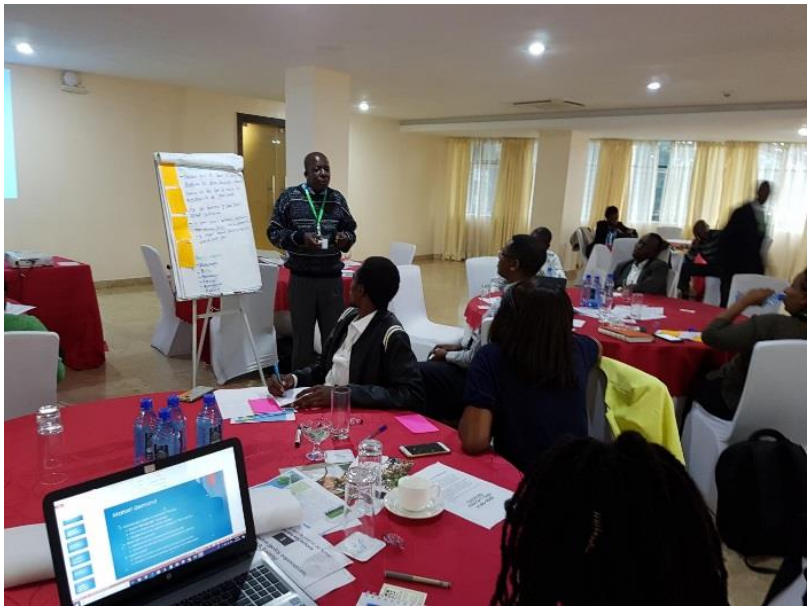
A comparative study on aquaculture sector development in Egypt, Ghana and Nigeria: Sharing insights and drawing lessons for Kenya



An Expert Group Round-Table Meeting

16th March 2018

Azure Hotel, Nairobi

3R Kenya Workshop Report

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WAGENINGEN UNIVERSITY & RESEARCH

3R Robust Reliable Resilient From Aid to Trade

AquaCulture Roundtable

Acknowledgement

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[1] 3R Kenya project (ACTS); [2] Wageningen University and Research; [3]Laikipia/Egerton University; [4]Wageningen Marine Research

List of abbreviations

EAC	East African Community
EKN	Embassy of the Kingdom of Netherlands
ESP	Economic Stimulus Program
FCRs	Feed Conversion Ratios
FFAs	Fish Farmers Associations
FFEs	Fish Farming Estates
FMDA	Fisheries Management and Development Act
GoE	Government of Egypt
GoG	Government of Ghana
GoK	Government of Kenya
GoN	Government of Nigeria
KEBS	Kenya Bureau of Standards
KES	Kenya Shillings
KFS	Kenya Fisheries Service
KMAP	Kenya Market-led Aquaculture Program
PPP	Public Private Partnerships
RAS	Recirculation Aquaculture Systems
SDFBE	State Department of Fisheries and Blue Economy

1. Introduction

The 3R (Resilient, Robust, and Reliable) Kenya from Aid to Trade) project is an applied research and learning initiative supported under the Agriculture and Food and Nutrition Security (FNS) programmes of the Embassy of the Kingdom of the Netherlands (EKN). 3R Kenya seeks to assess evidence and lessons from FNS and other related programmes that support competitive, market-led models in spurring agricultural development. It focuses on the **aquaculture**, dairy and horticulture sectors. 3R Kenya is executed at a time when Dutch government's bilateral relations in Kenya are oriented to actions that support the transition from Aid to Trade to enhance the development of agri-food sectors. Through evidence generation and stakeholder dialogue, 3R seeks to contribute to an understanding of effective conditions for sustainable inclusive trade for transforming resilient, robust and reliable agri-food sectors.

In the aquaculture sector, the 3R project conducted an initial sector scan study (Obwanga and Lewo, 2017) that provides an overview of the sector's current development trajectory. Following this scan, the 3R aquaculture team undertook a comparative study of the aquaculture sectors in three countries in Africa (Egypt, Ghana and Nigeria) that have had relative success in commercialization of aquaculture. The study (desktop research) identified the evolution of the aquaculture sectors in these three countries based on 7 key factors (market demand, environments, infrastructure, technical capability, investment, human resources and institutional systems) to understand what worked well or not. The aim of the analysis is to draw lessons that could be relevant for Kenya.

This report summarizes the proceedings of an expert workshop that was co-organized by the 3R aquaculture team and the Aquaculture round-table to deliberate on the findings of the comparative study. The Aquaculture round-table provided an appropriate platform to connect with relevant sector stakeholders to discuss the findings and identify the lessons that would be appropriate for the Kenyan aquaculture sector. The select experts and stakeholders were drawn from the membership of the Aquaculture Round-table and beyond (see list in Appendix 1) and included representatives from central and county government, farmers, EKN funded projects, aquaculture farmers, feed manufacturers and other input and services providers, academia and research institutions.

The objectives of this workshop were:

- To present key findings from the comparative study of the aquaculture sectors in Egypt, Ghana and Nigeria
- Draw key insights and deliberate on the relevance and application of lessons to the Kenyan context
- To recommend concrete actions for sector stakeholders to consider

2. Summary of Workshop presentations and discussions

Following introduction of the participants, the workshop was officially opened by Hon O. Mbeo, Chairman of the Aquaculture round-table. This was then followed by some key presentations and deliberations.

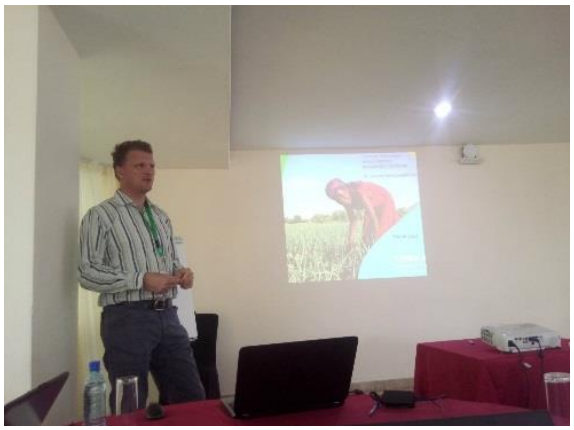
2.1 Brief overview of 3R Kenya project

A presentation by Dr. Catherine Kilelu (3R Kenya project coordinator) gave an overview of the project background and the objectives, zooming in on the aquaculture sector. Aquaculture is a growing sector in Kenya with promise to contribute to food and nutrition security (part of the big 4 agenda of the government). There is growing domestic demand for high value, nutritious foods such as fish. Kenya has graduated into a middle income country, and donors (such as the Dutch government) are seeking to engage with Kenya more from trade and investment approaches rather than through traditional aid including in agri-food sector development.

The aquaculture sector is a sector of focal interest given the growing demand for fish in the country whose demand cannot be met through local production (hence growing imports e.g. from China to help meet demand. There is an expanding domestic and foreign investors' interest in this nascent sector. There are opportunities to further grow the demand as the current per capita consumption of fish in Kenya is 4.5 kilos (which is low compared to other countries and other sectors in the country such as dairy and horticulture). Being a young sector, aquaculture can learn from the pitfalls in other sectors such as dairy and horticulture but also learn from what other countries have done to sustainably commercialize the aquaculture.

2.2 Kenya Market-led Aquaculture Program (KMAP) - Feed versus strain trials preliminary results

Arnoud Meijberg, the project leader of Farm Africa's KMAP made a presentation on preliminary results of a feed and strain study that KMAP is conducting in collaboration with WorldFish and Karatina University. This is in consideration of the feeds challenge that is a limiting factor for the sector's growth. The trials are conducted as a comparative study of tilapia production in Karatina and Kisumu. The full analyses of the study will be ready by May 2018. This study compared use of pellets versus mash feed which brought out interesting results on cost revenue analysis and seasonal cycles of fish production. What emerged is the need to conduct studies on whether farmers are ready to pay more money for quality feed and can the farmer break even with feeds that are slightly costly but of good quality (looking at feed conversion ratio).



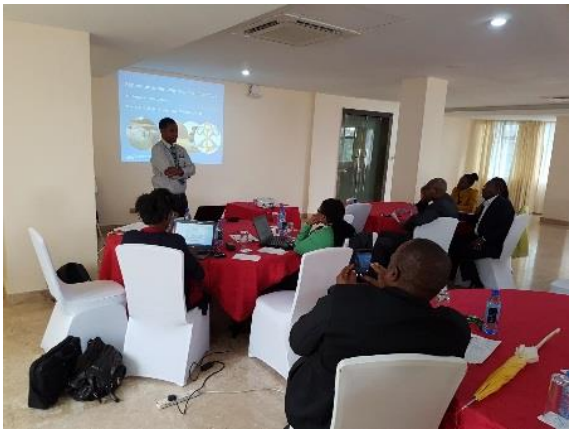
Discussion points from the presentation

- There seems to be a gap in research on the optimum feed of good quality and also at a fair price for the farmer. On the other hand feed manufacturers would wish to produce a feed that despite being of good quality would still give them profit as they are in business. Furthermore concrete data on this is missing given that optimum feed is difficult to identify given that most producers are using trial and error to try and achieve optimal feeding.

- The study raised critical issues, for instance, findings that were relevant for fish farming in one part of the country may not apply in another part of the country. Unfortunately prior to the study, there had been few studies carried out. On the other hand different farmers employ different farming strategies and may not employ strategies proposed by extension officers or other sources of extension information.
- Despite the many challenges associated with cold areas, tilapia farming in these areas can still be successful if the right strategies are employed. On fish feeding – the main point is that fish in cold areas need more protein.
- High crude protein in fish feeds does not necessarily translate to profits in fish production. There is need for studies beyond crude protein amount in feeds to investigate other variables like temperature (which is an important determinant of the amount of feed eaten by the fish and the amount given to the fish). Evidence from WorldFish studies show that temperature is a more important determinant of fish growth than the feed given since fish will not metabolize the feed well under poor temperature conditions. Hence raising the appropriate species under optimum conditions is key to the success for farming in areas like Kisumu and Karatina where the studies were conducted.
- It is also important for the farmer to take into account other factors like water quality, genetics and Feed Conversion Ratios (FCRs) in understanding profitability. Furthermore, ensuring fish farming is identified as a business and ensuring that there is access to market is key for success of fish farming and focus shouldn't only be on crude protein in fish feeds.

2.3 Setting the scene: Why a comparative study?

This presentation by Dr. Eugene Rurangwa, a member of the 3R aquaculture team set to explain the rationale for the comparative study including the choice of the countries. The aim of the comparative study was to find out what should be the focus for the 3R project in drawing insights on the drivers for aquaculture sector commercialization in Kenya. It was noted that despite the great potential for fish farming in Kenya, the country imports fish from China and even the neighboring Uganda. Further, it was noted that in East Africa fish consumption is lower than in the rest of Africa (in fact there is a downward trend in fish consumption in Kenya due to low output resulting from high production costs). The high farm prices for fish in Kenya (quoting prices from Kamuthanga where a kilo of table size fish goes for KES 612.21 for whole sale and KES 672.91 for retail) indicates the good business potential in fish farming, which is also drawing the interest of foreign investors. East Africa as a block presents a big market for fish due to its overall population and an ever-growing middle class population. The need for more fish production also presents opportunities for technologies and knowledge transfer for foreign private sector investors, but with the need to make these work in the local context. To further commercialize aquaculture in Kenya, there is need to identify which farmers to focus on that are willing to be entrepreneurial. Whether it is about the large-scale farmers or the small-scale producers, the most important thing is the potential to make profit from aquaculture with those that are willing to adopt a business approach rather than focusing on the



size of the farm. There is need for the Kenyan aquaculture sector to grow to commercial maturity and to stop depending on aid/support.

2.4 Lessons from Egypt, Ghana and Nigeria in aquaculture sector development

A more detailed report on the comparative study will be available from end of April

Highlights of insights from Egypt

- The presentation highlighted that despite challenges of land and water scarcity, Egypt is the 2nd largest tilapia producer in the world after China.
- It was noted that tilapia production in Egypt was carried out in both brackish and freshwater. The Egyptian aquaculture sector growth followed a path of being stimulated by the Government whereby farmers were encouraged and facilitated to shift from traditional semi-intensive earthen ponds to a modern and sophisticated way of fish farming (intensive systems with aeration and use of formulated feeds).
- This change in production systems was matched by an increase in demand for quality fingerlings and fish feed, hence creating opportunities for growth of vibrant fish feed industries and commercial hatcheries. Currently the country has about 600 hatcheries and a number of fish feed milling companies producing extruded feed which although slightly expensive than the conventional fish feeds are preferred due to their better feed conversion ratios (FCRs).
- High domestic demand for Egyptian fish, with a consumer that prefers live or fresh fish. On the other hand, fish export is limited due to failure to meet quality standards demanded by the European market. Fortunately the high domestic demand for fish which the domestic supply cannot meet makes failure to export fish not a big concern.
- High production of tilapia in Egypt is still achieved from earthen ponds where modernization and use of high quality feeds has been embraced.

Highlights of insights from Ghana

- In Ghana, the dominant aquaculture production system is Tilapia cage culture. This has grown tremendously following the government's decision to partner with the private sector.
- The government created a conducive environment while the private sector invested in cage culture that is mostly concentrated in Lake Volta. Currently, there has been growth in cage fish production that is mostly dominated by foreign investors.
- The success of cage culture in the country is profound, such that only 3% of the total number of farmers in Ghana practice cage culture but the cage system accounts for 97% of the total fish production in the country.
- This growth of cage farming has resulted in growth of commercial hatcheries and fish feed production industries which have grown to cater for the demand for good quality feed and fingerlings.
- The Ghanaian tilapia production is bolstered by the high demand for fish in the country which is above the African and global averages (>23kg fish consumption per capita per year).
- However despite the huge market for farmed fish, production of Ghanaian Tilapia still competes poorly against Chinese tilapia based on cost of feeds, and poor performance of the Ghanaian Cedi (country currency).

- The government has sought to protect the industry by banning imports from China. This however has not worked effectively given that neighbouring countries (like Benin and Ivory Coast) still import Chinese fish which find its way-illegally- into Ghana through porous borders.

Highlights of insights from Nigeria

- The success of Nigerian Aquaculture is based on vibrant entrepreneurial farmers who decided to focus on catfish production in tanks whose demand in the market was higher than that of tilapia. The government of Nigeria was recommending/promoting tilapia production in earthen fish ponds.
- The catfish is produced in tanks or via Recirculation aquaculture System (RAS) set-up in peri-urban areas in a model known as the Fish Farming Estates (FFE) which are jointly managed through a cooperative model of management.
- The FFEs are mostly owned by civil servants or retirees who do not have time and experience in managing the farms hence they employ a manager / a technician who has expertise in fish farming resulting in efficient and professional management of the farms. The owners contribute money used for security, feed, fingerlings, and salaries for manager and technician.
- Co-operative style of farm management helps the farmers to secure loans from banks. This model also opens up opportunities for partnerships and professional linkages.
- Peri-urban catfish production creates easy market access and has also helped support vibrant restaurant businesses known as 'Bukas' that are based on fish recipes. It's worth noting that there is high demand for fish in Nigeria that stands at 2.6 billion tonnes annually.
- The growth of the catfish production has spurred the growth of hatcheries and feed production industries.
- The evolution of the Nigerian aquaculture sector exhibits a scenario where the private sector played a leading role in pushing the industry towards commercialization.
- Having become established the government has had to play catch-up and has reduced its role to that of facilitation and regulation (for instance in a bid to protect the sector the GoN has imposed bans on fish importation using the introduced fish importation quotas).
- In a bid to reduce its role, the government has enhanced the PPPs. In some instances the government has leased its facilities (research and extension facilities) to the private sector hence reducing the pressure on the government to manage these facilities.
- With a sense that catfish prices may tumble (resulting from over-supply), some farmers are now targeting tilapia production in anticipation that they will fetch better prices.
- **Some similarities of the aquaculture sectors in the three countries**
- Fish imports from China are perceived to be a threat to the development of the aquaculture industry in Nigeria and Ghana
- The growth of the aquaculture sector has created demand for research into better seed and feed. In Egypt and Ghana the demand for research has led to the growth of two improved Tilapia strains: the Abassa and Akosombo strains respectively, which have led to increased productions as well as reduced culture time.
- Extension still remains a big challenge for all the countries. There remains a big gap between government's objectives and the market demand for extension. For instance in Ghana, farmers practising cage farming are better informed compared to government extension agents. Furthermore, in some instances the extension given to farmers is irrelevant when it is focussed

on earthen pond production while the farmers are focussing on tank production of catfish or cage culture of tilapia in lakes or reservoirs

- Fish farming Estates in Nigeria: Farmers in peri-urban areas invest in their farms and have people to manage them. Most of them are professionals with other jobs and do farming as a side business.

2.5 Remarks from representative of State Department of Fisheries and Blue Economy (SDFBE)

To kick off the afternoon session, Ms. Susan A. Otieno made some remarks on policy matters at the SDFBE as captured below:

- As part of the BIG 4 agenda, the Ministry of Agriculture and Irrigation under which the SDFBE falls will steer food security and to a big extent the manufacturing agenda. SDFBE has been given a target of creating 20,000 jobs in the next 5 years which translates to 4000 jobs per annum. However this can only be achieved through Public Private Partnerships (PPPs) and hence it's imperative that the private sector plays a determinant role in this process.
- In this regard the Government of Kenya (GoK) is keen on creating a conducive business environment for the private sector to thrive, and therefore regular engagement will be important. However there exists a communication gap between government and private sector. Furthermore, the private sector is moving too fast while the GoK plays catch-up. It is therefore important for the private sector to share documents and reports with the government for action. The government is becoming less bureaucratic and is currently in the phase of meeting different stakeholders that fall under the ministry sectors.

- The Fisheries Management and Development Act (FMDA) 2016 is in operation. The act has created 4 institutions/parastatals which are currently in the process of being operationalised and it will be important if the stakeholders become conversant with the provisions of the Act so that all stakeholders operate within the confines of the Law.
- The Act established key parastatals in the aquaculture sector. The Kenya Fisheries Service (KFS) is in the process of being established and will be stringent on quality and sustainability issues. It is a powerful parastatal led by a Director General. With the new parastatals, the state department for fisheries role will be reduced to policy and regulation. All other departments will be transferred to the KFS.
- In line with this is the creation of an Apex Advisory Council with representation from the fisheries sector and ministries. This is a requirement of the FMDA Part 2 Section 6 which calls for an advisory board whose membership will include a representative nominated by an umbrella organization in the fisheries sector. The Act provides for representation of stakeholders by an umbrella fisheries body which is currently non-existent. Since the Aquaculture Round-table has representation from farmers, feed manufacturers, researchers, etc. and has shown interest in pushing the agenda forward, it would be good if the round-table can have representation in the

new advisory board. This is an issue of urgency for the SDFBE as the Governor's council is already asking for a status on the advisory board but a suitable umbrella organisation has not been identified. In order to qualify, the round-table needs to form an umbrella organisation and even if the umbrella association is not formed on time, a concreate plan on how they would like to represent fisheries in the advisory board can be developed.

- The National Fisheries and Ocean Policy is under review and very soon the views of the stakeholders will be invited for input during a validation workshop. The Manual for Standard Operating Procedures (MSOP) for aquaculture operations has been developed and county staff have been sensitized on the same. In addition to this Kenyan Fish and Fisheries products have been approved for the EU market and therefore this opens opportunities and need for intensified fish production to satisfy both the local and international markets. There will be officers present to help in providing access to the export market. There is a market in the European Union that has not been met.

Comments raised

- On policy guidelines related to cage farming - Although cage farming in Lake Victoria is picking up quite fast there is need to seriously take into account its sustainability and related environmental issues. The increase in cage farming activities has therefore attracted county and central governments to map the whole of Lake Victoria to identify specific areas suitable for cage farming. Policy guidelines on cage farming have also been formulated by the East African Community (EAC) – Farm Africa assisted the GoK to develop guidelines- and the policy document is at an advanced stage. However there is still need to formulate policy to dictate how Lake Victoria resources should be shared by surrounding countries.
- Representation of the sector stakeholders at the advisory council – Mr. Mbeo - noted that the aquaculture round-table will take a lead in engaging other stakeholders in the aquaculture and fisheries to ensure that a stakeholder representative is nominated to the advisory council.

2.6 Issues and discussions emerging from the presentations:

2.6.1 Demand, markets and market access challenges and opportunities

- While some stakeholders argued that there is no market for farmed fish, others were of the opinion that there is not enough (quality) fish produced from aquaculture to sustain the market. This explains why Chinese fish still finds its way into the Kenyan market. The fish producers may be unaware of the trade agreements that make it easier for Chinese fish to enter the Kenyan market, which some see as political rather than as measure to address supply shortage. Nonetheless, there is need for the local fish farmers to produce more commercially to sustain the demand. On the other hand Chinese fish may not be cheaper to produce as generally perceived given that major ingredients for feed manufacture like soya are expensive to produce in the country. Again it is not clear what quality of fish is allowed in the market especially given that most of the soya that makes the feed in GMO. However the Chinese government has efficiently developed mechanisms (including providing affordable credit to producers) to ensure that fish farming is viable and that they can access the global market through export tax rebates. However, for most African countries included those analyzed in the comparative studied (especially Egypt and Ghana), the interest rates for credit/loans are high while raw materials for feed manufacture which are mostly imported (specifically soya) are expensive. This is worsened by poor

performance of the local currencies against foreign currencies further increasing the cost of imported feed ingredients and hence the overall cost of production.

- Innovation by farmers is also key in accessing market and needs to be encouraged. For instance setting up more fish restaurants ("bukas") in Nigeria popularized fish eating by the roadside leading to increased fish consumption. This has enlarged the market for fish farmed in the peri-urban areas. In Egypt, eat more fish campaigns worked to grow the market for farmed fish. Unfortunately most of the Kenyan farmers fail to meet the standard size demanded by the market e.g. fish farmers in Mount Kenya area have been unable to meet the demand for bigger fish that has resulted in the stalling of a fish processing factory established in the region (Wamagana fish processing factory in Nyeri). There was market demand for table sized tilapia which is about 300g and farmers could not produce these sizes. The fish produced is stunted pointing to poor quality fingerlings or poor production management.
- There seems to be a lot of focus on markets for tilapia while neglecting that for catfish such that catfish farmers lack access to markets unlike tilapia farmers- a challenge well noted in Kiambu. This points to lack of value addition initiatives so as to market the catfish better, while on the other hand there is need for an oversight group to link farmers to markets at county level.
- Weaknesses in regulation may be exposing the Kenyan consumer to sub-standard products. There are concerns that fish imported from China may not even be accepted for consumption in the country or in Europe and therefore what is sold to Kenya are rejects. Questions arise on whether Kenya Bureau of Standards (KEBS) is strong enough to ensure quality of the products available for the Kenyan consumer.

2.6.2 Fish production (modernization/sophistication), inputs, challenges and opportunities

- There are other interesting aquaculture sector stories in Africa. For example Uganda is doing very well and could provide good lessons to Kenya. Uganda shares a border and a lake with Kenya where both countries practice aquaculture but with different levels of success. However, the study focused on Nigeria, Egypt and Ghana due to time limitations and also because of some unique lessons from these countries which, if appropriately tapped into, could significantly influence commercialization of aquaculture in Kenya. Similar to Egypt, there can be intensive production from earthen ponds if proper strategies are employed (e.g. proper circulation of water in the ponds, proper aeration and maintenance of optimum temperatures). However intensification may not mean emulating the exact fishing practices from the other countries but seeing what could work in Kenya.
- Access to quality inputs (mainly feed and seed) remain a challenge. In Nakuru County for instance, inadequate and substandard feed and seed is the main cause for low fish production and losses in the sub-sector. This is despite the county having a large group of farmers who received subsidies (including building of ponds) and extension services to enable them to get into aquaculture. Tilapia breeding has been found to be challenging and the fingerling producers are not keen on producing quality fingerlings. On the other hand, KEBS has been ineffective in assuring quality of feed and seed leading to lots of quacks and conmen taking advantage of uninformed farmers. For instance feed suppliers are selling feed with low crude protein than what appears on the label and yet the feed is sold at high prices.

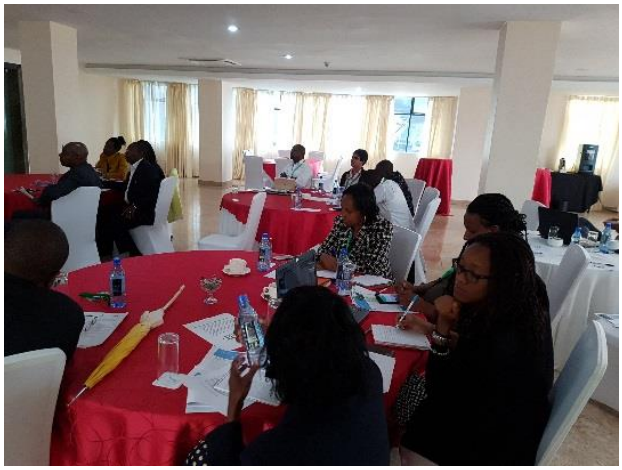
2.6.3 Devolution related challenges and opportunities

- Despite the county governments working to support aquaculture sector development, they face numerous challenges. For a start, devolution started when the fish farming Economic Stimulus Program (ESP) was coming to an end, and because there was no transition process in place, the sustainability of the programme that had been initiated by the central government was compromised. In some counties, the investment made in the sector has been lost as finances for supporting the aquaculture sector was diverted to other agricultural sub-sectors leaving many fish farmers discouraged.
- Challenges based on the sustainability of the methods of fish production have also been encountered by counties. For instance, ESP advocated for fish production from earthen ponds and most of them had to be located close sources of water (streams or rivers). This meant fish ponds were far from homesteads hence creating opportunities for theft and also posing challenges to management. The county governments had to adjust to models of farming convenient to the farmers. For instance, farmers are using lined ponds which are close to the homesteads. This requires that they harvest water for fish farming, but the proximity to the house enables them to easily monitor and eliminate the threat of theft. Fish production from earthen ponds is becoming more and more limited in counties like Kiambu where parcels of land are becoming smaller and smaller, therefore the county government is encouraging farmers to adopt the RAS (Recirculating Aquaculture Systems) and lined wooden ponds which are being advocated for and demonstrations have been done by the county government. This kind of fish production may be close to the peri-urban fish production seen in Nigeria. However the RAS demonstrations unit at the county level has faced challenges due to lack of technical expertise.
- Earthen ponds are cheaper and can be applicable to the Kenyan context. Kiambu currently has a project with Kenya Women's trust for intensive production. Kiambu is encouraging fish production in dams and cages. The county government has also set up bulking and collection centers and has provided fish farmers with freezers. There is a gap between producers and consumers as the County government focused more on production than markets. Structuring production to meet market demand requires creating better linkages between production and markets by, for instance, getting farmers into groups for consistent supply (e.g. to hotels) which at the moment is a challenge. Another challenge facing the aquaculture sector is funding of stakeholder conferences, hence bringing partners together to source for funds is critical. More interaction between the county and national governments is also crucial.
- A revolving fund e.g. set up by counties was proposed to enable access to affordable finance to support farmers from the production to the marketing stage including setting up of small outlets for selling fish.

3. Break-out group discussions

The break out session was organized into three groups based on key areas/factors identified drawn from the comparative study as pushing the aquaculture sector towards commercialization and based on which, lessons could be. The key areas were:

a) Institutional system (policy, organizations, education, research, training)
b) Investments (inputs, finances, services)
c) Technical capability (skills, competences) and human Resources



Market was a cross-cut factor to discuss in all groups.

The following questions were used to guide the group discussions:

- What successful insights related to the factors of focus that catalyzed commercialization
- What seems not to have worked well
- What can we take as a lesson(s)
- What action(s) can we recommend to the sector

3.1 Group 1: Institutional system (policy, organizations, education, research, training)

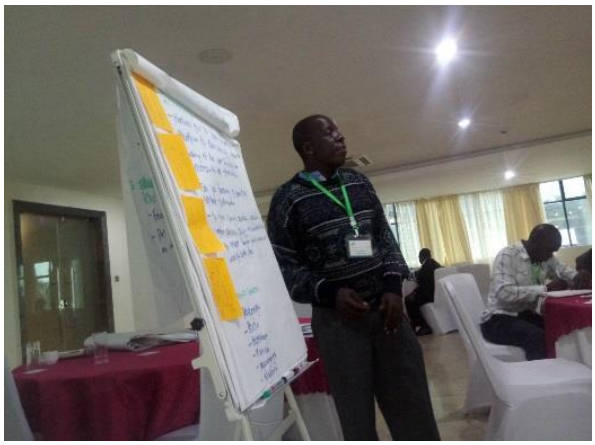
Policy

- While the GoE of and GoG seem committed to their aquaculture policies, the Kenyan Aquaculture policy 2012-2017 has expired and a new one is yet to be put in place. Stakeholders in the industry in Egypt work in concert to ensure a vibrant aquaculture industry something that Kenya is catching up to slowly. There is need for stakeholders to be more involved in sector policy and strategic plans development. However policy implementation still remains a challenge across the three countries, an issue attributed to low funding by the government.
- To achieve sustainability of the aquaculture sector development at county level, there is need for the sector to plug into the County Integrated Development Plans and strategic planning processes to ensure adequate resources are allocated to the sector. In addition the county governments need to monitor farmers' progress and address challenges affecting the value chain.

Organization

- Stakeholder forums and platforms like Fish Farmer Associations (FFAs) and Cooperatives in some countries have worked in bringing stakeholders together to lobby for better quality inputs and affordable access to finance and in buying feed in bulk for members etc. These platforms have created significant influence in the growth of commercial aquaculture in Nigeria, Egypt and Ghana. In Kenya there is need for :
    - Improved collaboration between stakeholder organizations

- Organization of stakeholder forums at different levels
- Setting up of a stakeholder database
- Establishment of an aquaculture levy where stakeholders provide input which would contribute to aquaculture development
- Provision of subsidies by the Government on aquaculture inputs to farmers.
- Establishment of farmer co-operatives and strengthening co-operatives which is working well in the other countries



Education, Research and Training

In the three countries education, research and training seem to be playing catch-up. In Ghana and Nigeria, the most training and extension was meant for pond fish farming and hence it is irrelevant to cage culture or FFEs. Fortunately research has been responsive in Egypt and Ghana developing better performing tilapia strains (Abassa and Akosombo strains). In Kenya, input providers like feed manufacturers (e.g. Sigma) would wish to invest in research to identify quality products for their consumers, however this kind of research is expensive. Interventions for research and training needed include:

- Universities to tailor-make their content with a focus on the job-market/industry demand
- Provision of practical knowledge to trainees being prepared to work in the sector
- Collaboration among universities and existing fish farms to gain hands-on skills.
- Government initiative to have Vocational training institutes (TVET) to take up aquaculture courses.
- Research on feed by universities and input suppliers is essential.
- Research to be demand-driven where students are funded deliberately to research on “needed” research areas.
- Need for capacity building (updating on new technologies) for extension officers.
- PPPs in research, training and extension
- Establishment of centre of excellence (CEs) E.g. Sagana Research and Training Centre

Market demand

Unlike in the three comparative countries where the per capita fish consumption is high, Kenya’s fish consumption is low. Per capita consumption can be increased through:

- Regular ‘*Eat more fish*’ campaigns. These campaigns have been very effective in the central part of the country which wasn’t originally a fish eating area
- Focusing on market days in town centers which has worked in some peri-urban areas like Kitengela and can also work in Kiambu which is struggling with fish marketing. There is also a need for a central contact point in the county where farmers can get information on farming and market
- Establishment of fish collection centers for farmer groups, while frequent seminars would work to update stakeholders on current issues in the industry

The group identified the following counties as priority counties:

Kiambu, Karatina, Tharaka Nithi, Nyeri, Muranga, Embu Western Kakamega, Busia, Siaya, Kisumu, Bondo. The approach would be to identify 20 model farmers from each county to learn from.

3.2 Group 2: Investment (inputs, finances, services and infrastructure)

What are successful insights and lesson related to the factors of focus that catalyzed commercialization?

Inputs, finances and services

The Kenyan aquaculture sector is private sector-led and, like in Egypt and Nigeria, there is opportunity for it to grow. However, there is need for the government's role in facilitation and regulation to ensure that farmers get quality inputs. The government also needs to create a conducive environment for the banking sector so that farmers can secure loans at lower rates. Farmers should have an entrepreneurial approach to aquaculture while identifying the best culture system that fits them best (i.e. semi-intensive and intensive). There is also need to ensure that extension services are effective and efficient. The Government has a role in ensuring the type/quality of extension material/information that is given to farmers.

Some approaches that have not worked in developing the Kenyan aquaculture sector in relation to inputs, finances and services include:

- Hand-outs from the government
- Working in isolation (there is need for an integrated approach by all stakeholders)
- Incorrect inputs: Farmers selecting the wrong fingerlings to farm in cages on the other hand county extension staff may be lacking knowledge on what type of fingerlings are suitable for cage farming.
- Need to define clear roles between county, national and private sector in developing regulations
- Need to develop a strong value chain strategy for the fish industry
- Need for strengthening certification and regulation of inputs (feeds and fingerlings) by KEBS
- Organizing FFA to get loans and inputs

Infrastructure (beyond production systems): (e.g. roads and cold chains).

Borrowing lessons from the growth of peri-urban catfish farming in Nigeria, it is noted that the successful growth of the FFEs prompted the government to support the sector by developing roads leading to the FFEs, connecting production sites to markets. In so doing, the road infrastructure was improved creating easy access to the markets. This shows how the private sector can play a leading role in developing the sector hence pulling the government in its role of facilitation and regulation. Unfortunately the rapid growth of the peri-urban farming has created environmental challenges with drainage of waste water from the farms becoming an issue of concern for neighbors of the FFEs given that most of these farms are not well planned. In Egypt and Ghana, despite the private sector playing a leading role, the governments have been slow in catching up with the sector's development. Farmers have to grapple with poor road networks and infrastructure in addition to lack of electricity connection.

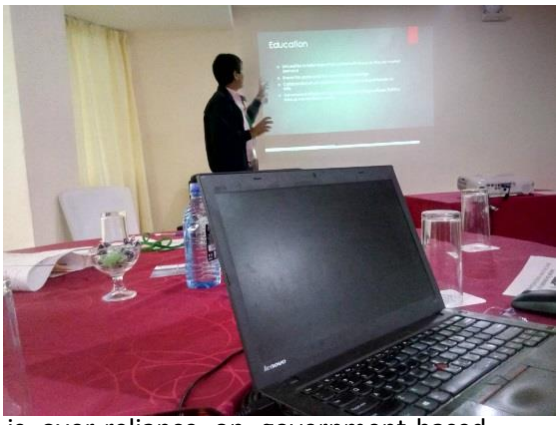
The Kenyan aquaculture sector is equally faced with infrastructural challenges that include poor roads, lack of cooling facilities and high cost of electricity. Farmers are also faced with choosing between tilapia and catfish for aquaculture. While catfish is easier for the farmer, it faces challenges of marketing. On the other hand, tilapia has higher consumer preference but the farmers face challenges including poor seed

and feed quality. Fortunately the country has enough water bodies for aquaculture. For the Kenyan aquaculture sector to grow, the group recommended the following:

- Development of market infrastructure (cold rooms, handling & testing facilities)
- Development and improvement of the road infrastructure in areas where aquaculture is practiced
- Development of infrastructure is best done under Public-Private Partnerships (PPP)
- Pooling of resources by farmers and formation of workable FFAs that can ensure consistent production to sustain the market demand. These FFAs could also work to
- Strategically lobby for market share/protection and fair taxation
- Market bargaining power i.e. for input, market access, credit and better product prices
- Sector growth driven policies and better articulation of national policies which should trickle down to the county level policies
- Formation of associations of manufacturers
- Quality assurance for fish and fish products in the market

3.3 Group 3: Technical capability (skills, competences) and human Resources

Given the successful growth of the feed industries in Nigeria, Egypt and to a lesser extend Ghana, the group identified that is lack or low level of skills and technical know-how among different stakeholders in the industry. For instance in basic fish farming skills; in feed making and feeding regimes, understanding of carrying capacity in production systems & meeting market demand. In addition, there is lack of competence among staff working in the aquaculture sector including, extension workers and managers of commercial farms. This leads to wrong technical advice to farmers by both government and private extension service providers. Furthermore there is low human resource specifically in extension, research and training. Since the government has generally been the source of extension information, there is over-reliance on government-based extension (most of whom are not specialized in aquaculture production). Additionally, farmers lack well-structured marketing strategies as well as the entrepreneurial skills. The group proposed strategies that can be used to overcome these challenges including:



- Farmer to farmer skills transfer (including a fee to be paid for the service)
- Putting in place best aquaculture practices as an obligation
- National government to have a central platform for data, knowledge, research findings etc. that is easily accessible to all stakeholders.
- On-the-job training (beyond academics) and continuously transferring new skills to actors in the sector.
- Linking research and industry to ensure relevance of research in addressing industry challenges.
- Collaboration with other countries to tap into the knowledge and expertise in developing the sector

4. Way forward and Action points

The following remarks were made as a way forward:

- **Registration of an umbrella platform that has all aquaculture stakeholders**: The round-table has different stakeholders with different interests. Engaging all value chain actors is necessary to be able to influence the agenda of sustainably developing the sector. To form a strong formal association that offers a strong value proposition to all stakeholders is an important part of the agenda. There is a need for the aquaculture round-table to exist as a registered entity in order to facilitate channels of communication with the central government. An apex co-operative organization would be a big and influential force. Kenya could borrow a leaf from Uganda where such a co-operative was formed and it has been instrumental in doubling fish production and influencing government policy. Following the restructuring of the government (to have central and county governments) and also the restructuring of the SDFBE, there is need to effectively use these new developments to grow the sector through stakeholders engaging collectively. There is also need to spearhead the formation of an umbrella organisation that will take into consideration all the stakeholders in the aquaculture industry. This will be discussed within the next Aquaculture Round-table and feedback will be shared via email.
- **Strengthening of extension**: There is a need to find ways of enhancing capacity of fish farmers. There are gaps in the aquaculture extension system hence a need to identify the major actors in extension so as to enhance the supply of skills to cater for the demand. Money from the GoK isn't enough to cater for extension and there is need for innovative approaches to extension. Extension needs to not only focus on provision of technical knowledge but also business training. Stakeholder forums need to propose successful aquaculture extension models.
- **Need for collaboration between research and private sector in curriculum development**: Research should be funded for specific projects. Private sector should be involved in developing a training curriculum.
- **Enhancing PPPs**: How can private and public partnerships in research and training be established to make research more demand-driven?
- Who should spearhead the research?
- Who should be in charge of developing a training curriculum? It is not enough for the private sector to be involved in just developing a training curriculum. Can research and training be spearheaded through a collaborative effort?
- This needs to be included in the agenda for the next round-table meeting in order to have more concrete action plans. The aquaculture sector actors need to learn (get insights) from other agri-food sectors doing well like dairy. The value proposition can be made in terms of a SWOT analysis or situational analysis.

Identification of priority Counties to guide 3R research: For priority counties, a recently initiated project of IFAD working in partnership with WorldFish has identified 15 counties where they will be working. This project can provide the basis for identifying counties of focus for 3R work. The report from the mapping study is in public domain. The round-table chair will share the list of selected countries with the round-table workshop participants.

Annex 1: Participants list

	Name	Organization/Institution /specialization	Sector	Area	Email
1	Mrs. Susan Otieno	State Dept of Fisheries & Blue Economy	GoK- Central Govt	Nairobi	saotieno@yahoo.com
2	Nicholas Kagundu	County government of Nakuru County	GoK- County Govt	Naivasha	nickmurimi@gmail.com
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4	Dr. Joyce Maina	University of Nairobi/Fish Nutrition Research	GoK - Academic Institutions	Nairobi	Mainajoyce78@gmail.com
5	Mr. Kenneth Rono	Eldoret University/ Aquatic Sciences	GoK- Academic Institutions	Eldoret	Kennethrono01@gmail.com
6	Hon Ochieng Mbeo	Chairperson Aquaculture Round-Table- Secretariat	Sector Platform	Mfangano Island	info@lakeviewfisheries.com
7	Terry Wakahia	Kenya Women Holdings - Aquaculture	Finance Institution	Nairobi	twakahia@kenyawomen.org
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17	Kenneth Kambona	Development Shift Consulting	Aquaculture consulting and investment	Nairobi	kkambona@gmail.com
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22	Jessica Koge	ACTS (3R Kenya project)	Research	Nairobi	j.koge@acts-net.org

Annex 2: Programme

Time	Activity	Lead
0830 – 0900	Registration	Jessica Koge 3R Kenya
0900 – 0915	Introduction of participants	Mr. Benson Obwanga, 3R Aquaculture team Egerton University
0915 – 0925	Welcome remarks	Hon. Ochieng Mbeo Chair of the Round-table Secretariat
0925 – 0940	Brief introduction on 3R	Dr. Catherine Kilelu, 3R Project Coordinator
0940 – 0950	Official Opening of the workshop	P.S State Dept of Fisheries and Blue Economy (TBC)
0950 – 1000	Preliminary results of Feeds Vs Fingerling trials	Arnoud Meijberg, Farm Africa- KMAP
1000 – 1015	Setting the scene- Why a comparative study	Dr. Eugene Rurangwa, Wagenigen Marine Research
1015 – 1040	Presentation - Key insights from the Comparative study on aquaculture sectors in Ghana, Nigeria and Egypt	Mr. Obwanga Benson, 3R Aquaculture Egerton University
1040 – 1100	**Health break**	
1100 – 1130	Plenary- Discussion/Feedback from Insights	Benson Obwanga/ Eugene Rurangwa to direct process
1130 – 1300	Breakout sessions- Lessons learnt from Nigeria, Ghana & Egypt	
1300 – 1400	**Lunch**	
1400 – 1500	Presentation by break out groups : Take home lessons what can work and cannot work / way forward	Facilitated by Benson Obwanga
1500 – 1530	Conclusion- Synthesis of recommendations	Eugene Rurangwa
1530 – 1545	Closing remarks and vote of thanks	Benson Obwanga
1545	**Health break then Guests leave at own pleasure**	

References

Obwanga, B., & Lewo, M.R., 2017. From aid to responsible trade: driving competitive aquaculture sector development in Kenya; Quick scan of robustness, reliability and resilience of the aquaculture sector. Wageningen, Wageningen University & Research, Report 2017-092 3R Kenya. 68 pp.; 5 fig.; 3 tab.; 64 ref