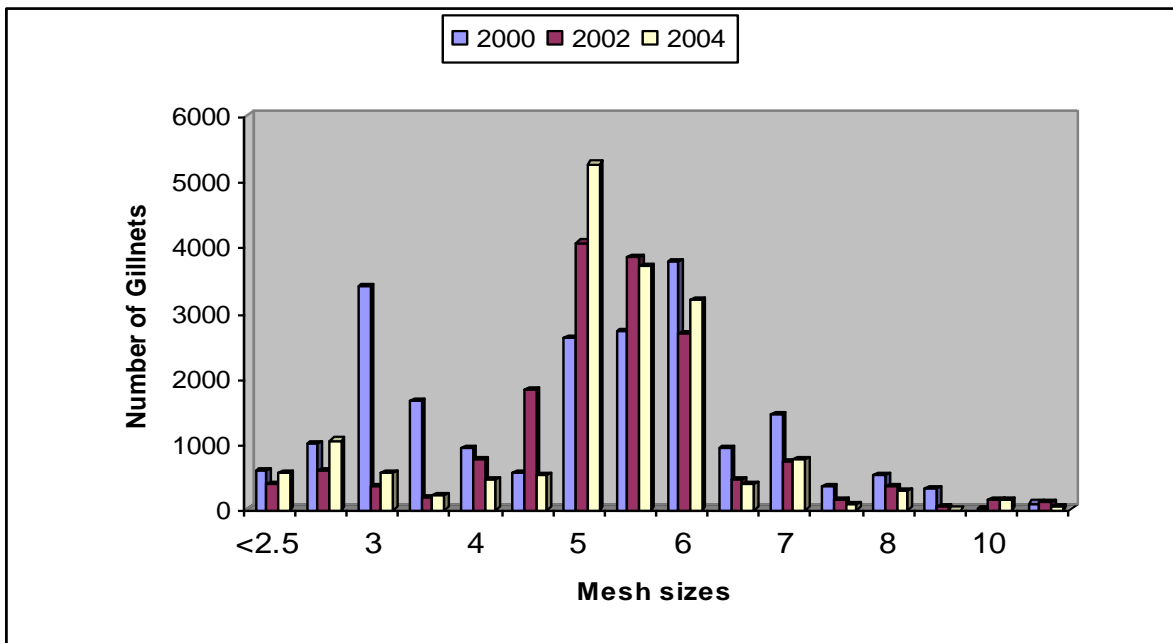


Figure 10: Distribution Gill nets by mesh sizes - Rachuonyo District 2000, 2002 and 2004 Frame Survey

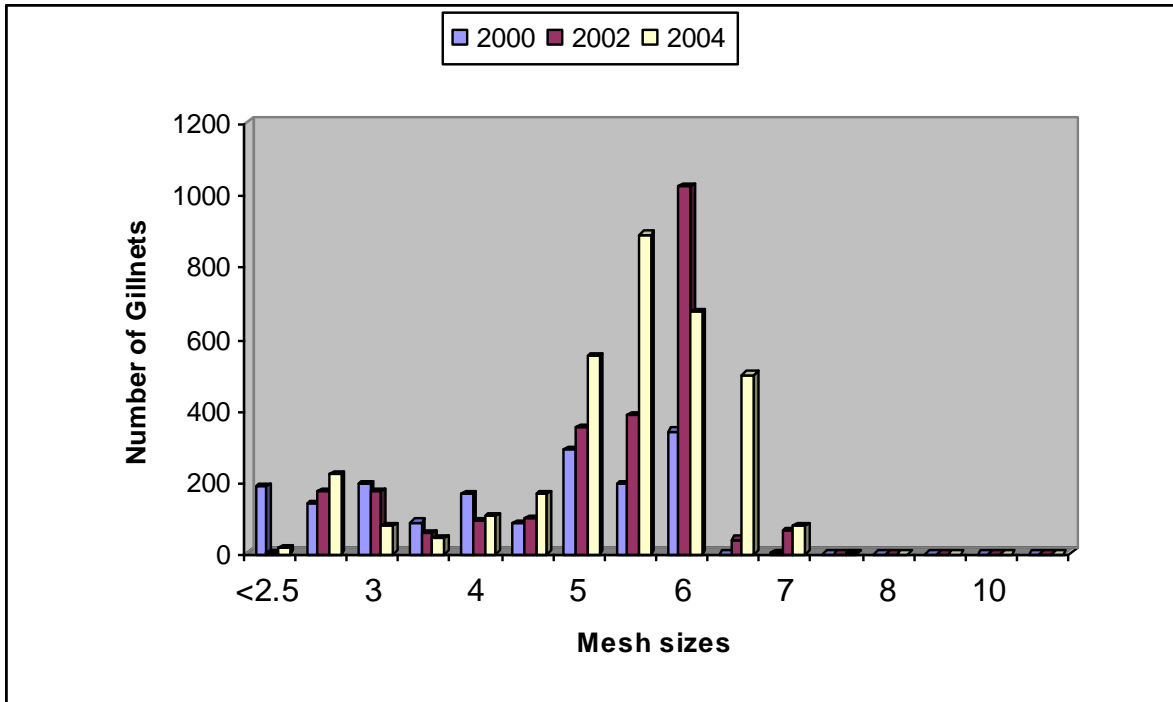


Figure 11: Distribution of Gill nets by mesh sizes -Homa Bay District 2000, 2002 and 2004 Frame Survey

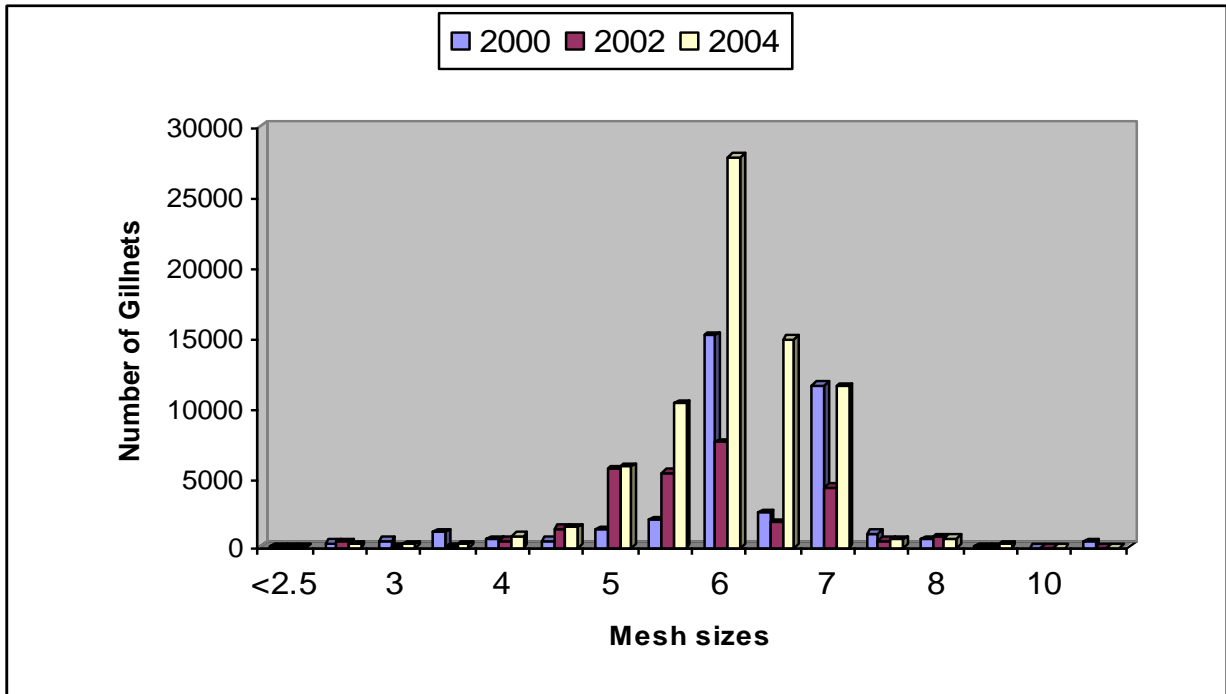


Figure 12: Distribution of Gill nets by mesh sizes -Suba District 2000, 2002 and 2004 Frame Survey

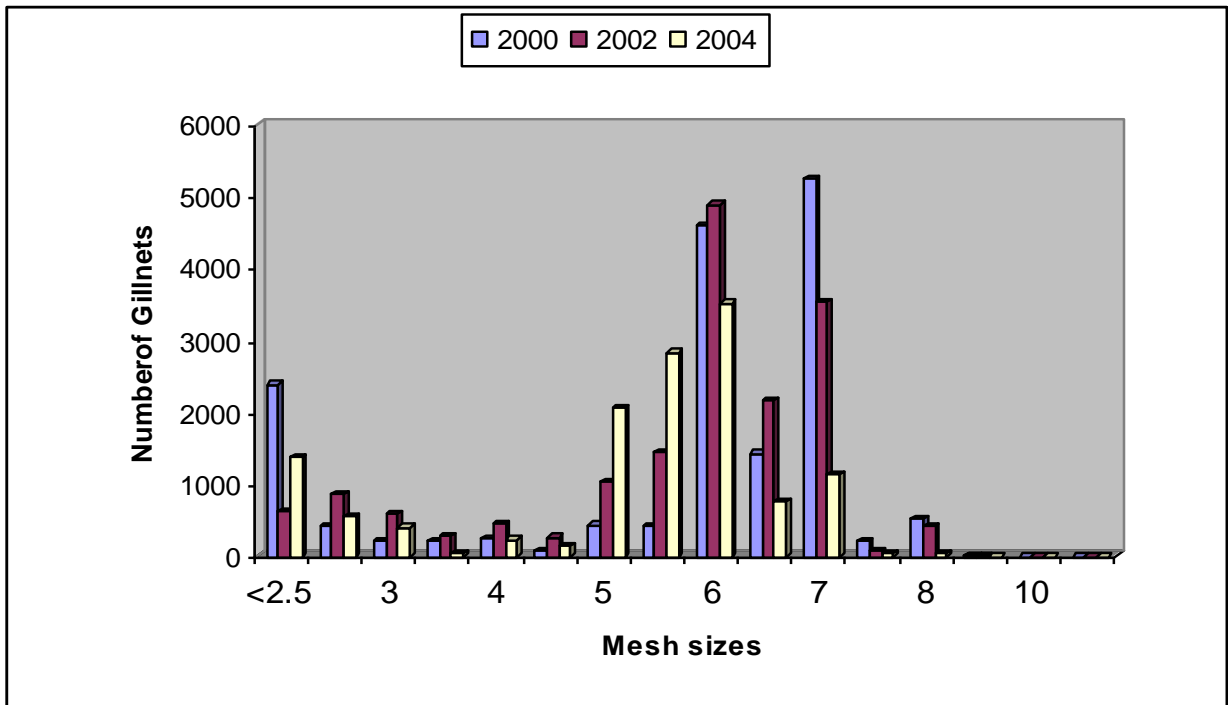


Figure 13: Distribution of Gill nets by mesh sizes - Migori District 2000, 2002 and 2004 Frame Survey

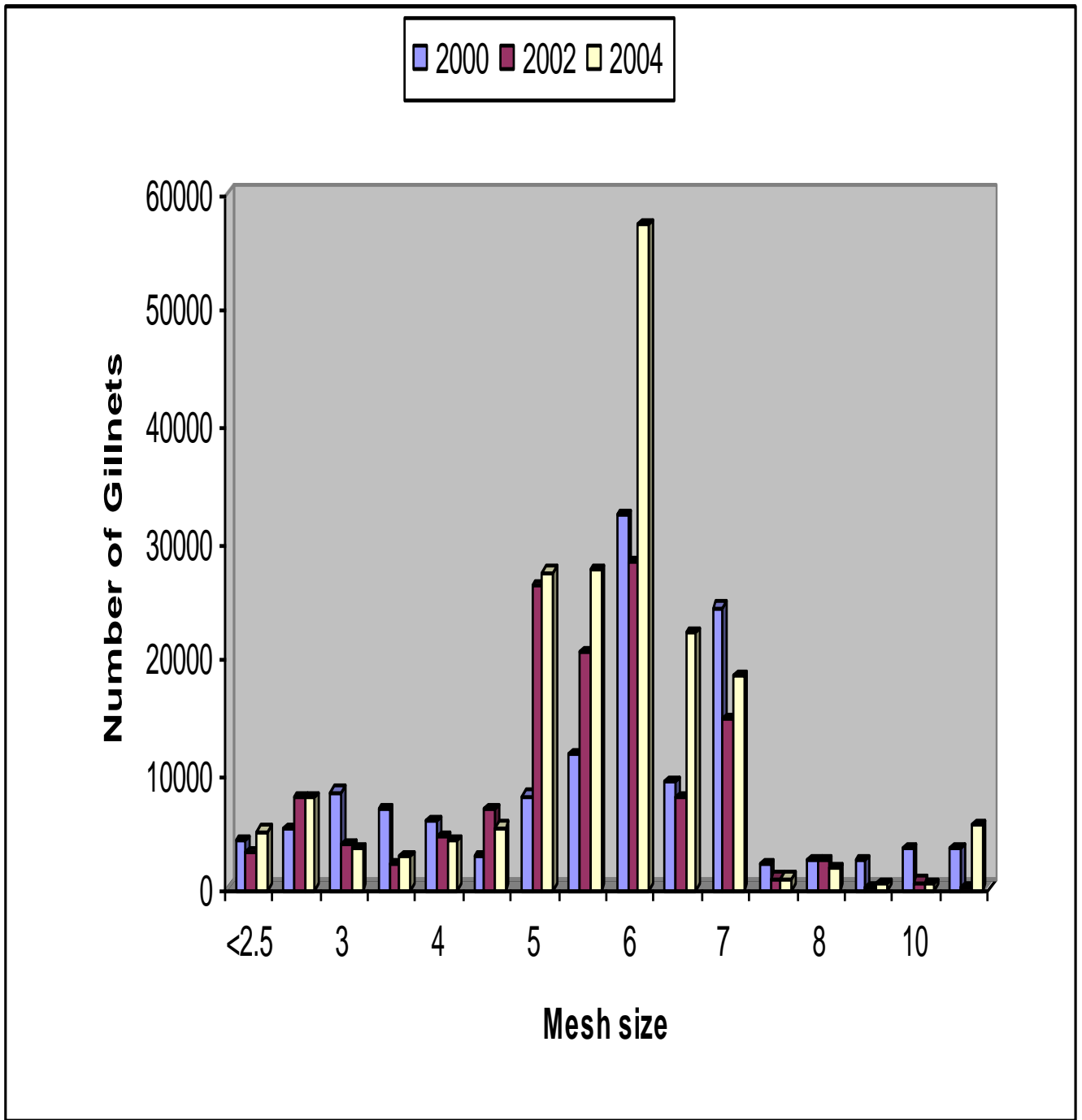


Figure 14: National Gill Nets Distribution by mesh sizes 2000, 2002 and 2004 Frame Survey

3.5.2 Long line hooks

A total of 2,045,605 long line hooks were recorded during FS 2004 as compared to 1,039,893 that were recorded during the 2000 FS and 2,562,066 in 2002 Frame Survey (Figure 15). During the FS 2004 the highest numbers of 607,006 hooks were recorded in Bondo District. This was followed by Suba District with 403,249 hooks, Rachuonyo 387,990, Busia 237,820, Migori 237,020, Kisumu 152,740, Homa Bay 10,300 and the least was Nyando District with 9,480. Long line hooks fishery mainly targets *Lates niloticus*.

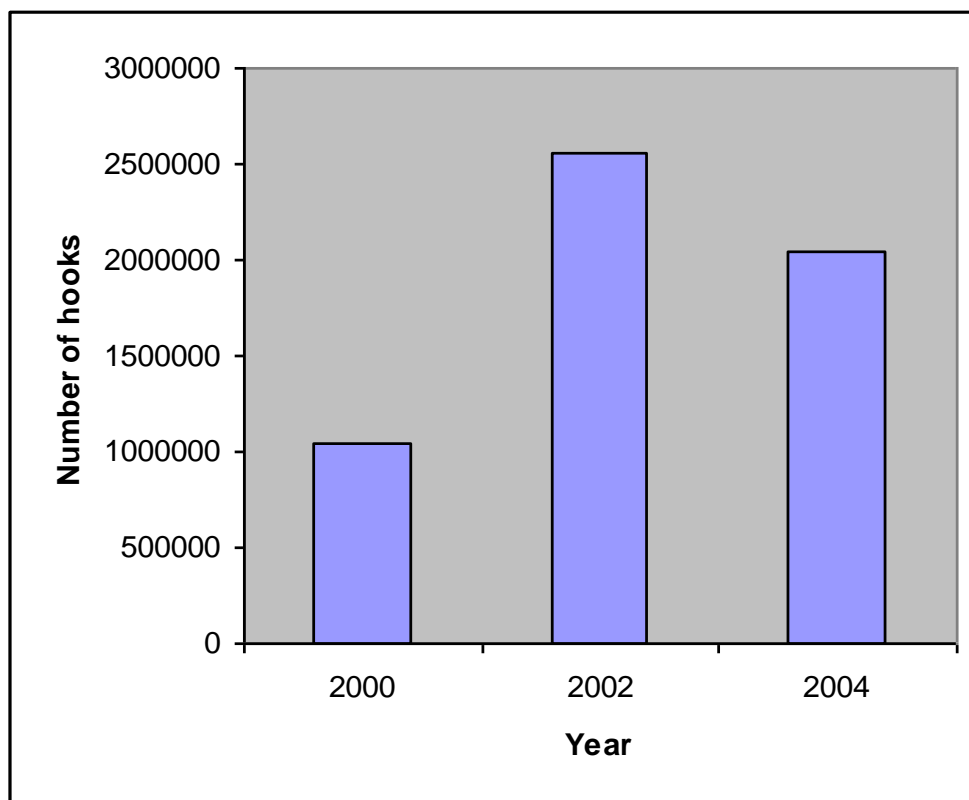


Figure 15: Comparison of long lines hooks during 2000, 2002 & 2004 Frame Surveys

3.5.3 Beach seines

During the year 2004 FS, only 869 beach seines were enumerated as opposed to 1,157 and 5,803 which were recorded in the FS 2002 and 2000 respectively, (Figure 16). It is worth noting that during the FS 2000 the actual numbers of pieces of nets making one beach seine were recorded while in the FS 2002 and 2004 the

number of a unit Beach Seine was captured irrespective of the number of gear pieces making the whole beach seine. The highest numbers of beach seines were found in Suba District with 491 or 56.5% of the total. Suba District was followed by Bondo with 169 beach seines. Homa bay District had the least beach seines (3) followed by Nyando with 5 (Figure 17). There was a reduction of beach seines between the three surveys in all the districts apart from Kisumu and Homa bay where there was a slight increase between 2002 and 2004 FS.

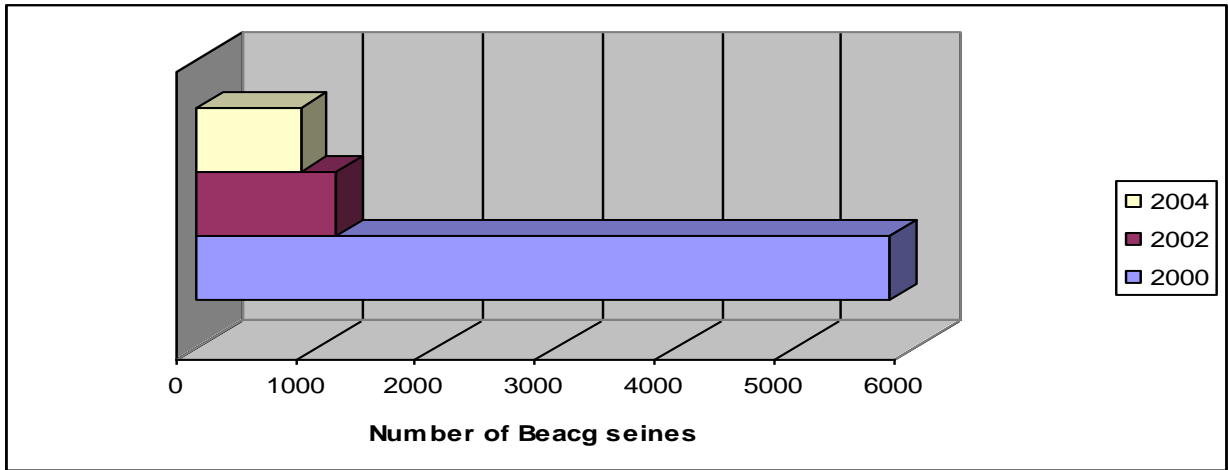


Figure 16: Beach seine nets during 2000, 2002 and 2004 Frame Surveys

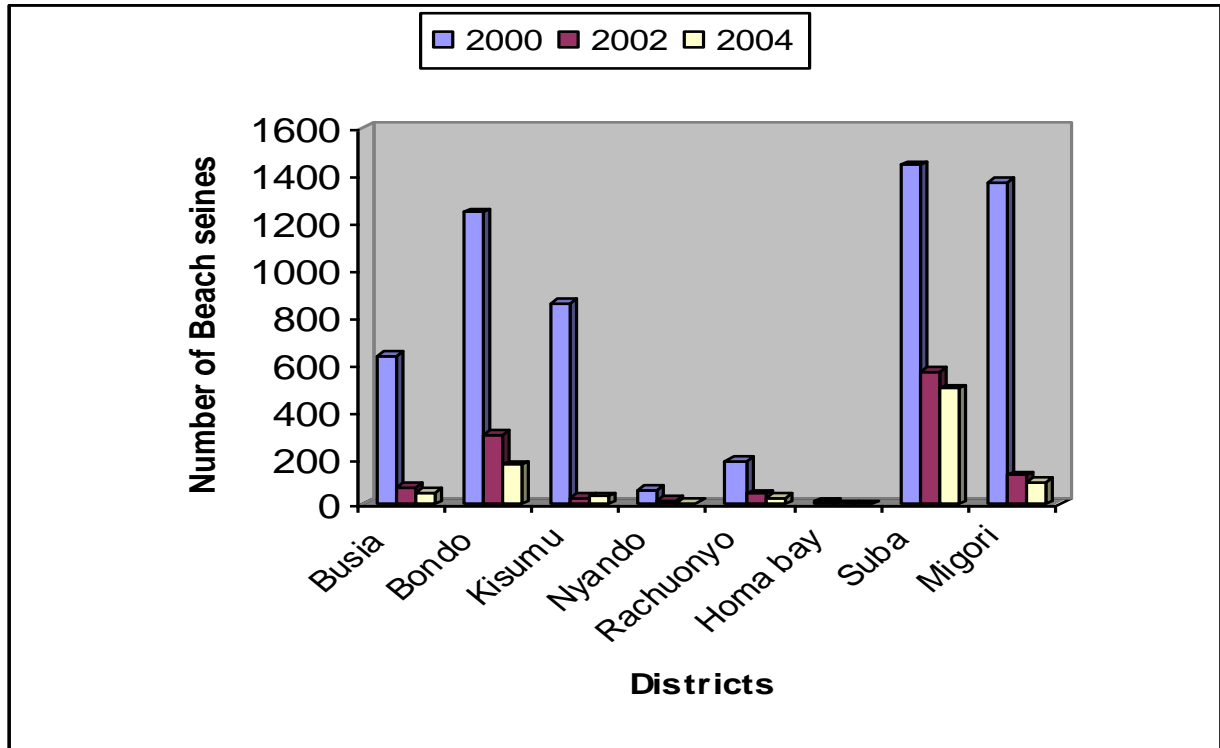


Figure 17: Distribution of Beach seine nets by Districts FS 2004

3.5.4 Small seines

Small seine units enumerated during the FS 2004 were 3,048 while 2,097 and 12,387 units were enumerated in the FS 2002 and 2000 respectively. Just like in the case of beach seines, the number of small seines units was considered during FS 2002 and 2004 irrespective of the number of pieces making a unit. This was not the case during FS 2000 where pieces making one unit were enumerated. This fishery targets *Rastrineobola argentea*.

Suba District had the highest number of small seines at 1,674 followed by Bondo with 548. Nyando District had the least with only 21 while Homa bay had 43 small seines.

3.5.5 Cast nets

Cast nets did not feature as a popular gear in the FS 2004 but some 78 units were observed in six districts as opposed to 102 and 4,548 during 2002 and 2000 FS

respectively. No cast nets were enumerated in the Districts of Nyando and Homa bay.

3.5.6 Hand lines

A total of 13,432 hand lines were recorded mainly in Bondo, Suba, Kisumu and Migori Districts. In the year 2002 FS, the total number of hand lines were 12,172 as opposed to 34,313 in 2000

3.5.7 Traps

Trap fishery was more popular within the gulf compared to the open waters outside the gulf. Totals of 1,846, 2,311 and 3,179 traps were recorded for the years 2004, 2002 and 2000 Frame Surveys.

3.5.8 Other Gears

Three more gear types namely lift nets, monofilament and scoop nets were also recorded though their impact was minimal. Lift nets were recorded in the year 2000 FS and only 11 of them were enumerated, 6 at Marenga B landing site in Busia District and 5 at Lwanda Konyango landing site in Migori District. Scoop nets were also recorded in 2002 and 2004. During FS 2002, 12 scoop nets were recorded, 7 in Bondo District and 5 in Suba. In 2004 only 14 of them were recorded in Bondo. Monofilament nets were only observed during the FS 2004 where 58 were recorded.

3.5.9 Combination of gear types

Some crafts were recorded with multiple uses of different gears. Most common were combination of gill nets with long line and mosquito seines with long lines.

4.0 CONCLUSIONS AND RECOMMENDATIONS

- (a) The results of the Frame Survey 2004 show that there was an increase in the fishing effort in terms of some fishing gears and fishing crafts as compared with 2000 and 2002. Specific efforts should be made to remove illegal mesh sizes of gill nets and beach seines from the lake.
- (b) This information can be used by management to enact legislation relating to entry of fishers, fishing crafts and gears into the lake.
- (c) The results can also be used as sampling frames for design of a number of fisheries Surveys e.g. catch assessment, socio-economics, resource mapping, stock assessment and ecological studies.
- (d) The Frame Survey findings produced comparative data on infrastructure development and distribution e.g. roads, electricity, water supply etc. This information is important in the planning and development of the fisheries sector.
- (e) There is need for formulation of new management options for Lake Victoria e.g. limiting entry to the fishery, and encouraging alternative sources of income for the fishers to reduce pressure on the fishery.
- (f) The FS results can be used to achieve solutions to resource use and its sustainability.
- (g) Further the results can be used for The implication of the increases in fishing effort on the fish stocks should be assessed and appropriate measures taken.
- (h) Efficient and strategic deployment of fisheries staff, tools and equipment.
- (i) The FS results can also be used for estimation of expected revenue from the fisheries sector.
- (j) The ratio of staff to landing sites should be matched to improve development and management efforts.
- (k) Fish handling facilities and access to fish landing sites should be improved

- (1) There is need for empowerment of Beach Management Units (BMUs) to assist with fisheries development and management activities at the fish landing sites.

5.0 ANNEX A : NATIONAL AND DISTRICT SUMMARIES

Frame survey 2004 Country Summary Report

Kenya

Facilities summary

<i>Landing:</i>	304	<i>Electricity Supply:</i>	12
<i>Bandas:</i>	76	<i>Fish Stores:</i>	13
<i>Working Cold Rooms:</i>	3	<i>All Weather Roads:</i>	68
<i>Non- Working Cold Rooms:</i>	6	<i>Boat Repair Facilities:</i>	0
<i>Pontoon/Jetties:</i>	11	<i>Net Repair Facilities:</i>	107
<i>Potable Water:</i>	22	<i>Toilet Facilities:</i>	149

Craft and gear Summary

<i>Fishing Craft:</i>	12,284	<i>Outboard:</i>	860	<i>Gill Nets:</i>	190,756	<i>Hand Lines:</i>	13,432
<i>Transport Craft:</i>	352	<i>Inboard:</i>	0	<i>Long Line Hooks:</i>	2,045,605	<i>Traps:</i>	1,846
<i>Derelict Craft:</i>	1,906	<i>Paddles:</i>	6,560	<i>Beach Seines:</i>	869	<i>Small Seines:</i>	3,048
<i>Residency of staff:</i>	39	<i>Sails:</i>	4,858	<i>Cast Nets:</i>	78	<i>Lift Nets:</i>	0
<i># Of Fishermen:</i>	37,348			<i>Scoop Nets:</i>	14		

Gear Usage by Craft

<i>Crafts Using Gill Nets:</i>	4,996	<i>Crafts Using Hand Lines:</i>	1,093
<i>Crafts Using Long Lines:</i>	3,153	<i>Crafts Using Fish Traps:</i>	83
<i>Crafts Using Beach Seines:</i>	852	<i>Crafts Using Small seines:</i>	1,351
<i>Crafts Using Cast Nets:</i>	47	<i>Crafts Using Scoop Nets:</i>	7
<i>Crafts Using Lift Nets:</i>	0	<i>Crafts Using Other Gear:</i>	52

Frame survey 2004 District Summary Report

Busia

Facilities summary

Landing:	18
Bandas:	4
Working Cold Rooms:	0
Non- Working Cold Rooms:	0
Pontoon/Jetties:	3
Potable Water:	3

Electricity Supply:	2
Fish Stores:	0
All Weather Roads:	8
Boat Repair Facilities:	13
Net Repair Facilities:	9
Toilet Facilities:	11

Craft and gear Summary

Fishing Craft:	1,049
Transport Craft:	58
Derelict Craft:	170
Residency of Staff:	4
# Of Fishermen:	3,286

Outboard:	96
Inboard:	0
Paddles:	473
Sails:	479

Gill Nets:	15,990
Long Line Hooks:	237,820
Beach Seines:	50
Cast Nets:	12
Scoop Nets:	0

Hand Lines:	732
Traps:	122
Small Seines:	127
Lift Nets:	0

Gear Usage by Craft

Crafts Using Gill Nets:	445
Crafts Using Long Lines:	368
Crafts Using Beach Seines:	47
Crafts Using Cast Nets:	8
Crafts Using Lift Nets:	0

Crafts Using Hand Lines:	45
Crafts Using Fish Traps:	8
Crafts Using Small seines:	119
Crafts Using Scoop Nets:	0
Crafts Using Other Gear:	6

Frame survey 2004 District Summary Report

Facilities summary

<i>Landing:</i>	73
<i>Bandas:</i>	22
<i>Working Cold Rooms:</i>	0
<i>Non- Working Cold Rooms:</i>	0
<i>Pontoon/Jetties:</i>	3
<i>Potable Water:</i>	2

Craft and gear Summary

<i>Fishing Craft:</i>	3,678
<i>Transport Craft:</i>	87
<i>Derelict Craft:</i>	532
<i>Residency Staff:</i>	65
<i># Of Fishermen:</i>	11,054

Gear Usage by Craft

<i>Crafts Using Gill Nets:</i>	1,314
<i>Crafts Using Long Lines:</i>	1,017
<i>Crafts Using Beach Seines:</i>	162
<i>Crafts Using Cast Nets:</i>	22
<i>Crafts Using Lift Nets:</i>	0

Bondo

<i>Electricity Supply:</i>	3
<i>Fish Stores:</i>	3
<i>All Weather Roads:</i>	12
<i>Boat Repair Facilities:</i>	48
<i>Net Repair Facilities:</i>	35
<i>Toilet Facilities:</i>	37

<i>Gill Nets:</i>	44,917	<i>Hand Lines:</i>	8,320
<i>Long Line Hooks:</i>	607,006	<i>Traps:</i>	275
<i>Beach Seines:</i>	169	<i>Small Seines:</i>	548
<i>Cast Nets:</i>	24	<i>Lift Nets:</i>	0
<i>Scoop Nets:</i>	14		

<i>Crafts Using Hand Lines:</i>	566
<i>Crafts Using Fish Traps:</i>	13
<i>Crafts Using Small seines:</i>	536
<i>Crafts Using Scoop Nets:</i>	7
<i>Crafts Using Other Gear:</i>	37

Frame survey 2004 District Summary Report

Kisumu

Facilities summary

<i>Landing:</i>	30
<i>Bandas:</i>	10
<i>Working Cold Rooms:</i>	0
<i>Non- Working Cold Rooms:</i>	0
<i>Pontoon/Jetties:</i>	2
<i>Potable Water:</i>	2

<i>Electricity Supply:</i>	6
<i>Fish Stores:</i>	3
<i>All Weather Roads:</i>	8
<i>Boat Repair Facilities:</i>	13
<i>Net Repair Facilities:</i>	11
<i>Toilet Facilities:</i>	16

Craft and gear Summary

<i>Fishing Craft:</i>	1,070
<i>Transport Craft:</i>	68
<i>Derelict Craft:</i>	179
<i>Residency of Staff:</i>	2
<i># Of Fishermen:</i>	2,793

<i>Outboard:</i>	21
<i>Inboard:</i>	0
<i>Paddles:</i>	594
<i>Sails:</i>	455

<i>Gill Nets:</i>	17,358
<i>Long Line Hooks:</i>	152,740
<i>Beach Seines:</i>	32
<i>Cast Nets:</i>	1
<i>Scoop Nets:</i>	0

<i>Hand Lines:</i>	1,396
<i>Traps:</i>	93
<i>Small Seines:</i>	171
<i>Lift Nets:</i>	0

Gear Usage by Craft

<i>Crafts Using Gill Nets:</i>	485
<i>Crafts Using Long Lines:</i>	246
<i>Crafts Using Beach Seines:</i>	32
<i>Crafts Using Cast Nets:</i>	1
<i>Crafts Using Lift Nets:</i>	0

<i>Crafts Using Hand Lines:</i>	120
<i>Crafts Using Fish Traps:</i>	16
<i>Crafts Using Small seines:</i>	170
<i>Crafts Using Scoop Nets:</i>	0
<i>Crafts Using Other Gear:</i>	0

Frame survey 2004 District Summary Report

Nyando

Facilities summary

<i>Landing:</i>	9	<i>Electricity Supply:</i>	0
<i>Bandas:</i>	2	<i>Fish Stores:</i>	0
<i>Working Cold Rooms:</i>	0	<i>All Weather Roads:</i>	0
<i>Non- Working Cold Rooms:</i>	0	<i>Boat Repair Facilities:</i>	3
<i>Pontoon/Jetties:</i>	0	<i>Net Repair Facilities:</i>	2
<i>Potable Water:</i>	2	<i>Toilet Facilities:</i>	4

Craft and gear Summary

<i>Fishing Craft:</i>	209	<i>Outboard:</i>	0	<i>Gill Nets:</i>	3,777	<i>Hand Lines:</i>	7
<i>Transport Craft:</i>	12	<i>Inboard:</i>	0	<i>Long Line Hooks:</i>	9,480	<i>Traps:</i>	611
<i>Derelict Craft:</i>	43	<i>Paddles:</i>	143	<i>Beach Seines:</i>	5	<i>Small Seines:</i>	21
<i>Residency of Staff:</i>	0	<i>Sails:</i>	66	<i>Cast Nets:</i>	0	<i>Lift Nets:</i>	0
<i># Of Fishermen:</i>	482			<i>Scoop Nets:</i>	0		

Gear Usage by Craft

<i>Crafts Using Gill Nets:</i>	143	<i>Crafts Using Hand Lines:</i>	1
<i>Crafts Using Long Lines:</i>	24	<i>Crafts Using Fish Traps:</i>	17
<i>Crafts Using Beach Seines:</i>	5	<i>Crafts Using Mosquito seines:</i>	19
<i>Crafts Using Cast Nets:</i>	0	<i>Crafts Using Scoop Nets:</i>	0
<i>Crafts Using Lift Nets:</i>	0	<i>Crafts Using Other Gear:</i>	0

Frame survey 2004 District Summary Report

Facilities summary

Landing:	39
Bandas:	11
Working Cold Rooms:	0
Non- Working Cold Rooms:	0
Pontoon/Jetties:	0
Potable Water:	4

Craft and gear Summary

Fishing Craft:	1,200
Transport Craft:	16
Derelict Craft:	226
Residency Of Staff:	2
# Of Fishermen:	3,377

Outboard:	0
Inboard:	5
Paddles:	240
Sails:	955

Rachuonyo

Electricity Supply:	0
Fish Stores:	1
All Weather Roads:	12
Boat Repair Facilities:	12
Net Repair Facilities:	5
Toilet Facilities:	33

Gill Nets:	17,278	Hand Lines:	28
Long Line Hooks:	387,990	Traps:	553
Beach Seines:	26	Small Seines:	189
Cast Nets:	1	Lift Nets:	0
Scoop Nets:	0		

Gear Usage by Craft

Crafts Using Gill Nets:	353
Crafts Using Long Lines:	594
Crafts Using Beach Seines:	26
Crafts Using Cast Nets:	1
Crafts Using Lift Nets:	0

Crafts Using Hand Lines:	5
Crafts Using Fish Traps:	25
Crafts Using Small seines:	189
Crafts Using Scoop Nets	0
Crafts Using Other Gear:	7

:

Frame survey 2004 District Summary Report

Homa Bay

Facilities summary

Landing:	5	Electricity Supply:	0
Bandas:	3	Fish Stores:	0
Working Cold Rooms:	0	All Weather Roads:	0
Non- Working Cold Rooms:	0	Boat Repair Facilities:	0
Pontoon/Jetties:	0	Net Repair Facilities:	0
Potable Water:	1	Toilet Facilities:	3

Craft and gear Summary

Fishing Craft:	169	Outboard:	4	Gill Nets:	3,321	Hand Lines:	13
Transport Craft:	10	Inboard:	0	Long Line Hooks:	10,300	Traps:	17
Derelict Craft:	27	Paddles:	73	Beach Seines:	3	Small Seines:	43
Residency Of Staff:	0	Sails:	92	Cast Nets:	0	Lift Nets:	0
# Of Fishermen:	483			Scoop Nets:	0		

Gear Usage by Craft

Crafts Using Gill Nets:	101	Crafts Using Hand Lines:	2
Crafts Using Long Lines:	19	Crafts Using Fish Traps:	1
Crafts Using Beach Seines:	3	Crafts Using Small seines:	43
Crafts Using Cast Nets:	0	Crafts Using Scoop Nets:	0
Crafts Using Lift Nets:	0	Crafts Using Other Gear:	0

Frame survey 2004 District Summary Report

Facilities summary

<i>Landing:</i>	104
<i>Bandas:</i>	12
<i>Working Cold Rooms:</i>	0
<i>Non- Working Cold Rooms:</i>	0
<i>Pontoon/Jetties:</i>	2
<i>Potable Water:</i>	8

Craft and gear Summary

<i>Fishing Craft:</i>	3,575
<i>Transport Craft:</i>	90
<i>Derelict Craft:</i>	547
<i>Presence FD Staff:</i>	8
<i># Of Fishermen:</i>	11,639

<i>Outboard:</i>	503
<i>Inboard:</i>	0
<i>Paddles:</i>	2,111
<i>Sails:</i>	960

Suba

<i>Electricity Supply:</i>	1
<i>Fish Stores:</i>	5
<i>All Weather Roads:</i>	23
<i>Boat Repair Facilities:</i>	50
<i>Net Repair Facilities:</i>	37
<i>Toilet Facilities:</i>	62

<i>Gill Nets:</i>	74,904	<i>Hand Lines:</i>	1,947
<i>Long Line Hooks:</i>	403,249	<i>Traps:</i>	79
<i>Beach Seines:</i>	491	<i>Small Seines:</i>	1,674
<i>Cast Nets:</i>	29	<i>Lift Nets:</i>	0
<i>Scoop Nets:</i>	0		

Gear Usage by Craft

<i>Crafts Using Gill Nets:</i>	1,657
<i>Crafts Using Long Lines:</i>	580
<i>Crafts Using Beach Seines:</i>	485
<i>Crafts Using Cast Nets:</i>	11
<i>Crafts Using Lift Nets:</i>	0

<i>Crafts Using Hand Lines:</i>	198
<i>Crafts Using Fish Traps:</i>	4
<i>Crafts Using Small seines:</i>	635
<i>Crafts Using Scoop Nets:</i>	0
<i>Crafts Using Other Gear:</i>	3

Frame survey 2004 District Summary Report

Migori

Facilities summary

<i>Landing:</i>	27	<i>Electricity Supply:</i>	0
<i>Bandas:</i>	12	<i>Fish Stores:</i>	1
<i>Working Cold Rooms:</i>	0	<i>All Weather Roads:</i>	5
<i>Non- Working Cold Rooms:</i>	0	<i>Boat Repair Facilities:</i>	0
<i>Pontoon/Jetties:</i>	2	<i>Net Repair Facilities:</i>	8
<i>Potable Water:</i>	1	<i>Toilet Facilities:</i>	13

Craft and gear Summary

<i>Fishing Craft:</i>	1,334	<i>Outboard:</i>	118	<i>Gill Nets:</i>	13,211	<i>Hand Lines:</i>	989
<i>Transport Craft:</i>	11	<i>Inboard:</i>	0	<i>Long Line Hooks:</i>	237,020	<i>Traps:</i>	96
<i>Derelict Craft:</i>	182	<i>Paddles:</i>	770	<i>Beach Seines:</i>	93	<i>Small Seines:</i>	289
<i>Residency of Staff:</i>	2	<i>Sails:</i>	446	<i>Cast Nets:</i>	11	<i>Lift Nets:</i>	0
<i># Of Fishermen:</i>	4,234			<i>Scoop Nets:</i>	0		

Gear Usage by Craft

<i>Crafts Using Gill Nets:</i>	498	<i>Crafts Using Hand Lines:</i>	156
<i>Crafts Using Long Lines:</i>	305	<i>Crafts Using Fish Traps:</i>	3
<i>Crafts Using Beach Seines:</i>	92	<i>Crafts Using Small seines:</i>	275
<i>Crafts Using Cast Nets:</i>	4	<i>Crafts Using Scoop Nets:</i>	0
<i>Crafts Using Lift Nets:</i>	0	<i>Crafts Using Other Gear:</i>	0

6.0 ANNEX B: TRAINING MANUAL

PART I

INTERVIEWING METHODS[^]

A carefully carried out interview would yield better results than a haphazardly one. Hints provided below are guidelines for a good interview.

Definition of an interview:

An interview is a conversation with a purpose. These conversations are such that the interviewer asks and respondent answers. The interviewer obtains targeted information.

Asking questions:

Even though all questions in survey questionnaire must be answered, each interview situation is different because no two respondents or situations are exactly alike. Each interview must be tailored to fit these differences. The following comments should help in developing good interviewing techniques: -

1) Introducing oneself:

One must be confident when introducing the survey to the respondent. One must be fully conscious of what to speak if the respondent's first impression is to be good. (He will know that you are sure of what you are doing). You can go about it like this "I am..... I work at..... The purpose of my coming here is..... You are one among the fishers chosen for the survey. The information I will get from you will be used

[^] National Technical Committee on Frame Survey 2002: Frame Survey Training Manual

solely for Fisheries Management purposes and your name will appear nowhere”.

One must give more detailed information whenever the respondents need it. Interviewing techniques will have to be adapted to fit each situation. If the respondent is talkative, you must be patient and chat for a while with him/her to establish his confidence. On the other hand, the respondent may be unwilling to answer all the questions. The interviewer must be tactful and understanding, and listen carefully to what the respondent has to say, and if it seems necessary, explain again the purpose of the survey.

Do not cheat.

2) Confidentiality:

All the information obtained from a respondent is held in total confidence and used only in combination with that reported by others for district, provincial and national estimates. No individual report is released on anyone. Because some of the questions to be asked are personal, the interview should not be conducted in the presence of visitors unless the respondent having first learned the nature of the survey has no objection.

3) The Questionnaire:

Each interview is to be conducted using a questionnaire and the questionnaire must be filled on site during the interview session. The interviewer should know the questionnaire thoroughly. He will need to capture and hold the respondent's interest, and encourage his full and complete cooperation.

The interviewer should be sure that all the questions have been answered before he closes the interview. The interview when properly conducted is

a satisfying experience for both the respondent and the interviewer. Remember to make any relevant notes at the back of questionnaire forms.

4) *Probing:*

An answer to a question may not be given or be suspicious. This could be due to incorrect understanding of the question or simply due to suspicion. Obtaining an acceptable answer under such conditions is called probing. To “probe” is to rephrase the question in such a way as to get definite answer or to crosscheck on what appears to be a hasty answer. It is the communication of the interviewer that stimulates additional response or reaction by the respondent. This simply means digging deeper for clearer answers. An expectant pause or a questioning look can be an effective probe, so can be a more specific question or comment. The exact probing technique to apply on different interview situations will vary.

If the question is not answered directly or the respondent apparently missed the point of the question, the question should be repeated to make sure he understood it. The best thing is for the interviewer to explain the question in his own words, and be sure not to change its meaning or to suggest an answer. If the answer the respondent gives still seems to be unreasonable, one might use such neutral probes, as “I am not clear on that point”.

There are good and poor probes. A *good probe* is one that makes the respondent give a direct answer to the question. A *poor probe* is one that hints at a particular answer, thus putting an answer into the respondent’s mouth. The “I don’t know” type of answer is the most common response requiring probing. Often the respondent uses this measure to gain time to

think the question over or avoid giving direct information to a question. If the latter is the case, it is sometimes necessary to rebuild a friendly feeling of cooperation with the respondent. The interviewer might try repeating the purpose of the survey. Probes such as “I just want your best estimate” can follow this. By asking for his best estimate the interviewer permits him to give an intelligent estimate when he does not know the exact answer.

5) Reluctant respondent:

Actual refusals are rare. For most interviewers, there will be no refusals. If refusals come often, usually the fault is with the interviewer and with the way he introduces himself or explains the survey. If the interviewer continues to have problems he should contact the supervisor. For somebody who claims to be against surveys or for some reason he is antagonistic, the first thing to do is to let him cool down. The interviewer should listen sympathetically and not argue with him. The minute you argue or contradict anything the respondent says, the interview is in jeopardy and the confidence may be lost. Repeating the purpose of the survey and offering comments about something on the questionnaire of particular interest may generate co-operation. The interviewer should be honest and avoid insincere praise, which can be spotted as obvious mockery. A good interviewer is proud of his ability to meet people with ease and friendliness and to secure their co-operation.

6) Closing an interview:

Once all the information has been obtained, the interview should be brought to a close without any prolonged extension. Even though a friendly relationship may have been established with the respondent, the

interviewer should not overstay the welcome. The interviewer should finally acknowledge the respondent with gratitude and leave.

7) Interviewer review:

The interviewer should check over the questionnaire carefully as soon as possible after leaving the respondent. For the answers that are not quite clear or incomplete, the interviewer should check notes jotted down during the interview. Sometimes it may be necessary to review the questionnaire.

Experience has shown that most problems of incomplete and unclear answers could have been eliminated had the interviewer checked the questionnaire before handing it in. A required part of the work plan should therefore include crosschecking the questionnaire for any gaps left or mis-recorded responses.

PART II

DEFINITION OF TERMINOLOGIES

CRAFTS:

Craft refers to a device used to access the fishing ground. In Lake Victoria fisheries crafts / boats have evolved quite significantly from a single log, rafters, dugout canoes all through to large planked boats and non-planked boats. Depending on locality, same crafts may be referred to by different names, or slight structural or operational modifications may exist. The main categories of crafts operated in the lake are listed below.

Dugout canoe

A boat curved out of a log of wood / tree trunk. It has no joints or planks.

Sesse pointed at both ends

A modified dugout canoe pointed at both ends. Sides are made of planked wood and the bottom is V- shaped.

Sesse pointed at one end

Is an improved sesse modified to use outboard engines. In principle, this is a sesse canoe with one flat end for use with the outboard engines. Also referred to as Taruma

Karua /Parachute

Refers to a flat-bottomed boat made of planked wood. These are used mostly in the shallow waters.

Rafts:

May be made out of single logs or jointed logs.

Others crafts:

Any other type of craft not mentioned above and specify.

FISHING GEARS AND METHODS:

A fishing gear refers to any device actually used to capture fish from the water. It may be a net, a hook, any type of trap, be it traditional or modern, plus all the accessories that go with this. The main categories of fishing gears operated in the lake are listed below.

Gillnets (GN) A sheet of net webbing held vertically with help of floats and Sinkers and set in a straight line in the water column (seabed or mid water). For the purposes of this survey all forms of gill nets shall be included.

Mode of operation (MO): The gill nets will be classified in-terms of their mode of Operation. These could be passive or active or drift nets

Passive gill nets(P) These are set at one station throughout the fishing trip.

Active gill nets(A) These are gill nets that are actively operated by pounding or sprashing water by the fishers forcing the fish to encounter the set net and include *Onimo*, *Ochwado*, *Odundo*, *Katuri*, *Sekeseke*, etc.

Drift Net (D) A large sheet of jointed ‘gillnets’ set in the open waters and left to drift as it catches fish. It is structurally a gill net but with lighter weights (sand). Drift netting is an active fishing technique. Also called *tembea*.

Beach Seine (BS) Nets usually small in mesh size. They are used to encircle fishing grounds and hauling is done

by thinning the circumference. It has heavier lead line to enable it sweep the bottom against few floaters. May have a collection area “bunt” and posts at the two ends to which a long warp is attached. The gear is operated in the shallow waters

Small seines (SS) A sheet of net webbing with meshes 10mm and below. It operates the same as boat seine but adopted in deep waters mainly for *Rastrineobola argentea*

Long Line (LL) Refers to a single twine (manila) on which series of Snoods (short branches) are attached at intervals. At the end of each snood is attached a baited hook and mainline anchored in the deep waters to fish by itself.

Hook and line (HL) Refers to a single twine on which baited hook(s) is/ are attached.

Cast Net (CN) It is a bell /skirt -shaped gill net tied to a string in the centre held by the operator. It is thrown onto the water surface where it spreads out and sinks at the bottom where once pulled Out, scoops out what it entraps. Also referred to as *tupa tupa, ponyoka or peperusha*.

Lift Nets (LN) Sheet of seining with meshes 10mm and below mostly used in fishing for *Omena*. It is normally applied using two crafts. It is dragged up through a pulley system.

Scoop nets (SN) Scoop nets are V-shaped and are operated at the surface to scoop a school of fish or individual fish that are close to the surface.

Traps (TR)	Baskets (<i>Osadhi, Ounga, Sienyo</i>), fences (also called <i>Kira</i>)
Monofilament Nets (MF)	It is a gill net made from a single nylon filament
Others	Specify

PART III

THE QUESTIONNAIRE

Census Units and Variables

In the Frame Survey the main variable shall be the fishing boat within each landing site. The census variables include boat type, length of the boat, mode of propulsion, number of crew, gear type and size, and species targeted. Facilities within the landing site will also be enumerated.

Filling of the Questionnaire

The Questionnaire is in three (3) sheets. Sheet 1 gives the basic definitions used in the survey. Sheet 2 captures data on the location of the landing site, numbers of all categories of boats at the landing including transport and derelict crafts as well as general information on beach facilities and staffing. Sheet 3 captures boat and gear details of all fishing crafts.

Most of the items in sheet 2 shall be filled in by interview with a beach leader, or any other person with good knowledge of that area but the interviews should be supported by physical verification of the variables that are physically present e.g. toilets and derelict crafts.

The filling in of sheet 3 requires that the characteristics of each fishing boat be entered in one row. These include the boat details (Registration number, type, length and propulsion), the targeted fish species, crew and gear composition. Entries of all fishing boats at a given landing should be numerically serialized with each boat occupying one row.

Measurement of Boat length

Most boat owners know the length of their boats but this is usually in feet and the enumerator should convert it to approximate length in metres by dividing by a factor of three. In case the fisher doesn't know the length of the boat, the enumerator should use a metre-rule, tape measure or a rope with knots at one-metre intervals. The length should be measured from the hind to the front tip

Measurement of mesh sizes

For gears where a record of mesh size is required i.e. gillnets and small seines i.e. stretched mesh should be measured i.e. diagonally from knot to knot.

Mode of propulsion of boat

For fishing boats using inboard engine, engine are given code 1 whereas those using outboard engine motors are given code 2. Those using paddles have code 3 and sails code 4. The code should be recorded in column 35(PROP) of sheet 3 and the horsepower of engine in column 36(HP).

The commonly targeted fish species should also be recorded by codes in column 37 of sheet 3. The respective codes are given in sheet 1

Consistency checks

Supervisors should conduct consistency checks immediately they receive the questionnaires from the field.

PART IV

DESCRIPTION OF TERMINOLOGIES

Frame Survey	Total enumeration of sampling variables/ boat census.
Interviewer	Person asking questions/ recording responses.
Interviewee	Person being asked questions (one who responds to questions).
Landing Site	Where there are 10 or more fishing (non-derelict) boats.
Fishing craft	Refers to the device used to access the fishing ground. Also called boat or vessel.
Derelict Craft	All crafts, which has been damaged and has been out of fishing activities for the last one year or more .
Fish carrier	Non-fishing craft solely used to ferry fish and fishery Product.
Transport craft	Non-fishing craft used to transport goods and people excluding fish
Fishing Gear	A device used to capture fish from the water.
Crew	Persons who actually go to the lake to do fishing
Sampling Units and Variables	Refers to the units being counted e.g. boat, crew, etc.
Respondent	Interviewee.
Status/ Rank	Position held in the community or at the landing site.
Banda	A permanent structure used for handling fresh fish after landing. Permanent structure made of permanent building materials, cement, concrete.
Working Cold room	A permanent insulated structure in which fresh fish can be kept chilled
Non-working cold room	This therefore refers to a permanent insulated structure in which Fresh fish cannot be kept chilled
Fish Store	A structure built to hold fish at the beach. Does not Include cold room.
Pontoon	Floating facility protruding into the lake to facilitate landing of crafts.

Jetty	Fixed facility protruding into the lake to facilitate landing of crafts.
All-weather road	A road motorable throughout the year. May be murrum or tarmac.
Potable water	Good quality water from a tap or protected well for drinking.
Toilet facility	Availability of toilet at/ within the beach (pit latrines or flush toilets), which is currently in use.
Electricity Supply	Presence of electricity poles and wires.
Nearest market	Where most of the landed fish is first sold
Fisherman	Fishing crew, man or woman.
Net repair facility	Designated place for repair of nets
Boat repair facility	Designated place for repair of boats

NOTES ON CRAFT**SHEET I**

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. Taruma/ sesse flat at one end
2. Sesse pointed at both ends
3. Karua/ Parachute
4. Dugout
5. Rafts
6. Other (Specified)

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

PROP: Method of propulsion: - State main method

1. Inboard motor
2. Outboard motor
3. Paddles
4. Sail

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

CREW: Number of crew who normally accompany the boat

MO: Mode of operation of gillnets 1. Active 2. Passive 3. 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

LN Lift net: State number

SN Scoop net: State number

SS Small seine targeting Dagaa/Omena/ Mukene: State number of complete sets per mesh size in mm

Others Other gear not specified above: State type and Number

SPECIES TARGETED

1. *Lates*
2. *Rastrineobola*
3. *Tilapiines*
4. *Clarias*
5. *Protopterus*
6. *Synodontis*

SUMMARY DETAILS OF NUMBER OF CRAFT ON BEACH AND FACILITIES

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

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CRAFT SUMMARY

8. NO. DERELICT CRAFTS -----
9. NO. FISH CARRIER -----
10. NO. TRANSPORT CRAFTS (NON-FISHING) -----
11. NO. FISHING CRAFTS WITH OUTBOARD ENGINE -----
12. NO. FISHING CRAFTS WITH IN-BOARD ENGINE -----
13. NO. FISHING CRAFTS USING PADDLES ONLY -----
14. NO. FISHING CRAFTS USING SAILS -----

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FACILITIES SUMMARY

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

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ADDITIONAL INFORMATION

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

29	
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- 30 DO FISHERMEN LAND AT THIS BEACH FOR
[1] > 5 MONTHS OF THE YEAR
[2] < 5 MONTHS OF THE YEAR

30	
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