

Project Red Velvet

Market Study on the Aquaculture Sector in East Africa

05 November 2015
Final Report
Private and Confidential





05 November 2015

Ms. Jane Ndungo
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Dear Madam,

Market Study to map existing investments/facilities, new investment opportunities and potential partners in Kenya, Uganda and Tanzania within aquaculture and particularly marine fisheries

Deloitte Consulting Limited (herein after referred to as “Deloitte”) are pleased to enclose our final report setting out the results of the Market Study of the aquaculture sector in Kenya, Uganda and Tanzania in accordance with the terms of our consultancy agreement dated 26 June 2015.

The sole purpose of this Market Study Report is to map the existing investments/facilities within aquaculture and particularly marine fisheries in Kenya, Uganda and Tanzania, identify new investment opportunities and establish an overview of potential partners available to investors in the region.

In preparing this Market Study Report, we have relied upon and assumed, without independent verification, the accuracy and completeness of all information available from public sources and meetings with management of a number of the market players in the aquaculture industry.

This report is provided solely for your confidential use in order that you may inform yourself about the aquaculture industry in Kenya, Uganda and Tanzania.

You should not, without our prior written consent, refer to or use our name or the report for any other purpose, refer to them in any investment circular or other document, or make them available or communicate them

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to any other party (except for your affiliated companies and your other professional advisors). We accept no liability to any party in connection with this final report.

Thank you for the opportunity to work with you on this assignment. We look forward to working together in future opportunities.

Yours faithfully,

For: Deloitte Consulting Limited

John Ponsonby
Director

Important Notice

This Final Report is strictly private and confidential to the Recipient and is intended for the use of Innovation Norway and the Norwegian Embassies in Kenya, Uganda and Tanzania, and is solely for their benefit as defined in the contract dated 26 June 2015 (the "Contract"). Save as expressly provided for in the Contract. it must not be recited or referred to in any document, or copied or made available (in whole or in part) to any other party.

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AAK	Aquaculture Association of Kenya	LBDA	Lake Basin Development Authority
AFIPEK	Kenya Fish Processors & Exporters Association	LVFO	Lake Victoria Fisheries Organisation
AVC	Aquaculture Value Chain	MAAIF	Ministry of Agriculture Animal Industry and Fisheries of Uganda
BMU	Beach Management Unit	n/a	Not Applicable
CAGR	Compound Annual Growth Rate	NAFIS	National Farmers Information Service
CBD	Convention on Biological Diversity	NARDTC	National Aquaculture Research Development and Training Centre
CDA	Coast Development Authority	NEMA	National Environmental Management Authority
CITES	Convention on International Trade in Endangered Species	NEMC	National Environmental Management Council
DSFA	Deep Sea Fishing Authority	NGO	Non Governmental Organisation
DSIP	Development Strategy and Investment Plan	PSM	Port State Measures
DWFNs	Distant Water Fishing Nations	RAS	Recirculating Aquaculture System
EAC	East African Community	Sq. Km	Square Kilometer
EAWLS	East Africa Wildlife Society	SWIO	South West Indian Ocean
EEZ	Exclusive Economic Zone	SWIOC	South West Indian Ocean Commission
EIU	Economic Intelligence Unit	SWOT	Strength Weaknesses Opportunities Threats
ESP	Economic Stimulus Program	TAFIRI	Tanzania Fisheries Research Institute
EU	European Union	TIC	Tanzania Investment Centre
FAO	Food and Agricultural Organisation	TUFAK	Tuna Fisheries Alliance of Kenya
FDA	Food and Drug Authority	TZS	Tanzania Shillings
FFPEP	Fish Farming Enterprise Productivity Program	UBOS	Uganda Bureau of Statistics
FIR	Field Inspection Report	UEPB	Uganda Export Promotions Board
GDP	Gross Domestic Product	UGX	Ugandan Shilling
GoK	Government of Kenya	UFPEA	Uganda Fish Processors and Exporters Association
GoT	Government of Tanzania	UN	United Nations
GoU	Government of Uganda	UNCLOS	UN Convention on the Law of the Sea
GRT	Gross Register Tonnage	UNECA	United Nations Economic Commission for Africa
Ha	Hectares	US	United States
HP	Horse Power	USD	United States Dollar
IOTC	Indian Ocean Tuna Commission	VAT	Value Added Tax
KES	Kenya Shilling	WAFICO	Walini Fish Farmers Cooperative Society
Kgs	Kilogrammes	WIOMSA	Western Indian Ocean Marine Science Association
KMA	Kenya Maritime Authority	WSA	Water Spread Area
KMF	Kenya Marine Forum	WTO	World Trade Organization
KMFRI	Kenya Marine and Fisheries Research Institute	WWF	Worldwide Fund for Nature
KNBS	Kenya National Bureau of Standards		
KPA	Kenya Ports Authority		
KWS	Kenya Wildlife Service		

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Background and Purpose

Background

- Innovation Norway is a Norwegian Government Agency established to promote development of Norwegian enterprises, among others through cooperation with the business community and clients in international markets. In February 2014, Innovation Norway established a regional office for East Africa in Nairobi to promote business cooperation in Kenya, Tanzania and Uganda. To promote trade and investment opportunities for Norwegian companies, Innovation Norway proactively identifies such opportunities in cooperation with local industries and their associations as well as government investment and trade promotion agencies.

Our understanding of the assignment

- Innovation Norway required a market study to map existing investments/facilities, new investment opportunities and potential partners in Kenya, Tanzania and Uganda within aquaculture and particularly marine fisheries.
- The study was jointly co-financed by Innovation Norway together with the Royal Norwegian Embassies in Kenya, Uganda and Tanzania who intended to gain a better overview of the existing investments/facilities and future opportunities as well as an insight into potential partners within the fisheries sectors in the region, and in particular aquaculture and related industries. Thus Innovation Norway commissioned Deloitte to undertake a mapping study.
- This study is intended to give an overview of existing investments, and identify new investment opportunities and potential partners in the three countries who are, or may be, considered as potential partners to cooperate with Norwegian companies. The findings of the study will be shared with be shared with Innovation Norway as well as the Norwegian Embassies in Kenya, Uganda and Tanzania.

Methodology

Market research

- The information included in the report was largely obtained from public sources. These include:
 - Government websites;
 - Association websites and visits;
 - Company websites;
 - Publications; and
 - Articles.
- We collected as much information as possible within the timeframe and man days allocated to the report, subject to availability from the above listed sources.

Roundtables and Interviews

- We conducted roundtable discussions with the companies already identified by Innovation Norway as well as other companies we have identified as potential partners. The roundtable discussions offered an opportunity for the stakeholders involved to discuss issues affecting the sector and to understand the type of collaboration expected from Norwegian partners. The discussions were carried out in Kenya and Uganda.
- We informed the players in advance about the nature of the study the type of information that we wished to collect for you. The roundtable also offered an opportunity to collect information from the participants on their companies, although most of them declined to share financial information.
- For Tanzania, we contacted the players by phone and carried out interviews. This was the best approach after we were advised by our Deloitte Tanzania team that participants were unlikely to turn up for the round table given that most of them were based outside Dar es Salaam.

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Aquaculture is dominated by small scale fish farmers in all the three countries

Topic	Kenya	Uganda	Tanzania
Aquaculture Sub-Sector	<ul style="list-style-type: none"> • Aquaculture in the country is still largely underdeveloped though it has come a long way in the last 5 years. • This is mainly due to the government launched Economic Stimulus Program (ESP) and the Department of Fisheries Fish Farming Enterprise Productivity Program (FFEPP) aimed at expanding fish farming in the country. 	<ul style="list-style-type: none"> • The aquaculture industry in Uganda is the most developed in the region as fish represents a major source of protein in the diet of most Ugandans. • The Government of Uganda (GoU) has identified the sector as one of the key investment sub-sectors within the agriculture sector and in 2014 set a target of increasing fish production through aquaculture to 300,000 tonnes per annum by 2017. 	<ul style="list-style-type: none"> • The aquaculture subsector is under developed despite good potential in both fresh and marine waters. • The sub-sector is not yet as commercially developed as much as in the neighboring countries, and it has a large but yet untapped potential.
Current Production	<ul style="list-style-type: none"> • Aquaculture production increased from 1,000 tonnes in 2000 to 49,387 tonnes in 2014 according to the Ministry of Agriculture. • Main species produced from aquaculture are tilapia and catfish. • The bulk of production is done in earthen ponds using semi-intensive systems. • Current production is not enough to satisfy the demand for fish. 	<ul style="list-style-type: none"> • According to the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) aquaculture production was approximately 100,000 tonnes in 2013. • Most popular species for aquaculture are the North African catfish and tilapia mainly produced in earthen ponds. 	<ul style="list-style-type: none"> • Total fish production in Tanzania from aquaculture was approximately 2,998 tonnes in 2013. • Most popular farmed species are tilapia and North African catfish. They are mainly produced in earthen ponds. • Seaweed farming in Zanzibar has also significantly taken root and was estimated at 12,000 tonnes in 2013.
Sub - Sector Characteristics	<ul style="list-style-type: none"> • Kenya's aquaculture sector is dominated by small-scale fish farmers (95%) with less than five full time employees. • The fisheries sector including aquaculture contributed 0.8% to GDP in 2014 (USD 383m) and supports about 80,000 people directly and about 800,000 people indirectly. 	<ul style="list-style-type: none"> • There are a small number of large and small commercial fish farmers. However, the subsector is mainly dominated by small-scale fish farmers. • Fishing and aquaculture was estimated to contribute 3.1% (USD 504m) to the national GDP in the fiscal year 2013/2014 and 13.8% (USD 3,662m) to the agricultural GDP in the same period. 	<ul style="list-style-type: none"> • Aquaculture in Tanzania is a subsistence activity practiced by small-scale farmers who have low social, cultural and economic status and limited access to technology, markets and credit. • Fisheries and aquaculture contributed 1.4% (USD 3.45m) to the National GDP in 2013.

The potential for aquaculture is still not yet fully realised

Executive Summary	Kenya	Uganda	Tanzania
<h3>Challenges</h3>	<ul style="list-style-type: none"> • Unfortunately, after several years of fish farming in Kenya, the country is still suffering from basic challenges including: <ul style="list-style-type: none"> – Limited knowledge of aquaculture investment; and – Inadequate supply of certified quality feed and seed fish. • Some of the farmers who began fish farming as a result of the ESP have given up fish farming because they incurred large losses after stocking their ponds with low-quality fingerlings and substandard feed. 	<ul style="list-style-type: none"> • Like its neighbouring countries Uganda faces challenges in: <ul style="list-style-type: none"> – Limited knowledge on the aquaculture practice; – Lack of quality, affordable fish fingerlings and fish feed; and – Hurdles in accessing finance for growth. 	<ul style="list-style-type: none"> • Some of the reasons that have contributed to a slow development of the aquaculture sector are: <ul style="list-style-type: none"> – Government has given low priority to aquaculture funding and training; – Limited capital among farmers; – Limited aquaculture knowledge; and – Poor quality fish feed and fish fingerlings.
<h3>Potential</h3>	<ul style="list-style-type: none"> • Despite these challenges there is still potential for growth in the aquaculture sector. In addition, there are small scale commercial farmers who are willing (but unable) to up scale. • Some of the opportunities within the sector include: <ul style="list-style-type: none"> – Supply of quality feed and fingerlings; – Seaweed farming; – Development of aquaculture and mariculture as a means of fish production to supplement the dwindling stocks of fish in Lake Victoria; and – A large unexploited capture marine resource. 	<ul style="list-style-type: none"> • Opportunities exist in: <ul style="list-style-type: none"> – Fish processing at lakes other than Lake Victoria; – Commercial aquaculture to supplement reduced fish production from traditional sources; – Setting up of nurseries and hatcheries for quality seed and fingerlings for stocking of fish farms; and – Production of high quality feed that meets international standards. 	<ul style="list-style-type: none"> • Tanzania has a high potential for aquaculture, both on its marine coastline and its freshwater river and lakes. The climate is adequate to tropical species that are in demand both regionally and internationally (prawns, shrimps, seaweed, tilapia, clarias etc.). • Some of the opportunities available in the aquaculture sector are: <ul style="list-style-type: none"> – Investment in fish processing facilities in areas such as fish canning industry, value-added products, fish meal and cold and hot smoking; – Hatcheries for fingerling production; – Fish support services such as consulting, training and capacity building services; and – Aquaculture as a means to supplement production of fish from freshwater sources which has been in the decline.

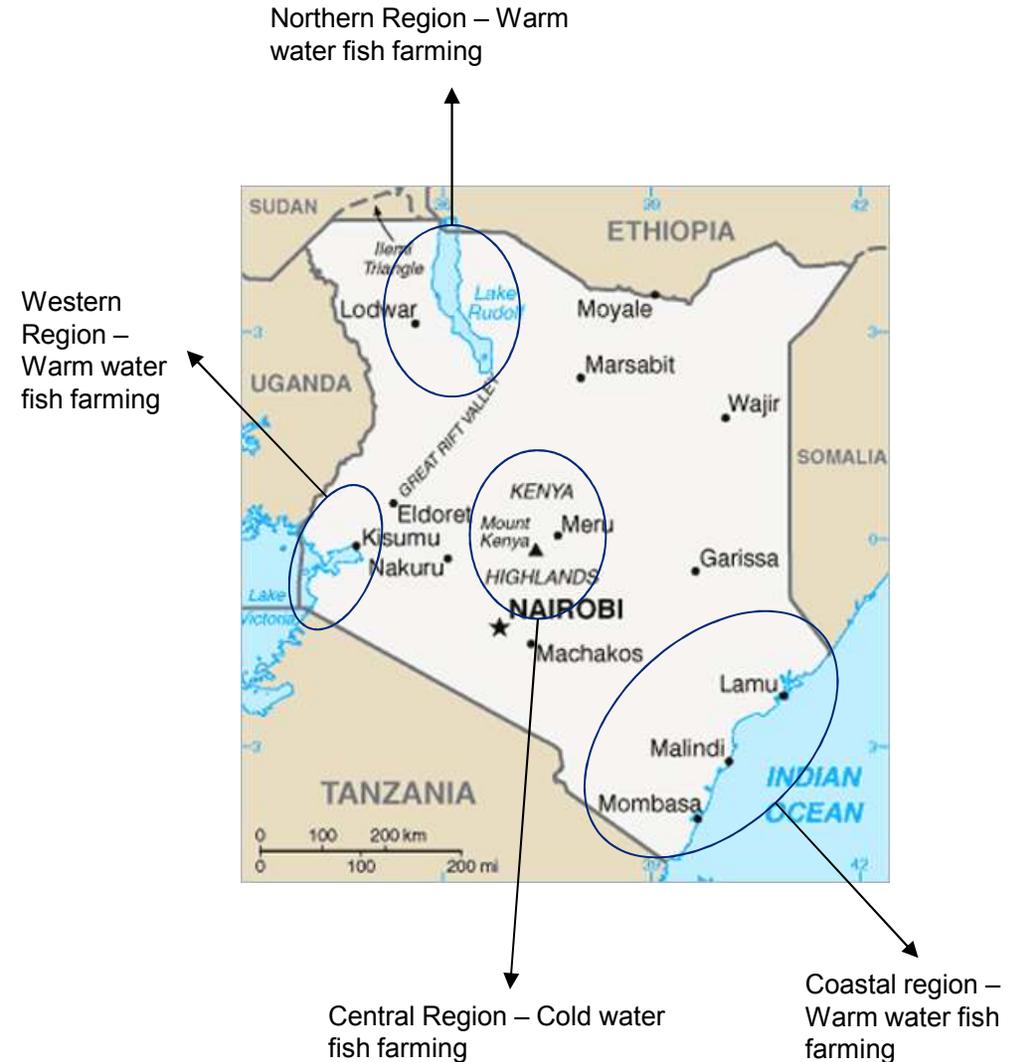
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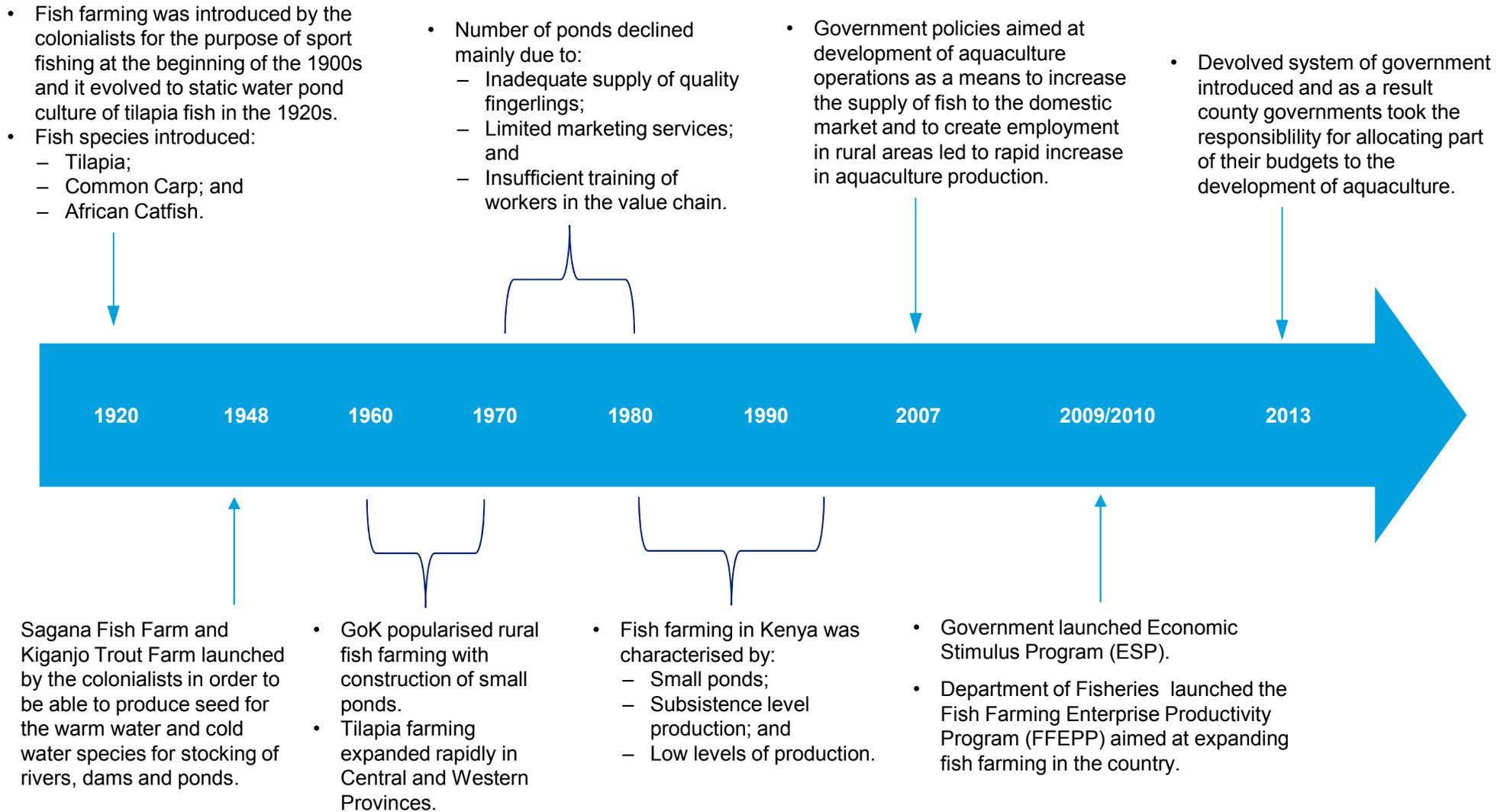
The fisheries sector in Kenya is largely dependent on capture fisheries from inland waters which accounted for 95% of total output in 2014

Overview

- Fish has always been an important source of protein in the human diet. According to Food and Agriculture Organisation (FAO), fish has become a source of healthy animal protein in many parts of Kenya. It has now spread to parts of the North Rift, Central and Eastern Provinces, which initially were non-fish growing areas.
- In Kenya, the per capita annual consumption of fish in 2014 was 4.5kgs compared to the worldwide average of 19kgs (based on FAO). With a population of 45.55 million, annual consumption is estimated at approximately 200,000 tonnes.
- Fish consumption contributes 11% of average daily protein consumption locally. With access to both freshwater and marine fisheries, Kenya has tremendous aquamarine production capacities. Fish is primarily commoditised and exported as opposed to use for food security.
- The fisheries subsector plays a significant role in the Kenyan economy and for the health of its population. The sector supports about 80,000 people directly and about 800,000 people indirectly.
- According to the Kenya National Bureau of Statistics (KNBS), in 2014, fisheries and aquaculture contributed 0.8% (USD 383m) to the Gross Domestic Product (GDP).
- The fisheries sector largely depends on capture fisheries from inland waters, which accounted for 80% (134,775 tonnes) of total output in 2014. 77% (128,708 tonnes) of the total fresh water fish capture come from Lake Victoria.
- Major species from Lake Victoria are:
 - Nile perch (mainly for export);
 - Sardines; and
 - Tilapia.
- Catches in Lake Victoria are declining due to overfishing combined with multiple environmental problems like pollution, water hyacinth infestation, reduced levels of oxygen in the water and introduction of alien species of fish.



Aquaculture In Kenya: Timelines

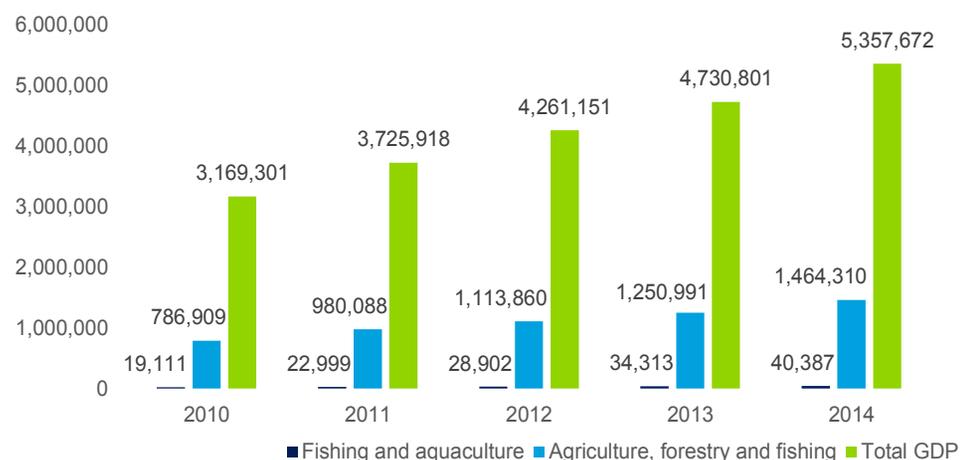


Fisheries and aquaculture contributed 0.8% to National GDP in 2014 and is still a small contributor to the economy of Kenya

Contribution to Economy

- The fisheries subsector is still a small contributor to the economy but has been growing steadily since the GoK shifted more focus toward developing policies and availing funds that support development of the sub-sector. The growth in the subsector of CAGR of 20.6% between 2010 and 2014 was higher than the agriculture sector growth of CAGR of 16.8% as well as that of total GDP of 14%. Contribution to GDP has therefore increased from 0.6% (USD 181m) in 2010 to 0.8% (USD 383m) in 2014.

Gross Domestic Product by Activity



Source: Kenya National Bureau of Statistics

- As the popularity of fish continues to grow in the country, a number of fish farmers who initially farmed fish at a subsistence level have turned into small scale commercial fish farmers. These commercial farmers are increasingly starting production both for local and export markets.
- According to the Ministry of Agriculture, Livestock and Fisheries, Kenya is mainly an export oriented producer of fish and import of the commodity is insignificant. Fish produced in the country is either exported or locally consumed.

Quantity, Value and Average Price of Principal Domestic Exports

	2010	2011	2012	2013	2014*	CAGR FY10 - 14
Quantity (Tonnes)						
Fish and fish preparations	17,804	15,519	17,455	11,712	15,213	(3.9%)
Value (KES millions)						
Fish and fish preparations	5,027	4,955	5,392	3,362	4,266	(4.0%)
Average Price (KES/Kg)						
Fish and fish preparations	282	319	309	287	280	(0.2%)

*Provisional

Source: Kenya National Bureau of Statistics

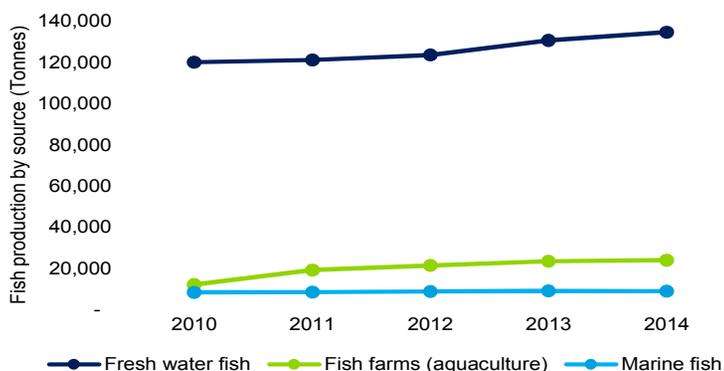
- Fish exported to the European Union (EU) (Netherlands, Belgium, Germany, Portugal, Italy, France and Spain) account for about 62% (9,432 tonnes in 2014) of all fish exported. However, new markets have emerged, among them Israel, the Far East, North America, the Middle East, and other African countries. In 1999, Israel became the most prominent single importer of Kenya's fish, a position it has retained to date.
- The quantity of fish and fish preparations exported from Kenya declined from 17,804 tonnes in 2010 to 15,213 tonnes in 2014. This also represented a decreasing export value from KES 5bn (USD 48m) in 2010 to KES 4.3bn (USD 40m) in 2010. The decline was attributed to stagnating volume of fish landed and therefore local demand was prioritised over exports.
- The export market in Kenya has faced a couple of challenges in the past with a fishing ban being imposed in 1998 by the EU, Kenya's largest export market, of fish from Lake Victoria, Kenya's largest source of fish. This was due to low quality standards that did not meet international standards for food exports. Despite this, fish export is set to be transformed following a partnership agreement arrived between the EU and African countries in March 2015. The initiative dubbed Fish Trade, is expected to pave the way for adoption and implementation of trade-friendly policies, easy fish certification procedures and simple standards and regulations. This is expected to reverse the slowing trend of shipment of seafood to the European market.
- The Government of Kenya also has plans in the pipeline to phase out hormonal fish breeding in 2015 as part of measures to meet stringent export standards set by the EU market.

Aquaculture production increased by 2.5% between 2013 and 2014 and this trend is expected to continue as more people take up fish farming

Production (Fish Landed)

- Fishing continues to be an important income generating activity in the country. The total value of fish output has maintained a steady growth over the last five years. Between 2010 and 2014, the quantity of fish output increased by a CAGR of 4.5% from 140,751 tonnes to 167,859 tonnes respectively.
- Fish from fresh water sources remained the major contributor to fish landed in the country, accounting for 80% (134,775 tonnes) of the total output in 2014. The key source being Lake Victoria, accounting for 76.7% (128,708 tonnes) of the total fish landed.
- Fish farming (aquaculture) was the second major source of fish, accounting for 14.4% (24,096 tonnes) of fish output according to KNBS. The Ministry of Agriculture - Department of Fisheries has placed this figure at 49,387 tonnes.
- According to KNBS, growth in the volume of fish landed from marine sources may have been hampered by inadequate fishing facilities and technologies for fishing in deep water which explains the 2% increase between 2013 and 2014. Despite the general upward trend in fish production between 2013 and 2014, the quantity of crustaceans landed dropped by 30.5% while that of molluscs declined by 3.4%. The decline in the quantity of crustaceans landed may partly be explained by changes in climate that affect sea water temperatures.

Fish production by source and value



Source: Kenya National Bureau of Statistics

- Overall, the total quantity of fish landed in the country increased by 2.6% to 167,859 tonnes in 2014 compared to 2013. Fresh water fish capture quantities grew by 3% from 130,752 tonnes in 2013 to 134,775 tonnes in 2014. Fish production from fish farming increased by 2.5% from 23,501 tonnes in 2013 to 24,096 tonnes in 2014 mainly attributed to increase in the area of farmed fish.
- Total earnings from fish landed rose from KES 21.3bn (USD 201m) in 2013 to KES 21.9bn (USD 207m) in 2014 representing a 3% increase. Total value significantly increased between 2012 and 2013 from KES 18.1bn (USD 171m) to KES 21.3bn (USD 201m), representing a 17.8% increase. According to KNBS, the growth in value was attributed to the rise in domestic market fish price occasioned by high demand for freshwater fish.

Quantity (Tonnes) and value (KES) of fish landed

	2010	2011	2012	2013	2014	CAGR FY10 - 14
Quantities (tonnes)						
Lake Victoria	111,868	111,619	118,992	124,643	128,708	3.6%
Lake Turkana	6,430	7,250	3,001	4,338	4,165	(10.3%)
Lake Naivasha	209	217	143	231	331	12.2%
Lake Baringo	53	158	251	263	201	39.6%
Lake Jipe	103	106	112	116	115	2.8%
Tana River dams	583	943	967	705	1,024	15.1%
Other areas	946	916	197	456	231	(29.7%)
Fresh water fish capture	120,192	121,209	123,663	130,752	134,775	2.9%
Fish farming (all fresh water)	12,153	19,265	21,487	23,501	24,096	18.7%
Marine fish	7,283	7,422	7,477	7,667	7,786	1.7%
Others *	1,123	1,150	1,388	1,469	1,202	1.7%
Total output (tonnes)	140,751	149,046	154,015	163,389	167,859	4.5%
Value (KES million)						
Fresh water fish	12,274	15,831	16,867	19,984	20,544	13.7%
Marine fish	557	630	878	921	961	14.6%
Others *	171	217	330	377	352	19.8%
Total value (KES M)	13,002	16,678	18,074	21,283	21,857	13.9%

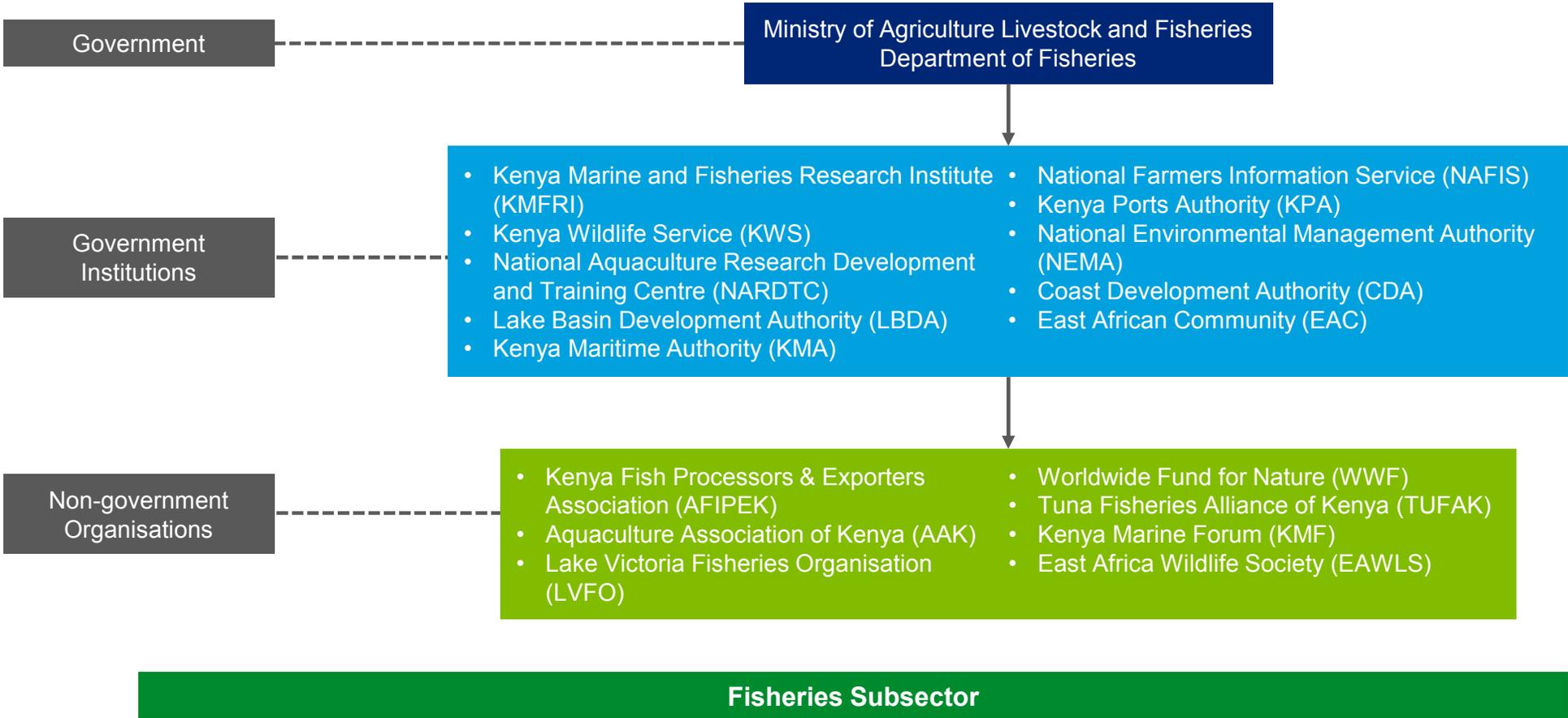
* - comprises Crustaceans and Molluscs

Source: Kenya National Bureau of Statistics

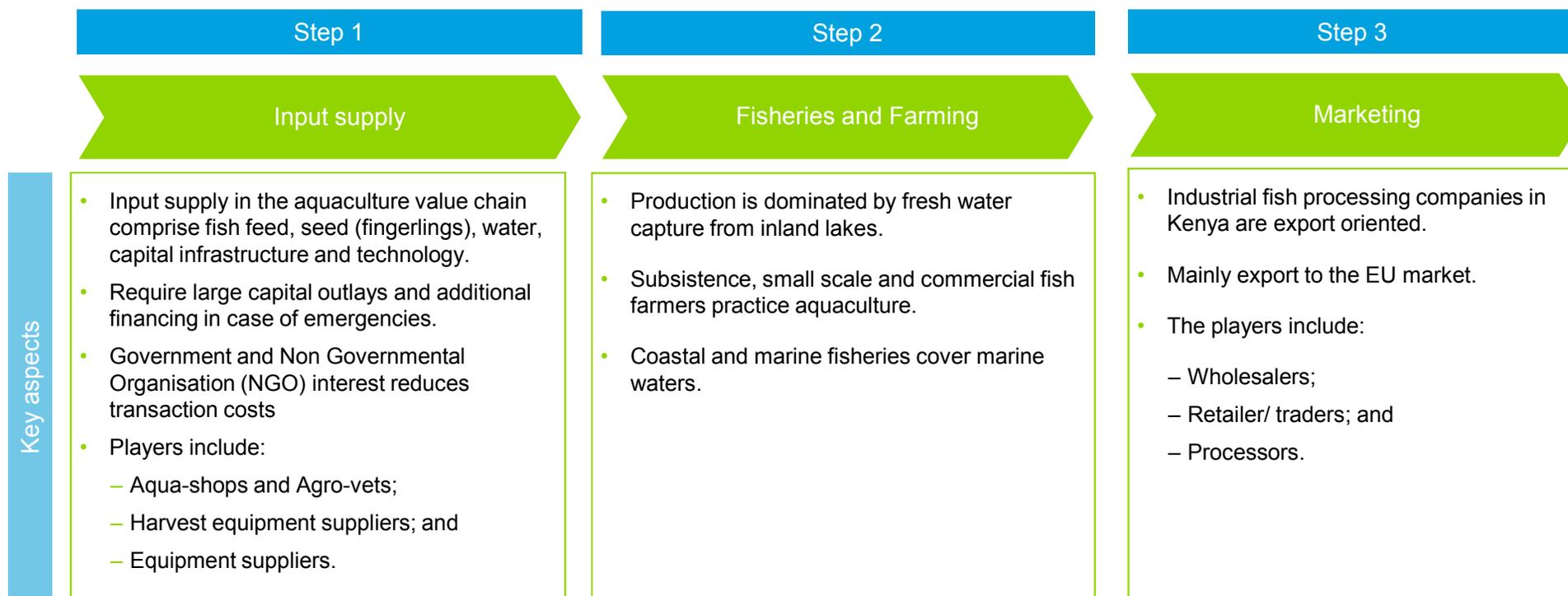
The Ministry of Agriculture, Livestock and Fisheries has administrative control and is responsible for management of the fisheries and aquaculture sector

Market Structure

- The fishing industry in Kenya employs a perfect competition type of market structure where prices are influenced by demand and supply and many players are present at all levels.



Sector Analysis – Fisheries Sub-Sector Value Chain



Fish feed is the most important input in fish farming accounting for 40-50% of variable production costs

Step 1

Input Supply

Fish Feed

- Fish feed is a key component in any fish-farming venture because fish nutrition accounts for 40-50% of the total variable production costs on the fish farm, according to the Fisheries and Aquatic Sciences Institute.
- The fisheries industry currently faces a challenge of lack of efficient and inexpensive farm-made feeds for different stages of fish development. Commercial fish feeds are too expensive for most farmers and therefore they prefer the use of locally mixed feeds which contain rice, maize or wheat bran.
- Most farmers are currently formulating their own feed using locally available ingredients. Local ingredients include fresh water shrimps from Lake Victoria, agricultural by-products such as wheat, maize or rice brans, cotton seed cake, soya and other related but cheap products. Occasionally farmers use feed formulated for livestock such as cattle or pigs with devastating results because of the crude protein levels.
- Due to the low quality of fish feeds in the Kenyan aquaculture market, the ESP nutrition team, together with other aquaculture stakeholders, established a vetting process for fish feed manufacturers. To date, 15 fish feed firms have been approved, but further survey efforts are under way to identify more firms. The table below summarises the key feed suppliers:

Authenticated key feed suppliers

Name	Location
Sigma Feeds Ltd Co	Nairobi
Uga Fish Feeds Kenya Ltd	Nairobi
Economy Farm Products Kenya Ltd	Nairobi
Maisha Bora Feeds Ltd	Kikuyu, Nairobi
Thoyu Feed Ltd	Nairobi
Kwality Fish Feeds Limited	Nairobi
Othaya Fish Feeders S.H.G	Othaya
Chumara Fish Feeds	Chuka
Bidii Fish Farmers S.H.G	Luanda- Emuhaya
Osifeeds Ltd	Kajiado
Zibag Fish producers & Processors	Nyandarua
Hesao Integrated Fish Farming Organization	Nyalenda B

Source: Fisheries and Aquatic Sciences - An Overview of Kenyan Aquaculture

Fish Seed (Fingerlings)

- Quality fingerlings are undoubtedly important in the fisheries sub sector as they result in good quality fish. Insufficient availability and poor quality of fingerlings for stocking are key constraints in the aquaculture sector.
- Demand for fingerling is on the rise as more farmers go into commercial aquaculture. The challenge has been raising quality fingerlings that have fast growth and are suitable for various agro-climatic regions. Applied research will therefore be a key back up in development of genetically viable species that are suitable for this region, presenting an opportunity for investors.
- Good quality seed can also be achieved via breeding and hybridisation. Such initiatives are still unpopular among fish farmers due to the technical knowledge and facilities required. These are some areas that private investors could link to support fish farming in Kenya.
- The table below summarise a number of key suppliers of fingerlings. There are also several other smaller scale suppliers:

Key fingerlings suppliers

Name	Location
Government Fish Multiplication Centers	
Sagana fish farm	Kirinyaga
Kiganjo trout center	Nyeri
Chw ele fish farm	Bungoma
Wakhungu fish farm	Busia
Kisii fish farm	Kisii
Lake Basin Development Authority fish farms	
Kibos fish farm	Kisumu
Yala Fish Farm	Siaya
Alupe fish farm	Busia
Other hatcheries	
Mw ea AquaFish farm	Kirinyaga
Green Algae	Kirinyaga
Mabro fish farm	Bondo
Jewel fish farm	Homabay
Jasa fish farm	Thika

Source: National Farmers Information Service

Kenya

Aquaculture information is increasingly being made available to farmers by Government and NGOs



Farmers learn how to identify male and female fish



Catfish feeding



Earthen ponds under construction at Mwea fish farm

Aquaculture production is mainly practiced by subsistence and small scale farmers

Step 2

Freshwater Fisheries

- The principal source is Lake Victoria (4,300 km²) followed by Lake Turkana, the country's largest inland freshwater body (7,400 km²). Other commercially important freshwater bodies include Lakes Naivasha, Baringo, and Jipe and the Tana River dams. Fishing in these water bodies is mainly undertaken by artisanal fishermen.

Systems of Aquaculture

- According to the AAK, aquaculture is widely described as farming of aquatic organisms including fish molluscs, crustaceans and aquatic plants. It involves some kind of farming intervention in the rearing process of aquatic organisms to enhance their production. In Kenya, aquaculture is practiced under three management levels:

Extensive Systems

- Extensive fish farming is practiced in public water reservoirs managed by organised groups of fish farmers. This system uses the lowest management levels with very little or no input being directed into production. This level of management intensity is common for operations with limited capital or where high quality commercial feeds are unavailable. Fish in this system are usually stocked in earthen ponds, dams and large water reservoirs and left to feed themselves with nutrients from the pond water.

Semi-intensive Systems

- This system forms the bulk of fish production units accounting for over 70% of the total aquaculture production. Here, earthen or concrete ponds are stocked with fish and productivity of the ponds is improved by using organic and inorganic fish feed.

Intensive Systems

- In the intensive system, earthen or concrete ponds are stocked with fish. In this system, water supply and discharge are closely controlled. Fish stocked are fed with nutritionally complete, formulated pelleted diet and stocking densities are high. The system exercises greater environmental control and use of mechanisation as compared to extensive and semi-intensive. There are few farmers utilising this system in Kenya mainly due to the high capital and technology required in intensive farming.

Marine Fisheries

- The country's marine capture fisheries potential is estimated at 150,000 tonnes per annum, but the current production averages 7,700 tonnes annually which is approximately 5% of the total annual fish landed. This quantity is very low due to the inability artisanal fishers to exploit the offshore fish stocks as commercial fishing equipment is expensive. Lack of adequate information on offshore marine fish stocks has also prevented investment in the industry. This is despite the fact that Kenya has a 640 km coastline with 12 nautical miles of territorial waters, 200 nautical miles of the Exclusive Economic Zone (EEZ) and is also located within the richest tuna belt in the Indian Ocean. Marine fisheries is categorised into two sub sectors:

Coastal Fisheries

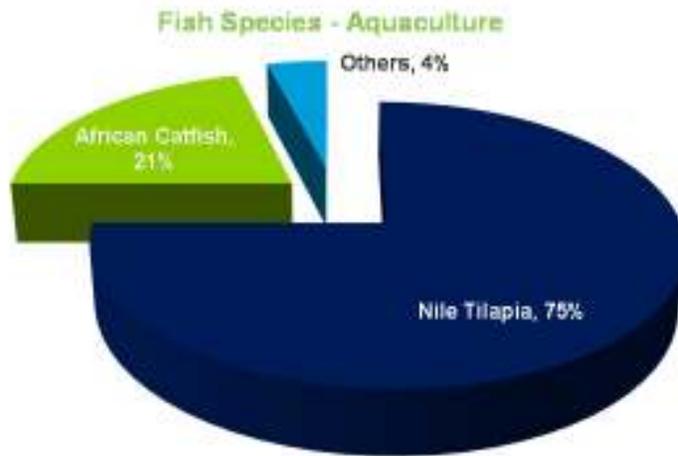
- The territorial waters, which include creeks and reefs, contain large numbers of tropical fish and crustacean species which are traditionally fished by artisanal fishermen as well as commercial prawn trawlers.
- The Coastal fish production is characterised by artisanal fishermen, with small vessels propelled by wind sails and manual peddles targeting mainly molluscs, crustaceans, rock cod, bech-der-mer, dry shark fins, marine shells, livers and roes, live fish and other sea products.

Exclusive Economic Zone Fisheries

- The EEZ is mainly characterised by Distant Water Fishing Nations (DWFNs) from Europe and Asia who utilise seining and long-lining methods of fishing mainly targeting the tuna and tuna-likes. Ring-net fishery is also developing, which is now exploiting up to 20 of the possible 200 nautical miles EEZ.
- The DWFNs fish under access fee arrangements with the government, with no obligations to land or trans-ship catches in the country. This arrangement limits the country's benefits from its EEZ fishery and denies Kenya development aspects associated with trans-shipment, landings for processing or even by-catch trade.
- Kenya's EEZ lies within the richest tuna belt of the South West Indian Ocean (SWIO), owing to its geographical location and proximity within the upwelling region of this part of the Indian Ocean. However exploitation of this rich resource by the Kenyan has been hampered by infrastructural limitations and appropriate fishing equipment and vessels.

Nile Tilapia is the dominant species farmed in Kenyan aquaculture

Aquaculture



Source: Fisheries and Aquatic Sciences - An Overview of Kenyan Aquaculture

- The most commonly farmed fish species is Nile tilapia, which accounts for about 75% of production, followed by African catfish, which contributes about 21% of aquaculture production. Other species include common carp, rainbow trout, koi carp, and goldfish.



Nile Tilapia



African Catfish



Common Carp



Rainbow Trout

Aquaculture is mainly practiced in ponds in Kenya

Concrete Ponds in greenhouse



Earthen Ponds



Cage Farming



Tank Ponds



Cage Farming



Kenya lies in the rich tuna belt of the Western Indian Ocean with potential production of 150,000 tonnes per annum

Potential for Production

- The GoK through the Department of Fisheries has developed a National Tuna Fisheries Development and Management strategy, which provides a roadmap for the sustainable development of the Kenya's tuna fisheries resources occurring in the Exclusive Economic Zone (EEZ) and ensuring an efficient tuna fisheries value chain.
- The strategy seeks to build effective governance system of the marine fisheries sector by providing institutional framework to ensure compliance with relevant national laws and international standards and agreements.
- Overall, the goal of the strategy is to help transit Kenya's tuna fisheries from artisanal-based fisheries to modern commercially oriented coastal and oceanic fisheries and accelerate economic growth of the tuna fisheries with direct positive impacts to employment, wealth creation, improved incomes and foreign exchange earnings
- Tuna Fisheries resources are significant in the global fish supply chain with their trade being estimated at about KES 356 Trillion shillings (USD 3.4tn).
- The Western Indian Ocean region accounts for 70% to 80% of the Indian Ocean catch of tuna, representing 20% of the global tuna production (the second largest in the world after the West Pacific ocean).
- Kenya is therefore located strategically in the rich tuna belt of the Western Indian Ocean region with estimates indicating that tuna fishing has the potential of 150,000 tonnes per annum in the Kenyan EEZ.
- Presently there is only one tuna processing plant in Mombasa with the capacity of 105 tonnes per day, the only one on the West Indian Ocean Coast with the rest of the processing capacity located in island nations in the Indian Ocean.
- Kenya's largely underdeveloped tuna supply chain currently has rudimentary fishing vessels not capable of going beyond 20 nautical miles from the coastline undertaking tuna fishing. In addition, the country does not have a commercial tuna fishing fleet and lacks even a single vessel capable of exploiting tuna resources prescribed to it by the United Nations Convention on the Law of the Sea which grants a state special rights over exploration and use of marine resources. Currently the country grants fishing access to DWFNs at a fee, which is not commensurate to the real value of the resource.
- In past regimes, the fisheries sector was never prioritised when it came to allocation of resources, development of policies to guide the industry and passing of legislation. This was due to limited availability on fish stocks in the marine waters, lack of an effective monitoring, control and surveillance system as well as costly infrastructure required to exploit fishing in the Indian Ocean. Past governments settled on the easier option of licensing DWFN fleets to fish in their territorial waters leading to underdevelopment of the offshore fishing industry.
- The current government is attempting to remedy this situation and has recently initiated the acquisition of a marine vessel for monitoring, control and surveillance.

Fishery resources in Kenya are managed by the Ministry of Fisheries Development through the Fisheries Act (Cap 378) and the Maritime Act (Cap 371)

Policy Framework

- At international level, there are a number of instruments that support nations to better manage their fisheries both domestically and internationally. Kenya has signed the 1982 and 1989 UN Convention on the law of the sea (UNCLOS) as well as the 1995 UN fish stocks agreement in July 2004. Kenya has also signed the FAO 2009 Port State Measures (PSM) although no clear commitments have been made to implement its obligations under the agreement. Marine fisheries remain largely unregulated and there is also a lack of sufficient information on marine fish stock status to inform management.
- The Kenyan fisheries sector has greatly benefited from regional collaborative initiatives such as joint management and research measures through the Lake Victoria Fisheries Organization (LVFO), the South West Indian Ocean Fisheries Commission (SWIOFC), the Indian Ocean Tuna Commission (IOTC), and the Western Indian Ocean Marine Science Association (WIOMSA).
- Locally, The Kenyan National Oceans and Fisheries policy (2008) aims to enhance the oceans and fisheries sector's contribution to wealth creation, increased employment for youth and women, food security, and revenue generation through effective private, public and community partnerships.

Policy development areas

- Promote sustainable management and utilisation of fishery resources.
- Strengthen capacity to carry out fisheries monitoring, control and surveillance.
- Promote sustainable aquaculture development.
- Strengthen community participation in fisheries resources management, value addition and marketing.
- Protect fish breeding grounds and implement closed seasons regulations where necessary.

Legal Framework

- Fishery resources in Kenya are managed by the Ministry of Fisheries Development through the Fisheries Act (Cap 378) and the Maritime Act (Cap 371). The Ministry is mandated to provide for the exploration, exploitation, utilisation, management, development and conservation of fisheries resources, and undertake research in marine and fresh water fisheries.
- The Fisheries Act which is set out in six Parts and 26 Sections, broadly empowers the Director of Fisheries, with the approval of the Minister, to issue regulations to promote the development of fisheries and aquaculture in Kenya.
- The Kenya Marine and Fisheries Research Institute (KMFRI), established as a state corporation through the Science and Technology Act (Cap 250), undertakes fisheries research.

Fisheries and Aquaculture

- The Science and Technology Act (1979)
- The Forest Act (2005)
- The Fisheries Act (1991)
- The Fisheries (General) Regulations (1991)
- The Fisheries (Fish Quality Assurance) Regulations (2000)
- The Fisheries (Safety of Fish, Fishery Products and Fish Feed) Regulations (2006)

Environment and Water Resources

- Environment Management and Coordination Act (1990)
- The Water Act (2002)
- Water (Plan of Transfer of Water Services) Rules (2005)
- Water Quality Regulations (2006)

Animal (fish) Disease, Food Safety and Public Health

- The Public Health Act (1961)
- The Animal Disease Act (1965)
- Code of Hygiene Practice (1989)

Institutional players in the fisheries and aquaculture industry

Key Stakeholders in the Aquaculture Sector Kenya

Key Players	Role/Profile
Ministry of Agriculture Livestock and Fisheries	<ul style="list-style-type: none"> Mandate is formulation, implementation and monitoring of agricultural legislations, regulations and policies, supporting agricultural research and promoting technology, facilitating and representing agricultural state corporations in the government, development, implementation and co-ordination of programmes in the agricultural sector, regulation and quality control of inputs, produce and products from the agricultural sector, management and control of pests and collecting, maintaining and managing information on the agricultural sector.
Kenya Fish Processors & Exporters Association	<ul style="list-style-type: none"> Mandate is to foster public recognition and support for the sector, to promote high quality fish and fish products and to advocate for the effective management of Inland and marine fish resources
National Aquaculture Research Development and Training Centre	<ul style="list-style-type: none"> Mandate is to spearhead the development of the entire Aquaculture Value Chain (AVC) in Kenya in collaboration with the private sector
National Farmers Information Service	<ul style="list-style-type: none"> Role is to enable farmers to get extension information simply by calling the service or browsing the NAFIS website.
Lake Basin Development Authority	<ul style="list-style-type: none"> Mandate is to carry out integrated sustainable development planning, implement development programmes and projects, coordinate development programmes and activities, promote management and conservation of natural resources and monitor and evaluate development programmes and projects.

Key Players	Role/Profile
Aquaculture Association of Kenya	<ul style="list-style-type: none"> Recognised umbrella body for all fish farmers in Kenya
Kenya Marine and Fisheries Research Institute	<ul style="list-style-type: none"> The Institute is empowered to carry out research in Marine and Freshwater fisheries, Aquatic biology, Aquaculture, Environmental Chemistry, Ecological, Geological and Hydrological studies, as well as Chemical and Physical Oceanography.
Kenya Wildlife Service	<ul style="list-style-type: none"> Conservation and management of wildlife and enforcement of related laws and regulations.
National Environmental Management Authority (NEMA)	<ul style="list-style-type: none"> Oversee the implementation of the Environmental Act, 1999, as well as Kenya's lead environmental watchdog.
Tuna Fisheries Alliance of Kenya (TUFAK)	<ul style="list-style-type: none"> Advocacy on Tuna fishery in Kenya and regionally

Guidelines for fish exports

Ministry of Fisheries - Guidelines for fish exports and imports

Any person intending to export or import fish and fishery products must fulfil the following requirements:

- Be in possession of a valid Fish Trader's Licence which is charged at a fee of KES 300 (USD 2.8) (NOTE: - The fish traders' licence is issued on the strength of the applicant being in possession of a valid Medical Health Certificate.
- Valid Fish Movement Permit. Fish movement permit fees are charged depending on the mode of transport:
 - Vehicle:
 - Not exceeding three (3) tonnes KES 500 (USD 4.7)
 - Exceeding three (3) tonnes KES 1,000 (USD 9.5)
 - Luggage accompanying trader using public passenger carrier vehicle: KES 50 (USD 0.5m)
- Fish processing licence which is charged at a fee of KES 1,000 (USD 9.5) (NOTE: - The licences mentioned above are renewable annually and expire on 31st December)
- Fish Exports
 - Any person intending to process fish and fishery products for export must:
 - Fulfil the requirements for handling and processing fish and fishery products;
 - Comply with The Fisheries (Safety of Fish, Fishery products and Fish Feed) Regulations, 2007; which can be obtained at a fee from the government printers;
 - Apply for issuance of certificate of compliance. On fulfilling the above requirements to the satisfaction of the Competent Authority, the applicant shall be issued with:
 - A permanent reference number.
 - Certificate of compliance
- For every consignment of fish and fishery products to be exported, the following shall apply:
 - The prospective exporter shall complete and submit to the Fisheries department office:
 - Application for export/import permit forms DF/P3 in triplicate
 - Three copies of the invoice
 - Three copies of C 63 or C 29 customs forms
 - Duplicate copies of Field Inspection Report (FIR) for fish and fishery products form
- On approval of the application, the prospective exporter will be issued with:
 - Fish Import/export permit
 - Fish and Fishery products Export Health Certificate
- The Fish Export permit fee is charged at 0.5% ad valorem of market price.
- The Export Health Certificate is charged at KES 1,000 (USD 9.5m) per consignment. (NOTE: - Whenever a consignment of fish is to be exported, the above two documents will be applied for by the exporter and the necessary fees paid for.)
- For live fish exports:
 - A Fish Import/ Export Permit will be issued by the Fisheries Department
 - The Department of Veterinary Services will issue the Export Health Certificate.

Guidelines for fish exports – cont.

Ministry of Fisheries - Guidelines for fish exports and imports

- Fish Imports
 - Any person intending to import fish and fishery products must complete and submit to the Fisheries department office:
 - Three copies of application for export/import permit forms DF/P3
 - Three copies of the invoice
 - Three copies of import declaration form
 - A copy of Export Health Certificate from exporting country
 - On approval of the application, the prospective exporter will be issued with:
 - Fish Export/Import Permit.
 - The Fish Import permit fee is charged at 5% ad valorem of market price.
 - Must be a registered member of AFIPEK

Aquaculture

- To encourage aquaculture, the Kenyan government currently requires no permit to establish fish tanks or ponds.
- The government Aquaculture Department however has certain guidelines for establishing cage farming on Lake Victoria.
- The Aquaculture Department has also established guideline for production of all male Tilapia using Super YY.

Sector Analysis - Kenyan Aquaculture sector SWOT analysis

Strengths

- Government support of the industry - The Kenyan government recognises the importance of aquaculture in relation to food security, poverty alleviation of rural populations, and reduction of fishing pressure in capture fisheries. GoK has to date constructed 46,824 fish ponds in 219 constituencies country-wide.
- Favourable climatic and geographic conditions for a variety of aquaculture species and systems.
- Relative high market prices for fish.
- Less labour intensive than other forms of agriculture.
- Pond bottom mud used to fertilise gardens/fields.

Weaknesses

- Disorganisation within the value chain – Lack of an integrated value chain with access to different market segments.
- Need experts for choice of fish species and appropriate culture.
- Lack of a stable supply of high quality inputs (e.g. water, feeds, fingerlings, technology and capital) hinders the development of intensive fish farming.
- High initial cost for training, pond construction & inputs.
- Mostly done on small scale hence lack in economies of scale that could potentially decrease the cost of running the farms.
- There are no processing plants near most of the fish – breeding areas, causing the farmers to incur high transportation costs as they need refrigerated containers and a good road network.
- Input supply delays and shortages.
- Fish culture inputs, such as feed, are too costly and not readily available locally.
- Lack of trained extension officers.

Opportunities

- Low level per capita consumption compared to other countries in the region.
- Demand for aquaculture products is growing rapidly due to its fast growing population and declining natural fish stocks in Lake Victoria.
- There are only six government accredited aquaculture input suppliers in Kenya.
- Branching into input supply &/or value addition.

Threats

- Lack of support structure and institutional organisation.
- Foreign currency fluctuations pose a threat as most of the fish is for the export market.
- Lack of quality controls in terms of inputs.
- Threat of Kenyan fish bans in foreign markets.
- Need for close proximity to water source.

Challenges and Opportunities

Challenges

- Legal framework is present, under the Department of Fisheries, but needs to be extended to include aquaculture.
- Inadequate supply of quality feed and seed. Farmers have given up fish farming because they ran into large losses after stocking their ponds with low-quality fingerlings and using substandard feed .
- Limited knowledge of aquaculture investment and lack of information on economic performance of various fish farming systems.
- Poor extension services such as provision of piping and pond structures for fish farms, cold storage facilities and refrigerated transport.
- Lack of robust need based research on the sector to help inform investors and create policies.
- Low funding by the government.
- Lack of investment by the private sector.
- Lack of a sustainable mechanism for production and distribution of pond inputs.
- Overfishing in main sources of fish farming.

Opportunities

- Supply of quality feed with excellent nutrition for the development of fish larvae and seed.
 - Seaweed farming. Kenya has a relatively lengthy coastline endowed with a wide variety of habitats for seaweed communities. Kenya produces a group of seaweeds different from Tanzania, Madagascar, Mozambique, and the Indian Ocean coast of South Africa and great potential exists in marine-based seaweed farming.
 - Development of aquaculture as a means of fish production to supplement the dwindling stocks of fish in Lake Victoria. Much of the potential has been identified in mari-culture.
 - A large unexploited capture marine resource. Currently production is at 7,800 tonnes with a potential of 250,000 tonnes per annum.
 - Investment in deep sea fishing logistics including technical support.
 - Production of suitable packaging materials for packaging fish for export.
 - Financing for setting up fish processing plants. Particular emphasis should be put on Tuna at the coast as Kenya is located in the richest tuna belt on the Indian ocean.
- Investment in cold storage and refrigerated transport.

Potential Barriers to Entry

- In Kenya, barriers to entry preventing new entrants from breaking into the aquaculture industry are not high. The include but are not limited to the following:
 - Access to land. Most aquaculture farmers practice small scale farming on less than 1 acre of land. Large parcels of land for practicing extensive farming are either costly or difficult to access;
 - Vertically integration. Most commercial players are vertically integrated in their operations supplying their own feed and seed, producing fish and processing it for the market; and
 - Acquisition of knowledge and skills. Well educated and trained employees who can manage a commercial fish farming venture are hard to come by.

Outcome of the Roundtable Discussions with various stakeholders

Challenges within the aquaculture sector

- The main challenges within the sector are:
 - i. Lack of quality feed. Feed constitutes approximately 50% - 70% of the costs of production;
 - ii. Lack of raw materials and expensive raw material for seed manufacturing;
 - iii. Lack of training/ basic technical knowledge on aquaculture. Most farmers rushed into the business as a result of the ESP and lacked any basic knowledge, experience and training on fish farming;
 - iv. Lack of quality fingerlings for stocking ponds. This was however not a very serious challenge as there were numerous government and private sector hatcheries working on making seed available;
 - v. Lack of finance coupled with high set up/ initial cost of pond infrastructure was also a challenge faced by new farmers as well as those looking to expand;
 - vi. Land was also identified as a challenge for farmers looking to expand and build more ponds or larger ponds;
 - vii. Maintaining fresh water in the ponds, especially for farmers not near a natural source of water;
 - viii. Lack of access to markets by some farmers while other farmers were unable to satisfy demand from their customers;
 - ix. Lack of good technology and equipment to sustain fish farming especially for upcoming small scale commercial farmers;
 - x. Lack of market information i.e. where to source fingerlings, seeds, market, technical knowledge etc.; and
 - xi. Lack of adequate research and development supporting the aquaculture sub-sector.

Possible solutions which would help resolve the challenges

- Some of the solutions discussed during the roundtable include:
 - i. **Feed:** Farmers who can afford to use imported the material from China and Dubai as quality feed sold locally is expensive. Some fish farms are manufacturing their own seed while others use organic feeds. A feed manufacturing plant that manufactures affordable quality feed was proposed;
 - ii. **Training:** the solutions suggested were:
 - Demonstration farms where farmers would physically learn how to operate aquaculture production systems;
 - Linking institutions of higher learning with farmers. This would enable students to be involved with potential employers from an early stage and build their skills;
 - Tailored courses for the farmers i.e. a week at an established farm. Qualification certificates should be issued after a farmer undergoes training;
 - Hatcheries to play an active role in training small scale and new farmers;
 - Inter-county training.
 - i. **Access to finance:** to mitigate high set up costs the following solutions were proposed:
 - Farmers formalising and properly documenting their businesses. Maintaining proper accounting records, developing a business plan and properly separating different businesses would make them more attractive to potential investors and providers of finance;
 - Presenting aquaculture as an industry with well-organised value chains would also attract investment; and
 - Farmers coming together in clusters and organised groups (co-operatives) to increase their bargaining power.

In addition to financing, local players expect investment in aquaculture systems, technology and knowledge transfer from foreign investors

Possible solutions which would help resolve the challenges – Cont.

- iv. Investments in recirculation systems and oxygenation systems were proposed to deal with the problem of access to fresh water;
- v. **Access to markets:** the proposed solutions were:
 - Sensitisation drives by both government and private sector would help increase the market uptake for fish;
 - A network of marketing centers in counties with point men who share information on demand of fish and could help open up markets; and
 - Aggressively seeking out markets as opposed to setting up a stand and waiting for customers. For example home deliveries have proven successful for Joyfish Farm; and
 - A mobile application with all relevant information on aquaculture, stakeholder forums and marketing opportunities were proposed to help with information on the sub sector.

Government Initiatives

- The government through the Department of Fisheries and Aquaculture is supporting aquaculture through the following:
 - i. Marketing outlets developed by GoK;
 - ii. Extension officers to train farmers are available and some private sector players to be licensed to offer services;
 - iii. M-samaki mobile information platform in the pipeline to be rolled out;
 - iv. Field trips via “eat more fish campaign”;
 - v. Demonstration centers at some of the government operated hatcheries;
 - vi. Technology innovations transfer at Kiganjo and Sagana fish farms. Recirculating Aquaculture System (RAS) and intensive catfish production are such examples;

- i. Residual monitoring plan for export to European markets adopted; and
- ii. Training of farmers on post-harvest handling.

Type of collaboration expected by local players

- i. Financing
- ii. Aquaculture systems – foreign investors to offer solutions on circulations systems, cold storage and transportation systems.
- iii. Technology transfer; and
- iv. Technical expertise and knowledge transfer.

The table shows potential public and private sector partners

Potential Investment Partners

Name	Products/services offered	Capacity (tonnes/day)	Company Details
Processors			
1 W.E Tilley (M) Ltd	Nile Perch	60	<ul style="list-style-type: none"> - Process Lake Victoria perch and distribute in fresh or frozen state. - Has an exclusive marketing arrangement with Prime Catch (Exports) Ltd, in Tanzania, who operate an Ultra Modern, State of the Art Fish Processing Plant being constructed and to be run in conformity with the codes of practice set by Directive 91/493/EEC of the European Union, guidelines published by the Codex Alimentarius Commission of the joint FAO/WHO Food Standards Programmes and guidelines set by the Food and Drug Administration of the United States Department of Agriculture. - The plant is considered state of the art in the food processing industry with strict sanitary standards.
2 East African Seafoods Ltd	Nile Perch	40	Part of Alpha Group
3 Alpha Group	Black Tiger Prawns, Banana Prawns, Octopus, Crabs, Lobsters, Squid, Cuttle fish, Scampi, Shrimp, Langostine	n/a	<ul style="list-style-type: none"> - Alpha Group is a conglomerate of companies operating from Sub Saharan Africa and Gulf Countries for last 50 years. - Activities are consolidated in two divisions namely the Marine & Logistics Division and Food Division. - The Groups present annual turnover is in excess of USD 150 Million with total workforce of 7,000. (Including 1,000 indirect employees) - Markets include export to: Spain, Italy, Israel, Portugal, Belgium, Japan and Australia.
4 Peche Foods	Nile Perch	15	<ul style="list-style-type: none"> - Mainly sells locally to supermarkets and export chain to the EU markets. - The factory is based 1.5 KM from Kisumu International airport and 3.5 km from the Kisumu city centre. - The company has approximately 200 employees
5 Capital Fish (K) Ltd	Nile Perch	50	<ul style="list-style-type: none"> - First fish company established on the shores of Lake Victoria. - Has a local community staff of over 250 workers and internationally trained managers. - Established in the early 1990's, the plant is located in Homa Bay on the shores of Lake Victoria - Exports frozen and fresh Nile perch and Nile perch products through Mombasa port to five star hotels and commercial shopping networks in USA, Japan, Middle East and Europe.
6 Fish Processors (2000) Ltd	Nile Perch	25	<ul style="list-style-type: none"> - Fish processing plant located in Kisumu city. - Products include Nile perch fish and filets.
7 Samaki (2000) Ltd	Nile Perch	25	- Fish processing plant located in Nairobi
8 Wananchi Marine Products Ltd	Tuna	100	- Fish processing plant located in Mombasa
9 TransAfrica Fisheries Ltd	Octopus, lobsters, cuttlefish, squids, crabs	29	<ul style="list-style-type: none"> - Established in 1983 to serve local market and later started to export to European market. - Diversified from lake products only to include sea products in 1995. - Built a modern processing plant in 1996.
Fish Farms			
1 Sagana Fish Farm	Tilapia, Catfish	n/a	<ul style="list-style-type: none"> - Established in 1993 in Kirinyaga - Located 2 km outside Sagana town, 105 kilometers Northeast of Nairobi. - Facilities include a hatchery, water quality laboratory, poultry unit, zero-grazing unit, and agro-forestry project.
2 Jambo Fish Limited	Tilapia, catfish Fish marketing Aquaculture products	n/a	<ul style="list-style-type: none"> - Established in 2010. - Located in Kiambu and Muias - Focus is on African Catfish and Natural Male Tilapia (all-male, mono-sex) fingerling production, grow-out and marketing of fish products to local market. - Produces and processes fish with a present capacity of 1,500 kg a week. - Have a state of the art processing plant with processing, packing and storage facilities. - Various aquaculture products include nets, water quality test-kits, thermometers, spawning nets, liners, aeration equipment, graders etc. - Main markets include local farmers and households.
3 Kamiti Fish & Integrated Farm	Tilapia, catfish fingerlings Training Pond construction and set up Aquaculture inputs Extension and marketing services	n/a	<ul style="list-style-type: none"> - Located in Kiambu county - The farm has a hatchery for fingerling production. - Also offer training, pond construction and set up, supply of inputs (feeds, liners and nets), extension services and marketing services. - Main markets include: farmers, individuals, hotels and schools.
4 Omega Farms	Tilapia	n/a	<ul style="list-style-type: none"> - Farm is located in Baringo, Kenya. - Main products include the natural species of tilapia in Lake Baringo.

Contact information is available in the appendix.

The table shows potential public and private sector partners

Potential Investment Partners

Name	Products/services offered	Capacity (tonnes/day)	Company Details
Fish Farms			
5 Mwea Aquafish Farm	Nile Tilapia, Catfish Training Fish feed	n/a	- Farm was established in 2009. - Farm is located in Kirinyaga, Kenya, 110 kilometers North East of Nairobi and 1.5 km from Kimbimbi town. - Facilities include a classroom for training and a fish feed store.
6 Green Algae Highland Fish Farm	Tilapia, Shubunkin, Goldfish sarassa comet, Gold fish yellow comet, Orlando Calicio, Gold fish red comet, Black moore, Gold fish red comet, Red Oranda, Siemese Doll Calico, Red Cap, Oranda, Koi Carp, Ryukin, Oranda Lionhead	n/a	- Farm is located in Sagana - Mainly produces ornamental fish - Hosts local and foreign visitors as well as university students to learn more about ornamental fish farming.
7 Kwetu		n/a	- Located 7 km from Mtwapa town - Mainly practices mariculture, rearing of aquatic organisms and tendering of aquatic plants especially mangrove.
8 Dominion Farms	Tilapia and catfish Fingerlings/ fries Soya oil Rice and by products Livestock upgrading Sugar cane Animal/ fish food processing Agriculture training college	n/a	- Located in Siaya, Kenya - Main markets include Western Kenya, Rift Valley, Nairobi, Eastern Kenya and Uganda - Farm employs 400 farmers and about 1,000 casuals - Largest commercial fish farm in the country - Produces around 1 million fish and fingerlings annually
9 Mabro Fish Farm	Tilapia and catfish Fish feeds	n/a	- Farm located in Siaya county - Main markets include: NGO's working with fish farmers groups, farmers, fish farm cooperatives and County Governments
10 Esupat Fish Farm	Nile Tilapia	n/a	- Located in Loitokitok, Kajiado - Main market is local community
11 Enmick Fish Farm	Tilapia and catfish	n/a	- Located in Kirinyaga county - Main market includes local farmers and government institutions
12 Thamuru Farm	Nile Tilapia, catfish	n/a	- Farm is located in Muranga county - Main market is schools
13 Afic Creative Enterprise	Nile Tilapia	n/a	- Farm is located 7km from Kakamega on your way to Mumias
14 Kitengela Aquafish Farm	Nile Tilapia, Catfish	n/a	- Farm is located in Kitengela, Kenya
15 Hankwa Aquaculture Farm	Nile Tilapia	n/a	- Farm is located in Tana Delta
16 Athi Fish Farm and Hatchery	Tilapia and Catfish fingerlings Fish feeds Grow out for catfish and tilapia Extension services (training and consultancy)	n/a	- Farm is located in Athi River, Machakos - Specialises in recirculation technology
17 Joy Fish and Integrated Farm	Catfish: fingerlings, Feed, farming, processing and training	n/a	- Located in Ruai, Kenya - Main market is direct home delivery
18 Eldofish	Nile Tilapia, Catfish, goldfish Fish feed Pond construction and management Extension services	n/a	- Located in the outskirts of Eldoret, Kenya - Distributes fingerlings and fish to local communities and ornamental fish for export
19 Samaki2		n/a	n/a
20 Sigma Feeds	Cattle, poultry, pig, fish, dog and rabbit feed	n/a	- Company located in Rongai - Established in 1984 - Main markets include: Retailers (Nakumatt, Tusksys, Naivas, Uchumi), Farmers and Distributors
21 Kuza Farms and Allied	Tilapia, Catfish	n/a	- Farm located in Kakamega county - Main markets include hotels
22 Kamuthanga	Tilapia, Catfish	n/a	- Farm located in Kitui - Employs the Recirculating Aquaculture System
Aquaculture Accessories			
1 JEWLET Enterprises	Feed, seed, aquaculture accessories, management, training and consultancy	n/a	- Located in Homa bay - Have two farms producing approximately 900,000 fry a Month - Facilities include a fish feed mill and store, 45 ponds and a room for training farmers

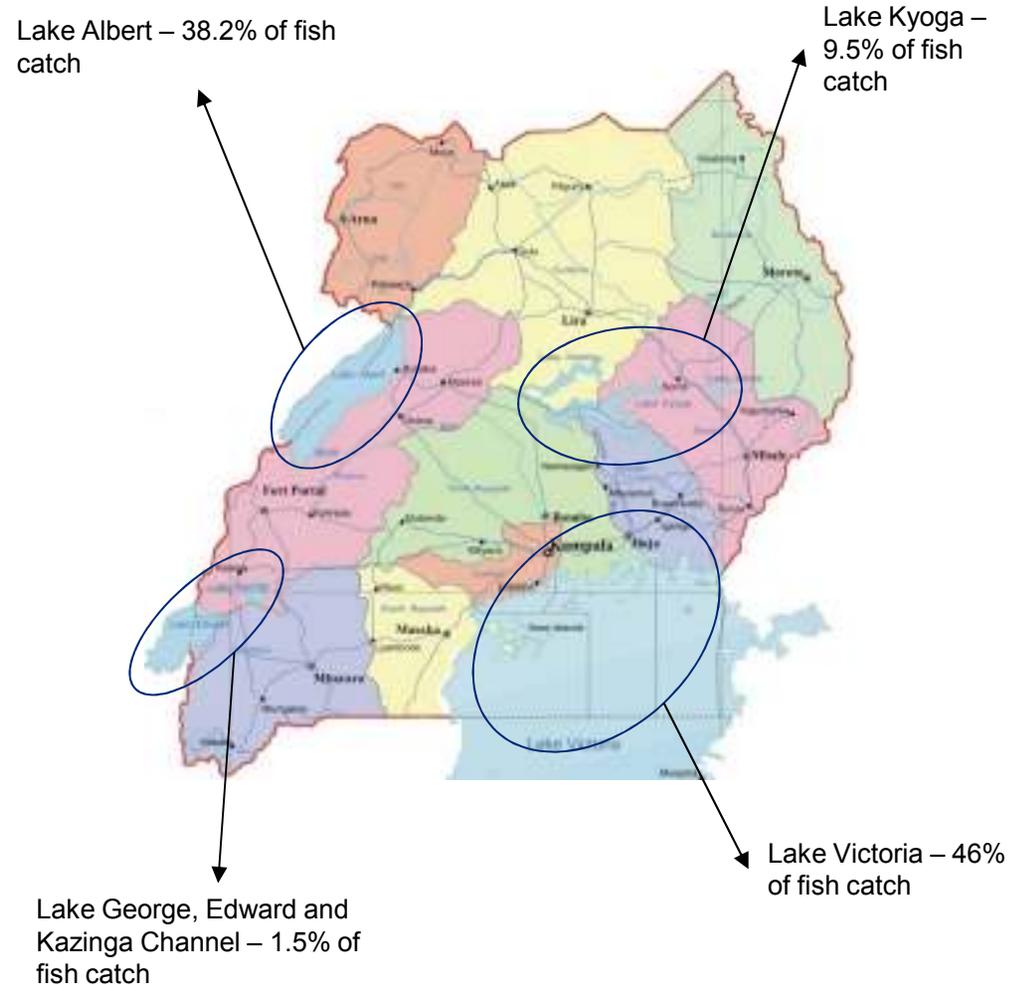
Contact information is available in the appendix.

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Approximately 20% of Uganda’s surface area is covered by water presenting enormous potential for both capture fisheries and aquaculture production

Overview

- Fisheries resources are among the most significant natural endowments in Uganda not only because of their magnitude and diversity, but also because they represent a major source of protein in the diet of most Ugandans. In addition approximately 1 million people are employed and derive income from the fisheries and aquaculture industry. According to FAO, this ranks Uganda third in Africa after Nigeria (approx. 2 million people) and Morocco (approx. 1.4 million people) in terms of people engaged in the fisheries and aquaculture sector.
- The sector has been identified by the Government of Uganda (GoU) as one of the key investment sub-sectors in the agriculture sector with investment opportunities available for fish farming and establishment of more fish processing factories on lakes other than Lake Victoria.
- The fisheries sub-sector in Uganda was the second highest foreign exchange earner after coffee until 2014 when both were overtaken by the tourism sector, currently in first place.
- According to the Uganda Bureau of Statistics (UBOS), fishing was estimated to contribute 3.1% (USD 504m) to the national GDP in the fiscal year 2013/2014 and 13.8% (USD 3,662m) to the agricultural GDP in the same period.
- Approximately 20% of Uganda’s surface area is covered by water presenting enormous potential for both capture fisheries and aquaculture production. The country’s fisheries landscape includes the five large lakes of Victoria, Kyoga, Albert, Edward, George and Kazinga Channel, 160 minor lakes, rivers, swamps and floodplains.
- Nile Perch, Nile Tilapia and Silver Cyprinid are the main species of fish produced in the country. The main export market is the European Union and others include the Middle East, United States, Egypt and South-East Asia.
- The fisheries sub-sector in Uganda is currently governed by The Fish Act (Cap. 197) and the aquaculture sector is regulated by the Fish (Aquaculture) Rules of 19 May 2003 (No.81 of 2003) which are subsidiary rules made under the Act.



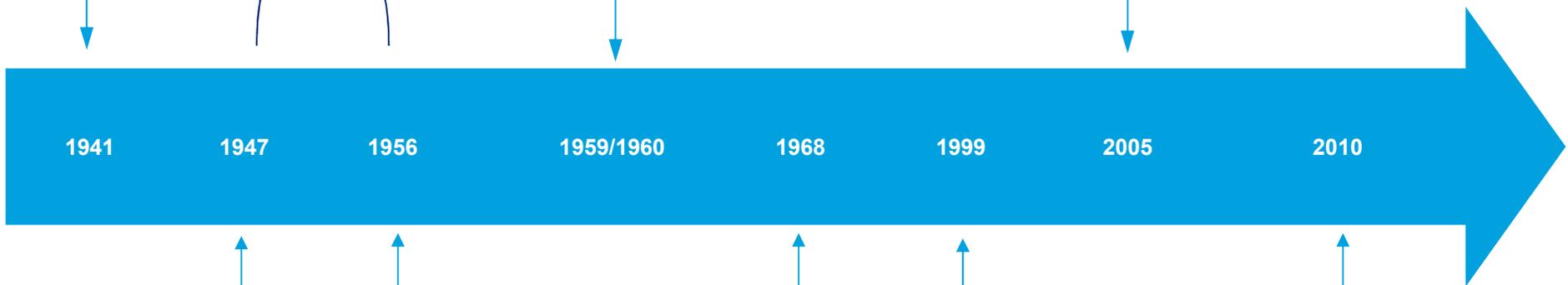
Aquaculture In Uganda : Timelines

- Fish Farming launched in Uganda by colonial authorities.
- Common carp species imported into the country.

- Tilapia adopted as main species for stocking purposes due to possible adverse impact of escaped common carp from fishponds.

- A comparative evaluation by FAO of carp and tilapia endorsed the use of carp and resulted in further expansion of aquaculture in Uganda.

- Due to limited availability of fish seed, carp has fallen out of favour, and North African Catfish, along with Nile Tilapia have taken its place.



- Kajjansi Fish Experimental Station introduced by colonial authorities.

- GoU embarked on a vigorous fish farming extension programme.
- 1,500 ponds were constructed as a result concentrated in central and southwestern regions.

- Department of Fisheries recorded up to 11,000 ponds mostly producing fish for subsistence.

- Until 1999, expansion of aquaculture was hampered as farming was based on supply of seed from farmer to farmer or from government stations.

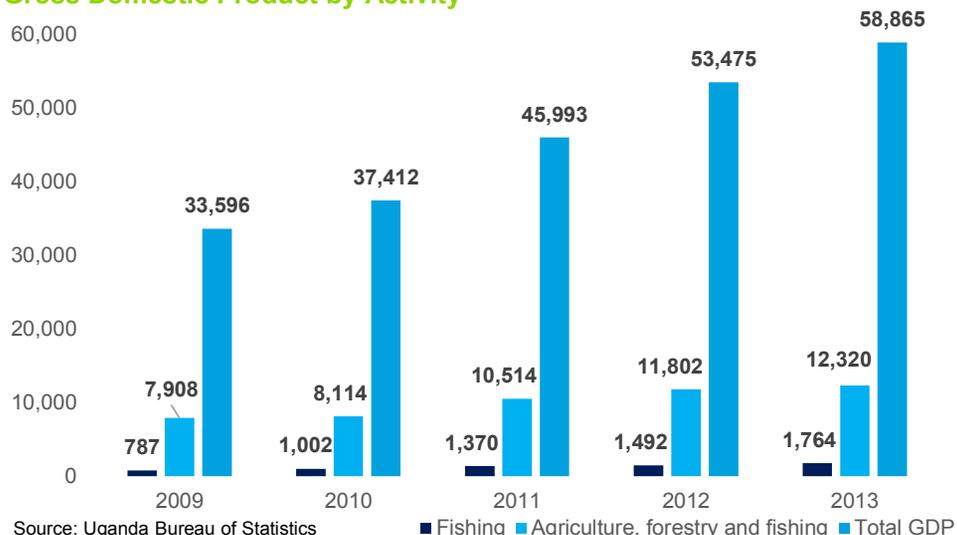
- Adoption of various production systems such as earthen ponds, cages, reservoirs and tanks have led to production of approximately 100,000 tonnes per annum according to the to the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).

Fishing and aquaculture contributed 3.1% to GDP in 2013/2014 representing a significant contribution to the economy of Uganda

Contribution to the Economy

- Uganda has the most developed fisheries sector in the region producing more than double the amount of fish of neighbouring Kenya.
- Aquaculture in Uganda is practiced by subsistence farmers, small scale fish farmers and commercial fish farmers.
- According to the GoU, through the Fisheries Department, the first category of fish farmers practice rural aquaculture (subsistence farming). This is vital in the provision of animal protein to the rural communities, but makes a limited contribution to overall fish production and the national economy.
- The second category of progressive small-scale fish farmers, driven by the pursuit for income and profit, has a more significant bearing on fish production and contributes directly to the rural economy through trade in farmed fish.
- The farmed fish from the third category, the emerging commercial fish farmers, makes a very significant and visible contribution to fish production and the national economy.

Gross Domestic Product by Activity



Source: Uganda Bureau of Statistics
Project Red Velvet- final Report - 05 November 2015

- Fishing contributed 3% (USD 482m) to the GDP of Uganda in the calendar year 2013. It contributed 14.3% (USD 3,365m) to the agricultural GDP in 2013 taking third place after food crops (53.8%) and forestry (15.7%).

Percentage Contribution to GDP

	2009	2010	2011	2012	2013
Fishing	2.3%	2.7%	3%	2.8%	3%

Source: Uganda Bureau of Statistics

Exports

- The quantity of fish exports has continued to drop significantly from 23,251 tonnes in 2009 to 20,087 tonnes in 2013, representing a CAGR of -3.6%. This is mainly due to the decline in fish stock according to Uganda Export Promotions Board (UEPB).
- In spite of the decline in the quantity of fish exports, fish exports registered a CAGR of 3.3% in foreign exchange earnings from USD 111.2m in 2009 to USD 126.7m in 2013. UEPB attributed this growth to the over whelming demand for fish which led to increase on the unit price for fish.

Quantity, Value and Share of Exports

	2009	2010	2011	2012	2013	CAGR FY09 - 13
Quantity (tonnes)						
Fish and Fish Products	23,251	23,376	21,552	22,928	20,087	(3.6%)
Value (USD '000)						
Fish and Fish Products	111,209	127,651	136,218	128,322	126,727	3.3%
Share of total exports (%)						
Fish and Fish Products	7.1%	7.9%	6.3%	5.4%	5.3%	(7.0%)

Source: Uganda Bureau of Statistics

- Internationally, the main export market is the EU and others include Australia, the Middle East, United States, Egypt and South-East Asia according the GoU Department of Fisheries Resources. Nile Perch accounts for approximately 90% (18,000 tonnes in 2014) of fish exports out of Uganda.
- Regionally fish is mainly exported to Democratic Republic of Congo (DRC), South Sudan, Kenya and Rwanda.

At 419,000 tonnes, Uganda is the highest producer of fish in East Africa representing a more established fisheries industry

Production

- The amount of fish captured in Lake Victoria declined marginally by a CAGR of -3.4% as shown on the table below. This was mainly attributed to overfishing coupled with capture of immature fish. This has put the future of the industry at risk as fish are not given the opportunity to reproduce and grow to bigger sizes before they are captured. The table below summarises the quantities of fish from each water body:

Quantity of fish catch by water body

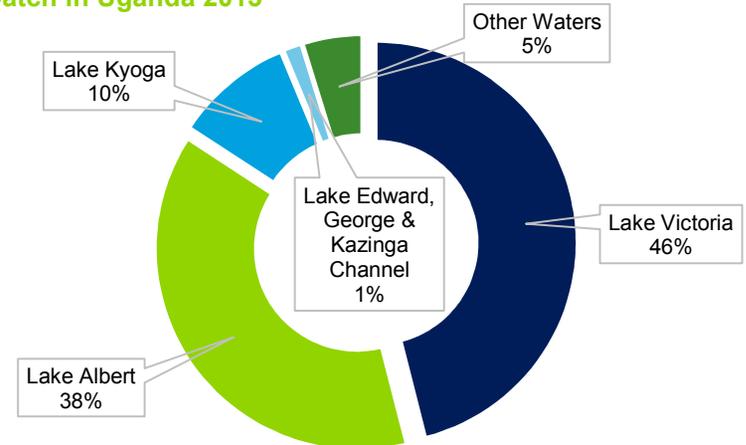
Tonnes '000	2009	2010	2011	2012	2013	CAGR FY09 - 13
Lake Victoria	221	163	176	186	193	(3.4)%
Lake Albert	57	154	164	153	160	29.7%
Lake Kyoga	60	49	62	44	40	(9.6)%
Lake Edward, George & Kazinga Channel	9	5	5	5	6	(8.2)%
Other Waters	20	15	15	20	20	0.0%
Total	367	386	421	408	419	3.4%

Source: Fisheries Department, Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)

- Lake Victoria continues to be the most important water body in Uganda, both in size and contribution to the fish catch. Its share of catch was 41.8% in 2011 rising to 45.5% in 2012 and then to 46% in 2013. It was followed by Lake Albert at 38%, Lake Kyoga at 10%, other waters at 5% and Lake Edward, George and Kazinga Channel at 1%. In 2013, approximately 94% of the fish catch was harvested from Lake Victoria, Albert and Kyoga as shown by the adjacent fish catch pie chart.
- Per capita annual consumption of fish in 2014 was 10 kgs. With a population of 38.84 million, annual consumption is estimated at some 390,00 tonnes.
- Lake Albert and Edward recorded an increase during the period under review. However, Lake Kyoga, Lake George as well as the Kazinga channel recorded a decrease in the fish catch during the period under review.
- Generally, the small increment in fish catch was caused by increased efficiency of Beach Management Units (BMUs) in fisheries management, leading to improvement in species-specific management plans, use of appropriate fishing gears and improvement in understanding on the economics of fisheries development.

- The industry players in conjunction with the Uganda Fish Processors and Exporters Association (UFPEA) have reacted and put a number of measures in place in a bid to fight fishing of immature fish. Independent inspectors are required to check on all fish processing factories, measure all fish processed and cut back on immature fish caught.
- According to the FAO State of Fisheries and Aquaculture 2014 Report, Uganda came in sixth position in the list of major fish producing countries from inland waters capture. Since Uganda is a landlocked country all fish capture stems from inland freshwater lakes, rivers and fish farms.
- However, the country is facing a significant decline in fish catch unless it embraces sustainable fishing practices and respects the ecological balance in river and lake ecosystems to tackle over-fishing, invasive species and habitat degradation respectively.
- Warning signs have already been issued on the declining stocks in Lake Victoria, one of the major sources of inland fish for Kenya, Uganda and Tanzania.

Fish Catch in Uganda 2013

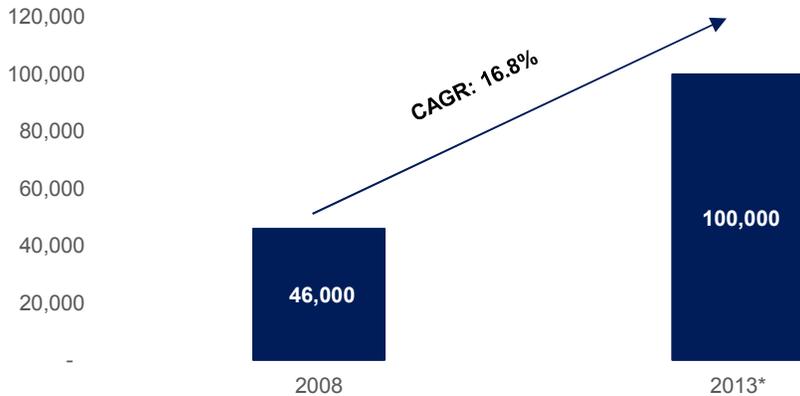


Source: Uganda Bureau of Statistics

Government of Uganda has set a production target of 300,000 tonnes per annum from aquaculture by 2017

Aquaculture Production

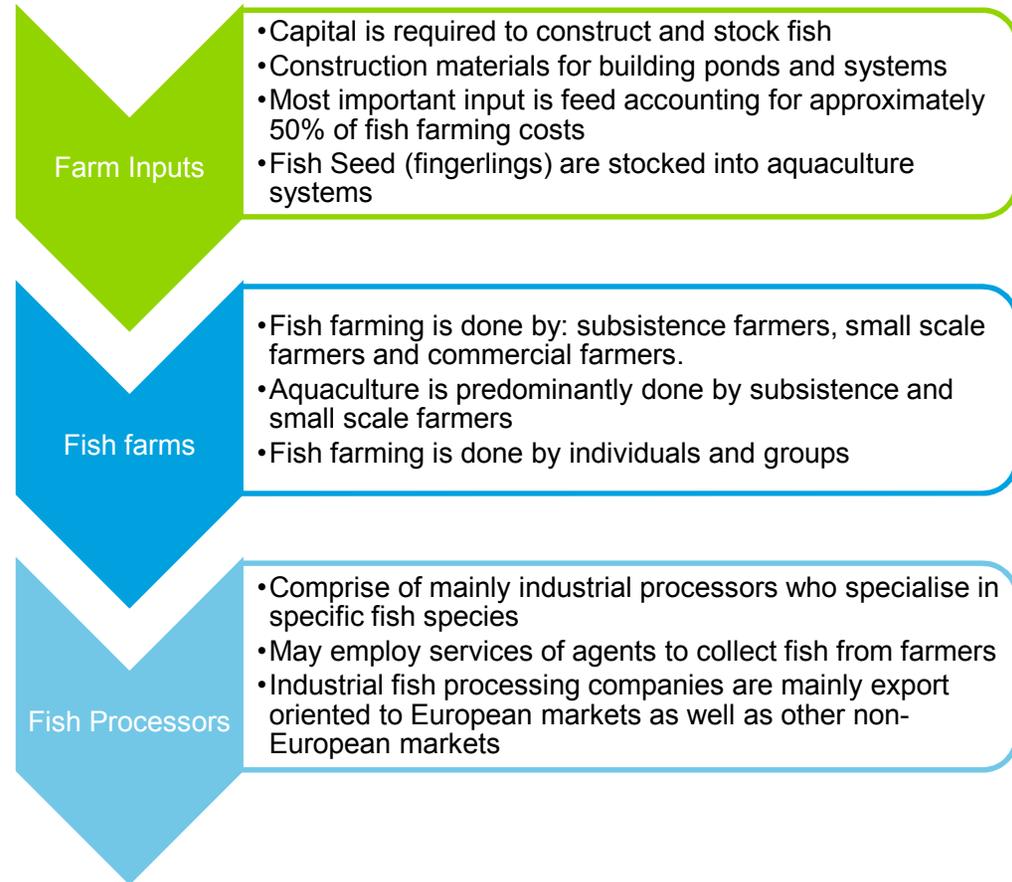
Aquaculture Fish Production Uganda



Source: Ministry of Agriculture, Animal Industry and Fisheries
 * - Supporting data for production figure unavailable

- Production of fish derived from the aquaculture sub-sector grew at a CAGR of 16.8% between 2008 and 2013. According to the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), the increase was as a result of good government policies such as the aquaculture parks investment policy and the upcoming cage fish farming.
- The move to establish aquaculture parks is a reaction to the dwindling wild fish stocks in Uganda’s water bodies and the government has identified development of aquaculture as a means to boost fish production.
- The potential for aquaculture is still not yet fully realised in Uganda according to the government. As a result, the GoU has set a target of increasing fish production from aquaculture to 300,000 tonnes per annum by 2017.
- Adopting modern fish farming practices, restocking of valley dams and minor water bodies, subsidising feeds for farmers and operationalising aquaculture parks are other measures identified by the government to boost aquaculture production in order to achieve the above target.

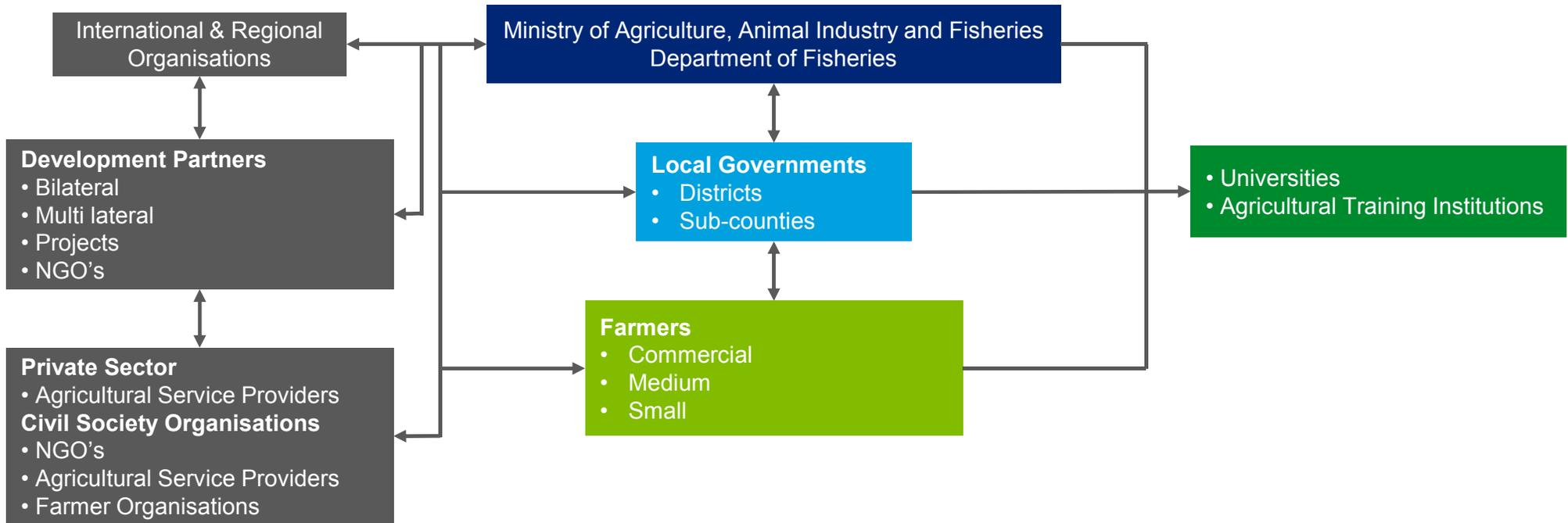
Value Chain



The fisheries sector is governed by Department of fisheries in the Ministry of Agriculture, Animal Industry and Fisheries

Institutional Framework

- The Department of Fisheries Resources is the authority responsible for the certification of fish and fish products intended for local consumption and for export. It is responsible for enforcing fisheries regulation, including carrying out inspection of factory premises, processing lines, landing sites, fish transport and export points for adherence to safety and quality requirements, as well as maintaining a national fish inspection and a quality control system. The authority granted to this department and described in the Fish (Quality Assurance) Rules (1998) originated in the late 1990s ban imposed by the EU on imports of Nile perch from Lake Victoria after various reports of unsanitary conditions and microbial contamination.



Ponds, cages and tanks are the main aquaculture production systems in Uganda

- Farmers in Uganda are engaged in aquaculture through use of various production systems that range between earthen ponds, cages, reservoirs and tanks.

Earthen Ponds

- Earthen ponds are estimated at 25,000 fish ponds covering 10,000 hectares, according to the Department of Fisheries. Organised pond production systems such as in well serviced aquaculture parks are being encouraged by the government for increased fish production.



Earthen Ponds

Cages

- It involves fish growth in a closed net structure fixed into a large water body. The water bodies are lakes, water reservoirs, rivers, dams and valley tanks and production is localised in areas within these water resources.
- Production is spearheaded by the private fisheries sector and production is expected to rise as farmers are seriously taking up cage farming. Fish cage farming has been piloted on Lake Victoria and Katwe. For example a private businessman has set up 250 cages stocked with fish on Lake Victoria.

Cages



Tanks

- Involves fish production in tanks which are power intensive or gravity driven systems and their are expensive. There are very few farmers using tanks, mainly in their backyards. Farmers are hesitant to engage in completely intensive rearing due to expensive materials, and high end technology required in fish farming.

Other Systems

- Government has identified potential of increased production from dams, ponds, minor lakes and valley tanks. Other systems include raceways and other water holding facilities like pens, irrigation streams and a collection of the above systems but are not taking root yet in Uganda due to lack of awareness and high capital investment.



Catfish is the most popular species for aquaculture in Uganda due to its fast growth and ability to feed on mast type of feed

Catfish

- The North African catfish is the most popular species for aquaculture in Uganda and according to FAO contributes approximately 60% of aquaculture production in Uganda.
- It is preferred by rural farmers practicing subsistence and small scale farming and there is a growing regional market for this species. Its main characteristics are its fast growth and ability to literally feed on anything organic available at household level. This species is found in all waters of Uganda, especially those linked to swamps, and it has traditionally been a primary target for a good segment of the fishing community.
- Farming of the catfish in Uganda is mainly limited by the availability of good quality and sufficient fish fingerlings when required by the grow-out farmers.

Nile Tilapia

- Nile Tilapia was until recently the most farmed species in Uganda. It is characterised by good quality growth, easy production of fish seed and good taste among local consumers.
- Nile tilapia was transplanted from Lake Albert to restock Lakes Victoria and Kyoga and several of their surrounding minor lakes and adjoining river systems. Through restocking programmes and aquaculture, it has been introduced in virtually all Uganda waters including shared/ transboundary water bodies.
- The only drawback is its prolific reproduction and the seemingly resultant stuntedness.

Common Carp

- The third most frequent species is the common carp which was first introduced from Israel in 1941 with the aim of stocking the fingerlings in the relatively colder waters of Lake Bunyonyi in Southwestern Uganda.
- However, propagation of this species was only successful in the late 1940s and was first bred by farmers in the early 1950s in the Buganda region in Central Uganda followed by Kigezi in Southwestern Uganda.

- The common carp did much better than tilapia and was preferred by farmers, but its inability to produce sufficient quantity of fish seed, poor extension and change of focus of the post-independence governments did not favour the expansion of carp aquaculture in Uganda. It is currently abundant in some parts of the country, but only as a minor component.

Others

- Other farmed species in Uganda include the Redbelly Tilapia and Trewavas transplanted from Lake Albert along with Nile tilapia and Nile perch from the 1940s in an attempt to augment the fisheries of Lakes Kyoga and Victoria. Although the two species were successfully propagated and distributed, they have not been as successful as Nile tilapia in either natural waters or in fishponds.
- Other species introduced from outside the country include Redbreast Tilapia, Black Bass and Trout. Currently, only Redbreast Tilapia is found in the natural waters as it easily reproduces in the wild while Black Bass and trout need artificial propagation.
- Giant river prawn and the red swamp crawfish have also been introduced and cultured in Uganda waters.



Trewavas



Redbelly Tilapia



Redbreast Tilapia

The Fish Act (Cap.197) is the main legislation managing fisheries in Uganda while the Fish (Aquaculture) Rules, 2003 regulate the aquaculture sector

Regulatory Framework

- The Fish Act (Cap.197) of 1 April 1951 is currently the main legislation managing fisheries in Uganda. There is currently an amendment to the Fish Act currently in the process of being enacted but this has not yet been passed.
- The main legislation regulating the aquaculture sector in Uganda is the Fish (Aquaculture) Rules of 19 May 2003 (No.81 of 2003) which are subsidiary rules made under the Act. The Rules set forth the different permits that are required to engage in aquaculture, their modalities of issuance, the prescribed offences and penalties under the Rules. They specify aquaculture inspectors' powers, promote responsible aquaculture activities, prescribe conditions for fish seed production, fish transfers, live fish imports and exports.
- The Fish (Beach Management) Rules, 2003 provide, for purposes of the Fish Act, for the management of beaches by establishing a Beach Management Unit at all gazetted fish landing sites and providing for the election of Beach Management Committees, which shall manage their respective Beach Management Unit. Fish (Quality Assurance) Rules, 2008 provide control of quality and hygiene of fish and fish products.

Fisheries and Aquaculture

- Fish act Chapter _ 197
- The Fish (Aquaculture) Rules, 2003
- The Fish (Beach Management) Rules, 2003
- The Draft National Policy on Fisheries Management and Development of small Fishes
- The National Fisheries Policy
- National Investment Policy for Aquaculture Parks

Environment and Water Resources

- Water Act (1995)
- Environmental Act (1995)
- National Water Policy (1999)

Animal (fish) Disease, Food Safety and Public Health

- The Public Health Act 1964 (Meat and Milk Rules)
- The Food and Drug Act 1964
- The Animal Breeding Act 2000
- The Food Safety Bill

Policy Framework

- The National Fisheries Policy of 2004 provides strategies to ensure sustainable exploitation of the fisheries resources at the highest possible levels, thereby maintaining fish availability for both present and future generations without undermining the environment.
- The policy sets out concentrated aquaculture production areas, known as Aquaculture Parks, which will create production thresholds that are required to overcome the major constraints and challenges that have resulted in under performance of the aquaculture subsector.
- There are no specific policies on aquaculture although the GoU has expressed interest in developing an aquaculture policy, strategy and action plan.

International Arrangements

- Internationally, Uganda is a party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Biological Diversity (CBD) and is a member of the World Organization for Animal Health (OIE) and of the World Trade Organization (WTO). Uganda also has access to the Kyoto Protocol and has ratified the Cartagena Protocol on Biosafety.
- Regionally, Uganda is a Party to the African Convention on the Conservation of Nature and Natural Resources.
- Concerning Lake Victoria, the three riparian States (Uganda, Tanzania and Kenya) adopted the Convention for the Establishment of the Lake Victoria Fisheries Organization in 1994 whose main objective is to promote the conservation and sustainable utilization of the living resources of the lake. The Organization has developed a regional strategy for aquaculture research and development in the Lake Basin.
- Concerning the Nile River, the Nile Basin Initiative is a partnership initiated and led by the riparian states of the Nile River through the Council of Ministers of Water Affairs of the Nile Basin states. The Initiative seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security.

Government Incentives, Investments and Interventions

Government Investments

- According to the Agricultural Sector Development Strategy and Investment Plan (DSIP): 2010/11 – 2014/2015 aquaculture acreage and tonnage is set to increase.
- To this end government investments in aquaculture will cover:
 - Identifying priority functional areas to be implemented with the actors, time frame, resource requirements and monitorable indicators for progress;
 - Improving the economic evaluation of potential investments to improve the selection of more technically and cost-effective solutions;
 - Developing appropriate mechanisms for cost sharing and funding of aquaculture interventions;
 - Establishing five aquaculture parks;
 - Clarifying the institutional adjustments necessary in MAAIF for effective implementation;
 - Preparing a time bound action plan for implementing the DSIP proposals;
 - Preparing guidelines for operation and maintenance for “Pond Management Units” and associations;
 - Preparing training materials for small-scale pond operators, private service providers, local government and central government staff, extension agents etc.;
 - Training farmer’s groups in stocking methodology, harvesting and water control and management; and
 - Building capacity to provide aquaculture investors with a range of information on structures, husbandry and feeding/health care.

Government Incentives

- A government strategy initiated to support a number of enterprises to increase volumes and quality for the export markets (Sub-programme 1.8: Promoting Strategic Enterprises) lists some interventions eligible for support under the programme.

Production	Processing	Marketing
<ul style="list-style-type: none"> • Multiplication of fish fry • Restocking of small and large water bodies • Fisheries research • Advisory services • Water for fish production and management • Production information • Monitoring, control and surveillance • Fisheries institutional development • Regulatory services for fisheries inputs 	<ul style="list-style-type: none"> • Primary processing • Industrial research • Technology acquisition • Public-private partnerships along value chains • Long-term financing 	<ul style="list-style-type: none"> • Market information system • Market linkages and access • Market intelligence • Market research • Market infrastructure • Storage infrastructure • Product quality control • Product certification

Government Interventions

- The GoU has laid out some interventions in the Agricultural Sector Development Strategy and Investment Plan: 2010/11 – 2014/2015 to support the fisheries sector. The interventions include:
 - Strengthening fish quality assurance and management;
 - Enhancing Fisheries Regulation and Control;
 - Enhancing production and development of capture fisheries;
 - Enhancing aquaculture development and management; and
 - Improving fisheries statistics and information gathering, processing, storage and use.

Uganda Aquaculture sector SWOT analysis

Strengths

- Government support of the industry - The GoU promotes investment in the aquaculture sector and continues to create a conducive investment climate.
- Favourable geographic location and resource in Lake Victoria with conducive climate (warm weather).
- Well developed export processing sector.
- Potential developments in other lakes.
- Less labour intensive than other forms of agriculture.
- Pond bottom mud used to fertilise gardens/fields in an integrated system.
- Good traditional management, resources and research capacity.
- Aquaculture development capabilities at varying levels

Weaknesses

- Disorganisation within the value chain – Lack of an integrated value chain with access to different market segments.
- Need expertise for choice of fish species and appropriate culture.
- Lack of a stable supply of high quality inputs (e.g. water, feeds, fingerlings, technology and capital) hinders the development of intensive fish farming.
- High initial cost for training, pond construction & inputs.
- Mostly done on small scale hence lack in economies of scale that could potentially decrease the cost of running the farms.
- Input supply delays and shortages.
- Fish culture inputs are too costly and not readily available locally.
- Lack of trained extension officers.

Opportunities

- Manufacture of value added fish products to improve the export value of the existing harvest;
- Local and regional cold distribution chain to reduce post-harvest loss and deterioration;
- Set up of a drying facility with special spicing and cold smoking features for production of dry/smoked fish;
- Production of value added by-products such as skins and carcass for use as raw materials for products such as gelatin, glue, fish oil and fishmeal;
- Fish export marketing.;
- Aquaculture in Uganda is mainly practiced at a subsistence scale. There is potential for substantial investment for large-scale fish farming to supplement reduced fish production from traditional sources;
- Setting up of nurseries and hatcheries for quality seed and fingerlings for stocking of fish farms; and
- Production of high quality feed that meets international standards.

Threats

- Inadequate knowledge on the status of fish stocks in all water bodies on the basis of which to establish sustainable levels of fishing;
- Loss of biodiversity;
- Inadequate facilities for seed multiplication and artificial propagation for restocking and stock enhancement;
- Breeding and nursery grounds are not identified, mapped and gazetted;
- Inadequate capacity of BMUs in fisheries management;
- The resurgence of water hyacinth and the emergence of new weeds;
- Lack of species-specific management plans;
- Prevalence of HIV/AIDS in the fishing communities;
- Inadequate mechanisms for fishing communities to save and invest;
- Lack of clear understanding on the economics of fisheries development; and
- Lack of feeds to sustain the real opportunities in aquaculture

Outcome of the Roundtable Discussions with various stakeholders

Challenges within the aquaculture sector

- One of the main challenges currently facing the fish industry is that tilapia fish has become increasingly expensive as a result of inadequate supply due to depletion. The fish available in the market are immature fish which does not allow the farmer make maximum returns from the business.
- There are Associations that have been formed within the aquaculture sector such as WAFICO – Walami Fish Corporation Services. The major challenge faced by the Associations is that members join with the expectation to receive money. When money is not forthcoming, the farmers stop attending the Association meetings. As a result, the Associations do not know who their members are and are unable to mobilise them for capacity building.
- Low quality and quantity of feeds is another main challenge. Feeds that are prepared locally are often of low quality because the producers have no knowledge about the right mix of ingredients to manufacture fish feed for different stages of growth. As a result, fish harvested are a small size even after attaining maturity leading to farmers holding more stock and making less sales. The supply of feeds is also not steady. Sometimes the producers stock out which is detrimental to fish farmers. Some farmers have resorted to importing machines from China to prepare their own feeds. Unfortunately, spreading out investments instead of focusing on fish farming causes the farmer's growth to remain stagnant.
- Many farmers do not keep records and it therefore difficult to determine the financial performance of the fish business, Most farms are not registered as businesses which makes it difficult to keep track of them and even harder to connect them to investors.
- Most farmers lack the funds to expand their fish farming businesses.
- There is a shortage of skilled labour. The qualified people who graduate at from the University with technical skills do not seek employment within the aquaculture sector. They prefer to work with established businesses i.e. processors and fishermen. Those who are willing to work do not have the necessary technical skills since they are often Diploma holders.
- Farmers have a challenge when it comes to maintaining the right temperature for hatching the fish. It is expensive to have incubators so farmers rely on natural weather resulting in lower production.
- Lack of diverse fish species. Many farmers have specialised in Tilapia while there are fewer farmers who produce other species of fish i.e. catfish
- Lack of production planning within the sector. Sometimes it is difficult to obtain fish during the year and as a result consumers have to wait for almost 8 months before the next supply.
- In Uganda, fish farmers often work individually and not in a group or association. In China farmers borrow money as a group because Banks easily lend to groups rather than individuals. This enables them to collectively grow their business and thus increase fish production.
- Lack of proper training and aquaculture specialists within the sector. Many farmers who have no knowledge about fish farming have been misguided by aquaculture service providers in the market especially in terms of pond sizes, the number of fish per pond, the quality of feeds and fish feeding patterns.
- During the dry season, there is a shortage of water which greatly affects the fish harvests in some parts of the country. This is a deterrent to farmers who live in areas affected by drought.
- Lack of technology. Uganda is still several years behind in terms of technology. Farmers are unable to afford and sustain high tech machinery which would otherwise simplify the running of the business and increase production. For instance in South Africa farmers use machines manned by one person to supply feed to a thousand ponds at the same time.

Outcome of the Roundtable Discussions with various stakeholders

Possible solutions which would help resolve the challenges

- Government to provide extension services to farmers by training them on fish farm management. In addition, government should increase the number of extension officers at district level.
- It was proposed that to avoid exploitation by the aquaculture service providers, Government should come up with guidelines to regulate them to avoid fluctuating quality and exploitation of farmers. Service providers include the feed producers, pond constructors among others. Feed producers should be certified to ensure all their produce are of the right formula mix.
- Farmers should buy feeds and fingerlings directly from producers and farmers respectively and avoid dealing with middle men. Farmers should also follow feeding charts to avoid producing small sized fish.
- Investment is required to set up farms for producing fish feed ingredients like soya and maize.
- To build aquaculture skills within the sector it stakeholders proposed that all fisheries students at the university should be sent to e.g. Lake Kyoga or other established aquaculture farms for one semester to acquire practical experience.

Opportunities and potential within the sector

- There is high demand for fish compared to supply. There is, therefore, a need to increase fish production to meet the growing demand.
- Similarly, there is high demand of fish feeds compared to the supply. Consequently, there is an opportunity to invest in feed manufacturing.
- In areas which suffer drought during the dry season, there is an opportunity to invest in the construction of reservoirs to supply clean water to the farmers.
- In order to have an efficient, adequate and more accurate feed supply process to the ponds, some of the high tech machinery which can do this is required. There is an opportunity for investors who are able to provide, maintain and sustain such machinery.

The type of collaboration expected from foreign investors

- The type of collaboration / Partnership could be in the form of:-
 - Equity stakes i.e. shareholding;
 - Technical assistance; and
 - Co-investment in projects.

The table shows potential public and private sector partners

Potential Investment Partners

Name	Products/services offered	Capacity	Company Details
Processors			
1 Byansi Fisheries Co. Ltd.	Nile Perch, Tilapia	20 tonnes/day	- Located in Kalisizo, Rakai
2 Fishways (U) Ltd.	Nile Perch, Tilapia	20 tonnes/day	- Located in Entebbe, Wakiso - Owned by W.E Tilley (M) Ltd
3 Fresh Water Fish Exporters Ltd.	Nile Perch, Tilapia	25 tonnes/day	- Located in Bukakata, Masaka
4 Gomba Fishing Industries Ltd.	Nile Perch, Tilapia	30 tonnes/day	- Located in Jinja and is a subsidiary of Fourways Investment Ltd - The processing plant is rigged to produce cold and hot-smoked filets or split whole fish (Nile tilapia and Nile perch) for both export and local urban markets. - Exports to Europe, the United States, and Asia. - Gomba is the only factory in Africa to operate a fish tannery utilising the raw skin of the Nile Perch. - The company has began Tilapia and fresh water prawn farming.
5 Greenfields (u) Ltd.	Nile Perch, Tilapia	40 tonnes/day	- Located in Entebbe, Wakiso. - The company has 200 employees. - Annual turnover ranges between USD 5 -10 million to Europe, Japan and America. - The company is also involved in fish farming especially farming fingerlings
6 Lake Bounty Ltd.	Nile Perch, Tilapia	50 tonnes/day	- Located in Kampala - Processing plant has E.U approval and FDA certificate for export to the European Union and other world markets (over 20 markets).
7 Igloo Food Industries Ltd.	Nile Perch, Tilapia	25 tonnes/day	- Located in Majanji, Busia
8 Marine & Agro Export Processing	Nile Perch, Tilapia	80 tonnes/day	- Established in 1992 - Located in Jinja - Largest fish processor and exporter of fish in Uganda exporting to global markets
9 Ngege Ltd.	Nile Perch, Tilapia	21 tonnes/day	- Located in Kampala - Ngege Ltd. is a subsidiary of Fourways Investments Ltd. With branches in Masaka, Mpigi, Mukono, and Luzira - Has cold storage facilities with a storage capacity of 280 metric tons and two chillers which can store 10 metric tons each. - Processes chilled and frozen freshwater fish and fish by-products for export. - Produces an average of 500,000 kilograms of fish and fish by-products each month.
10 Oakwood Investments Ltd.	Nile Perch, Tilapia	25 tonnes/day	- Located in Kasansero, Rakai
11 Tampa Fisheries Ltd.	Nile Perch, Tilapia	20 tonnes/day	- Located in Entebbe, Wakiso
12 Uganda Fish Packers Ltd./ Unifoods Ltd	Nile Perch, Tilapia	80 tonnes/day	- Located in Kampala - Subsidiary of Alpha Group - Processing plant meets European Union council directives - Raw material chill room has a 50 tonne capacity - Has two plate freezers and two blast freezers for chilling or freezing products. - Has 300 tonne capacity cold store for frozen products and 100 tonne capacity chill room for fresh products
13 Ifira (U) Ltd.	Nile Perch, Tilapia	n/a	- Located in Kampala - Main export markets include: Africa, Asia, Middle East and Europe - Employs more than 100 employees
Fish Farms			
1 Aqua World	Fry production and cage culture	n/a	- Located in Masaka
2 Cygnet Services (U) Ltd	Tilapia	n/a	- Tilapia grow out farm - Located in Kawuku, on shore of Lake Victoria
3 Edrhon Fish Farm	Tilapia, catfish Fingerlings	n/a	- Small scale farm located in Kampala
4 Ekitangaala Fish Farms	Tilapia	n/a	- Located in Kitangala - Export around 250 tonnes annually
5 Fish Farms Enterprises Limited.	Catfish fingerlings	n/a	- Located in Kampala
6 Iganga zone fish farmers association (IZFFA)	Seine, transport gear, marketing and coordination, technical advice and training	n/a	- Located in Iganga
7 Kajjansi Aquaculture Research and Development Centre (KARDC)	Tilapia, catfish	n/a	- Located in Entebbe - Has received substantial investment by the Chinese - Utilises the recirculating culture systems

Contact information is available in the appendix.

The table shows potential public and private sector partners

Potential Investment Partners

Name	Products/services offered	Capacity	Company Details
Fish Farms			
8 Kabeiura Farmers Limited	Tilapia and catfish fingerlings	n/a	- Located in Bushenyi
9 Kigezi Fish Farm	Catfish fingerlings Common carp feed	n/a	- Located in Kabale
10 Kiicota Integrated Farm Limited	Tilapia, catfish	n/a	- Located in Serere - Main markets include FAO, local farmers and export to Tanzania
11 Kitangala gardens and fish ponds Ltd	Catfish	n/a	- Located in Kasenge
12 Kitintale Fish Farm	Catfish	n/a	- Located in Kitintale
13 Mpigi Fish Farm and Water Supply	Pond construction, renovation, training, tilapia fingerlings, catfish fingerlings Air pump repair	n/a	- Located in Mpigi
14 MUSO4 F Enterprises	Tilapia fingerlings, catfish fingerlings, hatchery design, pond construction, renovation, training and extension services	n/a	- Located in Iganga
15 Namuyenge Mixed Farmers Ltd	Tilapia fingerlings, catfish fingerlings, fish feed	n/a	- Located in Mukono - Main market includes local market and neighbouring countries - Currently produce 5 tonnes of fish and 200,000 fingerlings - Aim to produce 30 tonnes of fish per annum
16 PACO fish farm	Tilapia, catfish, mirror carp	n/a	- Located in Wakiso
17 Rock Springs Fish Farm Ltd	Tilapia and catfish fingerlings	n/a	- Established in July 2005 - Located in Tororo
18 Samarieza Mixed Farm Limited	Catfish	n/a	- Located in Kampala
19 Scapa Fish Farm	Catfish, tilapia and common carp	n/a	- Located in Kamuli - Facilities include a hatchery as well as a grinder and mixer for feed production
20 Shalom Fish Farm Limited	Tilapia, catfish, fish fingerlings, fish pond construction, fish cage installation and marketing services	n/a	- Located in Kirombe - Main markets include private farmers, farmer groups and investment clubs
21 Source of the Nile Fish Farm	Tilapia	n/a	- Farm located in Jinja on a 900 acre piece of land - Largest commercial fish farm in Uganda - The farm produces 500,000 fish fries per month mainly sold to small scale farmers - Located on Lake Victoria where it becomes the River Nile - Exports mainly to Europe as well as to neighbouring Kenya
22 Sunfish Farms Ltd	Catfish, tilapia, training	n/a	- Began operations in 1997 - Located in Kajjansi
23 Umoja Fish Farm	Catfish, tilapia, goldfish	n/a	- Located in Kampala - Has a recirculation system - Main market includes local farmers
24 Walimi Fish Farmers' Cooperative Society	Catfish, tilapia and common carp	n/a	- Located in Kampala - It is a legally registered fish farmers' co-operative.
Feed Suppliers			
1 Ugachick Poultry Breeders Ltd	Fish feed	n/a	- Established in 1992 - Located in Kampala
Equipment Providers			
1 Aquaculture Management Consultants Ltd.	Farm planning, design and construction, extension services, training, fish farming supplies and gear	n/a	- Located in Kampala
2 Pearl Aquatics Limited	Production of cages Professional management Tilapia	168 tonnes	- Located in Garuga - Exports to Democratic Republic of Congo (DRC)
3 Uganda Fishnet Manufacturers	Fishnet manufacturer		- This is the largest manufacturer of lake fishnets in East Africa. - The company is part of the IPS Group, the Industrial activities Arm of the Aga Khan Development Network. - Annual sales range between USD 1 - 2.5million.

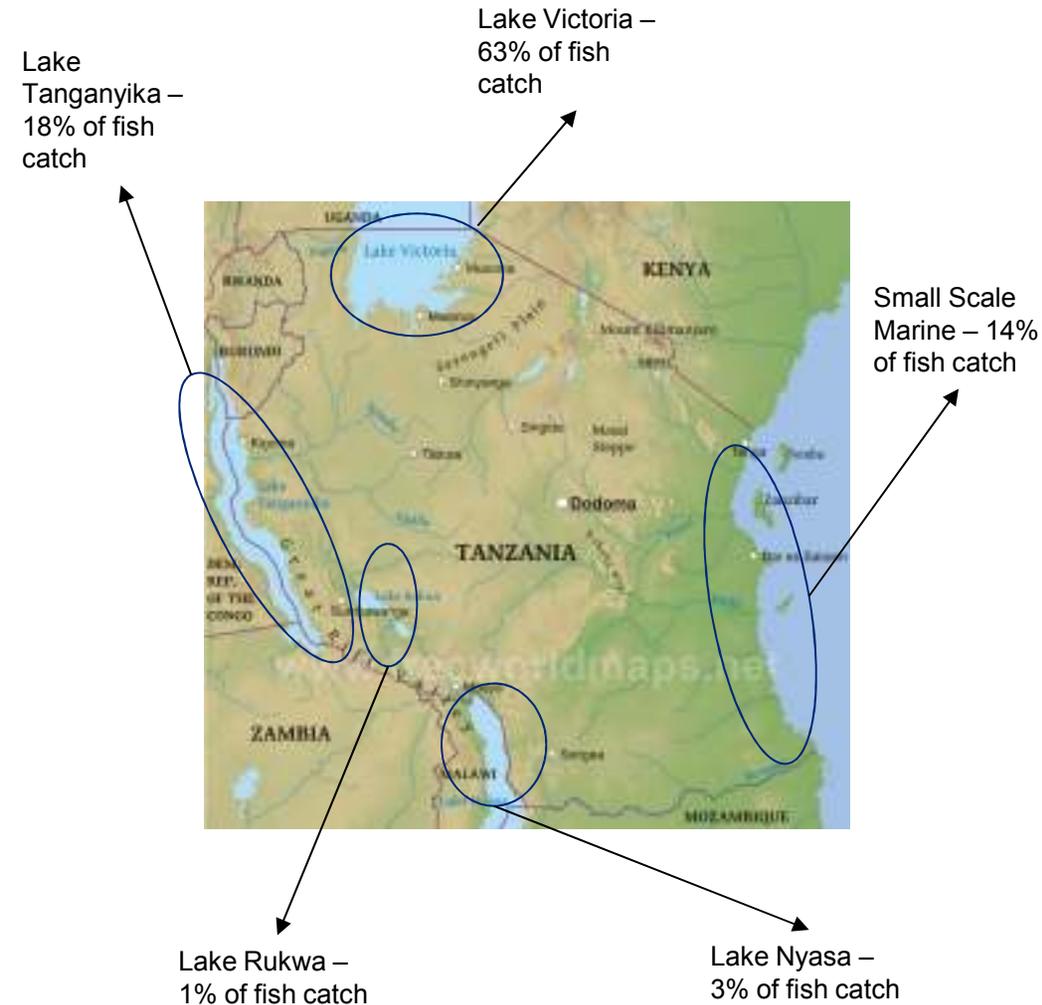
Contact information is available in the appendix.

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Uganda	36
Tanzania	52

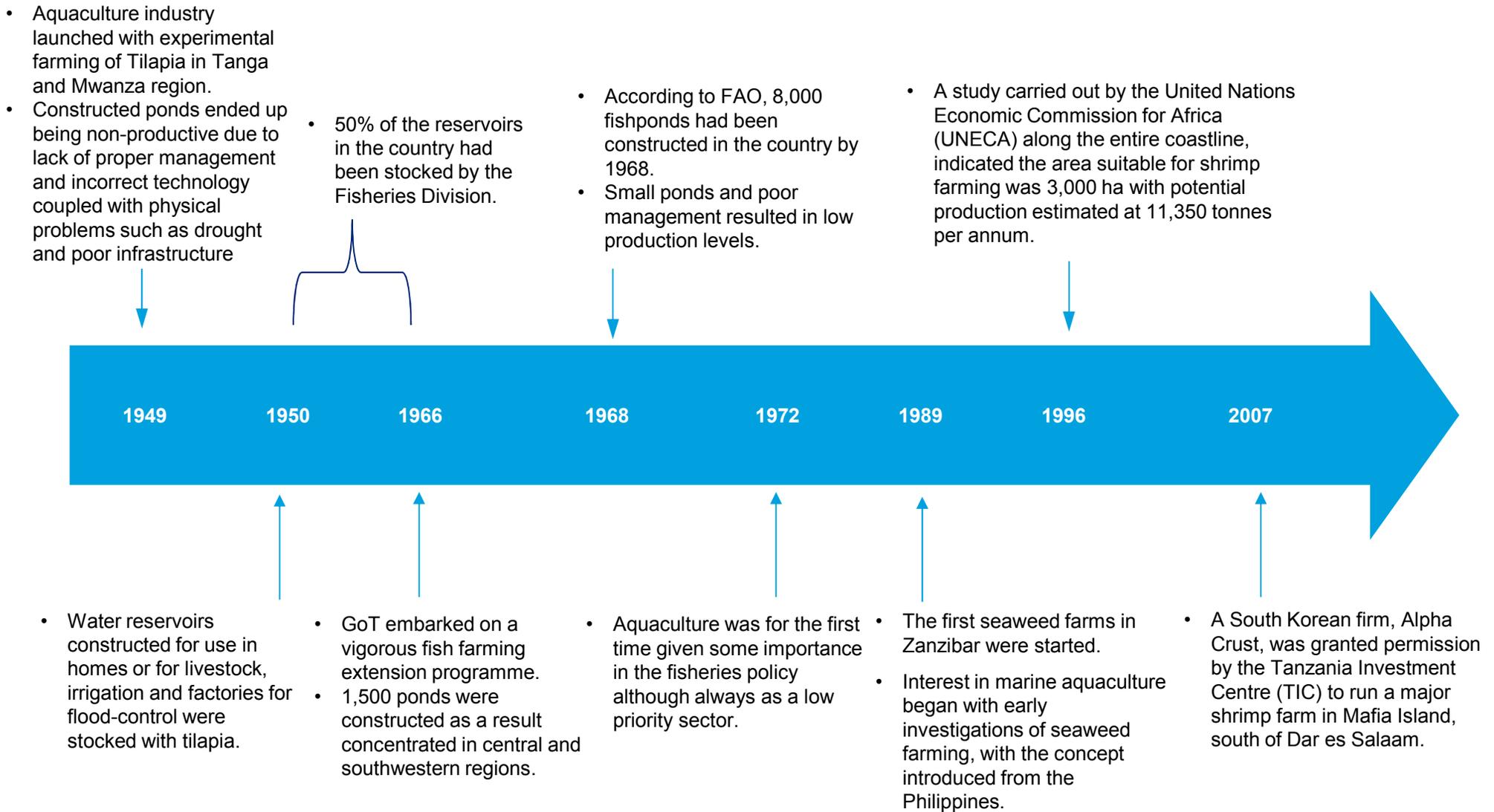
Tanzania has the potential to produce over 730,000 tonnes of fish per annum from Aquaculture

Overview

- Tanzania is endowed with fishery resources both marine and inland. The fresh water includes the shared waters of East African great lakes namely Lake Victoria, Tanganyika and Nyasa which cover an area of 53,480 sq. km. The country also has other small natural lakes, manmade lakes, river systems and many wetlands with fish potential. All these water covers around 62,000 sq. km. The marine water covers 64,000 sq. km as territorial waters and 223,000 sq. km as offshore waters, the EEZ.
- The country has one of the longest coastlines in Africa, about 1,424 km of the Indian Ocean, including Zanzibar and Pemba islands, which has not yet been exploited.
- Total fish production in Tanzania (including aquaculture) was approximately 368,000 tonnes in 2013. Aquaculture was only approximately 2,998 tonnes.
- According to the Government of Tanzania (GoT), the fisheries and aquaculture sector supported a total of 202,654 people in 2013 directly mainly fishermen/farmers deriving their livelihood from various fishery resources in the country. The fisheries sector indirectly supports more than 4 million people engaged in related fisheries activities.
- Fisheries and aquaculture contributed 1.4% (USD 3.45m) to the National GDP in 2013.
- According to the FAO State of Fisheries and Aquaculture 2014 Report, Tanzania came in eighth position in the list of major fish producing countries from inland waters capture.
- Seaweed farming has been recognised as offering potential for significant production volumes. The country has also been identified as having a huge potential for shrimp culture off the coast.



Aquaculture in Tanzania - Timelines

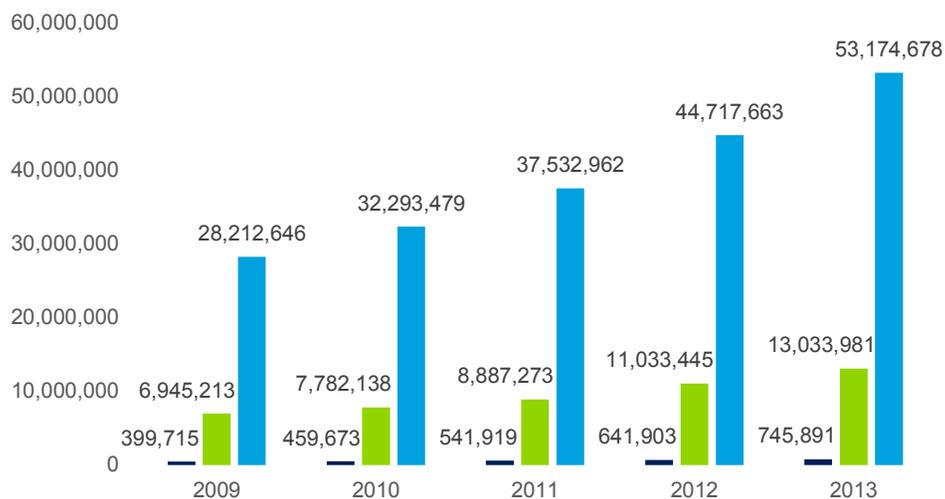


Fishing and aquaculture contributed 1.4% to GDP in 2013 representing a relatively small contribution to the economy

Contribution to the Economy

- The fisheries sector in Tanzania has a role to play in the economic and social wellbeing of the country particularly in supply of animal protein, income generation, employment and recreation, tourism and food security all of which are crucial for the attainment of the Millennium Development Goals.
- Fish production in Tanzania is mainly designated for local consumption with approximately 10% (38,574 tonnes) of fish produced being exported in the year 2013.

Gross Domestic Product by Activity (TZS millions)



Source: 2013 Statistical Abstract Report ■ Fishing ■ Agriculture, Hunting and Forestry ■ Total GDP

- The fisheries sector in Tanzania is still a relatively small contributor to GDP and its share has stagnated at 1.4% (USD 3.45m) of GDP between 2009 to 2013. The sub-sector grew by a CAGR of 16.9% between 2009 and 2013. The sub sectors growth was almost at par with that of the agriculture, hunting and forestry sector which grew by a CAGR of 17% as well as that of GDP which grew by a CAGR of 17.2%.

Estimated Fish Consumption

	2010	2011	2012	2013	CAGR FY09 - 13
Population size	40,000,000	40,000,000	44,929,002	44,929,002	3.9%
Imports of fish/fish products (kg)	2,759,772	3,216,671	4,885,689	6,642,398	34%
National fisheries production(kg)	347,156,950	341,065,980	365,023,000	367,854,000	1.9%
Aquaculture production (kg)		222,000	3,628,500	2,977,500	n/a
Export of fish/fish production (kg)	39,771,834	37,996,400	41,394,268	38,573,600	(1)%
National fish consumption (kg)	310,144,888	306,228,218	332,142,921	338,900,298	3.0%
Per capita fish consumption (kg)	7.8	7.7	7.6	7.7	

Source: 2013 Fisheries Annual Statistics Report

- The contribution of the aquaculture sector to national food security and economic development is still insignificant. Annual farmed fish production in 2013 is estimated at 3,000 tonnes, approximately 0.815% of the average annual fish production. Due to this low share of total production, the impact on poverty alleviation is therefore also insignificant. The possibility of an adverse impact on the environment is also insignificant since most farming is still at subsistence level.
- At present, aquaculture is largely a subsistence activity practiced by poor households in the coastal and inland areas but the benefits arising from it are several: it contributes to people's requirements for animal protein, particularly in the rural areas; it provides employment opportunities and is a source of income.
- The sector supports more than 4 million people engaged in related fisheries activities including processing, trading, fish transporting, net making and boat building.
- In 2013, per capita consumption was estimated about 7.7 kilograms (kg). Total fish consumption increased from approximately 310,000 tonnes in 2010 to 339,000 tonnes in 2013.

Fish production and value in the country have indicated increased trend over the recent years (2002-2013) with the highest quantity of 375,535 tonnes of fish landed in 2005

National Fish Production

- The Tanzanian fishery sector is mainly artisanal with very few commercial/industrial vessels of purse seines and long liners owned by DWFN, which operate under licensing agreements in our EEZ targeting Tuna and Tuna like species.
- The artisanal fishery accounts for almost all the inland and marine water catches and consequently it is currently the most important fishery in the country.
- Fish production in 2013 was valued at TZS 1,444bn, the country earned over USD 6.6mn as foreign exchange from export of fish and fishery products. The total fish production is shown in the table below:

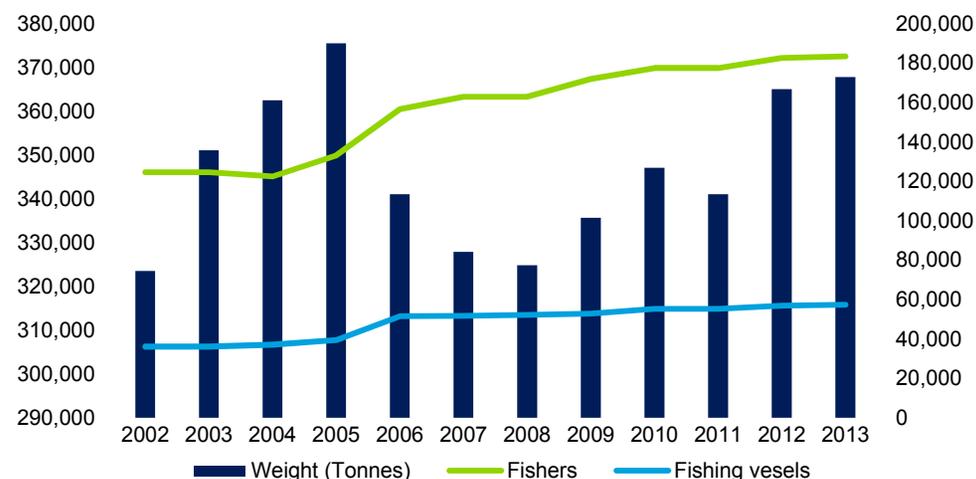
Total fish production from all major water bodies in 2013 (marine and inland)

Waterbody	Numbers		Catches (Tonnes)	Value (TZS) '000
	Fishers	Fishing craft		
Lake Victoria	101,250	28,470	234,530	938,119,720
Small scale marine	36,321	7,664	52,846	195,529,127
Lake Tanganyika	26,612	11,506	59,912	233,276,569
Lake Nyasa	5,550	2,632	9,913	38,165,050
Minor lakes (Bahati, Eyasi & Jipe)	3,680	1,471	390	1,460,625
Lake Rukw a	3,428	1,786	3,661	13,911,800
Mtere Dam	2,369	1,238	913	3,285,000
River Kilombero	1,224	799	4,902	17,891,205
Nyumba ya Mungu Dam	786	502	246	921,375
Others	2,003	969	541	1,872,049
Grand Total	183,223	57,037	367,854	1,444,432,520

Source: 2013 Fisheries Annual Statistics Report

- Fish production and value in the country have indicated an increase over the recent past years with the highest quantity of 375,535 m Tons of fish landed in 2005.
- The graph below shows the number of fishermen, fishing vessels and the weight, in tonnes, of fish produced from 2002 to 2013:

Fish production, fishers and vessels (2002-2013)



Source: 2013 Annual Fisheries Statistics Report

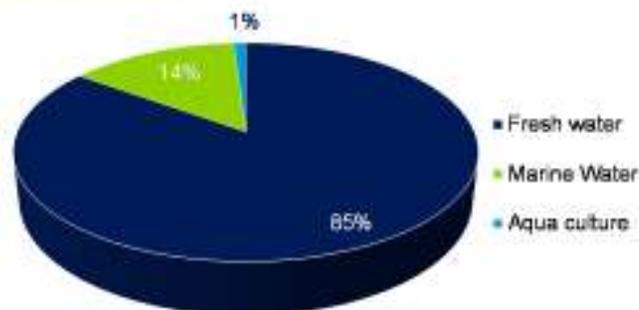
- About 183,223 fishermen and 57,037 fishing vessels were recorded in 2013. There has been a steady increase in the number of fishermen, fishing vessels and landing sites in all water bodies since 2005.
- The highest number of fishermen and fishing vessels were found in Lake Victoria (101,250 fishermen and 28,470 fishing vessels), others are Marine (36,321 fishermen and 7,664 fishing vessels) and Lake Tanganyika (26,612 fishermen and 11,506 fishing vessels), among others.

Lake Victoria is the principal fishery in Tanzania and accounted for 63% of all fish production from capture fisheries in 2013

Capture Fisheries

- Inland capture fisheries accounted for 315,008 tonnes in 2013, contributing to approximately 85% of Tanzania's total fish production, while marine production was estimated about 52,846 tonnes, equivalent to 14% and aquaculture production contributed to 2,677 tonnes, about 1% of total production.

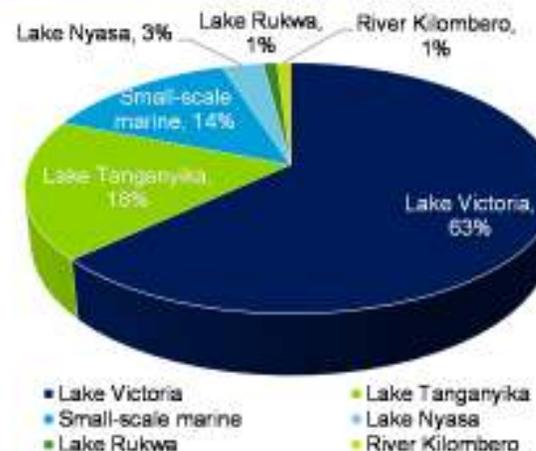
Fish Production by category



Source: 2013 Annual Fisheries Statistics Report

- The Inland capture fishery is mainly from major lakes (Victoria, Tanganyika and Nyasa), minor lakes (Kitangiri Singidani and Kindai), dams (Mtera, Nyumba ya Mungu) and rivers (Rufiji, Kilombero) and Marine water.
- The principal fishery, Lake Victoria, accounted for approximately 63% (234,530 tonnes) of all fish production from capture fisheries in 2013. Other major lakes, Tanganyika and Nyasa, contributed 18% (59,912 tonnes) and 3% (9,913 tonnes) respectively.
- Tanzania has access to about 50% of Lake Victoria, 45% of Lake Tanganyika, 20 % of Lake Nyasa and several minor lakes, dams, reservoirs, swamps, rivers and small ponds suitable for aquaculture.

Capture fish production by water bodies



Source: 2013 Annual Fisheries Statistics Report

- Fish production in Tanzania in 2013 was dominated by Lake Victoria (63%) followed by Tanganyika (18%) and small scale marine at third place (14% - 52,846 tonnes).

Main Fish Species

- Tanzanian fishery is dominated by multi-species. The most notable species are; Nile perch, Tilapia and Lake sardine locally known as "dagaa" from Lake Victoria.
- Species from Lake Tanganyika fisheries includes lake sardines (dagaa) and Tuna. Lake Nyasa has stock of various species of Tilapia and Lake sardines.
- Marine fisheries resources also contribute to the total annual catch. The main commercial marine species are sardine and anchovy, which together forms 30-50% of the total fish landing from marine sources.
- Other species being landed include: Octopus, Tuna, Kingfish, catfish, prawns, Lethrinus rhodopterus (changu), Carrotomus spinidens (pono), Caranx cynodon (kolekole) and Siganus oramin (Tasi).

6% of Tanzania's mainland area is covered by fresh water lakes and the coastline is approximately 800 km long hence opportunity in marine and aquaculture

Fishery areas

- Tanzania has abundant freshwater lakes (6% of the total mainland area) with substantial fish resources. In addition it has an 800-kilometre coastline with a narrow continental shelf. Freshwater fisheries account for approximately 85% (312,767 tonnes in 2013) of the landed catch.
- An estimated 60,000 people are employed as full-time fishermen, while another 30,000 are engaged in part-time fishing and fisheries-related activities, such as fish processing, marketing, distribution, net-making, marine engine repair, boat-building and other activities.
- Traditional methods are still used on the inland lakes, but modern fishing techniques are also employed in the coastal waters.

Fishery sector structure

- Marine sub-sector. This sub sector is divided into artisanal and industrial .
 - a) Artisanal: All artisanal fisheries in marine waters takes place within the territorial waters (12 nautical miles stretch). The catch consists mostly of fin fish and to a small extent of shrimps. It is dominated by the artisanal fishermen using poor crafts and fishing methods.
 - b) Industrial: The marine industrial sub sector fish both the territorial waters and beyond in the Exclusive Economic Zone (EEZ). The main target species in the territorial waters are shellfish (shrimps and lobsters), cephalopods and crabs. In the EEZ, industrial fisheries generally target tuna, tuna-like species, marlin, sword fish and sharks.
- Inland sub-sector. Inland fishing is carried out in the major lakes, the minor lakes, dams and rivers. Inland fishing is entirely carried out by artisanal fishermen...
- There are also other smaller lakes with fish, however, the fish catch is insignificant in terms of quantities landed. The main dams are Mtera and Nyumba ya Mungu. These are man made dams with significant fisheries mainly tilapia and catfish species.

- The major rivers are Pangani, Wami, Ruvu, Rufiji and Ruvuma all emptying into the Indian Ocean. Other rivers with fish include the Malagarasi, Ruaha, and Kagera. There are also minor rivers with fish in various parts of the country.

Techniques of fishing/production

- The main fishing techniques used in Tanzania depend on the type of fishery. The techniques are:
 - a) Freshwater fishery. This fishery is dominated by artisanal fishermen who use small boats of between 7 to 11 metres long mainly motorised by outboard engines. Other crafts used include dug out canoes and dhows. The main type of gear used is gill nets mesh size determined according to the size of the target species.
 - b) Marine Territorial waters fishery. This fishery yields fin fish, shellfish (prawns and lobsters), cephalopods (Octopus and squids), crabs and coral reef species. This fishery is undertaken both by artisanal and industrial fishermen. The artisanal fishermen use mainly canoes and small boats with inboard and few outboard engines with a total number of 7,190 vessels. The main fishing gear used are gill nets and shark nets for fishing fin fish. When fishing the territorial waters the industrial fishermen generally target shrimps for export markets. The fishing vessels used are trawlers. However, trawlers of more than 500 HP and/or more than 150 GRT are not allowed to fish in the territorial waters.
 - c) Marine EEZ. This fishery is solely industrial and the bulk of the catch is exported. This fishery is mainly conducted by licensed foreign vessels flying the flags of major fishing countries. The fishing vessels used in this fishery are purse seiners and longlines.

Aquaculture Production was low at 2,677 tonnes in 2013 due to focus on freshwater and marine fisheries

Aquaculture

- Fish farming in Tanzania is determined by several factors such as availability of water, suitable sufficient land for fish farming and awareness and motivation of the community in relation to economic benefits in fish farming.
- According to the Department of Fisheries, aquaculture production in the country is practiced at two culture environments: fresh water and marine water.
- Fresh water aquaculture involves production from waters with a consistently negligible salinity such as lakes, rivers and dams. Marine aquaculture refers to production in coastal and offshore waters in which the salinity is maximum and not subject to significant daily and seasonal variation.
- Aquaculture production in Tanzania is mainly subsistence and small scale generally with 3 fingerlings per square meter stocking density, the average area of fish pond is 300m² (15m x 20m).
- In 2012-2013 the estimated number of farmers for freshwater were 17,726 while in marine water there are 1,306 farmers for milk fish, 51 farmers for prawn, 188 farmers for crabs 98 farmers for pearl culture and 2,826 farmers for sea weed.

Aquaculture Production 2013

	Farmers	Fish ponds	Production(Tonnes)
Freshwater Ponds			
Nile Tilapia	17,725	20,235	2,131
Freshwater Trout	1	10	3
Marine water ponds			
Milk fish	1,306	246	221
Prawns	51	37	320
Muddy crabs	188	1,740	1
Total	19,271	22,268	2,677

Source: 2013 Fisheries Annual Statistics Report

Production Systems/Techniques

- Systems of aquaculture include ponds, small tanks and raceways. Production from ponds is mainly practiced with most fish farmers owning small ponds of an average size of 150m². The Ruvuma, Iringa, Mbeya and Kilimanjaro regions have been highlighted for having more pond density.
- Most fish farmers use animal manure as the main source of fertiliser for their fish and use feeds such as domestic leftovers, maize bran, wheat bran, vegetables and wild grass.
- According to FAO, Meru Trout Farm are the only commercial fish farm that produces the rainbow trout and are situated in Arusha. They are also the only farm in the country that uses the raceway production system.

Cultured Species

- Freshwater aquaculture in Tanzania involves production of mainly Nile Tilapia. This is mainly due to its proven superior growth compared to other species. The North African Catfish is also a commonly farmed species.
- Marine aquaculture has the potential for production of a variety of species such as the milk fish and flathead grey mullet. Shrimps molluscs, crabs, oysters and mussels fish farming activity has also been reported.
- Farming of seaweed, which was originally introduced from the Philippines, has taken root in Zanzibar and has attracted a lot of interest from fish farmers.



Fish fillets

Nile tilapia in the market



Tanzania Aquaculture sector SWOT analysis

Strengths

- Established regulatory structure in the industry.
- The operation of Beach Management Units at the fish landing sites.
- Existence of various fishery industry bodies across the sector.
- Existence of various vocational training institutions across the country
- Well developed fish processing facilities on Lake Victoria

Weaknesses

- Lack of quality feed and fingerlings for aquaculture production.
- Lack of fish storage facilities;
- Poor aquaculture information, knowledge, research and development;
- Traditional fishing and aquaculture infrastructure and facilities;
- Inaccessibility to markets and long marketing chain in the export market;
- Low human resource base with insufficient skills for aquaculture production;
- High HIV prevalence in communities that mainly practice fish farming;
- Weak law enforcement due to inadequate capacity to respond effectively to illegal fishing and trade practices;
- Declining fish catch in some areas, especially in Lake Victoria, leading to diseconomies of scale for fish processing;
- Inadequate capital for expansion purposes; and
- Poor collaboration between government and private sector.

Opportunities

- Capture Fisheries. Within the marine fisheries of Tanzania investment opportunities exist in the EEZ for the exploitation of species like Tuna;
- Aquarium fish potential. Development of this fishery is encouraged due to available markets for tropical aquarium fish;
- Investment in fish processing facilities in areas such as fish canning industry, value-added products, fish meal and cold and hot smoking;
- Manufacture and supply of fishing crafts, gears and pond structure;
- Hatcheries for fingerling production;
- Fish support services such as consulting, training and capacity building services; and
- Aquaculture. Culture of high value species such as prawns and shrimps for export markets as well as Nile tilapia which has high investment potential as it is popular in local markets.

Threats

- Contraction of fishery support services at national and local government levels
- Poor distribution logistics adversely affect international competitiveness.
- Poor transport logistics hold back expansion of export industries
- Little development initiative taken by government – makes pace of development under private sector leadership too slow
- Poor post harvest systems and high wastage compromise raw material quality for export industries

The laws and regulations in the fisheries sector are mainly aimed at developing and improving this sector, while at the same time advocating for sustainability of the resources

Regulation

- The Fisheries Act (2003)
- National Fisheries Policy (2010)
- National Water Policy (1993)
- Marine Parks and Reserves Act (1994)
- Territorial Sea and Exclusive Economic Zone Act (1989)
- Deep Sea Fishing Authority Act (1998)
- Deep Sea Fishing Authority Regulation (2009)

Government Regulators

- Ministry of Livestock and Fisheries Development
- Marine Parks and Reserves Unit

Institutions

- Tanzania Fisheries Research Institute (TAFIRI)
- National Environment Management Council (NEMC)
- Tanzania Industrial Fishing and Processors Association
- Deep Sea Fishing Authority (DSFA)

Programmes and Initiatives

- Fisheries Sector Development Programme
- National Fisheries Sector Policy and Strategy Statement
- National Aquaculture Development Strategy

Legal and regulatory framework

- The sector is guided by the **National Fisheries Sector Policy and Strategy Statements** (1997) which aims at transformation of the Fisheries Sector into sustainable commercial fishing, aquaculture, and processing for both domestic and foreign markets, and compliance to domestic and foreign market requirements while conserving the environment.
- The policy is backed up by the **Fisheries Act** No. 22 of 2003 which makes provision for sustainable development, protection, conservation, aquaculture development, regulation and control of fish and fishery products, aquatic flora and its products and for related matters. The Act regulates fishing and fishing industry, and aquaculture development in Tanzania mainland. The Act is supported by the Fisheries Regulations of 2009.
- The sector has a **Marine Parks and Reserves Act**, 1994 (Act No. 29 of 1994) that promotes sustainable management of critical marine resources and habitats through community participation. It aims at promoting protection and conservation of fisheries resources and aquatic environment for the sustainability of the resources.
- **Territorial Sea and Exclusive Economic Zone Act** (1989) provides for the implementation of the Law of the Sea Convention, and establishes the Territorial Sea and EEZ of Tanzania.
- The **Deep Sea Fishing Authority Act** (1998) provides for the establishment of the Deep Sea Fishing Authority (DSFA), which is responsible for regulating licensing, fishing, monitoring and surveillance in the EEZ.
- **Deep Sea Fishing Authority Regulation** (2009) provides way to the implementation of the Deep Sea Fishing Authority Act (1998). Exploitation of marine resources in the Tanzanian EEZ has been undertaken by foreign fleets uncontrolled or with very minimum supervision from the government of Tanzania. Many fleets have been fishing illegally in Tanzanian EEZ without any benefit coming to Tanzania, therefore these regulations were introduced to guide EEZ fishing activities.
- The **National Aquaculture Development Strategy** provides a framework in which the aquaculture industry in Tanzania can be developed in an economically, socially and environmentally sustainable manner. Its main purpose is to increase the levels of production and benefits from the aquaculture industry. The strategy covers a period of 15 years (2008/09 to 2022/2023) and is expected to play a role in meeting national objectives such as reducing poverty through increased income and food security.

Mari-culture potential is still largely untapped but has vast potential

Trends, issues and development

- The National Fisheries Policy was formally Endorsed in December 1997. This document establishes the development priorities of the aquaculture sub sector and was followed in 2003 by the amendment of the Fisheries Act No. 6 of 1970.
- Studies and trials have been undertaken to assess the viability of expanding aquaculture through diversifying production into other species, and developing the export market.
- The only aquaculture product exported is seaweed, which has shown an upward trend. However, the vast potential for mari-culture is so far largely untapped. There has not yet been any move to integrate aquaculture with other sectors such as the environment because the industry is still at subsistence level. However, in anticipation of the projected development of commercial aquaculture and the possibilities of its negative impact on the environment several management measures have been proposed and already put in place.



- For example clearing of seagrass and natural habitats for marine organisms could lead to degradation of the environment. Other environmentally damaging activities include dynamite fishing, cyanide fishing, coral harvesting, and over fishing. Some measures put in place include conducting baseline studies and monitoring of the positive and negative impacts of seaweed farming on the marine environment, education on environment conservation and improved enforcement of environmental laws and regulations.
- Seaweed farming in Tanzania's Zanzibar Island (Unguja) is a well established industry that brings in foreign currency and gives people an opportunity to earn income. In 2012, seaweed farming was second only to the tourism industry in terms of foreign exchange earnings.
- According to The Zanzibar Exporters Association, seaweed from Zanzibar is mainly exported to United States, France, Denmark, Spain, China and Chile. Annual production is around 12,000 tonnes and contributes around 90% of Zanzibar's marine products. The estimated number of seaweed farmers in Zanzibar is thought to be between 15,000 and 20,000.

Potential Barriers to Entry

- In Tanzania, barriers to entry preventing new entrants from breaking into the aquaculture industry are not high. They include but are not limited to the following:
 - Access to land. Foreign investors may occupy land for investment purposes or partner with Tanzanian leaseholders though large parcels of land for commercial fish farming are difficult to procure;
 - Unofficial payments to government; and
 - A well trained workforce capable of managing commercial aquaculture ventures is not readily available. Training costs will be incurred as human resource might have to be trained.

Tanzania

AlphaKrust's integrated shrimp aquaculture project in Mafia Island Tanzania is the first such project in East Africa

Integrated Shrimp Aquaculture Project

- Alpha Group, one of the largest seafood processors in East Africa has established an Integrated Shrimp Aquaculture Project in Mafia Island, Tanzania.
- Alphakrust Ltd, Group company of Alpha Group, implemented this ambitious project which is the first of its kind in East Africa. The project comprises of:
 - A 60 million capacity hatchery;
 - A 200 hectare WSA (water spread area) shrimp farm in phases; and
 - A processing plant with a capacity of 20 tonnes per day.
- The project is vertically integrated from the stage of brood stock collection to hatchery production of post larvae, culture of shrimps in farm ponds, processing and export.
- Alphakrust Ltd operates separate boats to collect good quality brood stock from the sea. These brood stocks undergo a series of screening procedures in the quarantine area as a part of bio-security procedures.

Farm Under Culture

- The farm has a 120 hectares Water Spread Area (WSA) in phase I and 80 hectares WSA in phase II, and is being developed at Jimbo village, Mafia Island, Tanzania. The target is to produce 1,600 tonnes of shrimp annually in two crops at its full operation.
- Ponds are stocked at a density of 15- 20 pieces per m². Shrimps are fed with high protein pellet made of high quality ingredients from reputable suppliers, following ISO 9000 standards. Good water quality management is highly essential for both survival and optimum growth of shrimps. Daily monitoring of different water quality parameters are done in the farm in a systematic way and scientifically analysed

Harvesting System

- Once the shrimp has grown to 33-35gm size, harvesting takes place by means of mechanical elevating harvester which assures minimum handling of shrimps to achieve good hygiene and higher recovery of Head On quality shrimps. All the harvested shrimps are chill killed, packed with slurry ice and sent to processing plant in insulated trucks.

Processing

- Alpha Group has its own EU approved plant to process the shrimps. According to The Alpha Group's website this plant is managed by a highly qualified technical team with a well-trained workforce. An expansion of a specific processing line for cultured shrimps is currently in progress.



Tanzania

Outcome of interviews with various stakeholders

Potential Production/potential for growth in the Sector

- There is a potential for fish production to increase (up to 75% growth) if the right investments are made. This include having more aquaculture development which can generate income for farmers and the country. However, the interventions for aquaculture needs to be done promptly since fish resources have indicated a decline in the past few years.

Challenges/Reasons against popularity of fish farmers

- Lack of capacity to fully produce due to lack of equipment and training among fish farmers. Example are that there are cases where extension workers in the government do not have much knowledge.
- Lack of established farms that can be role model businesses for the small upcoming fish farms.
- Lack of access to market and marketing information.
- Lack of funding targeted towards the aquaculture sector. The government needs to play an active role in promoting fish farming and making aquaculture a priority sector.
- Lack of inputs – quality fingerlings and feed
- Lack of funds to carry out fish farming at a large scale. Farmers are not able to access bank loans easily.

Coping Strategies for the challenges identified

- **Training:** Certain organisations such as Africa Fish Farm provide fish feed and training on fish feed development to local farmers at a community level. Additionally, other organisations such as Association of Marine Cultures runs community based projects that involves fish farmers and community on aquaculture education and awareness. Other farmers get extension services from government or other private non-governmental organisation.

- **Feed:** To cope with the lack of feed some farmers are producing their own feed although some are of poor quality.
- **Marketing:** Most farmers sell their fish at the local markets and neighbourhoods as there is lack of market information.
- **Fingerlings:** Farmers obtain fish from other farmers, some from the rivers and others from government and transplant them into their ponds.

Potential Opportunities

- Improved access to markets for fish products sold locally and internationally.
- Increased aquaculture production.
- Fish farm management training.
- Feed manufacturing.
- Fingerlings production.
- Value added processing i.e. canning, freezing, smoking other fish products etc.
- Supply of fish farming equipment

Viable types of collaboration with local players

- Training to local farmers on best fishing practices.
- Tilapia farming (both growing and marketing).
- Aquaculture systems.
- Funding.

Tanzania

The table shows potential public and private sector partners

Potential Investment Partners

Name	Products/services offered	Capacity	Company Details
Processors			
1 Kagera Fish Company Limited	Nile Perch	10 tonnes/day	- Located in Bukoba - Have more than 100 employees - Main markets in Europe, Far East and Middle East
2 Musoma Fish Processors Limited	Nile Perch	45 tonnes/day	- Located in Musoma - Incorporated in 1997 - Subsidiary of Alpha Group
3 Mwanza Fishing Industries Ltd.	Nile Perch	50 tonnes/day	- Located in Mwanza on shores of Lake Victoria
4 Nile Perch Fisheries Ltd.	Nile Perch	70 tonnes/day	- Located in Mwanza
5 Omega Fish Ltd.	Nile Perch	10 tonnes/day	- Located in Mwanza
6 Primecatch Export Ltd.	Nile Perch	50 tonnes/day	- Located in Musoma - Subsidiary of W.E Tilley Group
7 Tanperch Ltd.	Tuna	120 tonnes/day	- Established in 1992 - Exports to Europe, Middle East, Asia, America and Africa - Based in Mwanza
8 Tanzania Fish Processors Ltd.	Octopus, lobsters, cuttlefish, squids, crabs	80 tonnes/day	- Located in Mwanza - Subsidiary of Alpha Group
9 Tanzania Fisheries Development Co. Ltd (TFDC)		n/a	- Launched in 2007 - Located in Mwanza - Plant meets all EU standards and US F6FDA and other food safety standards
11 Bahari Foods Ltd	Sea fish and crustaceans	n/a	- Incorporated in 1998 - Processing Plant located in Dar es Salaam
12 Vicfish Ltd	Nile Perch	100 tonnes/day	- Located in Mwanza and Bukoba - Employs 598 workers - Exports to markets in USA, France, Germany, Hong Kong, Japan and Saudi Arabia
13 Tanpesca Ltd	Prawns, lobsters, octopus, squid	n/a	- Located in Dar-es-Salaam - Owns prawn trawling factory vessels and a refrigerated factory barge
14 Sea Products Ltd.	Octopus, cuttlefish, squid, spiny lobster, sand lobster, crab, prawns and various finfish species	n/a	- Located in Tanga - Has an EU approved and FDA registered seafood processing plant - Exports to Europe
Fish Farms			
1 Africa Fish Farm	Tilapia	7.5 tonnes/day	- Located in Ngara - Markets include local markets and Burundi
2 Meru Trout Farm - Ngare Sero Farm	Rainbow Trout	n/a	- Located in Arusha
3 Association maricultures organisation	Aquaculture development Marine protection Sponge farming Coral farming for aquarium trade (still in development stage) Artificial reeds Coral protection Awareness to community of Zanzibar	500 tonnes/annum	- Located in Unguja, Zanzibar - Exports to Switzerland, Zanzibar and Netherlands
4 Alpha Krust Ltd.	Shrimp	20 tonnes/day	- Launched in 2002 - Farm Shrimp on Mafia Island - 60 million capacity hatchery - 200 hectare WSA (water spread area) shrimp farm - Produce an estimated 1,000 tonnes of shrimp annually

Contact information is available in the appendix.

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Executive Summary	9
Aquaculture Sector Analysis	12
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Kenya Potential Partners Contact Information

#	Name	Contact Person	Phone Numbers	Location	Address	email/ website
Processors						
1	W.E Tilley (M) Ltd	Mr. Zul Jessa	+254 722 521 893	Nairobi	P.O Box 11880, Nairobi. Kenya	info@tilleygroup.com
2	Peche Foods	Mr. Pals Wagenaar	+254 725 844 056	Kisumu		ggm@sunblest.co.ke
3	Wananchi Marine Products Ltd	Mr. Salim Nyowe	+254 737 258 240	Mombasa		salim@wananchimarine.com
4	East African Seafoods Ltd	Karim Kurji	+254 020 351 3510	Kisumu, Mombasa		
5	Fish Processors (2000) Ltd	Mr. Jahagir Tejani	+254 733 617 395	Kisumu		firoz_tejani2005@yahoo.com
6	Sea Harvest (K) LTD	Mr. Paolo Roca	+254 722 410 302	Mombasa		nasimoja@gmail.com
7	Capital Fish (K) Ltd		+254 722 203 382	Homabay		http://capitalfish.co.ke/
Fish Farms						
1	Sagana Fish Farm		+254 716 346 041		P.O. Box 26, Sagana, Kenya	samaki@africaonline.co.ke
2	Jambo Fish Limited		+254 703 698 699	Nairobi	P.O Box 249-00621 Nairobi. Kenya	http://www.jambofish.com
3	Kamiti Fish & Integrated Farm	Suzanne Njeri	+254 722 599 995	Nairobi		
4	Omega Farms	Bonnie Dunbar		Baringo		bonniedunbar999@yahoo.com
5	Mwea Aquafish Farm		+254 726 165 127		P.O. Box 421 - 10303, Wang'uru, Mwea - Kenya	http://www.mweafish.com/contact.html
6	Farm Africa		+254 20 273 1664		P.O. Box 49502 - 00100, Nairobi, Kenya	http://www.farmafrica.org/kenya/aqua-shops
7	Green Algae Highland Fish Farm	William Kiama	+254 722 899 904	Sagana, Kirinyaga		afridozers@gmail.com
8	Kwetu		+254 724 926 756 / 254 733 555 255		P.O. Box 685-80109 Mtwapa, Mombasa-Kenya	info@kwetukenya.org
9	Dominion Farms	Chris Abir	+254 720 695 223/ 713 551 086	Western Kenya	P.O. Box 40600 Siaya, Kenya (Private bag)	chris.abir@domfarms.com
10	Roysfarm					roysfarm@gmail.com
11	Mabro Fish Farm	Rose Brockmoeller/ Elvis	+254 704 913 849/ 722 602 042	Bondo		mabrose11@yahoo.de
12	Esupat Fish Farm	Noah Ole Ntiati	+254 722 960 813	Loitokitok		ntiati@yahoo.com
13	Emmick Fish Farm	Michael Manyeki	+254 720 708 087	Karatina, Sagana		emmickfarm@gmail.com
14	Thamuru Farm	Tony Gachukia	+254 722 784 042			kgachukia@gmail.com
15	Afic Creative Enterprise	Joyce Makaka	+254 721 840 084	Kakamega		
16	Kitengela Aquafish Farm	Bonventure Onyango	+254 725 986 751	Nairobi		ondura.bon@gmail.com
17	Hankwa Aquaculture Farm		+254 724 339 970	Tana Delta		
18	Athi Fish Farm and Hatchery	Sandra	+254 712 862 172	Athi River	P.O. Box 62294 - 00200, Nairobi, Kenya http://www.athifishfarmandhatchery.com/about-us	athifish@gmail.com
19	Joy Fish and Integrated Farm	Kimani Karanja		Ruai	http://joyfish.co.ke/index.php/contacts	info@joyfish.co.ke
20	Eldofish	Nangasel	+254 704 775 859	Eldoret	http://www.eldofish.com/	Eldofish@yahoo.com, nangasel@gmail.com
21	Samaki2	Hon Muhoho	+254 728 427 660			
22	Thinkubator Aquaculture	Mr Otieno Okello	+254 712 047 940	Maseno Kisumu		
23	Sigma Feeds	Mr Vandan Shah	+254 733 780 248	Rongai	www.sigmafeeds.com	vandan@sigmakenya.com
24	Kuza Farms and Allied	Mr Jake Jirongo - Project Manager	+254 718 523 130	Kakamega	P.O Box 73179 - 00200	jjirongo@gmail.com
25	James Mugo	Mr James Mugo	+254 712 031 294			
Aquaculture Accessories						
1	JEWLET Enterprises	Enos Were	+254 722 958 594	Nyakach	P.O. Box 171 - 40301, Kendu-Bay - Kenya	info@jewlet.com

Uganda Potential Partners Contact Information

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Processors						
1	Byansi Fisheries Co. Ltd.	Mr. Paul Wasswa	+256 701 404 194 +256 481 422062 +256 481 422062 +25675-2404194	Masaka	P.O Box 156, Masaka, Kalisizo, Uganda	infbyansifisheries@yahoo.co.uk
2	Fishways (U) Ltd.	Mr. Sarfaraz Jessa	+256 754 225 226	Entebbe	P.O Box 394, Entebbe Uganda	sarfaraz@tilleygroup.com
3	Fresh Water Fish Exporters Ltd.		+256 414 258860 +25671-2274552	Masaka	P.O Box 1853, Bukakajja, Masaka, Uganda	marine@starcom.co.ug
4	Gomba Fishing Industries Ltd.	Mr Yusuf Karmali	+256 41 343066	Kampala	P.O.Box 633, Kampala	gombaf@infocom.co.ug
5	Greenfields (u) ltd.	Mr. PHILIP Borel.	+256 752 764 764	Entebbe	P.O Box 667, Entebbe Uganda	ill@infocom.co.ug, pborel@infocom.co.ug, www.greenfieldsuganda.com
6	Lake Bounty ltd.	Mr. Rakesh Shetty	+256 752 740 213	Kampala	P.O Box 71080, Kampala Uganda	info@lakebounty.com
7	Igloo Food Industries Ltd.		+256 414 258860	Kampala	P.O Box 23450, Kampala Uganda	marine@starcom.co.ug
8	Marine & Agro Export Processing		+256 434 123094	Kampala	P.O Box 2070, Kampala Uganda	marine@starcom.co.ug
9	Ngege Ltd.		+256 414221362 +256 414220413	Kampala	P.O.Box: 20028, Kampala	ngege@imul.com
10	Oakwood investments Ltd.		+256 481 421223 +256 414 258860	kasansero	P.O Box 164, Kasansero, Rakai, Uganda	marine@starcom.co.ug
11	Tampa fisheries Ltd.		+256 414 281908/9 +256 414 258860	Kampala	P.O Box 27135, Kampala Uganda	marine@starcom.co.ug
12	Uganda fish packers Ltd.	Mr. SUJAL Goswani	+256 752 796 978 +256 414287970/951	Kampala	P.O Box 7409, Kampala Uganda	sujal@alphauganda.com
13	Ifra (U) Ltd.	Mr. MANOJ Sreekanta	+256 755 689 466	Kampala	P.O Box 31111, Kampala Uganda	manoj@ifraonline.com
Fish Farms						
	Aqua World	Stella Nankya	+256 790560006	Kampala		stellahnankya@yahoo.com
1	Walimi Fish Farmers' Cooperative Society		+256 312 265 896	Kampala	P.O Box 6213, Kampala, Uganda	http://www.ugandaconomy.com/trade-associations/walimi-fish-cooperative-society-waficos
2	Cygnets Services (U) Ltd	Ggaba Kawuku	+256 702 883 387			jdssemakula@yahoo.co.uk
3	Edrhon Fish Farm		+256 772 882 006/ +256 702 882 006			edwinpaul@yahoo.co.uk
4	Ekitangaala Fish Farms	Rev. Rand Blair/ Mr. Latigo G. Washington	+256 752 712 515/ +256 782 330 467			randblair@utlonline.co.ug jlatwsh@yahoo.com
5	Fish Farms Enterprises Limited.	Sentamu Kizito	+256 782 678 768 +256 751 549 110	Kampala	P.O Box 11886 Kampala	fishfarms2000@yahoo.com
6	Iganga zone fish farmers association (IZFFA)		+ 256 712 197 155/ + 256 392 813 489	Iganga	P.O Box 191, Iganga	mmusomerwa@yahoo.com
7	Kajjansi Aquaculture Research and Development Centre (KARDC)	Rutaisire Justus	+256 414 200 745			jusruta@yahoo.com
8	Kabeihura Farmers Limited	Daniel Ojiambo	+256 700 956 080/ +256 789 555 984	Bushenyi	P.O.Box 47 Bushenyi	ojsberry@yahoo.com
9	Kigezi Fish Farm		+256 772 480 448	Kabale	P.O Box 777 Kabale	
10	Kikota Integrated Farm Limited	Peter Okonera Ongaria				pongaria@gmail.com

Uganda Potential Partners Contact Information

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13	Mpigi Fish Farm and Water Supply	Paul Ssebinyansi	+256 772 405 460	Mpigi	P.O. Box 65, Mpigi	paulssebinyansi@yahoo.com
14	MUSO4 F Enterprises	Musomerwa Buyunza Mutalib	+256 712 197 155/ + 256 702 197 155	Iganga	P.O Box 1412 Busalaamu, Iganga	mmusomerwa@yahoo.com
15	Namuyenge Mixed Farmers Ltd	Omar Waada	+256 772 372 797			bnkow adda2000@yahoo.com
16	PACO fish farm		+256 781 537 408	Kampala	P.O box 28523, Kampala	jos.namanda@gmail.com
17	Rock Springs Fish Farm Ltd		+256 776 985 322/ +256 712 985 322	Tororo	P.O Box 863 Tororo	rocks.farm@yahoo.com
18	Samarieza Mixed Farm Limited		+256 414 349 497/ +256 772 431 166	Kampala	P.O Box 825, Kampala	zarambasam@yahoo.co.uk
19	Scapa Fish Farm	Bishop Cyprian Bamwoze				c.bamwoze@ugandascapa.com
20	Source of the Nile Fish Farm	Abudala Napuru	+256 753 240 989/ +256 332 276 348	Jinja	P.O Box 322 Jinja	abudala@lakeharvest.com
21	Sunfish Farms Ltd	Digo Tugumisirize	+256 772 462 776/ +256 782 768 213			sunfishfarms@yahoo.com
22	Shalom Fish Farm Limited	Jean Kaahwa			P.O.BOX 29081 Kampala	j.kahwa@shalomfishfarm.com
23	Umoja Fish Farm		+256 712 429 922/ +256 772 702 773	Kampala	P.O Box 558 Kampala	jrugunda@yahoo.com
Feed Suppliers						
1	Ugachick Poultry Breeders Ltd		+256 414 250 341	Kampala	P.O. Box 12337, Kampala	ugachickfarm@infocom.co.ug
Equipment Providers						
1	Aquaculture Management Consultants Ltd.		+256 312 279 911	Kampala	P.O. Box 20044 Kampala	a.m.consult.ltd@gmail.com
2	Pearl Aquatics Limited	Dr. Gladys N. Bwanika	+256 392 177 188, +256 782 010591, +256 701 137101		P.O. Box 25765, Kampala	g.bwanika@pearl-aquatics.com
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Tanzania Potential Partners Contact Information

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2	Musoma Fish Processors Limited		+255 28 202 2988/9	Musoma	P. O. Box 1149, Musoma, Tanzania	
3	Alpha group					www.alphaafricagroup.com
4	Mwanza Fishing Industries Ltd.		+255 28 256 0885/ 256 0946/ 256 0868/ +255 28 257 0035	Mwanza	P.O. Box 348, Mwanza, Tanzania	mwanzafish@thenet.co.tz Muntaz_velji@yahoo.com
5	Nile Perch Fisheries Ltd.					
6	Omega Fish Ltd.					info@omegafish.com
7	Primecatch Export Ltd.		+255 15 512 640 171	Musoma	PO Box 786, Mara, Mara (T), Tanzania	
8	Tanperch Ltd.	Chandra Bhat, Managing Director	+255 22 2600293, +255 28 256 1337/38/39, +255 28 256 0987/ 256 1004/ 256 0984	Mwanza	P.O. Box 549, Mwanza, Tanzania	tanperch@qualityg.com
9	Tanzania Fish Processors Ltd.		+255 28 255 0105/ 255 0432/ 255 1274	Mwanza	P.O. Box 3001, Mwanza, Tanzania	vedagiri@alphatz.com tfpl@alphatz.com
10	Tanzania Fisheries Development Co. Ltd (TFDC)				P.O. Box 556, Mwanza, Tanzania	
11	Alpha Krust Ltd.				Ali Mwinzi Rd, Block 72, Plot NO.40 P. O. Box 8316, Dar-es-salam, Tanzania	www.alphaafricagroup.com
12	Bahari Foods Ltd		+255 22 270 1715/ 270 1716	Bukoba, Dar es Salaam and Mwanza	P.O. Box 3978, Dar es Salaam, Tanzania	bhagat@baharibounty.com info@baharibounty.com inquiries@baharibounty.com
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15	Sea Products Ltd.					
Fish Farms						
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