



Source: Egerton University, 29 May. 2020. Nairobi, Azure.

Food system value-chain adaptability - can new opportunities increase food security and food safety in Kibera?

Linking aquaculture to urban food systems

Workshop Report

Discussing new opportunities with the aquaculture value-chains between Nyeri - Kibera

Movenpick Hotel and Residences, 8.30 – 13h, Nairobi, Kenya, 29 May 2020

Feeding cities and migration settlement project¹

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¹ Feeding cities and migration settlement: <https://www.wur.nl/en/Research-Results/kennisonline/Feeding-cities-migration-1.htm>
Kibra documentary: https://youtu.be/K_goJu2encg

Summary

New business opportunities for aquaculture farmers in Nyeri and Kibera fish vendors – with potentials for real impact on food security in Kibera

The Covid-19 outbreak and its associated implications including curfews, lockdowns and cessation of movement has put pressures on vulnerable groups specifically in informal settlements including Kibera. In these settlements there has been a slowing down of businesses, severe impact on employment, income and food security of the inhabitants.

This workshop was carried out during the Covid-19 period in Nairobi on 29 May 2020, taking into account the severe challenges of hunger in Kibera, Nairobi. Participants at the workshop included a representative from the Nyeri County, representatives from Nyeri Fish Farmers Cooperative, a total of 10 fish vendors from Kibera and a community leader from Kibera, and representative of Egerton University. In the workshop a lot was discussed about opportunities for marketing and accessing the Kibera by fish supply from Nyeri, in terms of demand, competition, prices, logistics, and details about the products (tilapia/catfish), and the business models (fish farmers, transport, vendors). One question concerned the team involved, can we ensure that the new value-chain gets implemented in practice? If so, this will involve new arrangements for: 1) fish farmers selling the fish, 2) transport of the fish, 3) taking orders of fish, 4) documenting any amounts of sale and prices of fish, 4) storage of fish through the value-chain, 5) sales place/location including water and electricity and safety, 6) responsible team in Kibera taking care of the fish before received by the vendors, 7) documentation of any sale of fish (amount and prices), 8) organisation of vendors' user rights, 9) organisation of vendors to get formal registration to obtain loans for further investments in future, 10) marketing of the fish (young people will spread the news across to Kibera to the 700,000 people). The workshop concluded this is all possible with a lot of effort of the team involved. To facilitate the process, there is a need for the Nyeri farmer representative to go to Kibera 4 times.

It appeared that one bottleneck is critical and urgent. When the fish arrives in Kibera (1 tonne per week to start with), the vendors need to have the opportunity to store the fish for some 2-3 days before they can sell it all. They urgently need freezers. At this stage they cannot invest themselves, and given the low priced

market, any investment that will increase the price of the fish, cannot be implemented.

Following up this workshop, logistics are being set up which will not only enhance the fish vending business income and opportunities in Kibera, but will also assure more security of the vendors' daily activities, as they avoid making daily risky trips early in the morning to get their fish from the Nairobi's city centre. Importantly, thousands of households, including children in Kibera, will benefit from accessible nutritional protein based on fish, hence advancing the food security of their daily lives. Also, the Nyeri Fish Farmers solve their fish market challenge by accessing the large Kibera fish market. Hence, this new initiative will support viable and sustainable business for the many presently vulnerable women working on processing and selling fish as vendors in Kibera, and contribute to the SDGs: zero hunger and sustainable cities and communities.

Acknowledgements

We wish to sincerely thank the County Government of Nyeri through the office of the County Executive Chief (CEC) Agriculture, Livestock and Fisheries for giving us time to discuss our plans and also facilitating our travel to Nairobi by providing travel permission. We note that this workshop took place during the Covid-19 pandemic when Nairobi Metropolitan Area was under lockdown and movement into and out of Nairobi was restricted. The County of Nyeri facilitated the travel to Nairobi by writing permission to gain entry into Nairobi and out after the workshop and for this we are truly grateful. The project is also grateful to the two farmers who hosted us for farm visits. We appreciate the time you took off your busy schedule to show us around the farms. We also appreciate the time and dedication of Gabriel Francis Mwangi a community leader in Kibera who organised the fish vendors in Kibera for the workshop. Last but not least, we would like to thank the funding from the Wageningen University & Research "Food Security and Valuing Water programme", which is supported by the Dutch Ministry of Agriculture, Nature and Food Quality. We would also like to thank the 3R-Kenya project (<https://www.3r-kenya.org/>), for which important steps were made during workshop discussions about setting up new value chains targeting Kibera markets. 3RKenya was supported by the Embassy of the Netherlands, and was finalised in June 2020.

Abbreviations

ABDP	Aquaculture Business Development Programme
Covid-19	New Corona Virus
CEC	County Executive Chief
FCMS	Feeding Cities and Migration Settlements Project
GoK	Government of Kenya
MoH	Ministry of Health of Kenya
KES	Kenya Shillings
KFV	Kibera Fish Vendors
NFFC	Nyeri Fish Farmers Cooperative

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1. Introduction

This workshop is an output of the project called 'Feeding Cities and Migration Settlements' (FCMS), a Wageningen University Research (WUR) project². In contributing to Zero Hunger, WUR combines interdisciplinary knowledge in the agri-food domain, and supports transitions towards resilient sustainable urban food systems that are shaped for cities with high immigration rates (van Berkum et al. 2020; de Rooij et al. 2020; Soma et al. 2018). The project investigates three interrelated challenges: 1) Diagnosis of core bottlenecks within current food systems and opportunities for enhanced resiliency, 2) identification of innovations that can improve current food systems towards increased resiliency, and 3) lessons learnt internationally that can benefit urban food systems with informal settlements in Africa and Asia. In this project, an existing WUR framework for urban food systems and migration³ is applied by means of participatory research methodologies in different cities around the world, including Dhaka (Bangladesh), Kampala (Uganda) and Nairobi (Kenya). This workshop held in Nairobi on 29 May 2020 provides an example of how to carry out a suitable participatory approach, in co-development with stakeholders, on food related experiments in selected cities with informal settlements.

In Kenya the project focuses on the informal settlements of Kibera, located in Nairobi. Kibera is sometimes referred to as the second largest slum in Africa, with about 700,000 inhabitants. Kibera is one of the areas highly affected by food shortages. The existing fish value chains in Kenya, including value chains stemming from Lake Victoria (300km) and Lake Naivasha (90km) (See Figure 1), fail to deliver sufficient affordable high quality fish, which is in demand in Kibera. Moreover, the women who at present have their small-scale fish businesses face dramatic challenges. These challenges include the women risking their lives in unsafe early morning travels to get hold of scarce fish far away from the Kibera markets.

Towards the end of the year 2019 the project carried out some activities, including some in-depth interviews of households, a community leader, as well as vegetable and fish vendors operating in Kibera. This investigation led to critically important lessons learnt specifically about the bottlenecks of food systems in Kibera, and more generally about the way of life in Kibera; how links to the rural areas contribute to the livelihoods, and how the indigenous vegetable and fish food value-chains and the governance structures in Kibera perform and operate. A literature review was carried out as well a

documentary (https://youtu.be/K_goJu2encg), focusing on the fish and indigenous vegetable value-chains, and also highlighting the livelihoods of the Kibera population. Preparatory discussions to the Kibera case were carried out in a project called 3RKenya (<https://www.3R-kenya.org>) that ended in June 2020 (Kessler et al. 2020). The 3RKenya Project focused on realising Robust, Resilient and Reliable dairy, horticulture and aquaculture value-chains in Kenya (Obwange et al. 2020; Obwanga et al. 2018). In a workshop of the 3R-Kenya project on 12 December 2019, in an Aquaculture stakeholder forum, the FCMS identified the possibility to link the Nyeri Fish Farmers Association (NFFC) to the fish vendors in Kibera (KFV).

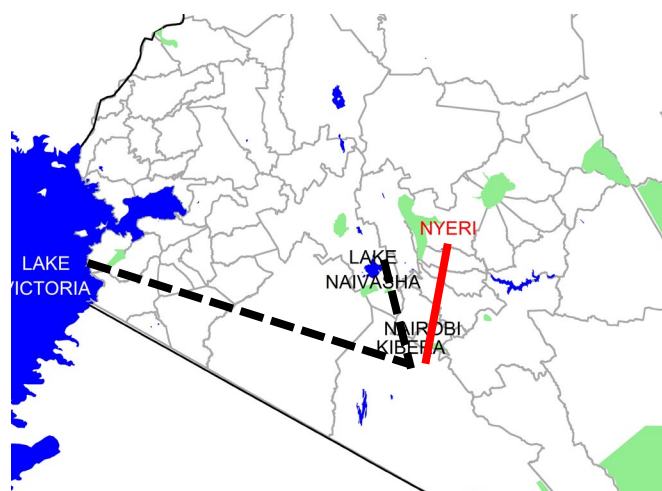


Figure 1 Existing fish value-chains (Lake Victoria and Lake Naivasha) and the new potential fish value-chain between Nyeri and Kibera discussed in this workshop

Source: Hennen, Wil. 31.07.2020. Plain map of Kenya. The Hague. The Netherlands.

The NFFC has organised its farmers into a dynamic farmers association that produces, processes and markets its fish in Nyeri and beyond. While the NFFC produces table-size fish (>250g) that meets the requirements of most high-end consumers, the farmers also harvest fish that has completed the production cycle but does not reach the table size requirements (100g and less). These fish sizes possibly meet consumer requirements in Kibera, and has gotten interest by the vendors interviewed during the making of the documentary. Based on the interviews with some of the KFVs, they source their fish mostly from the Lake Victoria fisheries and Lake Naivasha, and they have set up selling points in the different villages in Kibera like Lindi, Laini Saba etc. These selling points are either located on the roadsides or close to housing units within informal settlement. The KFVs target the high

² <https://www.wur.nl/en/Research-Results/kennisonline/Feeding-cities-migration-1.htm>

³ <https://www.wur.nl/en/Publication-details.htm?publicationId=publication-way-353636343939>

concentration of an urban population in a small area, and a associated high demand for fish. The Kibera fish market presents a niche market for the small fish from the NFFC. The workshop intends to facillitate discussion between the NFFC and KfV to address the actual opportunities and arrangements needed to get the new value chain operational. To support this process, the project worked with the Nyeri County Government through the County Executive Chief (CeC) of Agriculture Livestock and Aquaculture. It is worth noting that the Nyeri County is a target county in the Aquaculture Business Development Programme (ABDP), a programme supported by IFAD, and that the NFFC is doing well and provides a role model to learn from for other counties.

Workshop Objectives:

- To explore potential increase in demand for fish with potential market prices and find practical solutions to increase fish supply in Kibera.
- To share insights in how the value chain can be set up as a local business to local vendors, and to increase food security of the people of Kibera.



Figure 2 Meeting with Nyeri CEC Agriculture, Livestock and Fisheries
 Source: Egerton University, 28 May. 2020. Nyeri. Office of public officer (CEC).

2. Summary of Workshop Presentations

Welcome presentation by Mr. Obwanga Benson



Figure 3 Presentation by Benson Obwanga
 Source: Egerton University, 29 May. 2020. Nairobi, Azure.

Mr. Obwanga introduced the project 'Feeding cities and migration settlements', its objectives and some of the activities carried out so far in Kibera. He highlighted the interviews that had been carried out during a Kibera visit in December 2019, and the documentary that was made in Kibera that highlighted the indigenous vegetables and fish value chains following these interviews. The link to the Nyeri Fish Farmers Cooperative was established in a very last workshop of the 3R-Kenya project (5 March 2020, Nairobi), through which several stakeholders participated in a working session on the Kibera potentials. The project saw an opportunity to work with the NFFC which has a processing facility and produces fish of different sizes including small pieces which can be affordable to the consumers of Kibera. Access to Kibera fish market by around 1,000 farmers in Nyeri can increase sustainability of future food supply to Kibera, given that fish supply from the Lake Victoria is decreasing due to overfishing, climatic impacts, environmental pollution among other reasons. Moreover, fish is a cheap source of protein whose consistent supply to the Kibera ensures nutritional security. The relatively large Kibera population (about 700,000 people) provides an excellent opportunity for the Nyeri farmers to market their fish and therefore contribute to fish supply and food security in the informal settlement.

Presentation by Mr. Gabriel Francis Mwangi - Bottlenecks and challenges in Kibera



Figure 4 Mr. Gabriel Francis Mwangi (Community Leader) informs that there is a great potential for the new value chain supplying fish (tilapia and catfish) to Kibera

Source: Egerton University, 29 May. 2020. Nairobi, Azure.

Mr. Gabriel Francis Mwangi welcomed everybody to the meeting. He is a community lead in one of the villages in Kibera called Lindi. As community lead he takes the responsibility for the welfare of the people in his village, implying that if people need work, have health problems, need safety, or food, he takes the responsibility to assist as much as he can. He informed that a total of three main challenges exist in Kibera:

- There is too little supply of cheap affordable fish to the inhabitants of the Kibera.
- The vendors suffer from unsafe working conditions as they have to travel across Nairobi to get hold of the fish to be sold in Kibera.
- The consumers of Kibera have too little access to nutritious food, including fish.

From a food system perspective, water shortage, use of green energy for preparing the fish, and sanitation are critical issues to be solved in future.

Presentation by Ms. Agnes Kinyua - Opportunities to solve bottlenecks and challenges



Figure 5 Ms. Agnes Kinyua Nyeri County Fish Quality Assurance & Marketing Officer

Source: Egerton University, 29 May. 2020. Nairobi, Azure.

Ms. Agnes Kinyua stated that the initiative to meet the Kibera fish vendors was a great idea given that Nyeri county has abundant fish production. A total of about 1,000 farmers carry out fish farming in fish ponds in the Nyeri county. The fish farmers have organised themselves into a cooperative society which enables them to process and market their fish. The success in fish farming and how fish farmers have organised themselves has made the county a model to be studied by other counties carrying out fish farming in Kenya. In addition, the county takes part in the Aquaculture Business Development Programme (ABDP) currently being implemented throughout the country, supported by IFAD. However, while there is successful fish farming in Nyeri, the population in Nyeri is slowly taking up fish eating as the community is not traditionally a fish eating community. Therefore, while the county continues to popularise fish eating in the community, initiatives by the farmers to market their fish outside the county are highly welcome. Some of the fish is sold to hotels as far as Nairobi. The initiative to link farmers to the Kibera market provides great opportunity to market their fish and the county is ready to support such initiatives. Since there is a fish processing facility in Nyeri, the farmers have an opportunity to collect, process and bulk their fish from Nyeri and also to extend to neighbouring counties if demands in Kibera increases in future. The County Government highly supports the new strategy of establishing a fish value chain from Nyeri to the Kibera because this can assist the many farmers of Nyeri to reduce costs on feed and sell undersized fish that otherwise would be lost.

Presentation by Mr. Charles Mbauni –Practicalities for solving bottlenecks and challenges



Figure 6 Nyeri Fish Farmers Cooperative represented by Mr. Charles Mbauni (Chair) discussing together with the ten vendors representing Kibera at large

Source: Egerton University, 29 May. 2020. Nairobi, Azure.

Mr. Charles Mbauni has contributed extensively in the past to support the fish farmers in Nyeri, in the development of the Nyeri district to become a show case for other fish farming municipalities in Kenya. He was the first to think of the idea to match the problem of Kibera having too little supply of cheap fish – with the problem of the fish farmers in not marketing a large amount of small fish produced every year (3RKenya workshop on 5 March 2020). Note that this is not only a potential win-win to the farmers and the vendors, but also to the many households consuming the fish in Kibera. He presented the details from a fish farm perspective (fish size, use of pesticides, amounts, prices, etc), and introduced in the meeting the information needed for the Kibera vendors to judge on whether this is an opportunity or not. He introduced the opportunities that he thought was welcomed in Kibera, and facilitated the ongoing discussions, by clarifying the opportunities involved and difficulties to be solved. He informed that the three core problems of Mr. Gabriel Francis Mwangi can be solved if:

- Nyeri farmers supply a tonne of fish per week, which can be upscaled to 5 tonnes a week if demands are present in future.
- The supply of fish from Nyeri can be provided in Kibera and not elsewhere in Nairobi to ensure the safety of the vendors’.
- The consumers of Kibera will have access to cheap affordable and nutritious fish stemming from Nyeri.

3. Kibera fish trade and consumption potentials – discussion of emerging issues

Kibera is a highly populated area representing a huge market for fish. In the discussion, the Nyeri Fish Farmers Cooperative representative, Mr. Charles Mbauni, and the Nyeri County Fish Quality Assurance & Marketing Officer, Ms. Agnes Kinyua, represented the farmers and fish processing in Nyeri, while a selection of ten vendors and a Kibera community lead, Mr. Gabriel Francis Mwangi, represented the Kibera vendors and consumers. Some core issues are highlighted below:

Consumption

Fish sold in Kibera are labelled according to sizes (ranging from size 0 to size 10). Examples of the prices for different sizes are given in Table 1. Size 0 to size 2 are the most sold fish in Kibera according to the vendors. Some consumers in Kibera can only afford fish worth KES 30-50 (about 25-40 eurocents) and if the vendor would buy the fish at higher prices he/she may have losses as they will be forced to sell their fish at throwaway prices.

Table 1 Fish prices in Kibera

Fish size (in g/kg, approximately)	Price (KES)	
	When fish is scarce	When fish is plenty
Size 0 (about 50g)	140	90
Size 1 (>50g & < 100g)	200	110
Size 2 (about 100g)	220	140
Size 3 (about 250g)	280	
Size 4 (slightly >250g)	300	

Result of brainstorming, contributions by vendors in the meeting living in Kibera. Source could look like: Kibera fish vendors. 29 May 2020. Nairobi. Azure.

Consumers include people who live in Kibera and those who reside in middle income to high income populations living in neighbourhoods that border Kibera, who pass through Kibera on their way to work or from work. Those who pass through Kibera live in middle income neighbourhoods of Langata Estate. This latter category of consumers passing by are therefore stratified to have the opportunity to afford all fish size categories, and will contribute to even more demand of fish in Kibera.



Figure 7 Fish processing for sale in Kibera
Source: Egerton University, 14.12.2019 Nairobi, Kibera.

Fish sources and their characteristics

The vendors currently source their fish from as far from Lake Victoria, Lake Naivasha and hydro-electric power dams Like Masinga. The most common sources of fish that supply vendors from Lake Victoria, is Sio Port in Busia, collecting fish stemming from the counties Kisumu and Homabay. Masinga Dam fish is sourced from the counties Tumtum, Kamburu and Karakara, while Lake Naivasha fish is sourced from the counties Karakta, Kamere and Kongoni.

Moreover, some fish stem from aquaculture production at Victory Farms who produce fish by means of cage culture in Lake Victoria in Homabay County. The Victory Farms sells at two market points in Kibera and are planning on opening two others. There is also imported Chinese fish which is sold within Kibera.

Although not certified, the fish vendors claim they can distinguish between different sources of the fish by observing the fish quality and how the fish respond to processing. For instance, they insist that:

- Fish from Lake Naivasha has the following characteristics stemming from:
 - Kamere point – the fish has a mud odour
 - Karakta point - the fish smells of cigarettes because fishermen at this point use cigarettes when fishing
 - Kongoni point – the fish from this point has the best taste.
- Fish from the different points of Masinga Dam also has its unique characteristics:
 - Tumtum fish – has the best qualities
 - Kamburu fish - smells of cassava when cooked
 - Karakara fish – has a mud odour.

Fish from Lake Victoria has perhaps the best qualities but this judgement depends on the consumer category. Traditional fish eaters grew up eating this fish, and would therefore consider it the best. However, consumers whose communities are not traditional fish eaters may not necessarily tell the difference based on the source of fish.

The KfV identified different characteristics when they process their fish from different sources at present.

- Fish from aquaculture production has a shorter shelf life when compared to fish harvested from the wild. Before gutting or refrigerating, the fish (tilapia) takes up to 6-7 hours before getting spoilt. However, fish from the lakes, especially from the Lake Victoria, can take up to 12 hours without going bad.
- Aquaculture fish from imported sources can leave some irritation on the hands after processing, and has a tendency to have an apple-like feeling when eaten and has a cassava odour when cooked.
- Aquaculture fish reduces in weight after removal from the refrigerator and has a tendency to turn darkish.
- Catfish (although there is confusion between catfish and mudfish/lungfish) has a shorter shelf life compared to tilapia.



Figure 8 Fish Processing at Nyeri Fish Farmers Cooperative
Source: Nyeri Fish Farmers Cooperative, 10.03.2020. At Nyeri. Nyeri fish farmers cooperative.

Actors in the fish trade supply and value chain

The vendors are part of a value chain and, in short, this is how they work:

- Most vendors have links to brokers, fishmongers or fishermen either in Masinga Dam, Lake Victoria or Lake Naivasha from where they source their fish.
- The KfV operates at a high level of trust with their links, trust that has been built over the years of fish trade. Some vendors inherited the business from their parents and have maintained it as a source of livelihood. Most of the KfV are women as there is a perception that they are more trustworthy to both

customers as well as fish suppliers. In addition, most of the fish traders are from the Western part of the country, in particular members of the Luo tribe, because there is a perception that they have more knowledge about fish, being traditional fish consumers.

- Transactions are made through mobile money transfer.
- The vendors have to get up early and leave Kibera about 5 am, use a motorbike to the bus station, then to the city centre to pick up their parcels from an agreed collection point. These points are designated fish markets in the city or a bus/minibus termini. The parcels are marked with the vendor's names and phone numbers and they are alerted by a phone call once the parcels containing the fish arrive at the collection point. The transport cost is paid by the fish supplier, but the vendors pay a fine of KES 50 if they fail to pick up the fish on time.
- An individual KfV can buy up to 1,000 pieces of fish, which are transported via public transport or fish transporting vehicles, and collected at different outlets in the city like Gikomba Market or Toi Market. The amount of pieces bought depends on the capability of the vendors and the uptake of the fish by the consumers.
- Daily fish orders by vendors to suppliers vary, depending on how much they sell on a daily basis. For instance, a vendor who has the capacity to sell 150 pieces of fish will buy 150 pieces of fish and sell all within the day (which may last between 3 pm - 10 pm). However, at different occasions they may sell about 70 pieces and will only order about 80 the following day to add to the remaining stock.
- The KfVs operate at the roadside, mostly on the busy streets in the informal settlements. Some sell from deep inside in slum, close to homesteads/housing units. Victory Farms, a cage culture farm in Lake Victoria has at least two depots or fish selling points in the slum. While the vendors can get fish from the depot, their consumers can get the fish from the depot at similar prices, and therefore sometimes the depots are a disadvantage to the traders.
- The fish vendors already have existing vendors self-help groups, who have aggregated in for the purposes of saving money. However, this is not a formally registered group and cannot get loans for investments yet. It was discussed that if the vendors organise themselves they can get individual loans to buy equipment, such as refrigerators, which they can use to store their fish in cases when their fish has not all been sold. Such small fridges can have the capacity to hold up to 1,000 pieces of fish.
- In a short run, support to store fish is urgently needed. With a small contribution, more investments can be made to expand later on.

Covid-19 pandemic and its impact on fish trade and consumption

The Covid-19 pandemic was an unexpected occurrence. The informal settlement already faces challenges of water scarcity and its related sanitation issues, as well as unemployment, among other challenges. The pandemic therefore creates more challenges in the slum, which has an impact on the fish trade and consumption. The following effects of the pandemic on fish trade and consumption were highlighted:

- There has been an upsurge of fish vendors after the Covid-19 pandemic struck. Many persons in the slum lost their casual labour jobs and have turned to fish vending as an alternative source of livelihoods. As a result the price of fish has plummeted/fallen. The persons taking up fish vending may sell their fish just to make a small profit especially if they are taking it from the depots in Kibera. Therefore all the rest have to reduce the prices to compete.
- The curfew was imposed by the Government of Kenya (GoK), which restricts movement from 7 pm to 5 am in the morning, and has reduced the number of hours the vendors can sell fish (before 8 June the curfew was from 9 pm to 5 am). Before the curfew, some traders could sell fish from 3 pm to 11 pm at night (targeting those who come from work late).
- Supply of fish into Kibera has been affected by Covid-19. Most vendors rely on public transport to supply their fish from either Kisumu, or Lake Naivasha. The lockdown imposed on the Nairobi metropolitan area by the GoK has restricted the movement of public transport and other vehicles in and out of Nairobi.
- Some KfVs have become innovative in selling their fish by creating 1-m distance spaces at their selling points and ensuring that their customers maintain social distancing, and are provided with soap and water for hand washing (hence complying with the Ministry of Health (MoH) and GoK regulations even with the underlying water scarcity problems in Kibera).
- For the new fish vendors, fish trade has provided them an opportunity to support their livelihood.
- There is low supply of fish at the moment and therefore the vendors are eager to trade fish they have not consumed in their homestead.

4. Ways forward

Kibera is attractive for small business that market smaller-sized products that meet the demands of its population. Hence, several entrepreneurs have established shops in Kibera to take advantage of a low priced market. The Kibera people prefer cheap commodities that they can afford, for instance, smaller-sized fish at lower prices. Residents are aware of the importance of consuming healthy meals, and hence, look

for white meat options. Fish represents that cheaper but highly nutritious option. Kibera offers a large market for fish and can be the launching pad for similar initiatives targeting slums in Nairobi including, for instance, the Mathare slum. The 10 vendors who attended the workshop have potentials for creating a very large network of fish vendors in Kibera. The vendors can look for a common place where fish can be brought and they can pick up the fish; similarly to what Victory farms have done. Such a base location will be welcomed by the NFFC who then can supply large amounts of smaller-sized fish.

Following the contributions and discussions between the KfV and NFFC, the participants agreed that there is a highly relevant fish source from Nyeri County, and that there is a fish market for this source in Kibera. The following was agreed as the way forward:

- There is need for further interaction between the NFFC and the KfVs. Representation from NFFC needs to visit Kibera to see the fish market, and have an idea of its dynamics and potential suitability of relevant locations. It will be key for the NFFC representative to understand the fish sizes, the marketing by the vendors and the possible location of sitting at selling point.
- There is a potential to start with a small pilot to see how the business goes, then later expand to the rest of Kibera.



Figure 9 Workshop discussion
Source: Egerton University, 29 May. 2020. Nairobi, Azure.

The differences in the taste of fish and other attributes may be myths which may not necessarily have a major impact on fish trade and consumption. Victory farm fish, when they came to Kibera in the first place, had opposition from competitors, and there were myths about their fish. The vendors were concerned about the qualities of feed and pesticides used during growth of farmed fish in Nyeri, and the extents to which health standards are met.

- The NFFC representative assured the traders that the association collaborates with the county government to ensure the fish meets the health standards for consumption, not only in the country but even health

standards abroad. The Chair mentioned that given that they have a processing facility, their fish has to meet internationally set standards. The standards are checked at a regular basis to find what is fed to the fish, and based on samples taken to measurements, to ensure the consumer standards are met. The NFFC is also in a region where horticultural crops are produced in large amounts for exports, and there they also have to meet a stringent set of standards before they are exported. When standards are not met, the products meant for exports are returned to the farmers. The NFFC also endeavours to meet these standards.

- NFFC had thought of sending parcels of few pieces of fish to vendors, but after studying the market, they can set up a selling point in Kibera in near future. NFFC can even work with different vendor groups in the more than 10 villages in Kibera to strategise on how to do business in Kibera.
- For selling point, there will be an urgent need for seeking partners to assist establishment of the fish cooling storage facilities in Kibera for the NFFC to market their fish.
- There is also a need for development of trust between the KfVs and the NFFC, which will enable the vendors' ordering fish and remitting money to the cooperative, while the cooperative ensures the vendors receive the fish, as per the weights and respective sizes ordered.
- There will be a need for the NFFC to carry out a lot of marketing of fish products, to make people know about their fish, so as to carve a niche for themselves in Kibera. For instance, Victory Farms have been strategic in doing business in Kibera by working with the fish vendors in Kibera.
- NFFC prefers trade using fish weights instead of pieces so as to ensure trust with traders and consumers. Notably, Kibera Fish Vendors buy and sell fish in terms of sizes (which range from Size 0 to Size 10). The two entities (NFFC and KfV) should meet and agree on how to integrate the weights and size issue.
- NFFC can take into consideration that the KfVs have to travel to the City Centre to purchase their fish and back to the informal settlement to sell their fish. Therefore having considered this, the two entities have to agree on whether the fish will be sent to the city center or into Kibera, which saves the KfVs the trouble of having to get up very early in the morning, travelling to the city center to pick their fish. NFFC can contribute to the transport by bringing fish to Nairobi using a truck that is made available by the Nyeri County. A focal person is needed to be located at the selling point, who can take the orders from the KfV and can inform the NFFC, and make agreements of the number of pieces to be transported to Kibera from Nyeri on a weekly basis. The NFFC has its own vehicle that can only transport large volumes (at a minimum of 1 tonne) of fish to Kibera. The traders and the

farmers can operate based on trust, similarly to business relations with other traders from Lake Naivasha and Lake Victoria. One of the traders felt that receiving fish by parcel is far cheaper. The traders use to operate by receiving the fish parcel, selling it, then paying the suppliers once they sell the fish, before they can receive another package.

- Receiving fish as parcel transported in public transport is cheaper. However, if the fish would be taken to them to the Kibera it would be even cheaper and will save them the trouble of having to travel to Nairobi early in the morning to the City centre (Nairobi) to pick their fish. In addition, transporting the fish to Kibera using refrigerated trucks ensures quality and safety of the fish.
- The vendors would prefer small loans which they can use to buy refrigerators and pay back slowly as they sell their fish. However, in a short time, it is not possible to obtain loans as they need to get organised as a group, a process which will begin to ensure they can contribute with own investments in fish and technology, such as the private small refrigerators.
- The setting up of cold facilities for fish storage has been tried before. One such cooling facility was set up in a fish selling point in Kibera close to Moi Girls High School before the traders were evicted from the selling points by the GoK due to security reasons. Ensuring safety in a future selling point is therefore crucial.

5. After workshop

This report was edited and finalised mid-July 2020 and a lot has happened since the workshop took place. This includes:

- A selling point location has been identified that is safe, and two focal people have been assigned to the responsibility of taking orders from KFA and telling NFFC, and will ensure measurements of sale (quantity and price) are documented in Excel files and sent to WUR/Egerton. Rent, agreements, water and electricity have been organised.
- The NFFC plan to begin with transporting a tonne per week and will upscale when the logistics have been put in place. They will document any fish transaction to WUR/Egerton, including quantity and prices, as well as post-harvest losses.
- The Kibera community lead has organised a group of young people who has informed the citizens of Kibera that the fish will arrive soon, and labelled it as Kenyan fish (to be sure it is not confused with Chinese fish). He will support a WUR survey interviewing vendors, which is critically important now with Corona-19 in Kibera. A questionnaire survey has already been drafted (Egerton/WUR).

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YouTube documentary links

Kibera (Nairobi) - horticulture and aquaculture food systems:

https://www.youtube.com/watch?v=K_goJu2encg&feature=youtu.be

Pond aquaculture farming in Kenya: <https://www.youtube.com/watch?v=xH3itzOKWOY>

Cage aquaculture in Kenya: <https://www.youtube.com/watch?v=VYPnQQ1UwXw>

Appendices

Table 2 Programme of the Workshop

Time	Sessions	Leads
8.30	Arrivals (Coffee/ Tea)	Benson Obwanga (Egerton University)
9.00	Welcome	Benson Obwanga
9.15	Short introduction round	All participants
9.30	Bottlenecks and challenges in Kibera <ul style="list-style-type: none">- Corona and lock down – last developments?- Low protein supply and food insecurity?- Vendors’ needs for long term and stable business opportunities?	Gabriel Francis Mwangi (Community Leader and Youth leadeh leader Drop the gun Initiative Lindi Village lead in Kibera)
9.45	Opportunities to solve bottlenecks and challenges <ul style="list-style-type: none">- Nyeri aquaculture sector – 1000 farmers- Potential supply from Nyeri county	CEC for Agriculture, livestock and fisheries) (Nyeri County)
10.00	Practicalities for solving bottlenecks and challenges <ul style="list-style-type: none">- Transport and size of potential fish supply to Kibera- Opportunities for receiving, processing and selling the amount of fish?- New ways of organizing vendors needed?- The size of the fish - potential demand?- Information sharing and extension of potential consumers needed?- New ordering facilities needed?- How to do it?	Charles Mbauni (Chair Nyeri Fish Farmers Cooperative Society)
10.15	Coffee/ Tea	
10.30	Discussing practicalities for solving bottlenecks and challenges	All (Facilitator: Charles Mbauni)
11.55	Thanks and closing	Benson Obwanga
12.00	Lunch and following discussion	
13.00	End of workshop	

The Feeding cities & migration project

<https://www.wur.nl/en/Research-Results/kennisonline/Feeding-cities-migration-1.htm>

Cities all over the world are ever-expanding and becoming more complex in terms of logistics and administration. They need a robust and sustainable food system to provide everyone with enough healthy food. How do you feed growing cities? How do you strengthen their connections with the surrounding farmland that could provide enough healthy food? Too little attention has been dedicated to research on the dynamics of urban food systems and their impacts on human lives and long term sustainability in the past. In order to support the achievement of the Sustainable Development Goals of Zero hunger (SDG 2) and Sustainable Cities and Communities (SDG 11), WUR is committed to working with relevant stakeholders on developing suitable approaches, methods and, above all, strategic interventions and solutions.

Against this background, in the project 'Feeding the cities and migration settlements', the aim is to gain a better understanding of how to improve urban food systems while paying particular attention to the impact migration has on food security to create sustainable, resilient urban food systems. The Water-Food-Energy-Ecosystem Nexus plays an important part in meeting these challenges.

In the coming years, research will be carried out to further develop existing analytical frameworks in the areas of food, the rural-urban connection and migration into a joint analytical framework for

urban food systems. This will be done by investigating selected cities in Africa (Kampala, Nairobi) and Asia (Dhaka), in close cooperation with stakeholders at various levels. This framework will form a basis for further diagnostics and scenario analyses. It will take into account various crucial aspects, such as governance, spatial structure, spatial economy, supply chain and logistic relationships. We continuously work with the stakeholders in the three selected cities to explore strategic interventions and practical solutions.

Eventually, we shall formulate further investment and innovation strategies with governments, entrepreneurs, NGOs and scientific partners.



Figure 10 Kibera visit on 14.12.2019 (Egerton University/WUR)
Source: Egerton University, 14.12.2019. Nairobi, Kibera.

More information

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