REPUBLIC OF KENYA

MINISTRY OF AGRICULTURE, LIVESTOCK AND FISHERIES

STATE DEPARTMENT OF FISHERIES

FISHERIES ANNUAL STATISTICAL BULLETIN 2013

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1.0 INTRODUCTION

The State Department of Fisheries in Kenya is mandated to sustainably manage, conserve and exploit Kenya's fisheries resources to contribute to poverty reduction and wealth creation in the country. The department is keen to having objective, reliable and credible data and information on the status and trends of fisheries as this is the foundation of policy development and attendant management actions. This has been recognized in various international legal instruments including the 1982 UN convention on the law of the sea and the code of conduct for responsible fisheries amongst others. Towards this end the State Department of Fisheries has a full-fledged section of statistics that is dedicated to providing accurate and reliable data and information. Fisheries data are collected with the objective to ensure appropriate resource management. The data are used by scientists and fisheries managers for stock assessment, economic studies and an aid to fisheries decision management and policy making.

In Kenya fisheries data collection structure relies mainly from designated officers in the field. The data collection system is centralized where a landing site data collector usually a Fisheries Assistant or a member of a Beach Management Unit (BMU) collects daily primary data from the landing site, compiles monthly catch totals for each respective landing site and files returns to the County Director of Fisheries who compiles a county monthly statistical report including all the landing sites within the county and submits the monthly reports to National State Department of Fisheries head office. The data from all the counties are then compiled, analyzed and included in this Annual Statistical Bulletin which is released for each calendar year.

Fisheries data collection in the country has had its own challenges which included the following during the year under review:

1. Paradigm shift in fisheries management from a centralized command based system to one that puts emphasis on co-management with involvement of local fishing communities and other stakeholders in fisheries management as indeed provided for in the Fisheries (Beach management Units) regulations 2007. The shift towards co-management requires the involvement of fisher community in data collection, analysis and dissemination. As co- managers the communities' role in data collection should be guided by providing regular training of local level data collectors and standardized data collection protocols. Due to lack of adequate funds it has not been possible to proactively engage the fisher community in data collection activities;
2. The departmental human resource constraints in deploying data collectors at every landing site;
3. Changes of artisanal fishing units. This is given more impetus due to the deployment of new and /or improved fishing gears in Kenya's fishery waters.

This means that measures to estimate fishing effort have to be continuously revised. An example of this is the "Amouko" in Lake Victoria. This is a gear composed of many pieces vertically and horizontally integrated to make it more effective in catching many fish;

4. The challenge of ensuring data accuracy, quality and credibility that can be compared across regions and time scale due to lack of regular training of data collectors to update their skills.
5. Poor record-keeping and unsatisfactory reporting by fish farmers on fish production and marketing.

On fisheries data exchange, the State Department has active collaborative initiatives with various organizations. Due to the fact that some of the most important fisheries in the country are Tran-boundary, as a result there are strong mechanisms of data sharing with the aim of fostering better management of the shared fisheries resources. The department thus exchanges data with regional bodies such as the Lake Victoria Fisheries Organization (LVFO). Data exchange with this organization is wide ranging encompassing all aspects of fisheries. LVFO is also involved in setting benchmarks of data collections protocols by issuing standard operating procedures in data collection and analysis so that the data thus collected can be compared across the shared water body regardless of the country.

Such data exchange initiatives are also extended to the Indian Ocean Tuna commission (IOTC) which deals mainly with highly migratory tuna and tuna like species. The department also makes submissions to FAO statistical year books as well as for the annual economic survey reports by Kenya National Bureau of Statistics.

NB

The following symbols have been used in this Bulletin:

0	Meaning Nil
*	Meaning the value was less than half of the unit used
-	Meaning no data was available

2.0 NATIONAL FISH PRODUCTION

Kenya is endowed with both marine and inland water resources. The inland water resources include lakes, dams and rivers of varying sizes. Some of the major lakes include: Lake Turkana (6,405 Km^2), Lake Victoria-Kenyan side (6% of the whole lake =4,128 km^2), Naivasha (210 Km^2), Baringo (129 Km^2), and Lake Jipe (39 Km^2). Major rivers include Tana (700 Km), Athi/Galana/Sabaki (530 Km), Ewaso-Ngiro-North (520 Km), Kerio (350 Km),

Suam-Turkwel (350 km), Mara (280 km), Nzoia (240 km), Voi (200 km), Yala (170 km), Ewaso-Ngiro-south (140 km), Sondu (105 km), Malewa (105 km) and Kuja (80 km.
Further to these inland water resources, Kenya also enjoys a vast coastline of 640 km on the Western Indian Ocean, besides a further 200 nautical miles Exclusive Economic Zone (EEZ) under Kenyan jurisdiction. The country's coast is also located within the richest tuna belt in the South West Indian Ocean.

The Kenyan fishery is mainly artisanal with very few commercial/industrial vessels targeting mainly shrimps and several tens of purse seines and long liners owned by Distant Water Fishing Nations (DWFN) which operate under Kenyan license in our Economic Exclusive Zone (EEZ) targeting Tuna and Tuna like species. The artisanal fishery accounts for almost all the inland and marine water catches reported in this bulletin and consequently it is currently the most important fishery in the country, even though our EEZ which is predominately for commercial fishing is under exploited with an estimated potential of between 150,000 to 300,000 metric tonnes (Commonwealth secretariat report 2003 by Dr. George Habib).

The fisheries sector plays a significant role in employment and income generation. During the year under review the sector supported a total of 61,252 people directly as fishermen and 67,883 fish farmers with 69,194 stoked fish ponds. The sector supports about 1.1 million people directly and indirectly, working as fishers, traders, processors, suppliers and merchants of fishing accessories and employees and their dependents. Besides being a rich source of protein especially for riparian communities, the sector is also important for the preservation of culture, national heritage, and recreational purposes.

During the year (2013) under review, fish production from Inland, Aquaculture and Marine artisanal fisheries amounted to 163,293 metric tonnes with an ex-vessel and farm gate value of Kshs. 21,283,592,000 (Table 1). This was an increase of 6.0% in quantity and 17.8% in ex-vessel and farm gate value compared with 2012 figures of 154,015 metric tonnes with an ex-vessel value of Kshs. 18,073,859,000. The increase in quantity can mainly be attributed to increase in production of fish from Lake Victoria and aquaculture which during the same period increased by 4.7% and 9.4% respectively (Table 2). The increase in production from Lake Victoria was attributed to the increase in *Rastrineobola argentea* (Omena) production which increased by 26% during the same period (Table 3). But generally fish production has been on the increased since 2007 fetching higher and higher ex-vessel value year after year figure 1.

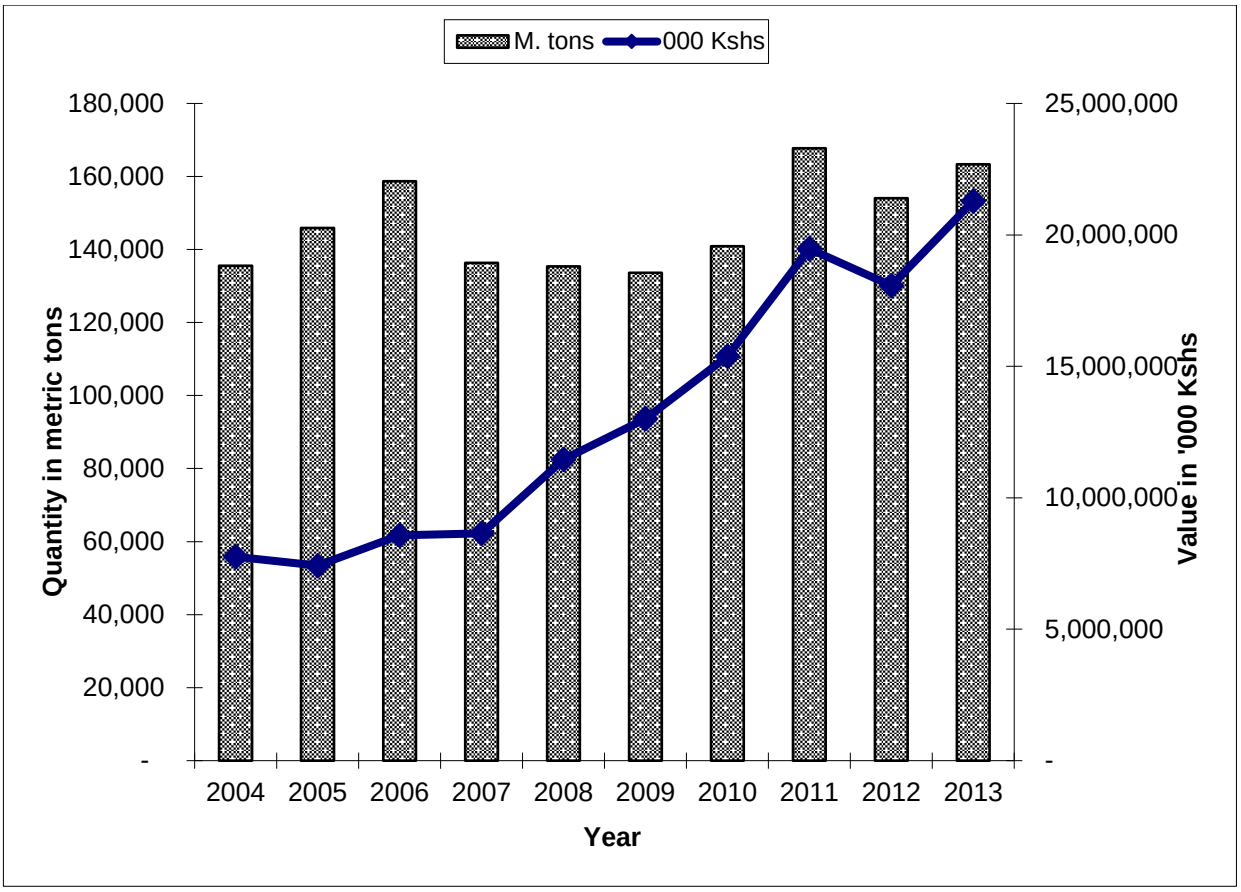

Figure 1: Fish production by quantity and value 2004-2013

Inland capture fisheries contributed 80% of Kenya's total fish production, with the principal fishery being that of Lake Victoria. The lake accounted for 124,643 metric tonnes or 76% of the country's total annual fish production in 2013. Lake Turkana, Kenya's largest freshwater body (7,400 km^2) produced 3,193 metric tonnes of fish during the year under review. Other freshwater-bodies of commercial importance included lakes Baringo (263 MT), Naivasha (231 MT), Kanyaboli (194 MT), Jipe (116 MT), Kenyatta (54 MT), the Tana River dams (705 MT), Takwel dam (59 MT), the Tana River delta (46 MT) and Riverine fishery (9 MT). Marine artisanal fish production was 9,134 metric tonnes equivalent of 5.6% of the national production while aquaculture production amounted to 23,501 metric tonnes contributing 14.4% of the total production, figure 2. Aquaculture earned fish farmers Kshs. 5,522,735,483 during the year under review.

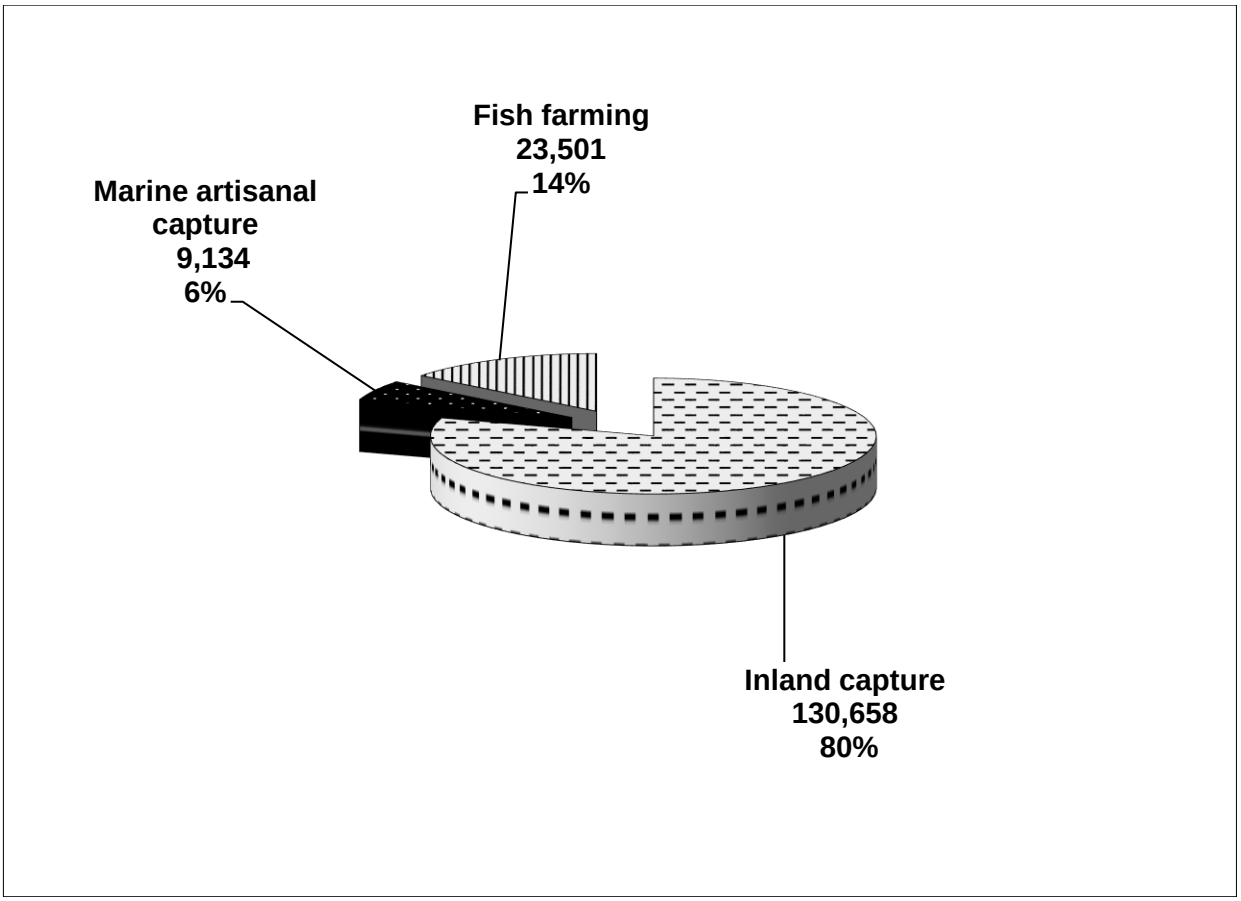

Figure 2: National fish production by Fishery Category 2013

The fish and fish products produced in the country are marketed domestically or exported to the international markets. The main fish and fishery products exported during the year under review included Nile perch fillets, Octopus, Headless and gutted whole Nile perch, Nile perch fish maws, Tilapia and Barbus. Fish and fishery products imported into the country included the following products among others: frozen Mackerels, Sardines, *Tilapia niloticus*, Tuna, Prawns, Reef Cod, Lizard fish, Herrings and fish meals among others.

Table 1 Fish landings by Weight, Value, Fishers, Ponds and fishing Crafts 2013

Fresh water	**M. tons**	**000 Kshs.**	**Fishers**	**Farmers**	**Crafts**	**Ponds**
Lake Victoria	124,643	13,858,682	40,078		13,468	
Lake Turkana	4,338	438,646	7,000		1650	
Lake Baringo	263	25,008	120		47	
Lake Naivasha	231	17,542	150		50	
LakeJipe/Dams	116	16,910	66		46	
Lake Kanyaboli	194	12,004	188		99	
Lake Kenyatta	54	3,770	120		40	
Tana River dams	705	73,024	316		180	
Takwel dam	59	11,849		67,883		69,194
Fish Farming	23,501	5,522,735	299		93	
Tana River delta	46	3,204				
Riverine	9	2,046				
Total	**154,159**	**19,985,420**	**48,337**	**67,883**	**15,673**	**69,194**
Marine water						
Dermersal	4,433	523,153				
Pelagic	2,362	309,893				
Crustaceans	762	250,851				
Other Marine	908	110,752				
Molluscs	669	103,523				
Total Marine	**9,134**	**1,298,172**	**12,915**		**2,913**	
Grand Total	**163,293**	**21,283,592**	**61,252**	**67,883**	**18,586**	**69,194**
Total Production	**M. tons**	**000 Kshs.**	**% Quantity**	**% Value**		
Inland Capture	130,658	14,462,685	80	68		
Marine Caprure	**9,134**	**1,298,172**	6	6		
Aquaculture	23,501	5,522,735	14	26		
Total	**163,293**	**21,283,592**	**100**	**100**		

Table 2:Table 2: Quantity and Value of fish landings 2011 - 2013

	2011		2012		2013	
FRESH WATER	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**
L. Victoria	133,801	13,847,170	118,992	11,775,377	124,643	13,858,682
L. Turkana	3,746	275,919	3,001	307,382	4,338	438,646
L. Naivasha	288	23,229	143	15,460	231	17,542
L. Baringo	102	9,469	251	23,514	263	25,008
L. Jipe/Dams	104	9,554	112	16,715	116	16,910
Lake Kanyaboli	173	12,676	125	8,479	194	12,004
Lake Kenyatta	233	8,000	33	2,182	54	3,770
Tana River Dams	732	53,781	967	81,609	705	73,024
Takwel dam	-	-	-	-	59	11,849
Fish Farming	19,584	4,223,471	21,487	4,633,634	23,501	5,522,735
Tana delta	53	3,480	39	2,409	46	3,204
Riverine					9	2,046
TOTAL	**158,816**	**18,466,750**	**145,150**	**16,866,761**	**154,159**	**19,985,420**
MARINE FISH						
Lamu County	2150	138987	2,062	170,483	2,147	177,666
Tana River County	704	51735	596	43,979	698	66,158
Kilifi County	2152	250305	2,061	335,820	2,136	319,831
Mombasa County	860	121327	782	129,236	855	158,104
Kwale County	1879	174510	1,976	198,066	1,867	222,039
TOTAL	**7,744**	**736,864**	**7,477**	**877,584**	**7,703**	943,798
CRUSTACEA						
Lamu County	162	79576	132	69,905	215	113,073
Tana River County	51	7563	129	21,654	68	10,747
Kilifi County	70	22806	164	64,125	93	32,407
Mombasa County	187	40619	207	48,374	247	57,717
Kwale County	105	25974	108	29,195	140	36,907
TOTAL	**574**	**176,539**	**739**	**233,253**	**762**	**250,851**
MOLLUSCS						
Lamu County	85	32,222	86	19,842	90	36,889
Tana River County	35	2098	18	1,563	37	2,402
Kilifi County	109	12823	178	28,335	116	14,681
Mombasa County	70	7904	77	11,494	74	9,048
Kwale County	330	35379	289	35,026	351	40,503
TOTAL	**629**	**90,427**	**649**	**96,260**	**669**	**103,523**
MARINE TOTAL	**8,947**	**1,003,830**	**8,865**	**1,207,098**	**9,134**	**1,298,172**
GRAND TOTAL	**167,763**	**19,470,579**	**154,015**	**18,073,859**	**163,293**	**21,283,592**

Table 3: Fresh Water and Marine fish catches by Species, Weight and Value 2011- 2013

	2011		2012		2013	
FRSH WATER	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**
Alestes	286	17,092	276	23,456	329	27,359
Bagrus	92	5,341	49	4,123	105	8,550
Barbus	82	5,208	10	848	94	8,443
Black bass	3	27	2	100	1	133
Clarias	6,426	879,376	6,596	1,048,549	6,918	1,196,823
Rastreonobola	72,314	3,224,846	52,948	2,813,882	66,717	3,552,513
Labeo	558	38,708	480	40,263	659	60,785
Haplochromis	539	22,010	723	63,272	1,126	85,212
Lates niloticus	47,116	9,143,763	53,023	7,547,723	44,319	8,589,887
Momyrus	-	2	-	-	-	-
Protopterus	1,346	114,021	1,196	95,886	1,318	115,852
Synodontis	994	54,964	15	1,283	141	11,885
Tilapia niloticus	23,144	4,427,842	22,196	4,525,560	25,071	5,531,254
Tilapia others	2,006	151,092	1,935	190,740	2,395	253,577
Trout	195	107,717	215	118,177	235	140,853
Carps	1,695	147,266	1,727	155,993	1,920	182,300
Eels	1	60	1	114	-	-
Citharinus	104	8,820	14	1,188	120	14,118
Hydrocynus	95	6,138	60	5,121	109	9,826
Distichodu niloticus	287	21,593	298	25,289	330	34,562
Unspecified	1,533	90,864	3,386	205,194	2,251	161,488
TOTAL	**158,816**	**18,466,750**	**145,150**	**16,866,761**	**154,159**	**19,985,420**
MARINE FISH						
Demersal	4,416	408,567	4,300	486,451	2,147	177,666
Pelagic	2,444	252,767	2,297	288,152	698	66,158
Sharks/Rays	306	31,602	373	46,064	2,136	319,831
Sardines	211	15,238	194	17,449	855	158,104
Unspecified	367	28,690	313	39,468	1,867	222,039
TOTAL	**7,744**	**736,864**	**7,477**	**877,584**	**7,703**	**943,798**
CRUSTACEA						
Spiny Lobster	93	80,899	96	94,255	123	114,952
Prawns	275	54,719	408	83,747	365	77,752
Crabs	206	40,922	235	55,251	274	58,146
TOTAL	**574**	**176,539**	**739**	**233,253**	**762**	**250,851**
MOLLUSCS						
Oysters	30	1,903	74	6,942	32	2,179
Beche-de-mers	134	17,600	36	18,676	48	35,296
Octopus	419	40,093	394	49,402	446	45,899
Squids	46	30,832	144	21,241	143	20,149
TOTAL	**629**	**90,427**	**649**	**96,260**	**669**	**103,523**
TOTAL MARINE	**8,947**	**1,003,830**	**8,865**	**1,207,098**	**9,134**	**1,298,172**
GRAND TOTAL	**167,763**	**19,470,579**	**154,015**	**18,073,858**	**163,293**	**21,283,592**

3.0 CAPTURE FISHERIES

Capture fisheries in Kenya is mainly from lakes Victoria, Turkana, Naivasha, Baringo, Jipe, Tana River dams, Tana river delta and Indian Ocean and it accounted for 85.6% of the country's total fish production in 2013 slightly down from 86.1% the previous year. Lake Victoria accounted for 89.26% of all the fish from capture fisheries in Kenya during the year under review. Lake Turkana contributed 3.00%, Tana river dams 0.50%, Lake Baringo 0.19%, Lake Naivasha 0.17%, Lake Kanyamboli 0.14%, Lake Jipe 0.08% , Lake Kenyatta 0.04%, Tukwel dam 0.04%, Tane river delta 0.03%, Riverine 0.01% while marine artisanal fisheries contributed 6.54% of all the fish from capture fisheries.

In capture fisheries, gill netting was the most used fishing method during the year. The other methods included use of gears such as long line hooks, hand line, traditional traps, trolling, ring nets, cast nets and small (mosquito) seines for *Rastrineobola argentea* fishing. There are other methods which were used but are currently prohibited due to their destructive nature. They include; Beach seining, Monofilament gill netting, Trawl netting, Scuba diving, spear gunning and vertical integration of gears.

3.1 LAKE VICTORIA FISHERY

Lake Victoria's contribution to total national annual fish production is enormous (76.4% in 2013) even in the face of rapidly declining fish stocks in the lake. Capture fisheries of Lake Victoria are a source of livelihood to many people employed directly as boat owners, fishermen (40,078), fish traders, fish processors, etc and indirectly as fishing gear manufacturers, boat builders, and ice producers among others. Lake Victoria is a multi-species fishery with hundreds of known species, but only *Rastrienobola argentea* (Omena), *Lates niloticus* (Nile perch), and *Oreochromis niloticus* (Nile tilapia) are of economic significance which contributed 93.7% of total catches from the lake (Kenyan side) during the year under review (Tables 4, 5 and 6). This has been the case for a number of years, figure 3 and table 4. However, for the last few years there have seen a rapid decline of fish stocks in Lake Victoria thereby creating a wide gap between supply and demand for fish in the country. In response to this undesirable situation, the government has taken concrete steps to promote aquaculture development in the country. It introduced and implemented the Fish Farming Enterprise Productivity Program (FFEPP) to bridge the existing supply-demand gap.

During the year 2013, fish production from Lake Victoria increased to124,643 metric tonnes with an ex-vessel value of Kshs 13,858,682,000 compared to 118,992 metric tonnes with an ex-vessel value of Kshs 11,775,377,000 landed in 2012 This year's figures translate into an increase of 4.7% in quantity and 17.7% in ex-vessel value of compared to the previous year. For the three species of commercial value, *Lates niloticus'* production decreased by 16.7% while *Rastrienobola argentea* and

Oreochromis niloticus increased by 26.0% and 22.4% respectively compared to the previous year. In terms of species contribution to the total weight of fish landed from the lake, *Rastrienobola argentea* took the lead with53.5%, *Lates niloticus*, 35.1%, *Oreochromis niloticus*, 6.0%, *Clarias spp*, 1.9%, *Protopterus aethiopicus*, 0.9%, *Haplochromis*, 0.9% and the others species combined contributed 1.8%, figure 4. Homa bay County contributed 64.3% of the total landings, Siaya 19.7%, Migori 7.5%, Kisumu 4.5% and Busia 4.1%, figure 5 and table 6.

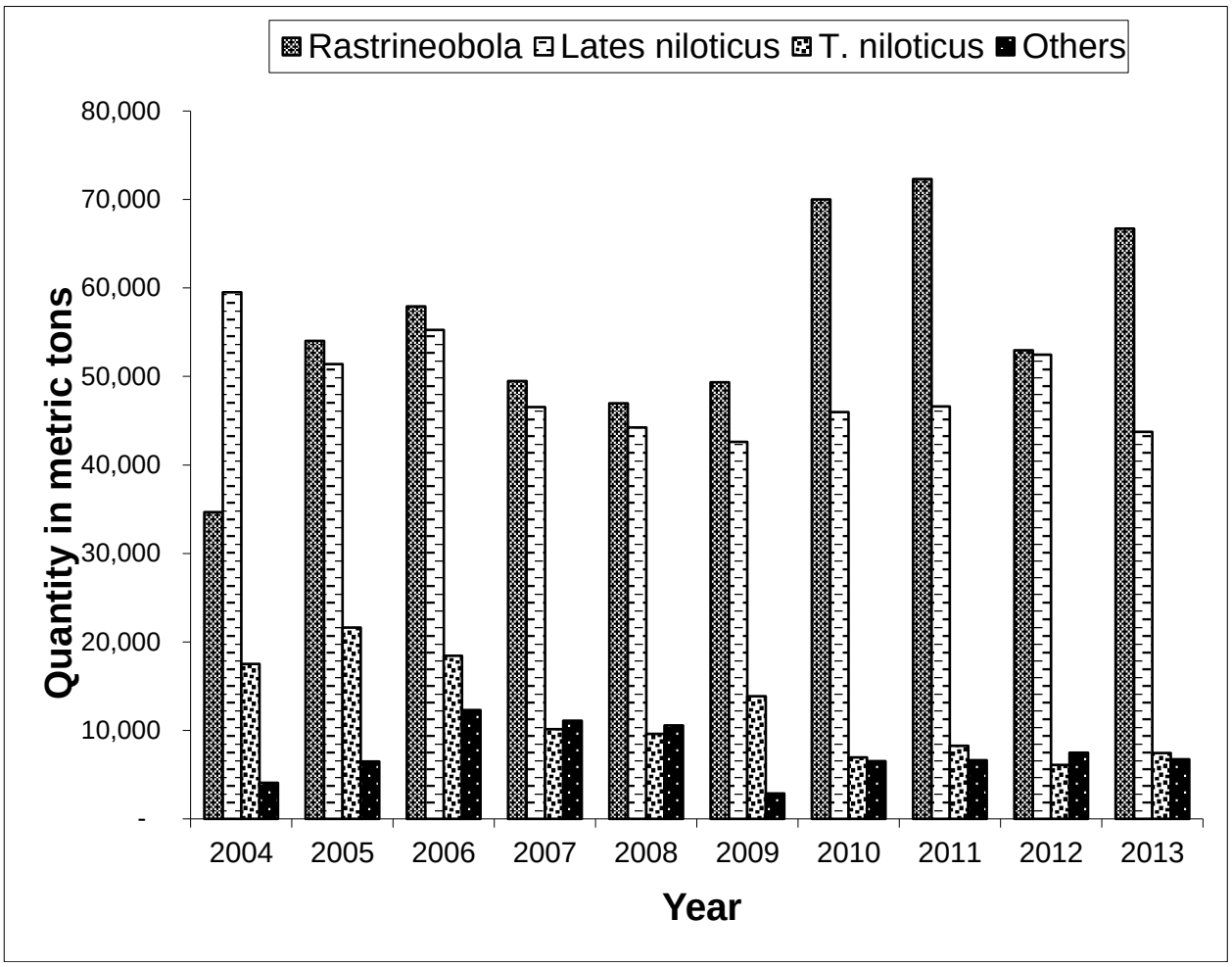

Figure 3: Lake Victoria species catch composition 2004-2013

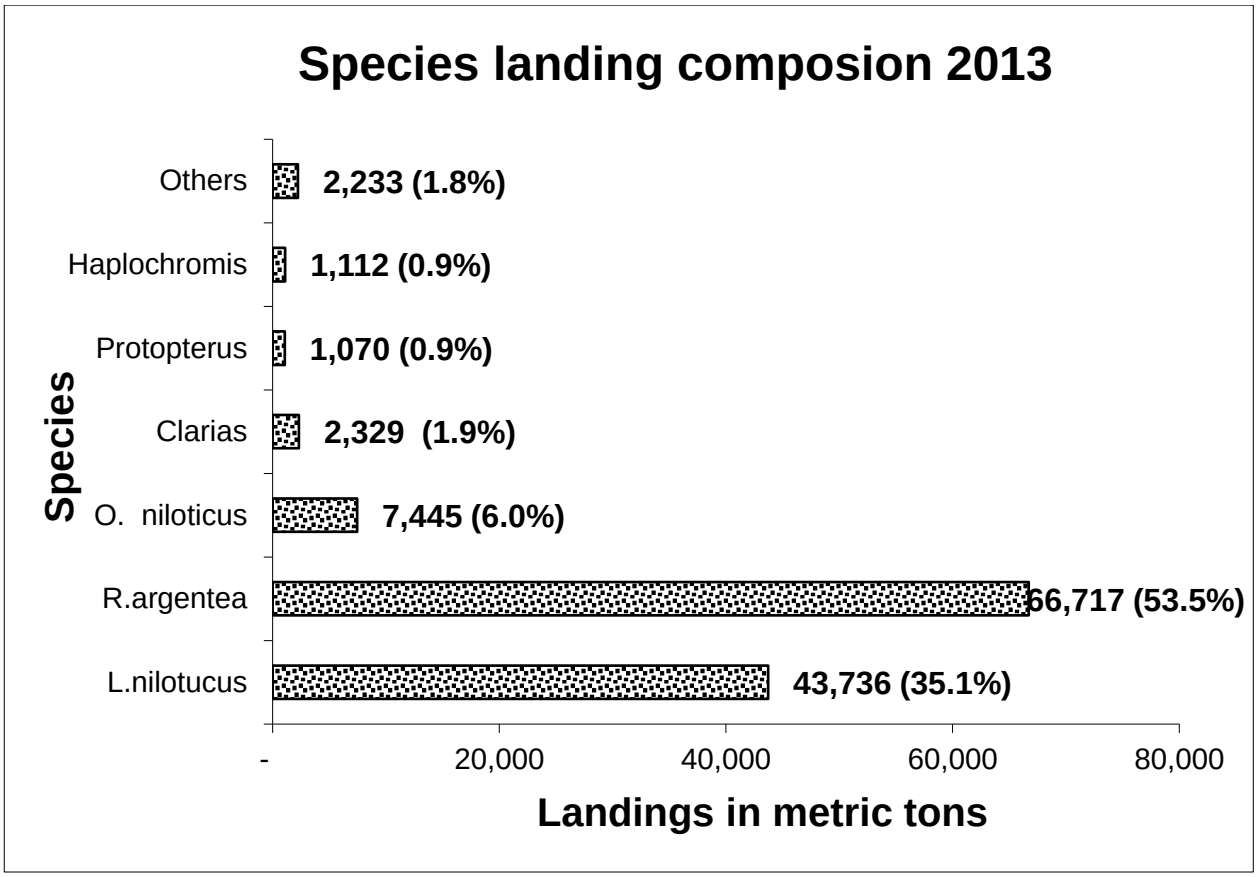

Figure 4: Lake Victoria species catch composition 2013

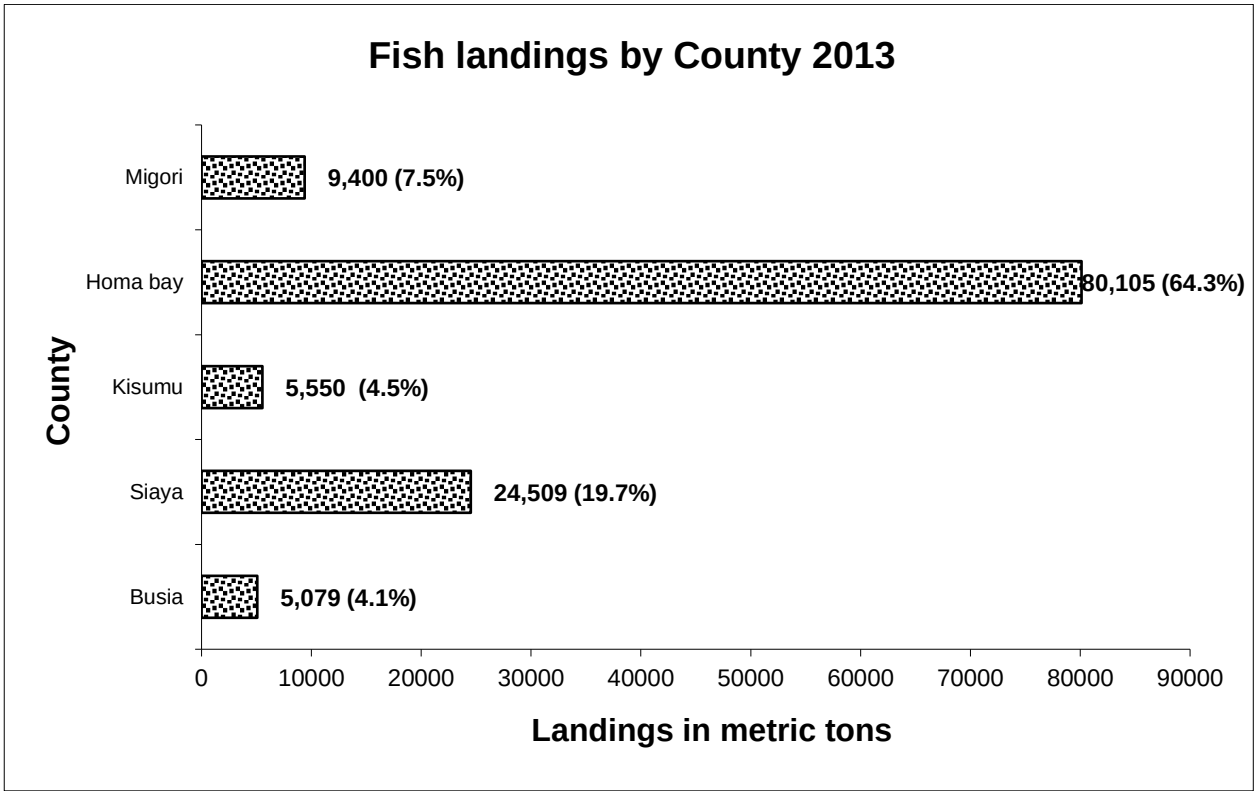

Figure 5: Lake Victoria fish landings by Counties 2013

The following are some of the challenges facing Lake Victoria fisheries which need immediate attention:
(i). The declining trend in species fish catches apart from *Rastrienobola argentea* and *Clarias spp* over the last decade or so could be an indicator of reduced fish stocks particularly *Lates niloticus* and every effort towards fish stock rejuvenation, including restocking, deserve attention since it directly threatens food security and income for livelihoods, which eventually culminates into hunger, joblessness, wrangles among the stakeholders, increased crime rates and social aspects.

(ii). Significant change in attitude by fishers towards conservation of the lakes' resources is necessary to curb on the illegalities within the lake.

(iii). Infestation of the lake by aquatic weeds i.e. Water Hyacinth and the Hippo grass which in most cases resulted into virtually blocking most landing sites and fishing grounds resulting into relocation of fishers to the open areas. This was mainly encountered in Homa bay County during the year under review.

(iv). The major challenge afflicting the fisheries of Lake Victoria is still mainly attributed to over fishing and habitat degradation. These have had adverse impacts to the fishery by changing the species diversity and reduction in total harvestable biomass. Over fishing is caused typically by problems associated with open access fisheries as outlined below:

a). Increased number of fishers and fishing crafts
The number of fishers in Lake Victoria (Kenyan side) has increased from 38,431 in 2000 to 40,078 (4.3% increase) in 2012. The number of fishing crafts increased from 11,515 in 2000 to 13,468 (17.0%) in 2012 on the Kenyan side of the lake while lake wide fishers increased from 129,305 to 205,249(58.7%) and fishing crafts from 42,519 to 69,549 (63.6%) during the same period. (*Lake Victoria (Kenya) biennial fisheries frame survey 2012 National report and Lake Victoria biennial fisheries frame survey 2012 Regional report).*

b). Increase in legal and illegal fishing gears:

The effort in terms of legal gear such as gill net and long line hooks have increased tremendously. The number of legal gill net of mesh size =>5 inches increased from 99,821 in 2000 to 154,012 (54.3%) in 2012 while the number of the illegal mesh sizes <5 inches increased from 33,544 to 54,115 (61.3%) during the same period. Generally, the total number of gillnets of all mesh sizes continued to increase over the years with an increase of 154.4% (from 133,365 to 206,127) between 2000 and 2012. The number of Long line hooks had the highest increase during the same period having increased from 1,039,893 to 2,478,976 an increase of 138.4%. Other illegal nets, such as monofilament gillnets have increased from 58 in 2004 to 469 in 2006, 4,190 in 2008 before declining to 1,468 in 2010 and then increasing tremendously by 728.4% to 12,161

monofilament gillnets in 2012. Efforts to remove these destructive gears should be stepped up and the effects of the expanding long line fishery in particular need to be evaluated and the fishery regulated accordingly.

The State Department of Fisheries is concerned about the sustainability of Lake Victoria fisheries. Scientists have advised that the fish stocks are continuously declining and unless this is effectively dealt with, the sustainability of the fishery remains under threat. This will eventually have a negative impact on other businesses and the fishers.

All stakeholders especially fish processors and gear distributors should collaborate with the State Department of Fisheries in order to manage Lake Victoria fisheries resources sustainably. As it has been noted above, many illegal gears are still in use and this can only be controlled with the cooperation of all the stake holders.

Table 4: Lake Victoria fish landings by Species, Weight and Value 2011 – 2013

Species	2,011			2,012			2,013		
	M. tons	000 Kshs	% Comp	M. tons	000 Kshs	% Comp	M. tons	000 Kshs	% Comp
Lates niloticus	46,612	9,100,611	35	52,472	7,472,681	44	43,736	8,521,449	35
Ratrineobola Argentae	72,314	3,224,846	54	52,948	2,813,882	44	66,717	3,552,513	54
Tilapia niloticus	8,240	1,112,239	6	6,081	899,643	5	7,445	1,209,614	6
Clarias	2,537	148,710	2	2,403	244,836	2	2,329	237,567	2
Protopterus	1,166	101,118	1	1,003	77,216	1	1,070	92,705	1
Haplochromis	527	21,272	0	715	62,774	1	1,112	84,513	1
Others	2,405	138,374	2	3,370	204,345	3	2,233	160,321	2
TOTAL	**133,801**	**13,847,170**	**100**	**118,993**	**11,775,377**	**100**	**124,643**	**13,858,682**	**100**

Table 5: Lake Victoria Monthly fish landings by Species, Weight (M. tonnes) and Value ('000 Kshs) 2013

Species		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
Latesl niloticus	Weight	3,111	3,331	3,644	3,533	3,871	3,940	3,128	3,941	3,536	3,889	3,888	3,923	43,736
	Value	606,077	648,952	710,009	688,459	754,230	767,698	609,445	767,923	688,908	757,821	757,597	764,331	8,521,449
Ratrineobala argentea	Weight	5,396	5,341	5,731	6,442	4,977	5,642	5,062	5,465	5,686	6,006	5,078	5,891	66,717
	Value	314,904	311,643	334,400	35,223	290,408	329,255	295,409	318,891	331,791	350,490	296,351	343,750	3,552,513
Tilapia niloticus	Weight	520	511	577	621	612	705	724	581	683	608	567	736	7,445
	Value	84,459	83,007	93,797	100,853	99,400	114,549	117,662	94,420	111,021	98,778	92,137	119,529	1,209,613
Clarias	Weight	145	205	202	204	186	195	197	202	190	207	179	218	2,329
	Value	14,799	20,918	20,562	20,776	18,997	19,851	20,135	20,633	19,353	21,131	18,214	22,199	237,567
Protopterus	Weight	82	130	88	81	74	69	78	94	100	88	90	96	1,070
	Value	7,075	11,222	7,660	6,977	6,441	6,001	6,733	8,148	8,685	7,612	7,807	8,343	92,705
Haplochromis	Weight	83	84	92	93	99	95	100	91	97	99	94	85	1,112
	Value	6,288	6,395	7,019	7,061	7,529	7,200	7,587	6,945	7,389	7,496	7,118	6,485	84,513
Others	Weight	181	185	160	206	195	166	173	189	200	237	153	188	2,234
	Value	13,020	13,313	11,467	14,819	14,010	11,933	12,337	13,546	14,340	17,057	10,998	13,482	160,322
	Weight	**9,518**	**9,786**	**10,494**	**11,180**	**10,014**	**10,812**	**9,462**	**10,564**	**10,492**	**11,135**	**10,049**	**11,136**	**124,643**
TOTAL	**Value**	**1,046,623**	**1,095,449**	**1,184,915**	**874,168**	**1,191,014**	**1,256,487**	**1,069,307**	**1,230,506**	**1,181,488**	**1,260,385**	**1,190,222**	**1,278,119**	**13,858,682**

Table 6: Lake Victoria Annual fish landings by Species, Weight, Value and by Counties 2013

County	**Busia**		**Siaya**		**Kisumu**		**Homa Bay**		**Migori**		**Total**	
Species	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**
Lates nilotucus	1,515	267,920	10,200	1,833,543	992	158,988	28,014	5,605,769	3,014	655,229	43,736	8,521,449
Ratrineobola argentea	2,454	128,268	9,518	542,967	1,650	138,784	47,197	2,456,647	5,899	285,848	66,717	3,552,513
Tilapia niloticus	1,059	209,908	3,958	594,707	1,058	166,265	1,058	171,856	314	66,878	7,445	1,209,614
Clarias	-	-	40	4,190	851	92,214	1,438	141,163	-	-	2,329	237,567
Protopterus	-	-	2	103	384	31,589	564	34,075	121	26,939	1,070	92,705
Haplochromis	-	-	-	-	25	2,435	1,087	82,078	-	-	1,112	84,513
Others	52	4,115	790	59,344	590	36,016	748	52,067	52	8,778	2,233	160,321
Total	**5,079**	**610,211**	**24,509**	**3,034,854**	**5,550**	**626,290**	**80,105**	**8,543,655**	**9,400**	**1,043,673**	**124,643**	**13,858,682**

3.2 MARINE CAPTURE FISHERY

The marine capture fishery is composed of coastal and near shore artisanal, semi-industrial and offshore industrial fisheries. Artisanal and semi-industrial fisheries are exploited by the coastal local communities while the industrial fisheries are exploited by foreign fishing companies. During the year under review, the artisanal fishing fleet comprised of 2,913 fishing crafts and 12,915 fishermen (*Marine Artisanal Fisheries Frame Survey 2014 report*) while the semi-industrial fleet had only one licensed trawlers. The inshore waters which are fishing grounds for artisanal fishermen are over-exploited and degraded. Great potential exists in the exploitation of the Kenyan EEZ where estimates done in 1975-1980 indicate potential of 100,000 to 150,000 metric tonnes annually (FAO, 1980) and more recent estimates indicate potential of 300,000 metric ton (Habib 2003). This fishery is currently exploited by Distant Water Fishing Nations (DWFN) upon payment of access fees to the State Department of Fisheries. The State Department has limited capacity for Monitoring, Control and Surveillance (MCS) to ensure compliance with the established fisheries management standards, besides it is possible that vessels could be accessing our EEZ resources without payment of access fees. However the challenge at hand is large and needs a comprehensive approach in order to establish and deploy a national fisheries enforcement unit. A well trained and a disciplined law enforcement unit is critical toward the management of every fishery particularly when its operation is based on best scientific information.

The artisanal fishing activities are affected by Kenya's coastal oceanographic conditions which are caused by changes in the monsoon wind system (UNEP, 1998) that results to seasonal reversal process with NE monsoons between November-March and SE monsoons between May-September. These oceanographic processes cause distinct seasonality in the artisanal fishery, with high catches during the NE monsoon than the SE monsoon. These two seasons are referred to as *Kazi kazi* and *Kusi* by the locals. During *Kazi kazi* the sea is calm and there is a lot of fishing activities and fish landings are normally high while during *Kusi* the winds render the sea rough thus unfavorable to fishing trips.

During the year under review, a total of 9,134 metric tonnes of assorted fish species with an ex-vessel value of Kshs. 1,298,172,000 were landed by the artisanal fishers. This production reflected an increase of 3% from last year's production of 8,865 metric tonnes with an ex-vessel value of Kshs. 1,207,098,000 (Tables 7,8 and 9). The landings were done by 12,915 fishers using 2,913 fishing crafts with different types and sizes of fishing gears. The landings were done at some 197 landing sites distributed all along the whole stretch of the Kenyan Coastline.

Landings from artisanal fishery have been increasing, declining then increasing in cycles while the value of the fish has maintained an upward trend over the years. Fish production from the marine artisanal fishery for the last ten years (2004-2013) has remained fairly constant between 7,000 and 9,000 metric tonnes only showing marginal fluctuations as shown in figure 6 below.

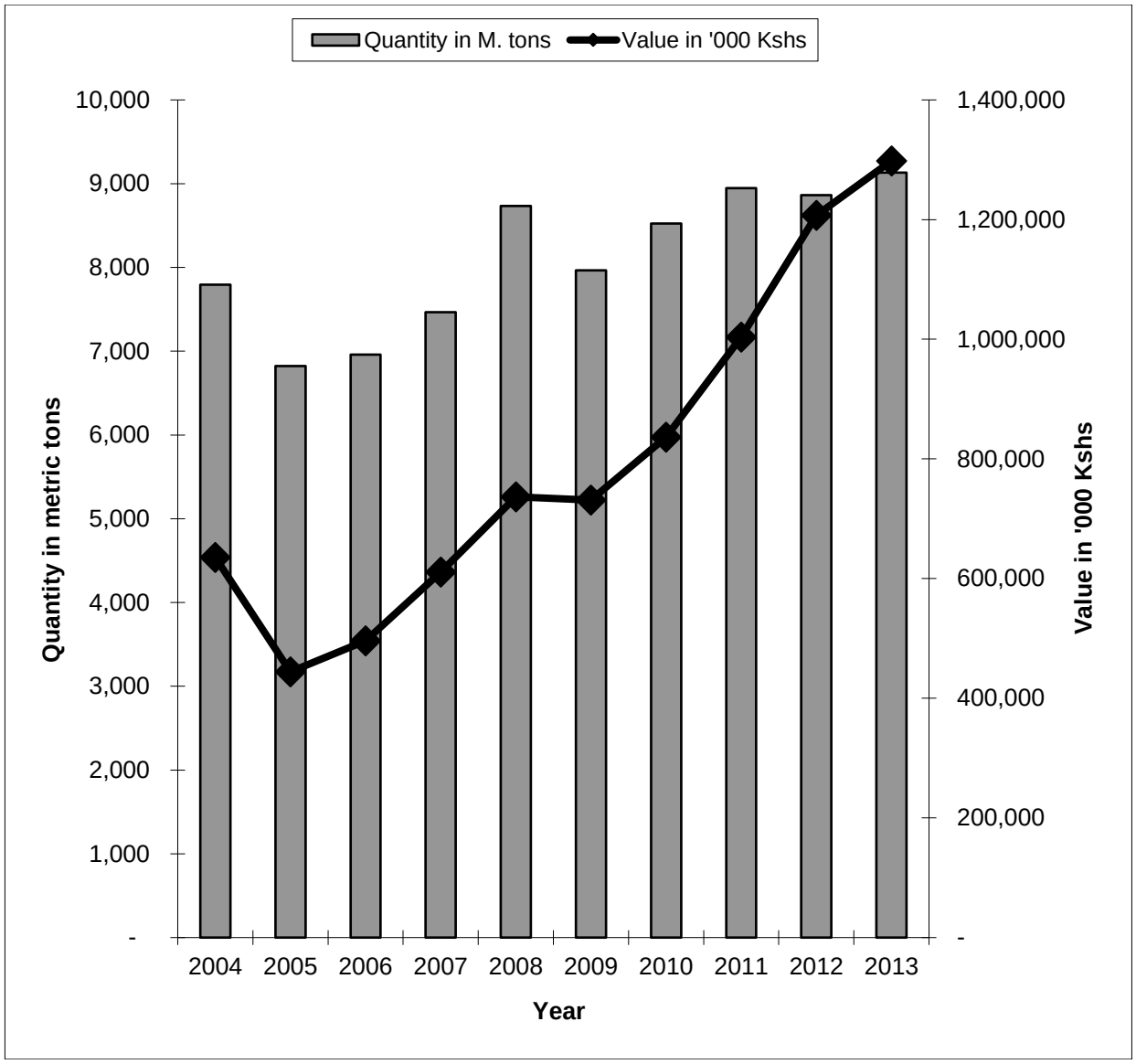

Figure 6: Trends of marine fish production by quantity and value 2004-2013

In 2013, dermersal fish species category dominated the marine artisanal fish landings by contributing 4,433 metric tonnes (48.5%) of the total marine landings while pelagic fish category contributed 2,362 metric tonnes (25.9%), the sharks, rays and sardines category made up 908 metric tonnes (9.9%) of the landings, crustaceans 762 metric tonnes (8.3%) and molluscs 669 (7.3%) figure 7. This trend has been the same over a number of years, figures 8.

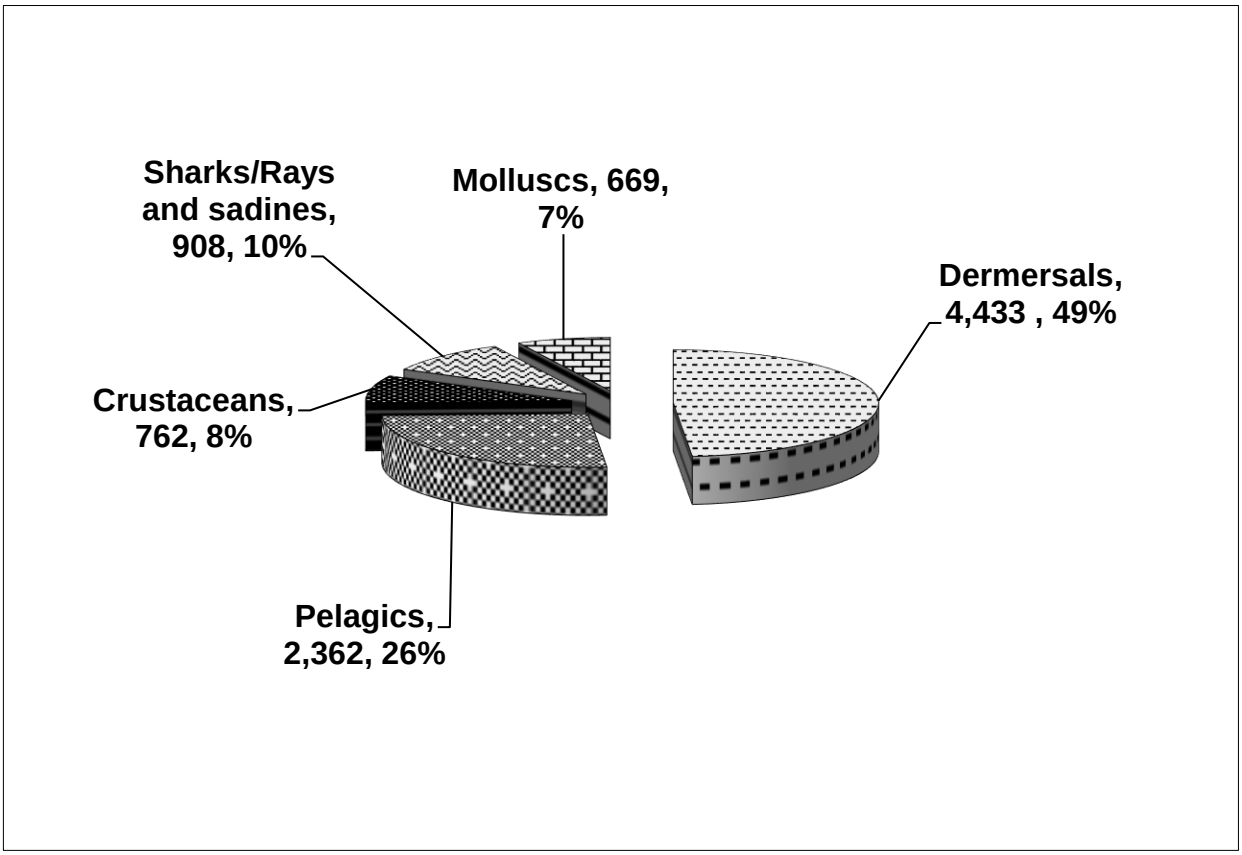

Figure 7: Percentage contribution of marine fish species groups 2013

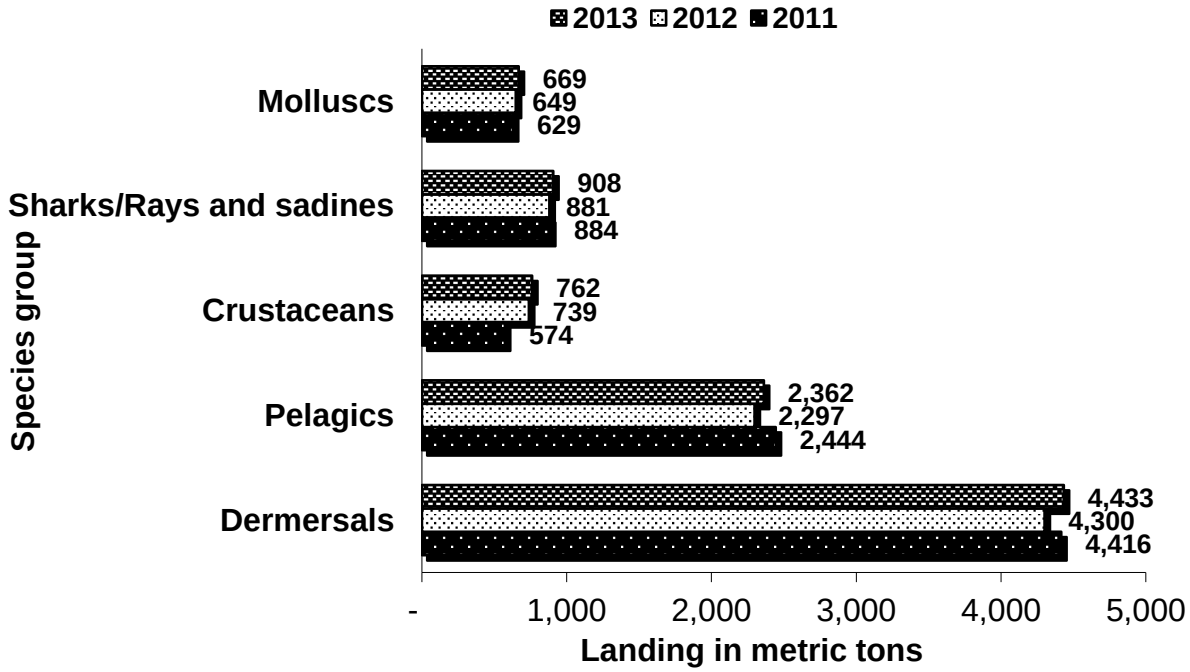

Figure 8: Trends of landings of marine fish species groups 2011-2013

During the year under review, Lamu County contributed the highest quantity of marine artisanal landings of 2,452 metric tonnes (or 26.8% of the total landings) with an ex-vessel value of Kshs 327,628,000 (or 25.2% of the total ex-vessel value). Lamu was followed by Kwale 2,358 metric tonnes (25.8%) with an ex-vessel value of Kshs 299,449,000 (or 23.1%), Kilifi 2,345 metric tonnes (25.7%) with an ex-vessel value of Kshs 366,919,000 (28.3%), Mombasa 1,178 metric tonnes (12.9%) with an ex-vessel value of Kshs 224,869,000 (17.3%), and lastly was Tana river county with a contribution of 803 metric tonnes or 8.8% with an ex-vessel value of Kshs 79,307,000 or 6.1% of the total ex-vessel value of all the marine artisanal landings as shown in figure 9 below.

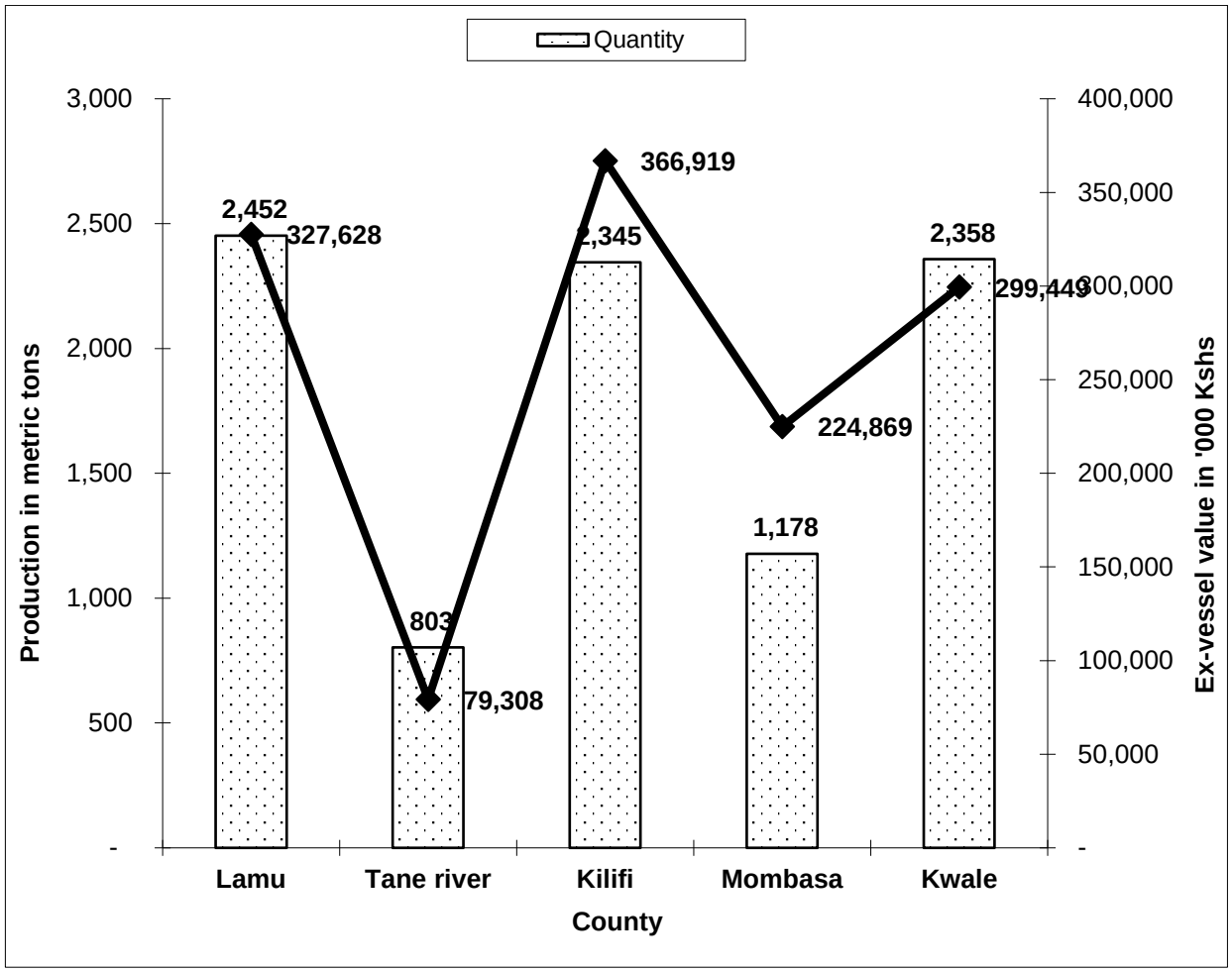

Figure 9: Marine fish production by Quantity, Value and Counties 2013

The most common fishing gears used by the artisanal fishers were gillnets, traditional traps (usio, malema), seine nets (which include beach, prawn and reef seines), long line hooks, hand lines, cast nets and trammel nets among others.

Table 7: Marine fish landings by Species, Weight and Value 2011 - 2013

	2011		2012		2013	
SPECIES	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**
DEMERSAL						
Rabbit fish	791	82,522	645	81,776	794	105,666
Scarvenger	683	63,759	602	71,633	685	81,641
Snapper	346	38,443	432	54,197	347	49,224
Parrot fish	538	42,151	416	44,969	540	53,973
Surgeon fish	94	8,332	104	11,295	94	10,668
Unicorn fish	154	14,692	133	13,680	154	18,812
Grunter	160	14,919	161	19,855	161	19,103
Pouter	164	14,403	168	17,277	165	18,442
Black skin	174	14,146	225	20,890	175	18,114
Goat fishr	115	11,460	125	14,940	115	14,674
Steaker	48	3,224	45	4,186	49	4,128
Rock cod	198	18,861	248	30,391	199	24,151
Cat fish	173	15,444	215	21,833	174	19,776
Mixed dermasal	778	66,211	781	79,531	781	84,780
TOTAL	**4,416**	**408,567**	**4,300**	**486,451**	**4,433**	**523,153**
PELAGICS						
Cavalla jacks	283	27,005	241	29,096	274	33,108
Mullets	228	22,807	292	31,381	220	27,962
Littla mackerels	339	32,183	329	37,998	328	39,457
Barracudas	327	33,869	260	31,386	317	41,523
Milk fish	63	5,578	79	9,521	61	6,839
King fish	173	20,835	121	17,942	168	25,544
Queen fish	199	20,711	179	20,889	192	25,393
Sail fish	145	17,735	142	21,193	140	21,743
Bonitos/Tunas	302	33,902	201	30,807	292	41,563
Dolphins	18	1,810	61	5,756	17	2,219
Mixed Pelagics	365	36,332	391	52,183	353	44,543
TOTAL	**2,444**	**252,767**	**2,297**	**288,152**	**2,362**	**309,893**
Sharks &Rays	306	31,602	373	46,064	314	46339
Sardines	211	15,238	194	17,449	217	22344
Mixed fish/Others	367	28,690	313	39,468	377	42069
TOTAL	**884**	**75,530**	**881**	**102,981**	**908**	**110,752**
CRUSTACEANS						
Lobsters	93	80,899	96	94,255	123	114,952
Prawns	275	54,719	408	83,747	365	77,752
Crabs	206	40,922	235	55,251	274	58,146
TOTAL	**574**	**176,539**	**739**	**233,253**	**762**	**250,851**
MISCELLANEOUS						
Oysters	30	1,903	74	6,942	32	2,179
Beche-de-mers	46	30,832	36	18,676	48	35,296
Octopus	419	40,093	394	49,402	446	45,899
Squids	134	17,600	144	21,241	143	20,149
TOTAL	**629**	**90,427**	**649**	**96,260**	**669**	**103,523**
TOTAL ARINE	**8,947**	**1,003,830**	**8,865**	**1,207,098**	**9,134**	**1,298,172**

Table 8: Marine monthly fish landing by Species, Weight and Value 2013

SPECIES	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		Total	
Demersal	**M. Ton**	**000 Kshs**	**M. Ton**	**000 Kshs**	**M. Ton**	**000 Kshs**	**M. Ton**	**000 Kshs**	**M. Ton**	**000 Kshs**	**M. Ton**	**000 Kshs**	**M. Ton**	**000 Kshs**	**M. Ton**	**000 Kshs**	**M. Ton**	**000 Kshs**	**M. Tns**	**000 Kshs**	**M. Ton**	**000 Kshs**	**M. Ton**	**000 Kshs**	**M. Tons**	**000 Kshs**
Rabbit fish	55	7,211	58	7,470	75	9,850	73	8,927	99	11,206	64	7,481	51	6,455	73	10,804	66	9,264	58	8,270	57	8,838	65	9,889	794	105,665
Scarvenger	65	7,549	63	7,260	71	7,707	54	6,448	62	6,020	51	4,164	43	5,040	55	6,829	63	7,778	51	6,989	51	7,158	56	8,699	685	81,641
Snapper	31	3,430	32	3,229	28	2,762	17	1,981	10	1,353	16	1,980	18	2,260	16	1,891	15	1,805	15	1,832	64	12,661	85	14,040	347	49,224
Parrot fish	45	4,710	42	4,374	47	4,970	63	5,399	64	5,039	45	3,895	39	3,962	45	4,675	31	3,413	39	4,183	38	4,521	41	4,832	540	53,972
Surgeon fish	13	1,136	11	1,374	12	1,564	7	897	3	354	4	412	7	833	5	628	7	537	8	1,018	8	984	8	932	94	10,668
Unicorn fish	15	1,556	21	2,655	24	3,103	15	1,607	7	906	8	1,010	8	947	8	1,069	13	1,768	11	1,292	14	1,588	11	1,310	154	18,812
Grunter	14	1,692	12	1,485	11	1,307	12	1,403	12	1,418	13	1,484	10	1,221	23	1,957	12	1,560	14	1,758	14	1,909	14	1,909	161	19,103
Pouter	15	1,410	12	1,222	16	1,646	13	1,387	13	1,435	16	1,580	8	1,549	16	1,749	13	1,357	14	1,539	16	1,912	13	1,655	165	18,442
Black skin	16	1,694	11	1,120	12	1,195	15	1,593	17	1,640	15	1,440	16	1,683	17	1,670	16	1,586	14	1,507	10	1,266	16	1,721	175	18,113
Goat fish	10	1,155	8	1,045	11	1,392	8	1,105	7	936	9	1,075	11	1,337	10	1,246	10	1,277	10	1,392	10	1,419	10	1,295	115	14,674
Steaker	3	464	3	318	3	279	2	245	3	354	16	182	2	197	3	389	3	272	2	225	6	795	3	408	49	4,128
Rock cod	25	2,873	20	2,211	13	1,463	13	1,611	10	1,507	15	1,553	14	1,742	19	1,940	19	2,231	19	2,667	12	1,757	19	2,596	199	24,151
Cat fish	15	1,733	14	1,326	11	916	12	1,548	20	2,282	13	1,373	9	1,134	14	1,212	13	1,676	14	2,094	21	2,465	18	2,016	174	19,775
Mixed dermasal	63	7,811	64	5,812	67	6,498	89	6,966	96	9,209	45	7,137	73	6,138	68	7,253	69	7,580	48	5,892	51	7,071	48	7,413	781	84,780
Total	**384**	**44,423**	**371**	**40,903**	**400**	**44,653**	**395**	**41,116**	**424**	**43,659**	**330**	**34,767**	**311**	**34,498**	**371**	**43,311**	**349**	**42,105**	**318**	**40,658**	**374**	**54,344**	**407**	**58,716**	**4,433**	**523,153**
pelagic																										
Cavalla jacks	25	2,874	29	3,264	59	7,371	18	2,094	13	1,402	17	1,929	14	1,731	14	1,793	12	1,758	24	2,970	23	2,718	26	3,205	274	33,108
Mullets	19	2,246	16	1,704	16	1,770	16	4,412	23	2,411	22	2,331	19	2,009	20	2,330	19	2,173	17	1,928	16	2,148	19	2,501	220	27,962
Little mackerels	48	5,804	56	6,135	32	3,944	25	2,758	20	2,453	18	2,190	13	1,518	16	1,922	20	3,053	18	2,223	35	4,021	29	3,436	328	39,457
Barracudas	40	4,851	40	4,943	25	3,231	24	2,972	22	2,421	18	2,229	17	1,999	25	3,087	24	3,788	24	3,252	30	4,184	29	4,565	317	41,522
Milk fish	6	671	3	290	3	365	4	359	11	1,168	5	507	5	592	5	662	4	465	5	576	5	667	5	518	61	6,839
King fish	10	1,439	11	1,567	18	2,509	16	2,282	17	2,689	14	2,141	6	1,071	17	2,727	14	2,200	13	1,925	16	2,299	16	2,695	168	25,544
Queen fish	12	1,411	10	1,211	17	2,060	21	2,723	24	2,993	9	876	7	906	9	2,176	16	2,195	15	2,050	21	2,935	29	3,856	192	25,393
Sail fish	19	2,619	22	3,015	12	1,806	8	1,257	5	760	4	673	4	668	6	1,036	8	1,520	9	1,320	17	2,717	27	4,352	140	21,743
Tuna	41	6,196	45	5,778	21	2,361	31	4,452	20	2,870	13	1,835	19	2,617	17	2,511	14	2,317	15	1,958	24	3,720	31	4,817	292	41,562
Dolphin fish	2	207	1	138	1	214	1	159	3	260	1	97	1	153	1	113	1	124	2	310	2	272	1	172	17	2,220
Mixed Pelagics	35	4,324	39	4,762	42	5,249	37	4,049	30	3,659	18	2,271	18	2,258	24	2,908	26	3,251	25	3,527	31	4,310	26	3,856	353	44,543
Total	**257**	**32,642**	**272**	**32,807**	**245**	**30,880**	**201**	**27,517**	**187**	**23,086**	**139**	**17,079**	**124**	**15,521**	**154**	**21,266**	**157**	**22,844**	**167**	**22,039**	**222**	**29,992**	**239**	**33,973**	**2,362**	**309,893**

Sharks & Rays	25	3,751	32	4,554	22	3,303	21	2,007	12	2,031	28	4,519	25	3,698	26	3,848	33	4,622	24	3,744	30	4,543	36	5,720	314	46,339
Sardines	35	3,263	33	2,926	21	2,097	15	1,437	12	1,217	10	1,035	9	1,074	12	1,147	14	1,628	15	1,874	10	1,162	30	3,484	217	22,344
Mixed fish	18	2,365	81	3,241	94	8,160	28	3,829	22	3,175	14	3,187	15	2,203	22	3,083	15	2,131	18	2,818	23	3,980	28	3,899	377	42,069
Total	**78**	**9,379**	**146**	**10,721**	**137**	**13,560**	**64**	**7,273**	**46**	**6,422**	**53**	**8,740**	**50**	**6,974**	**60**	**8,078**	**62**	**8,381**	**57**	**8,437**	**63**	**9,685**	**94**	**13,103**	**908**	**110,752**
Crustaceans																										
Lobsters	14	11,656	12	9,711	10	7,670	9	7,076	7	5,730	8	7,623	7	4,568	9	8,391	9	9,066	10	10,645	13	16,953	15	15,862	123	114,952
Prawns	23	5,316	25	5,042	26	6,035	33	8,797	41	6,387	33	6,335	27	5,896	22	4,812	23	6,520	32	7,705	39	8,510	39	6,397	365	77,752
Crabs	22	3,753	20	3,680	19	3,787	24	4,559	25	5,895	27	5,539	24	5,569	24	5,511	29	7,372	16	2,954	23	4,140	21	5,386	274	58,146
TOTAL	**59**	**20,725**	**58**	**18,433**	**54**	**17,492**	**66**	**20,433**	**73**	**18,013**	**68**	**19,496**	**58**	**16,033**	**56**	**18,713**	**61**	**22,957**	**59**	**21,304**	**74**	**29,603**	**76**	**27,645**	**762**	**250,851**
Molluscs																										
Oysters	1	39	1	32	1	27	1	48	1	72	1	116	1	43	7	61	11	1,230	2	150	2	166	2	196	32	2,179
Beche-de-mers	8	5,935	3	1,710	3	2,592	5	6,141	3	2,750	3	2,375	2	1,664	4	1,193	4	1,462	5	1,004	4	3,169	5	5,300	48	35,296
Octopus	43	4,102	44	4,200	48	4,327	48	5,604	23	2,858	20	2,232	26	2,259	22	3,300	31	2,965	48	5,120	41	4,789	52	4,144	446	45,899
Squids	15	1,907	14	1,676	9	787	12	1,648	11	2,193	8	959	10	1,453	16	2,594	12	1,766	13	1,772	11	1,535	12	1,858	143	20,149
Total	**67**	**11,982**	**61**	**7,618**	**61**	**7,733**	**66**	**13,441**	**38**	**7,873**	**33**	**5,682**	**40**	**5,420**	**49**	**7,148**	**57**	**7,423**	**68**	**8,045**	**58**	**9,658**	**72**	**11,498**	**669**	**103,523**
Total Marine	**844**	**119,151**	**908**	**110,483**	**897**	**114,319**	**791**	**109,780**	**769**	**99,053**	**622**	**85,765**	**582**	**78,446**	**691**	**98,517**	**685**	**103,710**	**667**	**100,482**	**791**	**133,281**	**887**	**144,935**	**9,134**	**1,298,172**

Table 9: Marine fish landing by Species, Weight and Value and by Counties 2013

Species	Lamu		Tana River		Kilifi		Mombasa		Kwale		Total	
DEMERSAL	**M. Tons**	**000 Kshs**	**M. Tons**	**000 Kshs**	**M. Tons**	**000 Kshs**	**M. Tons**	**000 Kshs**	**M. Tons**	**000 Kshs**	**M. Tons**	**000 Kshs**
Rabbit fish	339	28,230	27	2,017	162	28,662	108	24,147	158	22,609	794	105,666
Scarvenger	296	21,421	45	3,411	111	18,513	84	19,036	150	19,260	685	81,641
Snapper	86	7,584	32	2,416	140	27,031	18	3,473	71	8,720	347	49,224
Parrot fish	264	19,076	39	2,572	50	7,811	44	8,727	142	15,787	540	53,973
Surgeon fish	12	911	4	181	33	4,494	5	1,220	40	3,862	94	10,668
Unicorn fish	8	517	-	-	56	6,857	26	4,796	64	6,642	154	18,812
Grunter	64	5,357	2	182	21	2,586	43	7,576	30	3,402	161	19,103
Pouter	63	5,950	-	-	10	1,392	39	5,224	53	5,875	165	18,442
Black skin	74	6,286	-	-	18	2,237	3	803	80	8,788	175	18,114
Goat fish	46	3,842	3	235	4	588	30	5,868	32	4,142	115	14,674
Steaker	20	468	-	-	8	1,271	-	-	22	2,389	49	4,128
Rock cod	61	5,367	25	2,036	37	6,686	10	2,152	66	7,911	199	24,151
Cat fish	32	2,389	73	5,550	29	6,145	12	2,197	29	3,494	174	19,776
Mixed dermasal	385	33,944	35	2,322	197	28,159	24	4,080	140	16,274	781	84,780
TOTAL	**1,750**	**141,343**	**284**	**20,923**	**875**	**142,432**	**447**	**89,299**	**1,076**	**129,154**	**4,433**	**523,153**
PELAGICS												
Cavalla jacks	68	5,911	33	2,488	86	12,941	24	4,183	63	7,584	274	33,108
Mullets	93	7,760	4	306	45	7,385	21	3,018	58	9,493	220	27,962
Little mackerels	-	-	11	814	179	22,112	29	4,246	110	12,285	328	39,457
Barracudas	67	5,421	20	1,521	117	17,734	47	9,273	65	7,575	317	41,523
Milk fish	27	1,992	-	-	12	1,875	6	827	17	2,144	61	6,839
King fish	11	1,012	71	8,925	49	9,046	9	2,161	27	4,400	168	25,544
Queen fish	29	2,200	105	14,610	29	4,831	9	944	20	2,806	192	25,392
Sail fish	6	487	3	410	88	13,024	29	5,601	15	2,220	140	21,743
Tuna	10	846	32	2,813	126	21,103	18	3,480	105	13,322	292	41,563
Dolphin fish	-	-	-	-	9	1,140	-	-	8	1,080	17	2,219
Mixed Pelagics	35	3,030	28	2,112	160	24,112	8	1,162	122	14,128	353	44,543
TOTAL	**345**	**28,660**	**306**	**34,000**	**900**	**135,304**	**201**	**34,895**	**611**	**77,035**	**2,362**	**309,893**

Sharks & Rays	29	4,501	108	11,235	55	10,439	77	15,333	44	4,830	314	46,339
Sardines	-	-	-	-	60	7,325	75	9,694	82	5,325	217	22,344
mixed fish/Others	22	3,162	-	-	245	24,330	55	8,883	55	5,694	377	42,069
TOTAL	**51**	**7,663**	**108**	**11,235**	**361**	**42,095**	**207**	**33,909**	**181**	**15,850**	**908**	**110,752**
CRUSTACEANS												
Lobsters	60	69,887	6	5,924	16	15,003	10	4,594	32	19,544	123	114,952
Prawns	19	3,717	61	4,721	44	12,703	208	49,543	34	7,068	365	77,752
Crabs	136	39,469	1	102	33	4,701	31	3,580	74	10,295	274	58,146
TOTAL	**215**	**113,073**	**68**	**10,747**	**93**	**32,407**	**248**	**57,717**	**140**	**36,907**	**762**	**250,851**
MISCELLANEOUS												
Oysters	1	47	-	-	19	1,765	12	366	-	-	32	2,179
Beche-de-mers	18	30,208	-	-	8	1,901	0	14	22	3,173	48	35,296
Octopus	53	3,229	37	2,402	68	7,239	40	5,680	247	27,349	446	45,899
Squids	19	3,404	-	-	21	3,775	22	2,989	82	9,981	143	20,149
TOTAL	**90**	**36,889**	**37**	**2,402**	**116**	**14,681**	**74**	**9,048**	**351**	**40,503**	**669**	**103,523**
TOTAL MARINE	**2,450**	**327,628**	**803**	**79,308**	**2,345**	**366,919**	**1,178**	**224,869**	**2,358**	**299,449**	**9,134**	**1,298,173**

3.3 LAKE TURKANA FISHERY

Lake Turkana is Africa's fourth largest lake by volume and Kenya's largest inland lake measuring about 249 km long by 48 km at its widest part, with a delta extending into Ethiopia. It lies in a closed basin 365 meters above sea level. The lake has three volcanic islands namely the north, central and south islands. The central island has three saline crater lakes known for endemic species of tilapias. The islands are listed as UNESCOs world heritage sites.

Over 90% of the annual water discharge by volume is from river Omo originating from the Ethiopian highlands while the rest is from seasonal rivers Kerio and Turkwel. River Omo drains a large portion of the south western highlands of Ethiopia and therefore influences fluctuations in the lake's water level, which in turn affects the amount (or abundance) of fish stocks and hence fish production from the lake. With no surface outlet, the water budget is a balance between river inflow and evaporation which imposes special physical chemical conditions making the lake saline. Therefore any activities dealing with water abstraction or damning that interferes with the natural discharge rates of river Omo has a negative effect on the lake volume levels.

The lake has about 48 species of fish with a dozen supporting a commercial fishery. The species exploited commercially include, Nile perch (*Lates niloticus),* Tilapia *(Oreochromis niloticus),* Catfish *(Clarias gariepinus), synodontis schall, Hydrocynus forskalii, Labeo horie, Bagrus spp, Distichodus niloticus, Citharinus spp, Barbus spp* and *Alestes spp.* The fishery is characterized by bust cycles in fish landings associated with fluctuations in lake levels due to the dynamics of the climatic conditions especially precipitation leading to filling and drying up of the Ferguson's gulf. The filling up of the Ferguson's gulf is associated with boom in fish catches especially tilapias. The peripheral communities entirely rely on fishing directly supporting about 7,000 fishers and 6,500 fish traders and transporters.

During the year under review, a total of 4,338 metric tonnes of fish were landed with an ex-vessel value of Kshs 438,646,000 from both sides (Turkana and Marsabit counties) of the lake. This years' production was an increase of 44.6% in quantity and an increase of 42.% in ex-vessel value compared to 2012 production of 3,001 metric tonnes and an ex-vessel value of Kshs 307,382,000. The trends in annual fish catches from Lake Turkana are determined by the lakes' water level and for that the catches have been unpredictable for a long time. But there has been a continuous decline in the catches since 2009 apart from the increase in 2013, figure 10.

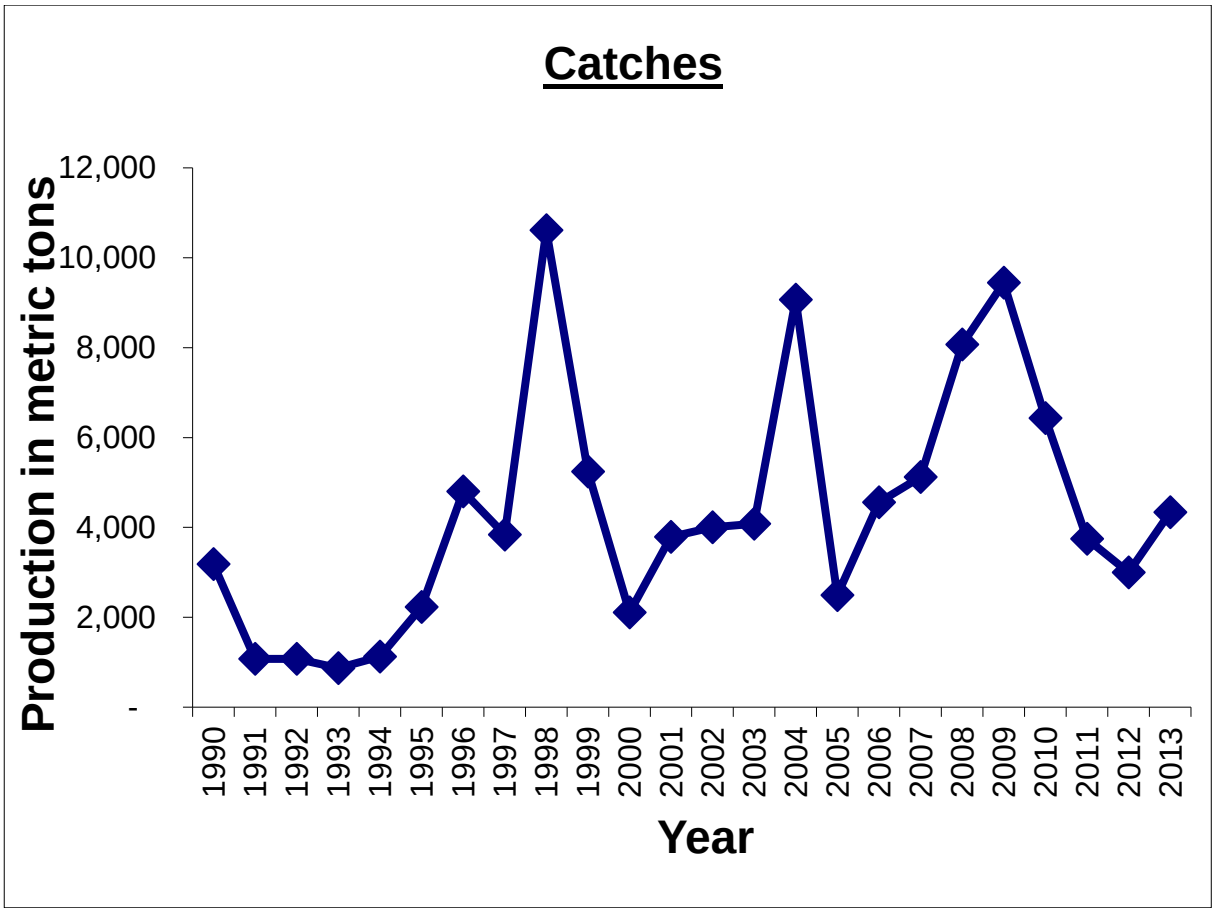

Figure 10: Trends in annual fish landings from Lake Turkana fishery 1990-2013

During the year under review, *Tilapia spp* dominated the landings by contributing 1,812 metric tones (or 41.8%) followed by *Labeo horie* 657 metric tonnes (15.2%), *Lates niloticus* 583 metric tonnes (13.4%), *Alestes* 329 metric tonnes (7.6%) and *Distichodus niloticus* 330 metric tonnes *(*7.6%). These five species combined contributed 85.5% and the other species combined contributed the remaining 14.5%, figure 11 and table 10. The Western side (Turkana county) produced the bulk of the lake's production of 96.7% (4,193 metric tonnes) while the Eastern side (Marsabit county) contributed only 3.3% (145 metric tonnes), Table 11.

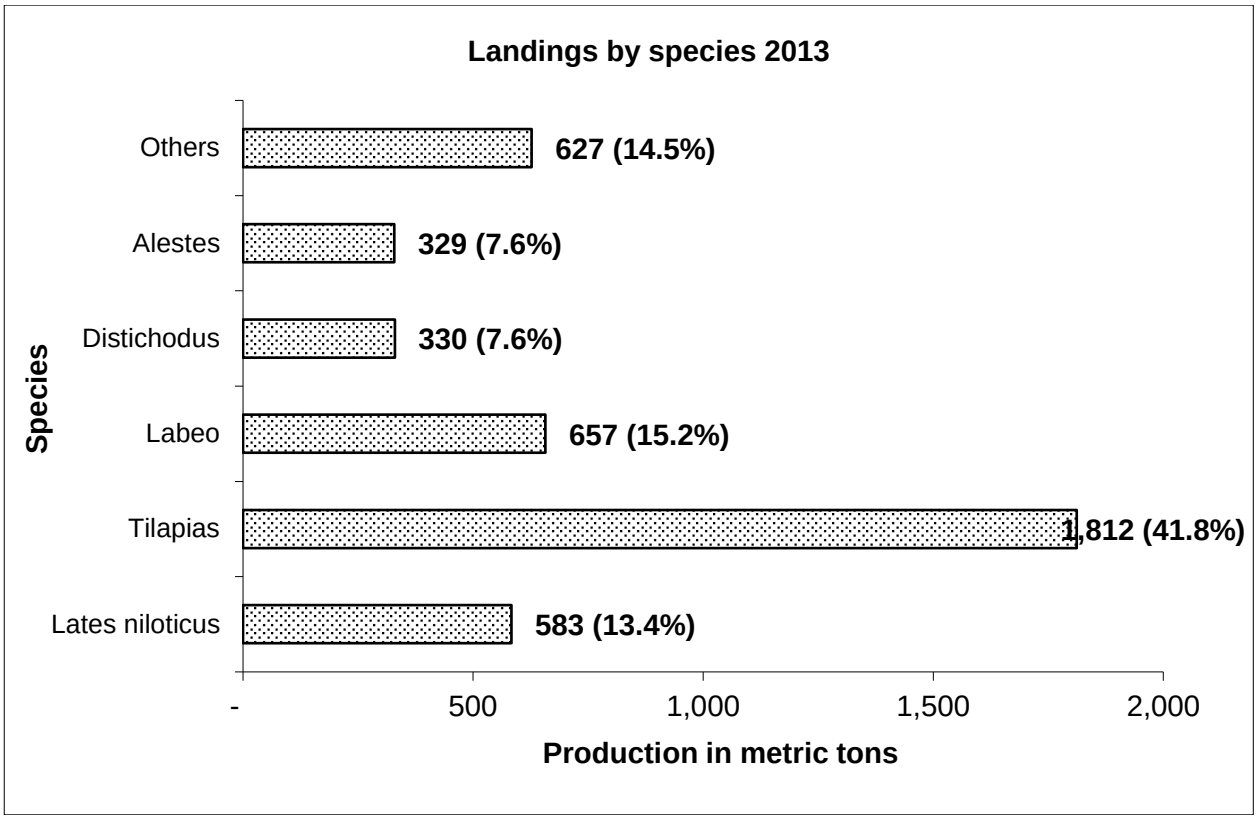

Figure 11: Species composition in catches of Lake Turkana Fishery 2013

One of the major challenges in the exploitation of the Lake Turkana fishery is lack of cold storage facilities within reach forcing all fishers to sale almost all their catches as dried or smoked products which are inferior products and consequently fetch highly reduced market prices per nominal unit weight.

There is also need to evaluate the data collection system in the region due to the expansiveness of the lake shoreline and build capacity of the local fishers groups and Beach Management Units (BMUs) through training to effectively undertake primary data collection. With fisheries staff strength of just 18 persons from both sides of the lake as at December 2012, it is important to enlist the support of the fishing communities to help in collecting timely and accurate data for planning and policy review.

Some of the main challenges facing Lake Turkana fishery which need to be addressed include the following:

- Lack of appropriate fish handling and preservation facilities that usually lead to post harvest losses and poor quality of fish and fishery products;
- Poor state of landing site access roads, which make marketing impossible at some landing sites such as Todonyang and Namukuse;
- Armed conflicts between the Turkana in Kenya and the Dasenach in Ethiopia over fishing and grazing grounds in the River Omo delta. Many lives have been lost especially on the Kenyan side;
- Weak and unfavorable fish marketing systems along the fish landing sites;

- ♦ Rampant insecurity in the lake which make resource Monitoring, Control and Surveillance a risky affair;
- ♦ Insufficient funds for training Beach Management Units in data collection

There is an urgent need to develop a sound management plan for Lake Turkana fishery. The State Department of Fisheries should strengthen community participation in Fisheries resource management, utilization and conservation in the entire lake through:

- Capacity building of BMU officials and fishers from both sides of the lake;
- Train fishers on appropriate hygiene and sanitation, fish handling, processing and fish value addition.

Table 10: Lake Turkana fish landings by Species, Weight and Value 2013

County	**Western side**		**Eastern side**		**Total**	
Species	M. tons	000 Kshs	M. tons	000 Kshs	M. tons	000 Kshs
Lates niloticus	568	65,656	15	2,782	583	68,438
Tilapias	1,768	186,382	43	3,913	1,812	190,296
Labeo	571	53,939	86	6,526	657	60,465
Barbus	91	8,287	-	-	91	8,287
Citharinus	120	14,118	-	-	120	14,118
Distichodus	330	34,562	-	-	330	34,562
Clarias	61	4,860	-	-	61	4,860
Hydrocy forskalii	109	9,826	-	-	109	9,826
Synodontis	141	11,884	-	-	141	11,884
Alestes	329	27,359	-	-	329	27,359
Bagrus	105	8,550	-	-	105	8,550
TOTAL	**4,193**	**425,424**	**145**	**13,222**	**4,338**	**438,646**

Table 11: Lake Turkana Monthly fish landings by Weight and Value 2013

	Western side		**Eastern side**		**Total**	
Month	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**
January	659	78,147	18	1,644	676	79,791
February	559	59,805	19	1,763	578	61,569
March	407	41,120	14	1,293	421	42,413
April	232	25,404	15	1,346	247	26,750
May	442	42,225	4	371	446	42,596
June	402	38,702	8	747	410	39,449
July	552	38,751	8	754	560	39,506
August	362	38,021	9	792	371	38,812
September	327	35,465	12	769	339	36,234
October	148	14,820	9	885	158	15,706
November	61	7,928	9	881	70	8,809
December	41	5,034	22	1,976	62	7,011
TOTAL	**4,193**	**425,424**	**145**	**13,222**	**4,338**	**438,646**

3.4 LAKE BARINGO FISHERY

Lake Baringo is one of the Rift valley lakes with a surface area of 130 Km^2 and a mean depth of 5.6 metres. The lakes has rivers El Molo, Perkerra and Ol arabel as the main inlets but with no obvious outlet and the waters are assumed to seep through to the underground bedrock which is believed to be volcanic

The fishery of Lake Baringo is currently based on four species including *Oreochromis niloticus* (Tilapia), *Barbus gregorii, Clarias mossambicus* and *Protopterus aethiopicus* which was introduced in the lake.

The fishery was previously based on the tilapiine species, however owing to changes in the lakes biophysical processes such as siltation and species introductions, the fishery is currently dominated by *Protopterus aethiopicus.*

During the year under review a total of 263,445 Kgs of fish with an ex-vessel value of Kshs. 25,008,451 were landed. This was an increase of 4.8% in quantity and 6.4% in ex-vessel value compared to last year's production of 250,624 Kg valued at Kshs. 23,513,800.

The species catch composition was dominated by *Protopterus aethiopicus* having contributed 72% (190 metric tonnes) followed by *Tilapia spp* 17% (44 metric tonnes), *Clarias spp* 10% (26 metric tonnes) and *Barbus spp* with 1% (3 metric tonnes), figure 12 and table 12.

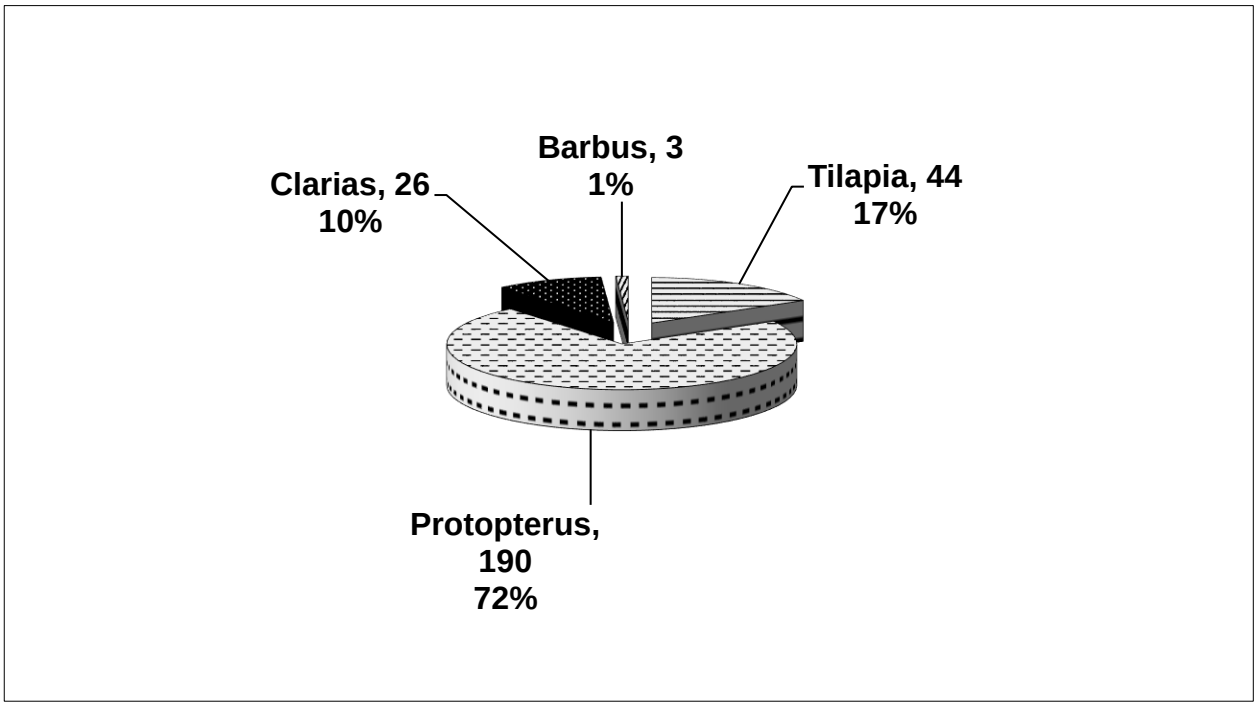

Figure 12: Percentages catch by species composition in Lake Baringo in 2013

Table 12: Lake Baringo Monthly fish landings by Species, Weight and Value 2013

	Tilapia		Protopterus		Clarias		Barbus		Total	
MONTH	**Kgs**	**Kshs**	**Kgs**	**Kshs**	**Kgs**	**Kshs**	**Kgs**	**Kshs**	**Kgs**	**Kshs**
Jan	1,852	183,459	9,101	912,072	845	46,283	104	5,217	11,902	1,147,030
Feb	3,314	328,283	8,110	812,795	790	43,268	147	7,342	12,361	1,191,688
Mar	3,528	349,435	8,310	832,883	1,565	85,768	128	6,376	13,531	1,274,461
Apr	2,449	242,525	9,723	974,425	1,950	106,870	133	6,666	14,255	1,330,486
May	2,799	277,202	11,949	1,197,595	2,571	140,858	118	5,893	17,437	1,621,549
Jun	2,072	205,258	9,132	915,207	1,063	58,223	242	12,076	12,508	1,190,764
Jul	2,780	275,332	11,921	1,194,692	1,023	56,036	207	10,337	15,930	1,536,397
Aug	3,828	379,148	13,720	1,375,017	1,015	55,622	288	14,395	18,851	1,824,182
Sep	4,396	435,408	13,846	1,387,673	1,731	94,871	284	14,202	20,258	1,932,154
Oct	6,338	627,716	16,329	1,636,505	3,251	178,156	551	27,534	26,469	2,469,911
Nov	6,696	663,257	20,689	2,073,440	6,048	331,427	586	29,273	34,019	3,097,397
Dec	4,050	401,091	57,291	5,741,816	4,247	232,714	336	16,810	65,924	6,392,431
TOTAL	**44,102**	**4,368,113**	**190,120**	**19,054,120**	**26,098**	**1,430,096**	**3,125**	**156,122**	**263,445**	**25,008,451**
	M. tons	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**
TOTAL	**44**	**4,368**	**190**	**19,054**	**26**	**1,430**	**3**	**156**	**263**	**25,008**

3.5 LAKE NAIVASHA FISHERY

The present fish population of Lake Naivasha comprises of the introduced species including largemouth bass (*Micropterus salmoides*) which was introduced in 1927, 1951 and 1956 from the United States of America, *Tilapia zilli* introduced from Lake Victoria in 1956. The introduction of *Tilapia zilli* also contained *Oreochromis leucostictus* and other tilapine species which are presently not encountered in the lake. The exotic rainbow trout (*Onchorhynchus mykiss*) occasionally strays into the lake from river Malewa while *Barbus amphigramma* migrates between the lake and river Malewa. The Louisiana red swamp crayfish (*Procambarus clarkii*) was introduced in 1970 as a source of food for the bass. The *Procambarus clarkii* and *Barbus amphigramma* are not under commercial exploitation currently in the lake.

Lake Naivasha commercial fishery had been declining before the year 2001 necessitating a one year ban on fishing in 2001 and the subsequent years, up to date, there has been an annual closed season during the breeding season (1st June to 31st August), to allow the fish stocks to recover. The recent accidental introduction of Common carp (*Cyprinus carpio*) has created a shift in the fish production from the lake. The *Cyprinus carpio* is believed to have come through river Malewa from Nyandarua highlands during the El-Nino period of 1998-1999.

Species composition in the catches from the lake has drastically changed since the year 2002 where total catches were dominated by the *tilapiines*. However over the last twelve years, *Tilapiines* contribution in catches has declined with the introduced *Cyprinus carpio* assuming greater prominence in the catches.

It is imperative for management and research to understand the implications of the *Cyprinus carpio* on the other fish species in the ecosystem. Besides, it is also important to understand the effects of the feeding habits of the *Cyprinus carpio* on the breeding grounds/nests of the *tilapiines* in the fishery.

During the year under review, a total of 230,963 Kgs of fish with an ex-vessel value of Kshs. 17,542,071 were landed from Lake Naivasha. This was an increase of 61.5% in quantity and 13.5% in value compared to 2012 landings of 143,330 Kgs valued at Kshs 15,459,939 to the fishers. Common carp (*Cyprinus carpio*) continued to be the most dominant species accounting for 86.0% (198,540 Kgs) of the total catch. The other species contribution were *Mirror carp* accounting for 10.2% (23,563 Kg), *Oreochromis niloticus* 2.6% (5,905 Kgs), lake 'Naivasha tilapia' (*Oreochromis leucostictus*) 1.0% (2,382 Kgs) and Black bass (*Micropyerus salmoides*) 0.2% (562 Kgs). *Tilapia zilli* and *Clarias* landings were a mere 1Kg and 11 Kgs respectively, figure 13.

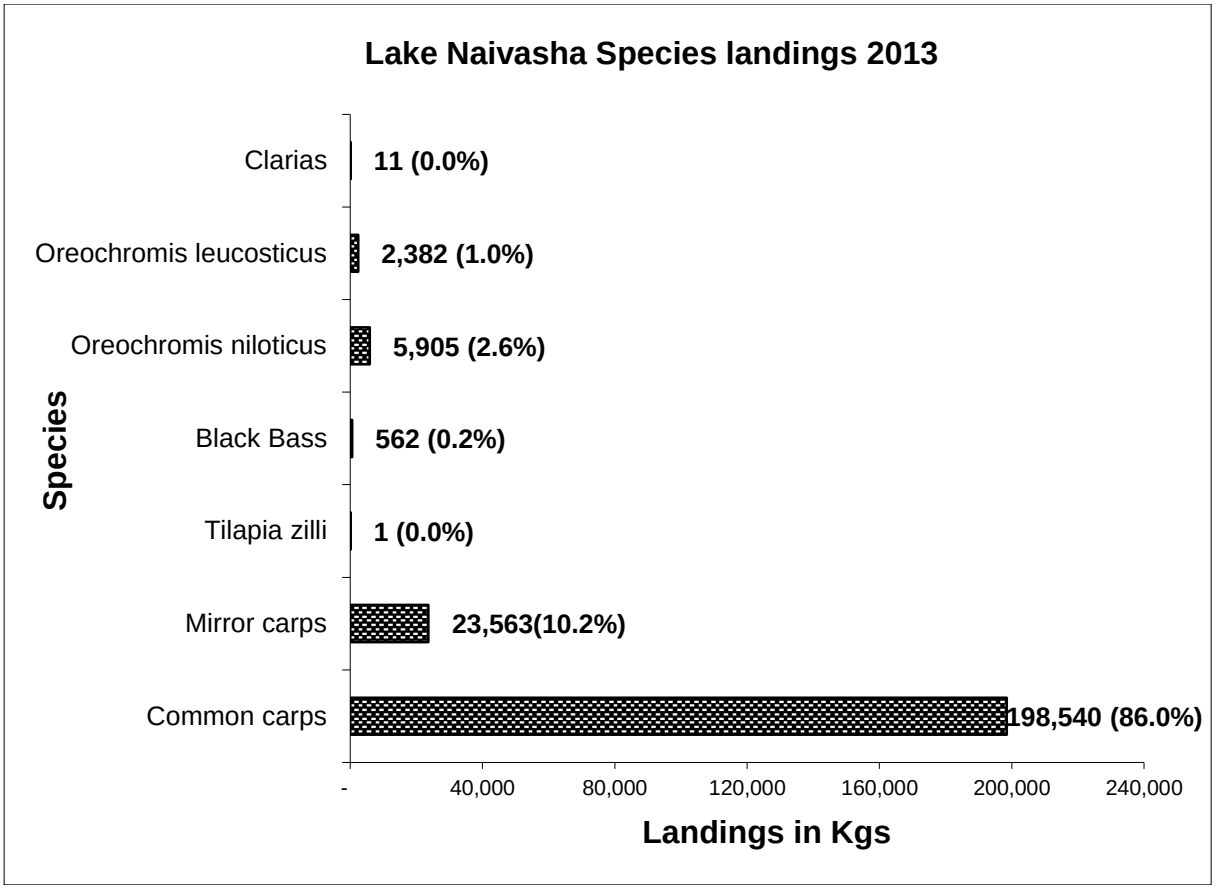

Figure 13: Lake Naivasha species percentage landings in Kgs 2013

During the year under review, average monthly fish catches for the months fished i.e. January to May and September to December was 25.7 metric tonnes with a peak just before the annual closure in May and another peak after the closure in September and October, figure 14 and Table 13.

During the year 2013, a total of 50 fishing crafts were licensed to operate in the lake for a period of 9 months (3 months were closed fishing season) and these were operated by an average of 150 fishers per month.

The annual closed season on fishing activities in Lake Naivasha was effected from 1st June to 31st August during the year under review, as part of management measure to allow the fishery to recover.

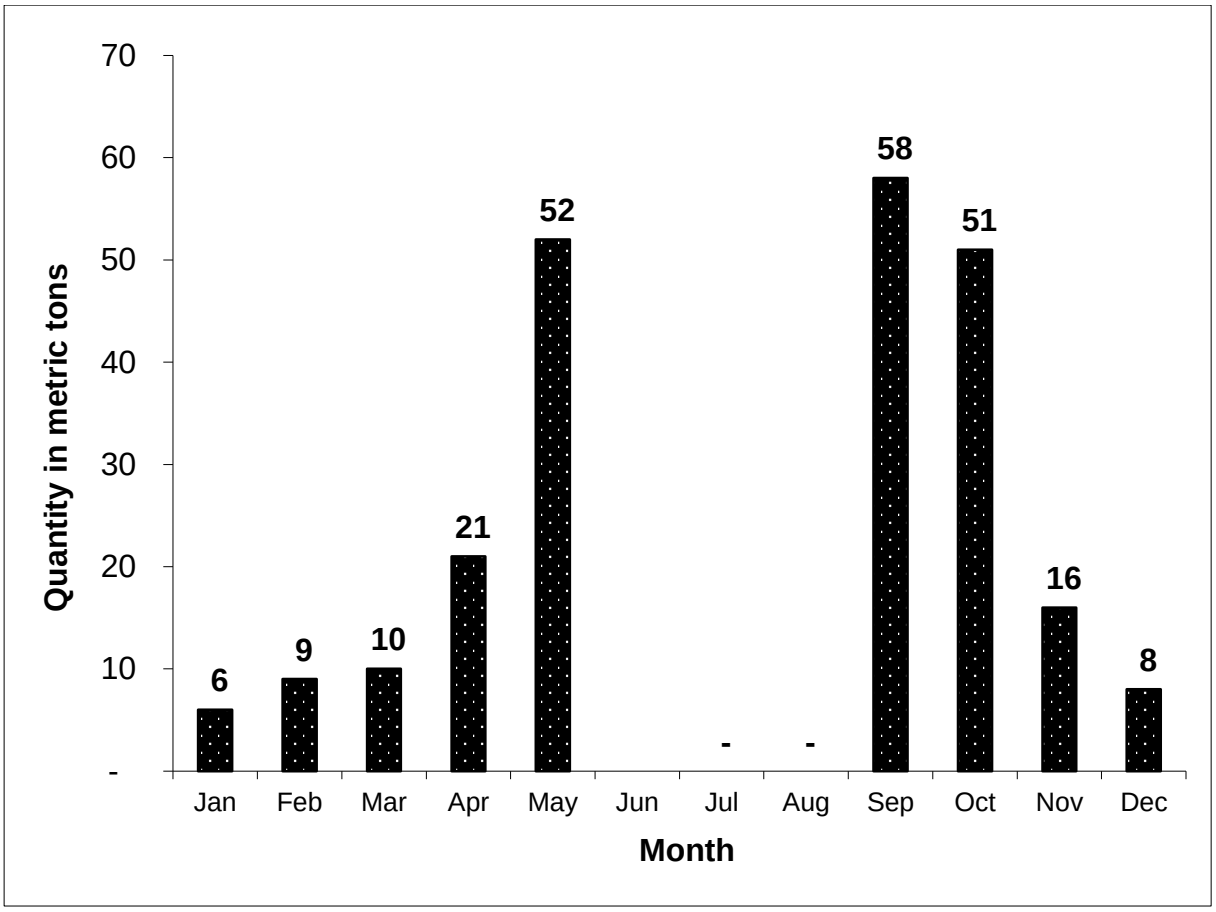

Figure 14: Lake Naivasha monthly catches in metric tonnes 2013

Table 13: Lake Naivasha Monthly fish landings by Species, Weight and Value 2013

	Black Bass		O. leucosticus		O. niloticus		T. zilli		Common carps		Mirror carps		Clarias		Total	
Month	**Kgs**	**Kshs**	**Kgs**	**Kshs**	**Kgs**	**Kshs**	**Kgs**	**Kshs**	**Kgs**	**Kshs**	**Kgs**	**Kshs**	**Kgs**	**Kshs**	**Kgs**	**Kshs**
Jan	32	10,165	269.5	71,740	676	144,514	-	-	5,023	642,788	238	35,945	-	-	6,240	905,152
Feb	32	7,860	278	61,220	447	112,342	-	-	7,570	833,970	375	46,515	-	-	8,702	1,061,907
Mar	11	2,870	514	66,776	294.5	59,597	-	-	9,170	840,035	454	50,605	-	-	10,444	1,019,883
Apr	10	1,040	557	59,682	384	85,011	1	255	19,237	1,408,633	1,074	75,516	8	1,610	21,271	1,631,747
May	24	2,630	575	50,456	740.5	189,375	-	-	48,894	3,682,971	1,305	97,063	-	-	51,540	4,022,495
Jun	CLOSED SEASON															
Jul																
Aug																
Sep	121	28,302	14	730	1,150	263,325	-	-	54,643	2,682,965	1,731	142,148	3	250	57,662	3,117,720
Oct	129	31,371	17	1,018	896	172,663	-	-	32,349	2,426,612	17,619	1,101,083	-	-	51,010	3,732,747
Nov	108	26,568	33	4,290	645	142,545	-	-	15,075	1,100,475	487	60,388	-	-	16,348	1,334,266
Dec	93	21,762	124.5	16,185	672	153,888	-	-	6,578	493,350	279	30,969	-	-	7,747	716,154
TOTAL	**562**	**132,568**	**2,382**	**332,097**	**5,905**	**1,323,260**	**1**	**255**	**198,540**	**14,111,799**	**23,563**	**1,640,232**	**11**	**1,860**	**230,963**	**17,542,071**
	M. tons	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**
TOTAL	**1**	**133**	**2**	**332**	**6**	**1,323**	*****	*****	**199**	**14,112**	**24**	**1,640**	**0**	**2**	**231**	**17,542**

3.6 LAKE JIPE FISHERY

During the year 2013, a total of 116 metric tonnes of both Tilapia and Clarias with an ex-vessel value of Kshs 16,910,000 were landed from Lake Jipe. This reflected an increase of 3.6% (or 4 metric ton) in quantity and 1.2% in ex-vessel value compared to previous year 2012 production of 112 metric tonnes valued at Kshs 6,715,000. The only two species (Tilapia and Clarias) caught in the lake showed a steady average production of 8 metric tonnes per month for Tilapia and 1 metric ton for Clarias (Table 14). Tilapia contributed 85.1% (99 metric tonnes) and Clarias 15.9% (17 metric tonnes), figure 15.

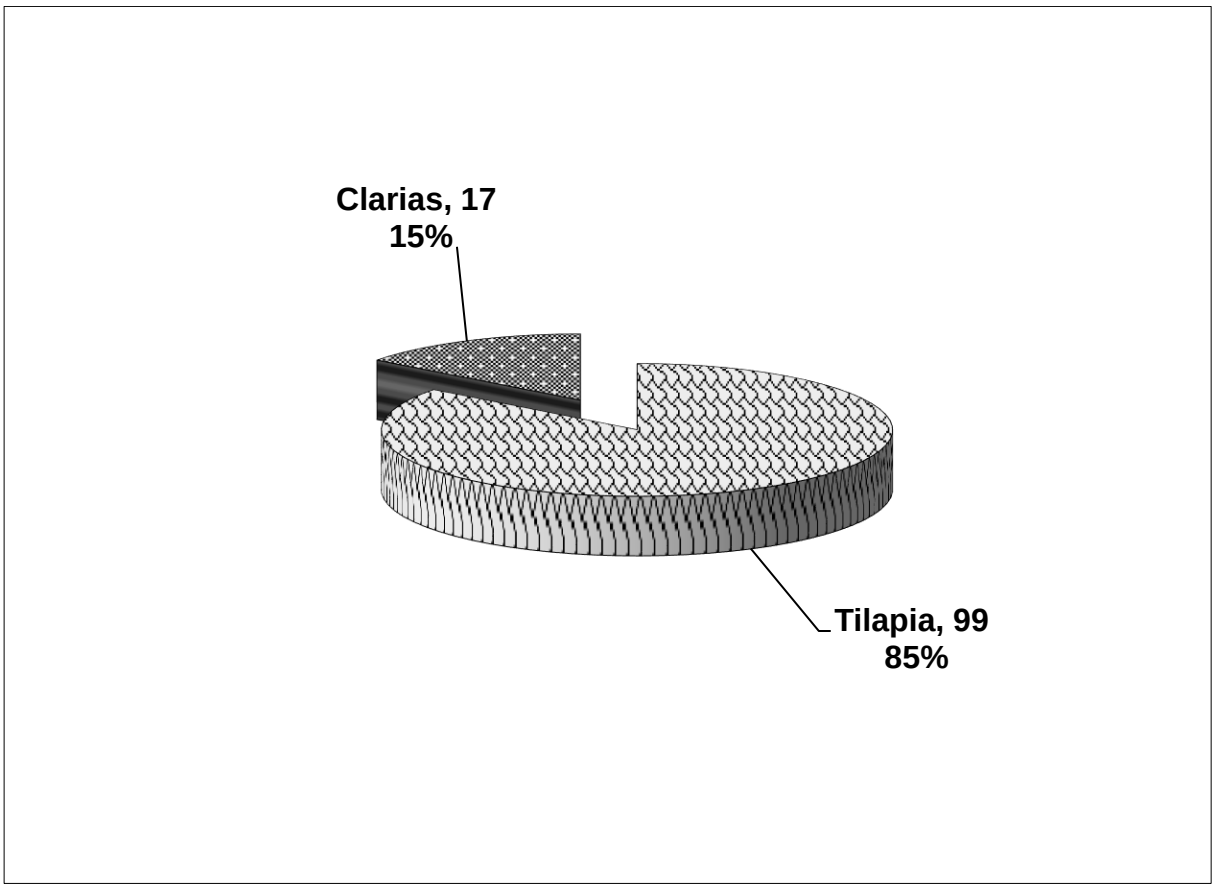

Figure 15: Percentages composition of species catch in Lake Jipe 2013

The challenges which faced capture fisheries in Lake Jipe during the year under review included;

- Floating vegetation continued to stand out as the biggest problem faced by the fishers. The vegetation abstracts fishing crafts motion besides serving as hiding ground for the fish hence impacting substantially on the low production;

- Siltation – there is observable high rate of silt deposition in the lake's bed which is caused by among others sand harvesting activities on the banks of River Lumi and increased agricultural activities along the river course. The siltation has contributed to creation of a shallow inlet point in the lake which eventually brings about diversion of the river course off the lake and the water ends up in Nyumba ya Mungu resercoir in Mwanga district of Tanzania. The knock on effect accruing from this is and not limited to proliferation of water weeds, increased salinity and receding of the lake shoreline.

Table 14: Lake Jipe Monthly fish landings by Species, Weight and Value 2013

Month	Tilapia		Clarias		Total	
	M. tons	000 Kshs	M. tons	000 Kshs	M. tons	000 Kshs
Jan	9	1,345	1	178	**10**	**1,523**
Feb	9	1,283	1	166	**10**	**1,448**
Mar	8	1,234	1	131	**9**	**1,365**
Apr	8	1,191	1	169	**9**	**1,360**
May	8	1,233	2	202	**10**	**1,435**
Jun	8	1,172	2	209	**10**	**1,380**
Jul	8	1,125	2	188	**9**	**1,313**
Aug	8	1,157	1	165	**9**	**1,323**
Sep	8	1,209	1	145	**9**	**1,354**
Oct	8	1,253	1	115	**9**	**1,368**
Nov	8	1,274	2	199	**10**	**1,473**
Dec	9	1,359	2	210	**11**	**1,568**
Total	**99**	**14,834**	**17**	**2,076**	**116**	**16,910**

3.7 TANA RIVER DAMS FISHERY

A total of 705 metric tonnes of fish with an ex-vessel value of Kshs 73,024,000 were landed from the main fishery water bodies of the Tana River dams of Masinga, Kamburu, and Kiambere. This production reflected a decrease of 27.1%

in quantity and 10.5% in ex-vessel value compared to 2012 figures of 967 metric tonnes valued at Kshs 81,609,469.

The most important species in the catches were *Cyprinus carpio* (Common carp), *Tilapia spp*, and *Clarias gariepinus*. Landings of *Cyprinus carpio* were the highest at 288 metric tonnes (or 40.9%) followed by *Tilapia spp* 232 metric tonnes (32.9%) and *Clarias gariepinus* 184 metric tonnes (26.1%). The other species (the *Eels, Barbus spp*, *Labes spp* and *Mormyrus)* combined contributed 0.1% (Table 15). Tana River dam's fish production is determined by the level of water in the dams and this causes fluctuations of the total annual landing depending on the water level in the dams, figure 16.

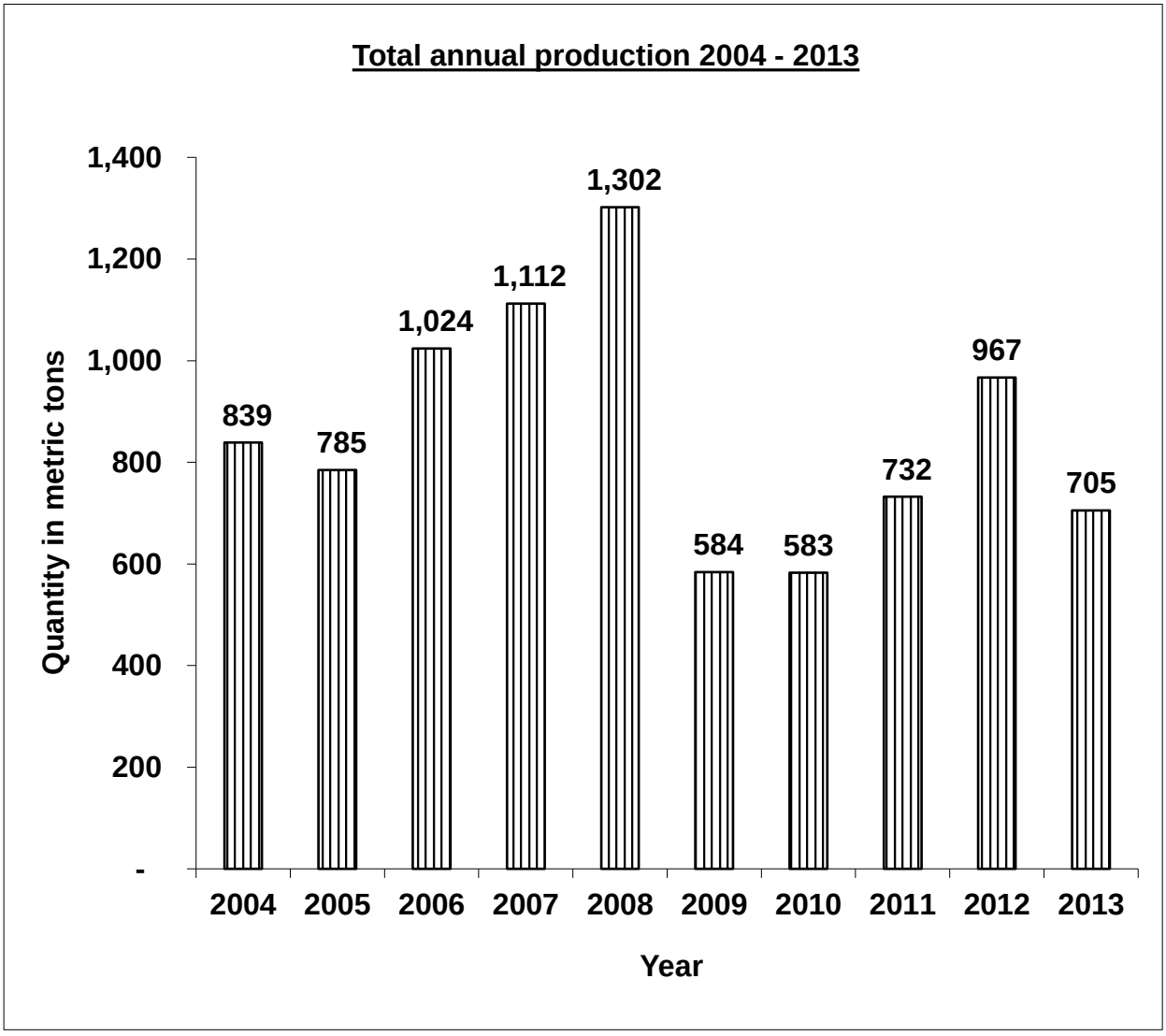

Figure 16: Tana River dams' fish catch trends in metric tonnes 2004 – 2013

Table 15: Tana River dams Monthly fish landings by Species, Weight and Value 2013

Month	Tiilapia		Common carp		Clarias		Others		Total	
	M. tons	000 Kshs	M. tons	000 Kshs	M. tons	000 Kshs	M. tons	000 Kshs	M. tons	000 Kshs
Jan	30	2,733	22	1,798	14	1,362	*	6	66	5,899
Feb	32	2,865	23	1,893	13	1,349	*	7	68	6,114
Mar	29	2,766	18	1,543	16	1,776	*	3	63	6,089
Apr	13	1,179	22	2,062	12	1,330	*	4	46	4,575
May	15	1,376	27	2,493	15	1,842	*	4	57	5,715
Jun	14	1,273	24	2,236	15	1,900	*	4	53	5,413
Jul	13	1,185	25	2,611	16	2,212	*	3	54	6,011
Aug	13	1,284	24	2,513	14	1,964	*	3	52	5,764
Sep	15	1,557	26	3,142	16	2,423	*	4	58	7,126
Oct	16	1,574	25	2,547	18	1,993	*	2	59	6,116
Nov	19	1,994	25	2,732	17	2,175	*	5	60	6,905
Dec	23	2,455	27	2,685	18	2,154	*	3	68	7,297
Total	**232**	**22,240**	**288**	**28,256**	**184**	**22,479**	**1**	**48**	**705**	**73,024**

3.8 LAKE KENYATTA FISHERY

During the year under review a total of 54,000 Kgs of fish with an ex-vessel value of Kshs. 3,770,101 were landed from Lake Kenyatta in Lamu County of the coast province. There was an 63.6% increase in quantity of the fish landed coupled with 72.8% increase in ex-vessel value compared with 2012 figures of 33 metric tonnes with an ex-vessel value of Kshs 2,182,652. The catch composition from this lake comprised of three species namely *Tilapia spp*, *Protopterus spp* and *Clarias spp*. *Tilapia spp* contributed 46% of the total catch, *Clarias spp*. 28% and *Protopterus spp* 26% figure 17 and Table 16. The fishing effort was 120 fishers using 40 fishing crafts. Fishing was mainly passive with gillnetting, long line hooks and hand line hooks being the most common methods of fishing.

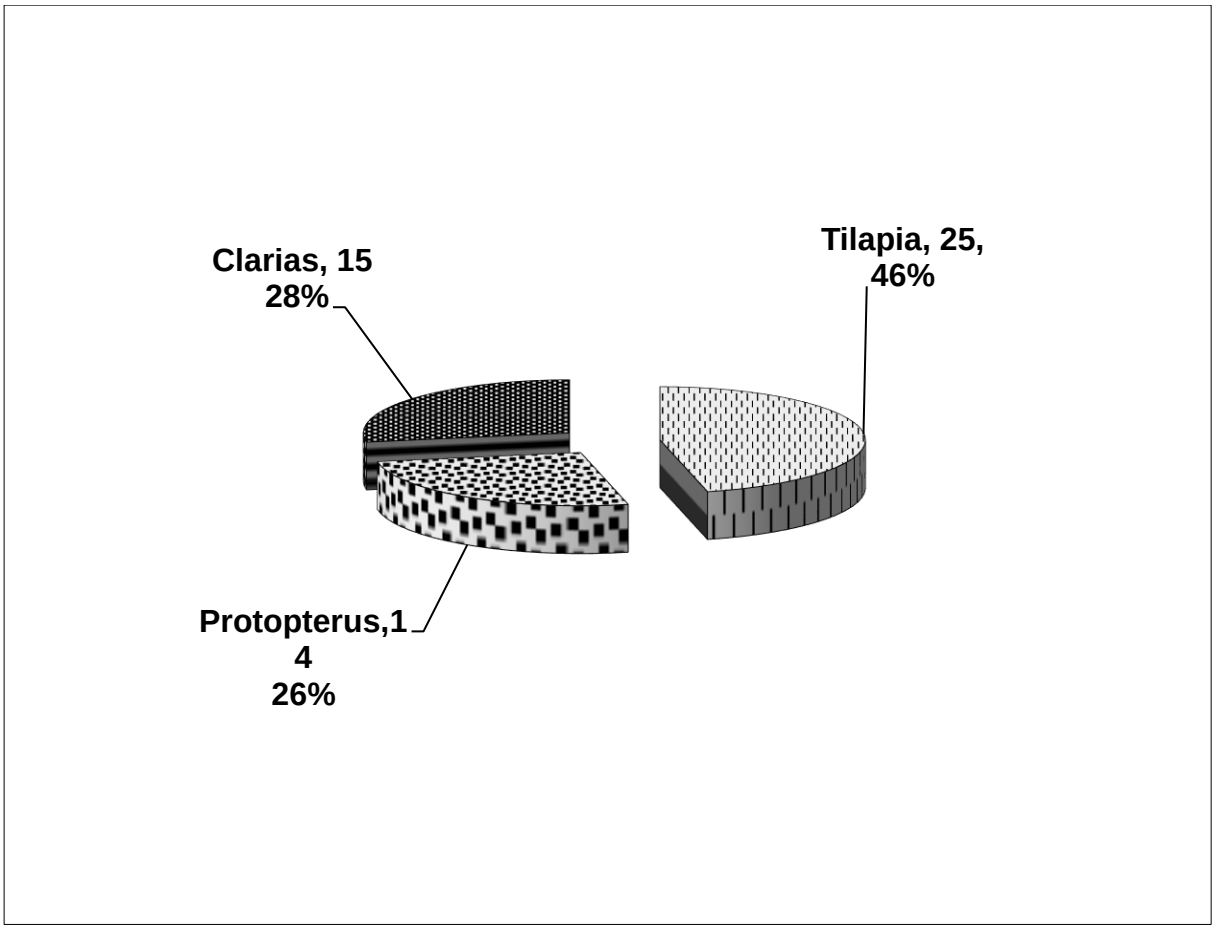

Figure 17: Percentages composition of species catch in Lake Kenyatta 2013

Table 16: Lake Kenyatta Monthly fish landings by Species, Weight and Value 2013

	Tilapia		Clarias		Protopterus		Total	
	Kgs	Kshs	Kgs	Kshs	Kgs	Kshs	Kgs	Kshs
Jan	2,331	87,704	734	61,614	720	50,380	3,784	199,698
Feb	1,907	71,815	2,116	177,760	1,413	98,877	5,435	348,452
Mar	1,059	39,403	2,439	204,908	1,345	94,168	4,844	338,479
Apr	1,059	41,310	2,439	204,908	1,816	127,127	5,315	373,345
May	2,754	194,473	1,526	128,186	2,899	202,933	7,179	525,591
Jun	2,331	69,273	728	61,142	47	3,296	3,105	133,711
Jul	2,331	92,788	731	61,378	7	471	3,068	154,637
Aug	2,754	237,689	877	73,654	61	4,238	3,692	315,581
Sep	1,483	122,022	956	80,264	1,372	96,052	3,811	298,338
Oct	2,754	235,147	947	79,555	2,623	183,628	6,325	498,331
Nov	3,602	288,532	953	80,027	1,258	88,047	5,812	456,607
Dec	636	50,843	483	40,604	511	35,784	1,630	127,231
Total	**25,000**	**1,531,000**	**14,929**	**1,254,000**	**14,071**	**985,000**	**54,000**	**3,770,000**
	M. tons	000 Kshs	M. tons	000 Kshs	M. tons	000 Kshs	M. tons	000 Kshs
Total	**25**	**1,531**	**15**	**1,254**	**14**	**985**	**54**	**3,770**

3.9 LAKE KANYABOLI FISHERY

Lake Kanyaboli is one of the satellite lakes of Lake Victoria. It is located in Siaya County. The fisheries of the lake are comprised of the following fish species: *Oreochromis niloticus, Protopterus aethiopicus, Haplochromis* and *Clarias spp.* A total of 194 metric tonnes with an ex-vessel value of Kshs 12,003,895 were landed from the lake during the year under review. This was a 55% increase in quantity of the fish landed coupled with a 42% increase in ex-vessel value compared with 2012 figures of 125 metric tonnes with a value of Kshs 8,479,311.

The main species in catches were Tilapia which contributed 54.7% (106 metric tonnes) of the total catch followed by Clarias 19.5% (38 metric tonnes), Protopterus 18.4% (36 metric tonnes) and Haplochromis 7.4% (14 metric tonnes), figure 18 and Table 17. The fishing activities were undertaken by 188 fishers operating 99 fishing crafts.

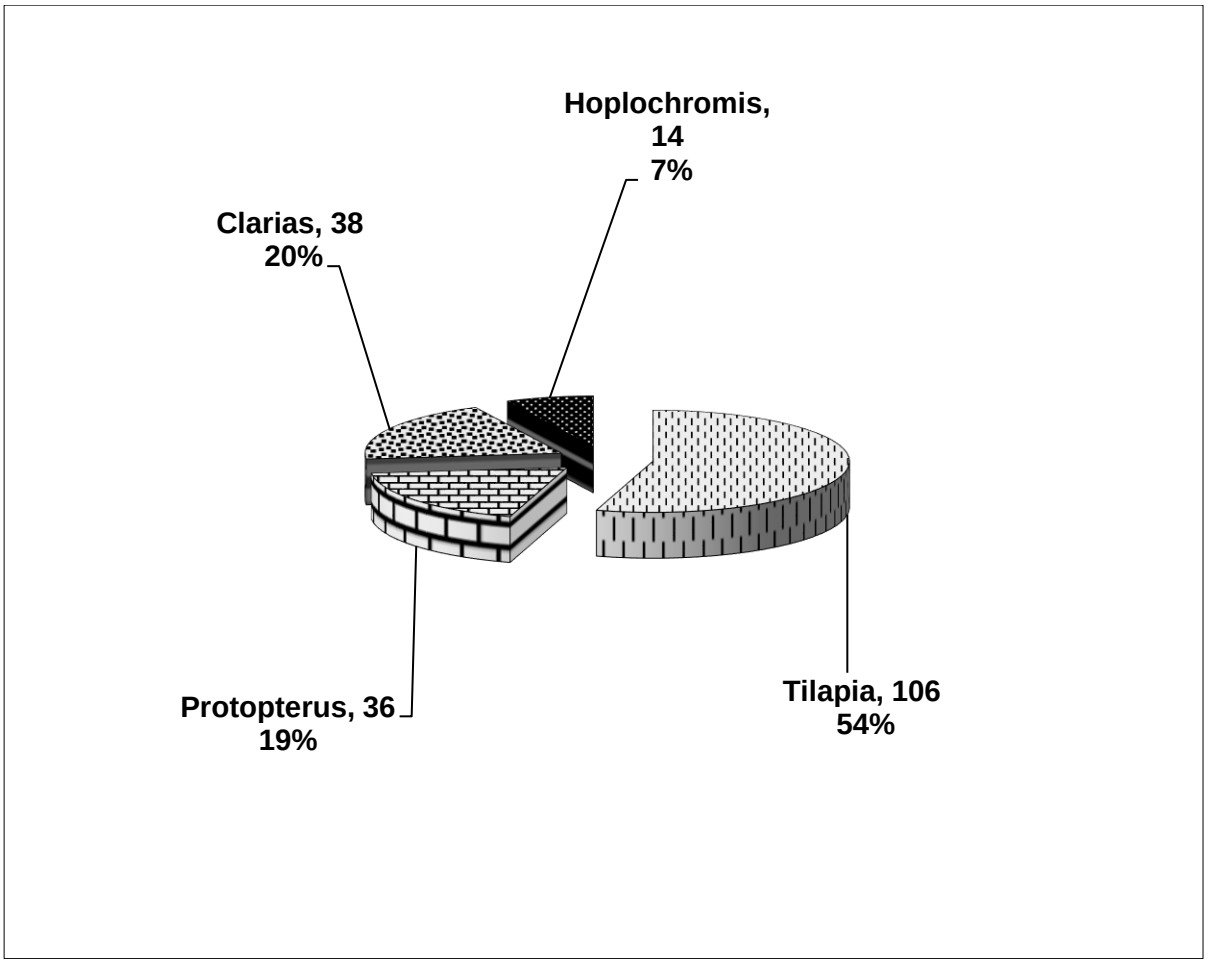

Figure 18: Percentages composition of species catch in Lake Kanyaboli 2013

Table 17: Lake Kanyaboli Monthly fish landings by Species, Weight and Value 2013

Month	Tiilapia		Protopterus		Clarias		Haplochromis		Total	
	Kgs	Kshs	Kgs	Kshs	Kgs	Kshs	Kgs	Kshs	Kgs	Kshs
Jan	6,159	363,929	1,386	95,671	2,694	182,830	2,018	98,303	12,256	740,732
Feb	14,006	827,527	4,056	280,044	3,497	237,336	1,435	69,902	22,993	1,414,809
Mar	5,090	300,747	2,065	142,561	4,371	296,670	2,099	102,260	13,625	842,237
Apr	14,359	848,378	4,114	284,059	3,846	261,007	2,009	97,863	24,327	1,491,307
May	7,460	440,774	2,415	166,774	1,526	103,562	924	45,019	12,325	756,129
Jun	5,383	318,043	2,843	196,302	1,324	89,857	745	36,314	10,295	640,517
Jul	9,270	547,710	1,209	83,505	1,767	119,914	677	32,973	12,923	784,101
Aug	7,869	464,941	3,269	225,712	1,413	95,931	587	28,576	13,138	815,161
Sep	6,912	408,393	3,729	257,484	4,325	293,555	984	47,920	15,950	1,007,353
Oct	11,144	658,436	3,548	244,964	3,986	270,507	857	41,766	19,535	1,215,673
Nov	11,657	688,764	3,652	252,169	4,803	325,947	1,180	57,505	21,292	1,324,385
Dec	6,808	402,233	3,387	233,862	4,337	294,334	843	41,062	15,374	971,491
Total	**106,116**	**6,269,875**	**35,673**	**2,463,108**	**37,889**	**2,571,449**	**14,356**	**699,462**	**194,034**	**12,003,895**
	M. tons	000 Kshs	M. tons	000 Kshs	M. tons	000 Kshs	M. tons	000 Kshs	M. tons	000 Kshs
Total	**106**	**6,270**	**36**	**2,463**	**38**	**2,571**	**14**	**699**	**194**	**12,004**

3.10 TAKWEL DAM

Turkwel Dam is one of the major Hydro Electric Power Station in Kenya. It is situated in North West of Kenya, in the border of Turkana, West Pokot and Pokot North districts. The dam was constructed under the control of Kerio Valley Development Authority (KVDA) from 1986 to 1991 and is still under the management of KVDA. The State Department of Fisheries has been working with KVDA and Moi University on the introduction of fish in this Dam for commercial exploitation since 2006. The dam has a area of 66 square Km with a capacity of 1,641 cubic metres. Data of fish landings from the dam were recorded for the first time during the year under review.

During the year a total of 59 metric tonnes of fish with an ex-vessel value of Kshs 11,849,000 were landed from the dam. The fisheries of the dame are comprised of two species: Tilapia *(Oreochromis niloticus)* and *Clarias spp*. Tilapia landings contributed 93.2% (55 metric tonnes) while Clarias contributed 6.8% (4 metric tonnes) during the review period, figure 19. Average monthly catches were between 4 and 6 metric tonnes, figure 20 and Table 18.

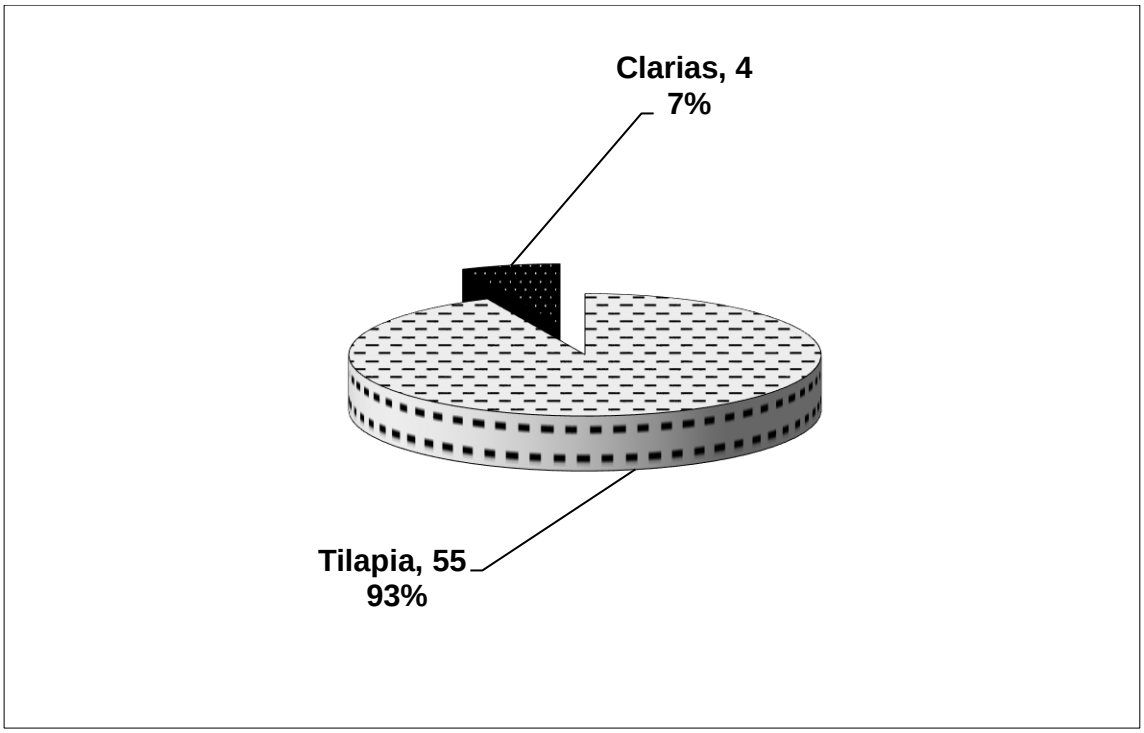

Figure 19: Percentages composition of species catch in Takwel dam 2013

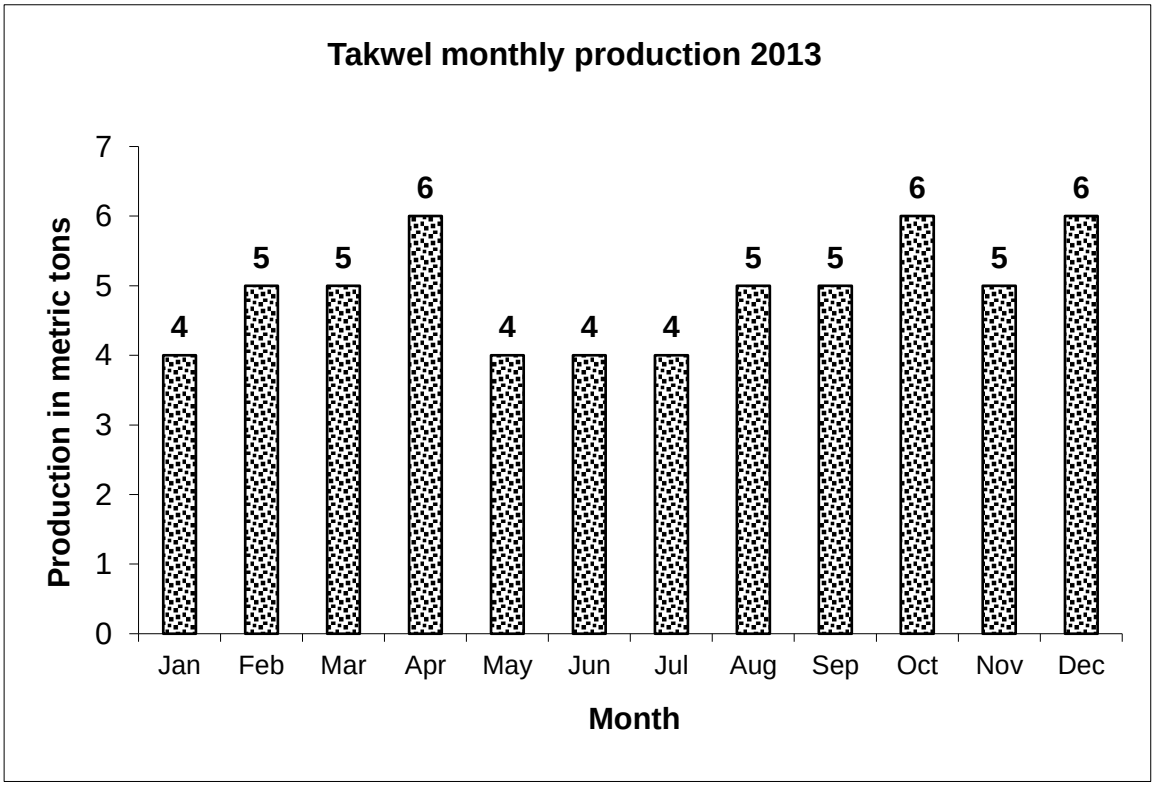

Figure 20: Takwel dam monthly fish catches in metric tonnes 2013

Table 18: Turkwel dam Monthly fish landings by Species 2013

Month	Tilapia		Clarias		Total	
	Kgs	Kshs	Kgs	Kshs	Kgs	Kshs
Jan	3,850	770,000	400	80,000	4,250	850,000
Feb	4,260	852,000	300	60,000	4,560	912,000
Mar	4,180	836,000	1,200	240,000	5,380	1,076,000
Apr	4,095	819,000	1,420	284,000	5,515	1,103,000
May	4,200	840,000	160	32,000	4,360	872,000
Jun	3,840	768,000	5	1,000	3,845	769,000
Jul	4,085	817,000	-	-	4,085	817,000
Aug	4,860	972,000	15	3,000	4,875	975,000
Sep	5,210	1,042,000	8	1,600	5,218	1,043,600
Oct	5,780	1,156,000	24	4,800	5,804	1,160,800
Nov	5,502	1,100,400	30	6,000	5,532	1,106,400
Dec	5,785	1,157,000	36	7,200	5,821	1,164,200
TOTAL	**55,647**	**11,129,400**	**3,598**	**719,600**	**59,245**	**11,849,000**
	M. tons	**'000 Kshs**	**M. tons**	**'000 Kshs**	**M. tons**	**'000 Kshs**
TOTAL	**56**	**11,129**	**3**	**720**	**59**	**11,849**

3.11 TANA RIVER DELTA

Fresh water fish landings from Tana River delta in Tana River County during the year under review amounted to 45,971 Kgs with an ex-vessel value of Kshs 3,204.175. This was an increase of 18% in quantity of the fish landed coupled with a 33% increase in ex-vessel value compared 38,976 Kgs with an ex-vessel value of Kshs 2,409,130 landed in 2012. The landings comprised of *Tilapiines* 17 metric tonnes (38%), *Clarias spp* 16 metric tonnes (35%) and *Protopterus spp* 13 metric tonnes (28%), figure 21 and Table 19.

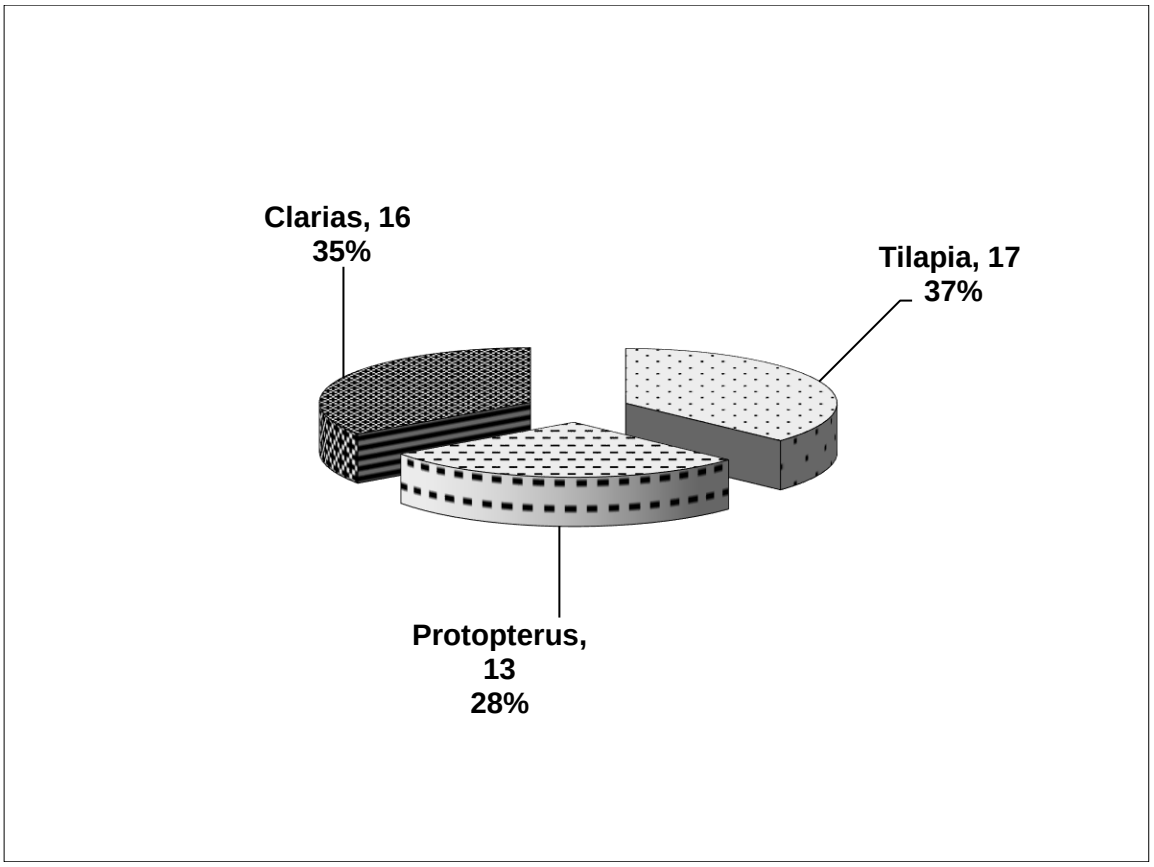

Figure 21: Percentages composition of species catch in Tana river delta 2013

Table 19: Tana River delta freshwater monthly fish landings by Species 2013

	Tilapia		Clarias		Protopterus		Total	
Month	Kgs	Kshs	Kgs	Kshs	Kgs	Kshs	Kgs	Kshs
Jan	1,268	86,964	1,586	108,784	1,008	81,444	3,861	277,192
Feb	1,411	94,530	1,504	104,694	1,240	79,256	4,155	278,480
Mar	1,416	97,291	1,602	101,893	990	76,558	4,008	275,742
Apr	1,458	96,841	1,171	77,846	1,269	104,224	3,899	278,911
May	1,268	85,942	1,533	105,859	1,297	104,694	4,098	296,496
Jun	1,522	103,610	897	58,890	695	55,701	3,114	218,201
Jul	1,842	119,436	1,507	97,190	808	64,942	4,157	281,569
Aug	1,922	124,876	1,573	100,910	1,020	82,875	4,514	308,661
Sep	1,933	126,061	1,471	95,267	1,103	89,214	4,507	310,542
Oct	1,809	116,717	1,434	93,672	1,085	88,008	4,328	298,397
Nov	822	54,862	956	63,082	1,103	89,235	2,881	207,179
Dec	719	46,867	806	52,163	922	73,776	2,447	172,807
TOTAL	17,390	1,154,001	16,041	1,060,247	12,540	989,927	**45,971**	**3,204,175**
	M. tons	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**	**M. tons**	**000 Kshs**
TOTAL	**17**	**1,154**	**16**	**1,060**	**13**	**990**	**46**	**3,204**

4.0 AQUACULTURE (FISH FARMING)

Prior to the year 2007, several initiatives on fish farming in Kenya had been executed by the Department of Fisheries, The main activities were geared towards using fish farming as a tool for poverty alleviation and food security, and were addressed through various project activities that included but not limited to: pond construction and management, stocking rates trials, feed trials, integration of fish farming with other agricultural activities, brood stock management, seed quality and evaluation of growth performance of Nile tilapia and Catfish strains.

These initiatives had limited impacts due to slow uptake of fish farming by entrepreneurs emanating from lack of information on fish farming technology and culture practices, limited funding by Government, and limited political support from the policy makers.

The Initiation of the Fish Farming Economic Stimulus Programme started during the 2009/2010 financial year in Kenya, has revolutionized fish farming practices in the country and has made Kenya a fish producing and fish eating Nation. The project was implemented in high aquaculture potential areas of Western Kenya, Nyanza, parts of Rift Valley, Eastern, Central Kenya and Coast regions. These regions are endowed with a lot of water resources that include springs, wetlands, rivers, water reservoirs and the temporary water bodies.

The State Department of Fisheries has aggressively been promoting aquaculture development in the country to counter the declining production from capture fisheries. Aquaculture, being a food production sub sector, is being mobilized to positively contribute towards food security, generate income and create employment to our young generation.

To enhance aquaculture production, up to date (end of 2013), the State Department has trained fishers, implementing officers and stakeholders on fish farming practises; conducted a national aquaculture suitability appraisal and developed suitability maps for 210 Constituencies in the country; developed a fish breeding structure with a holding capacity of over 200,000 brood-stock; developed fish feed specifications for tilapia, catfish and trout and related supply chain; procured 54 Fish Feed Pelletizing machines and distributed them to the constituencies; procured 148 Motorcycles and recruited 286 Fisheries Extension Officers for extension service delivery in the constituencies; constructed (4) Fish Processing Plants in Tetu, Imenti South, Rongo and Lurambi constituencies; constructed a state of the art fish processing factory in Mitunguu, Meru County in collaboration with private sector investors; constructed 3 Recirculation Aquaculture Systems (RAS) in Kiambaa (Jambo Fish Farm & Samaki Tu Fish Farm) and Kisumu Rural (Thinqubator Fish Farm) Constituencies; constructed

over 69,194 fish ponds country-wide (46,824 fish ponds in 160 Constituencies country-wide by GOK, and some other 22,370 ponds under the multiplier effect by farmers and investors and stocked them with over 100 million fingerlings; increased the area under aquaculture from 722 hactares in 2008 to 2,076 hactares in 2013; increased national aquaculture production from 4,452 metric tonnes in 2008 to 23,501 metric tonnes in 2013.

Fish farming production during the year (2013) was 23,500,812 Kgs (23,501 metric tonnes) with a farm gate value of Kshs. 5,522,735,483 compared to 21,486, 828 Kgs (21,487 metric tonnes) valued at Kshs. 4,633,634,405 in 2012. This production was from 69,194 ponds with an area of 20,758,200 metres square (2,076 hectares), 161 tanks measuring 23,085 metres square and 124 reservoirs with an area of 744,000 square metres throughout the country. Over the last ten years, fish production has increased from as low as 1,035 metric tonnes produced in year 2004 to the present production of 23,501 metric tonnes, figure 22.

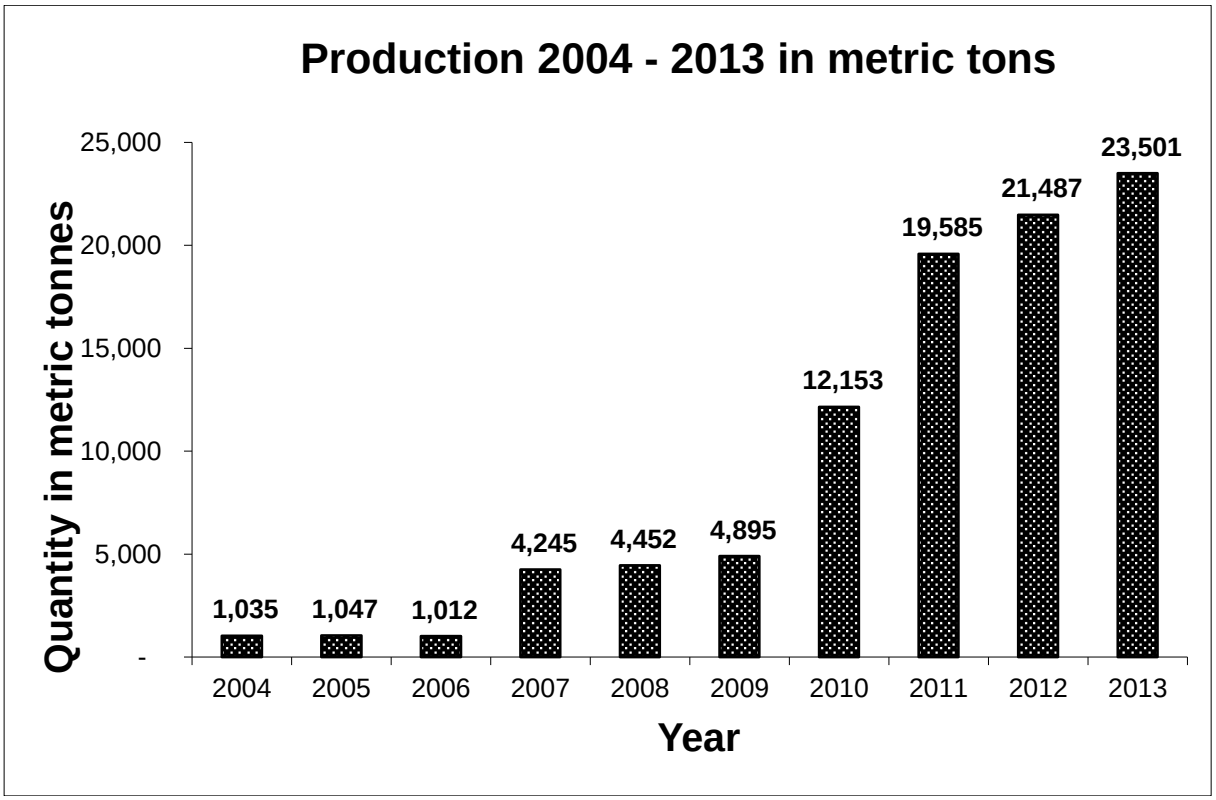

Figure 22: Aquaculture production for last ten years (2004-2013)

The following constraints continued to affect aquaculture activities during the year under review:

- Inadequate readily available and affordable quality fish seed (fingerlings);
- Inadequate good quality and affordable fish feeds;
- Poor adoption of fish husbandry techniques by some farmers even after being trained on basic pond management;

- Water scarcity due to other competing uses – industry, domestic and agriculture;
- Inadequate market information for use by fish farmers;
- Lack of good credit facilities and schemes for fish farmers;
- Security and safety of fish in ponds posed by thieves and predators;
- Poor book keeping and record management leading to inaccurate data from farmers along the aquaculture value chain e.g. input costs, management cost, quantities of fish harvested and value;
- Sub optimal staffing levels especially extension personnel;
- Inadequate facilitation in terms of transport and timely funds towards carrying out of fisheries extension service provision.

Management and ownership of fish ponds is mainly by individual fish farmers while self-help groups are the ones who manage dams/reservoirs in the country. Fisheries extension staff assists the farmers in the best pond and dam/reservoir management practices.

The State department of fisheries policy on shifting fish farming from subsistence to commercial enterprise demands increased and reliable fish seed and feed production for the farmers.

5.0 EXPORTS OF FISH AND FISHERY PRODUCTS

During the year under review, a total of 6,742 metric tonnes of fish and fishery products were exported earning the country Kshs. 2,568,886,000 in foreign exchange. In quantity, exported fish products were mainly Nile perch products and its by-products totaling 5,783 metric tonnes or 85.6% of the total exports (i.e. fillets 5,156 metric tonnes or 76.5%, Headless and Gutted whole Nile perch 428 metric tonnes or 6.3% and fish maws 199 metric tonnes or 3.0%), Octopus 455 metric tonnes (6.7%), Tilapia 205 metric tonnes (3.0%), marine shells 134 metric tonnes (2.0%) and Barbus 54 metric tonnes (0.8%) table 20. This year's Nile perch products and by-products export of 5,783 metric tonnes was a decreased of 36.6% from the previous years' export of 9,122 metric tonnes. By country destination, Netherlands had the lion's share of Nile perch products exports at 1,380 metric tonnes or 23.9%. Netherlands was followed by Israel with 1,038 metric tonnes (17.9%), Portugal 685 metric tonnes (11.8%), France 506 metric tonnes (8.7%), Germany with 488 metric tonnes (8.4%), Spain 288 metric tonnes (5.0%), Greece 264 metric tonnes (4.6%) and China with 255 metric tonnes (4.4%) among others, figure 23.

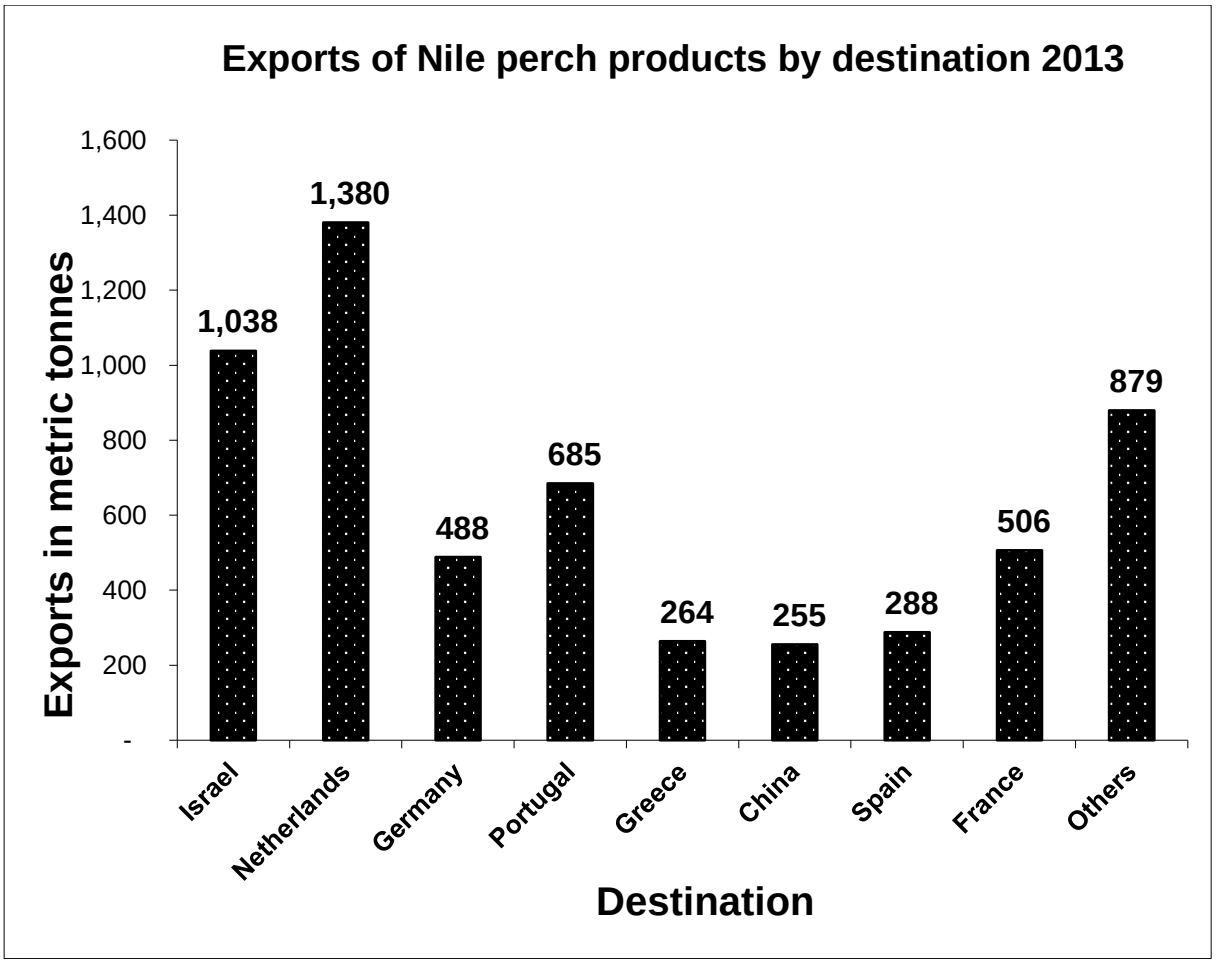

Figure 23: Exports of Nile Perch Products by destinations- 2013

By Nile perch products and by-products type, exports of chilled fillets contributed the highest percentage of 47% (2,666 metric tonnes) followed by frozen fillets 43 % (2,490 metric tonnes), frozen headless and gutted whole Nile perch 5% (310 metric tonnes), frozen maws 3% (199 metric tonnes) then chilled headless and gutted whole Nile perch 2% (118 metric tonnes) figure 24.

Apart from the above mentioned exports, 1,509 metric tonnes of Tuna loins were processed at a labour charge of Kshs. 215,260,000 and trans-shipped through the port of Mombasa. This quantity was a decrease of 72% from the previous year's trans-shipment of 5,305 metric tonnes.

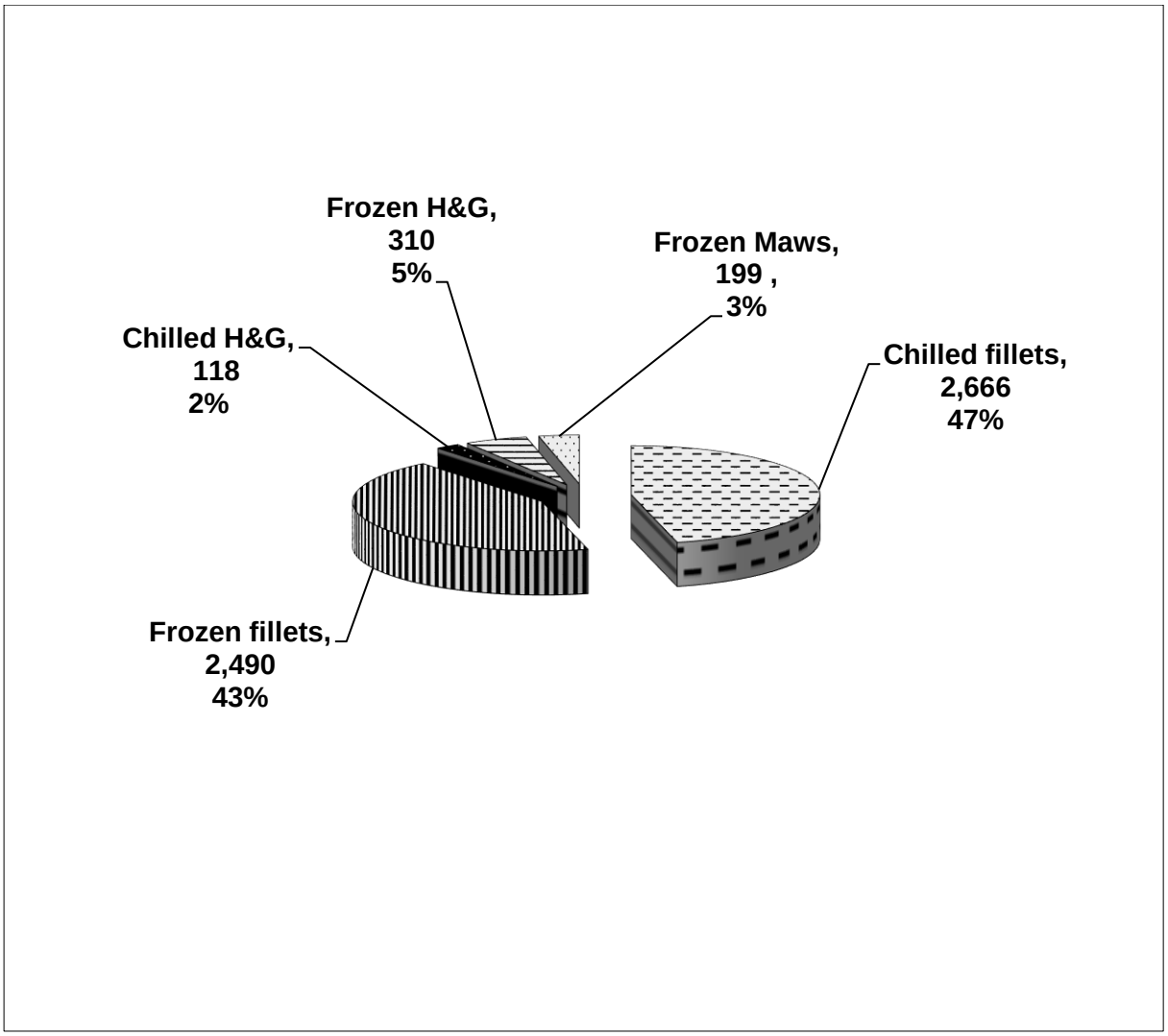

Figure 24: Exports of Nile perch by product type 2013

Table 20: Exports of Fish and Fishery Products 2013

Commodity	M. Tons	000Kshs	% Quantity	% Value
Nile perch Fillets	5,156	1,958,999	76.5	76.3
H & G Whole Nile perch	428	143,456	6.3	5.6
Fish maws	199	272,391	3.0	10.6
Frozen Lobsters	15	18,417	0.2	0.7
Live Lobsters	11	7,150	0.2	0.3
Live Crabs	17	5,897	0.3	0.2
Frozen Octopus	455	118,651	6.7	4.6
Frozen Squids	3	1,120	0.0	0.0
Bech-der-mer	5	2,572	0.1	0.1
Shark fins	6	3,929	0.1	0.2
Marine shells	134	7,552	2.0	0.3
Frozen Seabream	5	1,951	0.1	0.1
Frozen Snappers	26	7,918	0.4	0.3
Frozen Mixed fish	23	1,961	0.3	0.1
Tilapia	205	13,546	3.0	0.5
Barbus	54	3,376	0.8	0.1
TOTAL	**6,742**	**2,568,886**	100.0	100.0
Tuna loins	1,509	215,260		

Grand total	**8,251**	**2,784,146**		

6.0 IMPORTS OF FISH AND FISHERY PRODUCTS

In 2013, Kenya imported 5,269 metric tonnes of fish and fishery products worth Kshs 523,531,000. These imports were mainly composed of Mackerels with 2,916 metric tonnes which was 55.3% of the total fish and fishery products imported during the year. These were followed by *Tilapia niloticus* 739 metric tonnes (14.0%), Sardines 370 metric tonnes (7.0%), mixed marine fish 356 metric tonnes (6.8%), frozen Tuna 256 metric tonnes (4.9%), Pangasius fillets 117 metric tonnes (2.2%), Prawns 85 metric tonnes (1.6%), fish meal 85 metric tonnes (1.6%), frozen Lizard fish 82 metric tonnes (1.6%), Reef Cod 81 metric tonnes (1.5%) and Salmon 49 metric tonnes (0.9%), figure 25 and table 21. The imports originated largely from Asian countries, notably India, Pakistan, Japan and Korea but all the *Tilapia niloticus* was imported from China.

Some 450,000 Trout ova and 20,649 pieces of aquarium fish worthy Kshs 1,049.000 and 629,000 respectively were also imported during the year under review.

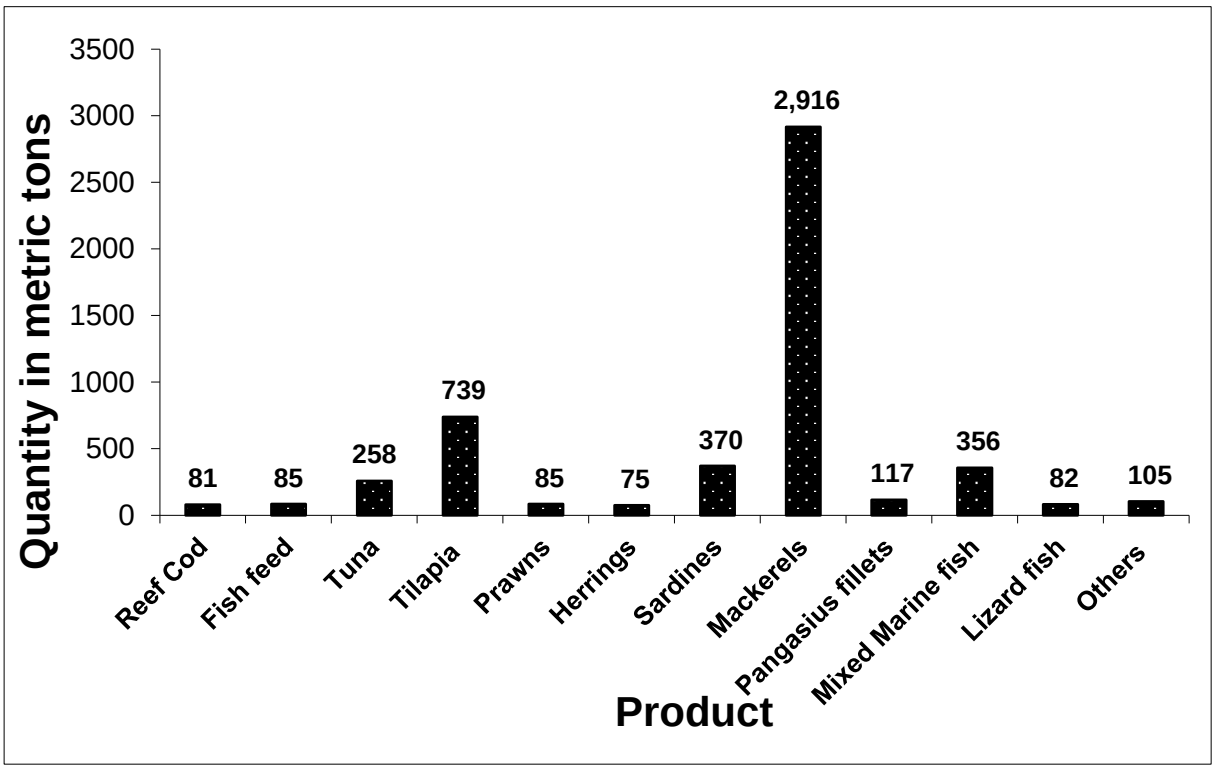

Figure 25: Import of fish and fish products 2013

Table 21: Imports of Fish and Fishery Products 2013

Commodity	Quantity (M. Tons)	Quantity (Pieces)	Value ('000Kshs)	% Quantity	% Value
Frozen Lizardfish	82		4,316	1.6	0.8
Frozen Mackerels	2,916		169,053	55.3	32.3
Frozen Mixed Marine Fish	356		24,502	6.8	4.7
Frozen Pangasius Fillets	116		9,597	2.2	1.8
Frozen Pangasius Fingers	1		157	0.0	0.0
Frozen Sardines	370		18,514	7.0	3.5
Atlantic salmon	2		823	0.0	0.2
Fresh Salmon	11		1,272	0.2	0.2
Frozen salmon	34		10,960	0.6	2.1
Smoked Salmon	2		1,607	0.0	0.3
Frozen Tuna	258		23,856	4.9	4.6
Frozen Tilapia	392		37,286	7.4	7.1
Frozen Tilapia fillets	347		137,623	6.6	26.3
Frozen Prawns	85		47,960	1.6	9.2
Frozen Shrimps	9		4,128	0.2	0.8
Frozen King fish	16		3,195	0.3	0.6
Frozen Reef Cod	81		6,029	1.5	1.2
Frozen Dorado	4		717	0.1	0.1
Frozen Herrings	75		4,018	1.4	0.8
Frozen Galate	1		115	0.0	0.0
Frozen Sword fish	1		168	0.0	0.0
Frozen Fillets	18		6,124	0.3	1.2
Assorted fish products	7		2,391	0.1	0.5
Fish feed	25		2,154	0.5	0.4
Tuna fishmeal	60		6,966	1.1	1.3
Sub Total	**5,269**		**523,531**	**100.00**	**100.00**
Aquarium fish		20,649	629		
Trout ova	-	450,000	1,049		
TOTAL	**5,269**	**470,649**	**525,209**		