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Fish farming dynamics in South Western Highlands Agro-Ecological Zone, SWHAEZ, baseline survey in Kabale, Kisoro, Rukungiri and Kanungu Districts

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Abstract
Grey literature stipulates that, aquaculture has been in the zone for more than 5 decades. However, as any other enterprise, its status and economic contribution in the region remains a mystery. In order to have an insight of in the enterprise for a holistic research, a survey was necessary. The study was conducted in the zone, where questionnaires were administered to 98 fish farmers for 8 days. The results indicate that, there are currently fewer farmers than had been anticipated given a long history of the sector in the zone. 100% of all the farmers in the zone practiced earthen ponds as their solely production systems. Majorly, the education level of farmers was found to be at primary level, 48.8%. 84% of farmers employed incomplete fish feeds. Common cultured fish species was Nile tilapia. Farmer challenges included; stunting fish growth, lack of complete feeds, quality fish seed and skills.

Keywords: Aquaculture, zone, farmers, earthen ponds, education, fish feeds, fish species.

1. Introduction

Aquaculture refers to the farming of aquatic organisms, including; plants, crustaceans, mollusks, algae and fish. Aquaculture (water farming) implies some form of intervention to enhance production in the process of rearing.

Global aquaculture has continued to grow to the extent of being fully comparable to capture production in terms of feeding human population. However, aquaculture production worldwide remains imbalanced across regions, with some countries dominating in production than others. For instance, by the year 2010, Asian countries accounted for 89% of the world aquaculture production by volume [1]. Aquaculture production is less evidenced in the Low Developed Countries (LDCs) especially the Sub-Saharan countries in terms of share of the world production. Considering aquaculture production in the Sub-Saharan countries, Uganda has emerged the 3rd in production after Egypt and Nigeria [1].

Aquaculture in Uganda was introduced in 1953 with the establishment of the Kajjansi experimental station, Aquaculture Research and Development Centre (ARDC), [2-3]. ARDC was constructed for demonstration of fish farming and provision of fry to out growers [2]. The introduction of fish farming in Uganda came along with trials of different fish strains ranging from native ones to exotic fish species that were introduced from Asian countries [4]. Despite the long history of aquaculture in Uganda, it has remained at a small scale/subsistence level [3]. However, since the 1990s, the sector has rapidly increased because of greater interest of the population, and support from both the private sector and the government. Several commercial fish farmers are emerging [5] and there is a high adoption of new production systems, especially cage farming from the traditional pond systems in the country. However, adoption of commercial fish farming and diversification of aquaculture is only evidenced in the central region of Uganda. Considering the aquaculture grey literature available in South Western highlands Agro-Ecological Zone (SWHAEZ), the enterprise seems to be insignificant despite a lot of interests and a rich resource of aquatic ecosystems.

Aquaculture in the zone was introduced between 1950s and 1960s by Uganda's fisheries department field extension which involved the establishment of fish nursery centres and numerous fish ponds on local smallholdings [6]. Aquaculture was spearheaded as a measure of

enhancing food proteins in the region where overpopulation and limited land resources imposed severe constraints in the zone. By the 1960s, aquaculture in the zone had grown to three fry centres, which served as breeding and rearing stations, public buying points and for experimental purposes [7]. Fry centres were located in three districts; Kabale 5 ponds, Rukungiri 9 ponds, and Kanungu 9 ponds [8]. In addition to the fish fry centres, there was a fish farm demonstration centre at Kitanga in Kabale District with 14 ponds, bringing the total number of fish ponds operated by the department of fisheries to 37 [7]. The major fish species cultured by then were, Tilapia and Mirror carp. Mirror carp attained the highest local preference owing to the comparatively larger size in comparison to Tilapia. However, most of the fish farming practiced by then was on subsistence scale [9]. Unfortunately, the strong foundation that was laid for aquaculture in the zone, was later eroded almost completely during the long political turmoil to which Uganda was subjected to from the mid 1970s [6]. Since this time, little or no work has focused on the enterprise (aquaculture) in the zone for revamping despite a lot of work being done in the central region of Uganda. Therefore, in order to begin a holistic research on the enterprise in the zone, a baseline survey was regarded paramount. Thus, the major aim of the current study was to determine the status of the enterprise in the zone so that gaps can be unfolded for further research.

1.1 Specific aims/objectives of the survey

- Compile information on the existing fish farmers and their levels of education in the zone
- Highlight on the production systems used, and fish species being reared in the zone
- Investigate on the quality of feeds, feeding regimes and management levels employed at the zone
- Examine whether there are hatcheries in the zone
- Assess the challenges facing aquaculture in the zone
- Outline the possible recommendations to aquaculture problems in the zone

2. Methods and materials

The data for this study are drawn from a field survey that was carried out in June 2012 on 98 fish farmers in the Districts; Kabale, Kisoro, Kanungu and Rukugiri of SWHAEZ. These Districts were selected because they are under the operational research mandate of KAZARDI.

2.1 Document review

Secondary data was collected by reviewing both print and electronic documents. This included but not limited to some reports from the above mentioned Districts' Local governments (DLGs).

2.2 Structured interview questions (Questionnaires)

Structured interview questions (See annex) were administered to fish farmers in different sub counties selected at random in each District. Initially a sample size of six farmers in each sub county per District was required, however, because of logistical challenges, this was not followed. Also, this was not feasible because in some sub counties, farmers were either not there because of the inapplicability of the enterprise or farmers had abandoned fish farming. Out of the 98 fish farmers interviewed in the zone, 44 were from Kabale, 17 from Kisoro, 19 from Kanungu and 18 from Rukungiri Districts. Prior to administering the questionnaire, the tool was pre-tested at 5 fish farms in Kabale District. Extension personnel from Kabale District local government played a major role in identifying and setting up pre-testing activities. Results from the pre-testing were used to develop the final questionnaire. Other pre-survey activities included reconnaissance in the pilot survey with the Districts' fisheries officers and other stakeholders where lists of the fish farmers were obtained. It must be noted that, the lists of farmers that were obtained from the Districts did not tally with the present farmers that were surveyed. This is because, either some fish farmers had died, abandoned the enterprise or new comers had adopted the sector. Survey enumerators were mainly from KAZARDI staff and internship students. Because most of the enumerators were not from aquaculture background, they were trained initially by KAZARDI aquaculture scientist, and socio-economist, so as to be knowledgeable with primary data collection methodology and aquaculture practices.

2.3 Observation

This method was used because of its applicability in situations where some bits of information were either ignored or difficult to capture using other data collection tools by researchers.

2.4 Data analysis

All data collected were used to develop analytical categories and theoretical explanations. Quantitative data was analyzed using simple descriptive statistics by SPSS software 17 for widows and implemented in Microsoft office excel 2007.

3. Results

3.1 Existing fish farmers in the zone

Findings from this baseline survey revealed that there were 1,404 (One thousand four hundred and four) farmers in the zone. Out of these farmers, 49.2% were found in Kabale, 39.9% in Kanungu, 7.6% in Kisoro and 3.6 in Rukungiri (figure 1). Generally, these figures stem from the respective District Fisheries Officers in the Zone

It can be noticed that, the number of fish farmers in Rukungiri is very low compared to other Districts. The reason for this is that, at the time, Rukungiri District had no substantive a fisheries officer and because of this, it was difficult to trace the records/data base regarding fisheries in the District. The number of fish farmers in Rukungiri indicated above was got from what currently the volunteering fisheries officer had visited physically.

Further results revealed that fish farming in the zone begun in the 1950s (figure 2). However, during these years, 1950s, it was only evidenced in Kabale District.

Later on, the enterprise evolved in other Districts in the 1960s apart from Kisoro where it begun in the 1970s (figure 2)

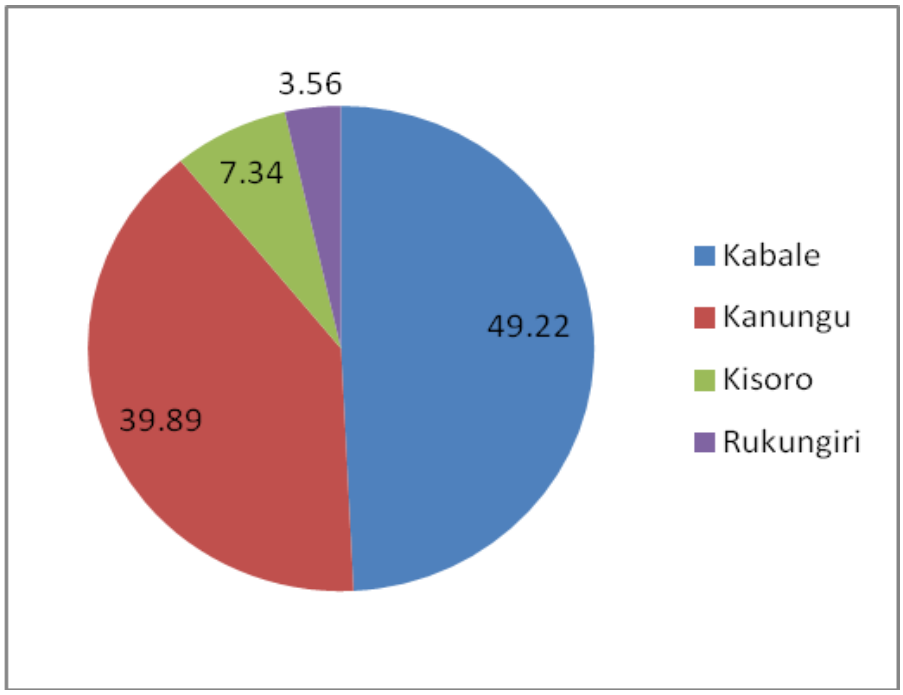

Fig 1: Percentage number of fish farmers in the zone (per District)

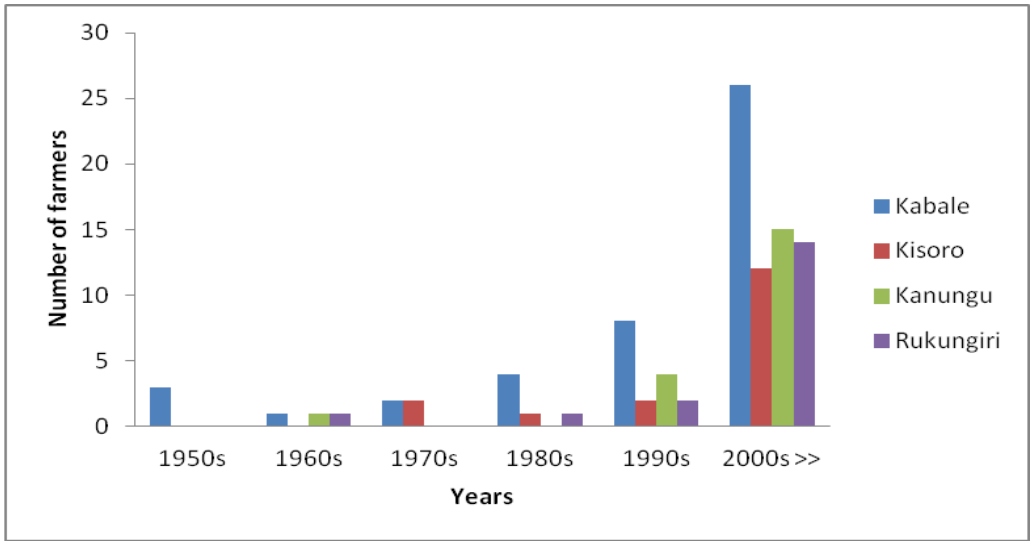

Fig 2: Time (years) aquaculture begun and its trends in the zone

Considering the old age of aquaculture in the zone mentioned above, it can be realized that, fish farming became prominent with effect from the 1990s to date (Figure 2). Also reference the number of farmers in the zone over time, it is noticed that Kabale District dominated (Figure 2). Most of the farmers that were visited and interviewed, majorly were males compared to females (Figure 3). The least number was observed for fish farmers who owned fish farms as a group. However, in Kisoro District, neither a group, nor females owned a fish farm. The group owned fish farms reflect mainly the ones that were constructed by the Department of Fisheries during the genesis of aquaculture in the zone as mentioned above. However, it must be noted that, these farms are currently in dilapidated states as some could be seen emerging from the bushes at the time of our visit. Some have collapsed completely for instance the Kitanga one, where only one pond could be seen emerging from the swamp (Plate 1). It is alleged that, this is due to inadequate or erratic funding to the District local government

Plate 1: One of the ponds in the zone that belong to department of fisheries

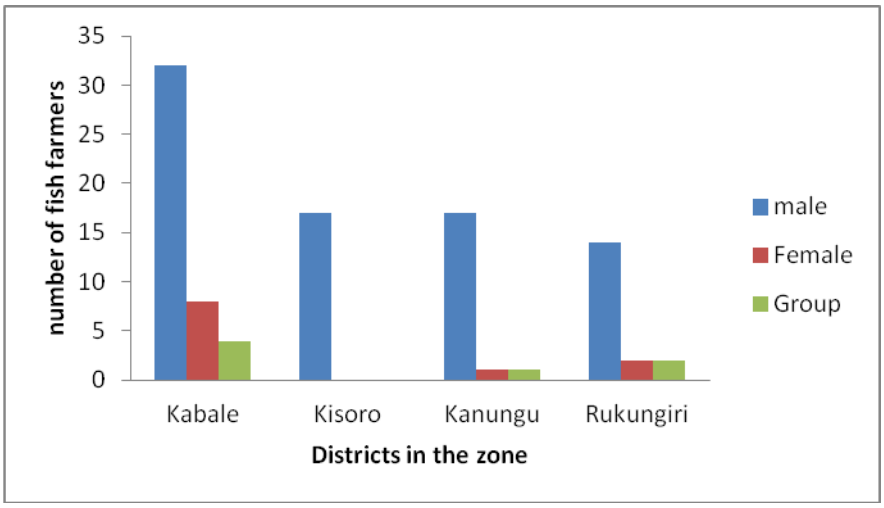

Fig 3: Number of fish farmers by sex in the zone

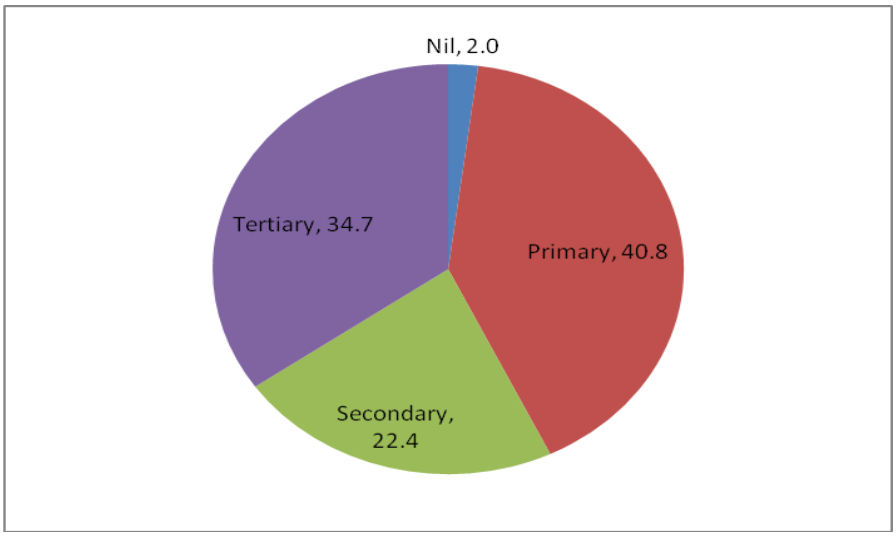

Fig 4: Percentage levels in education of fish farmers in the zone

Levels of education differed among the fish farmers in the zone and were categorized into 4 groups; Nil (who never went to school), Primary (P1 to P 7), Secondary (S1 to S4) and tertiary (including S5 to S6 and other higher institutions of learning). This is according to the education standards of Uganda. A bigger percentage of fish farmers, 40.8%, were found to be at primary level (Figure 4).

3.2 Production systems and fish species reared in the zone

Out of the 98 farms/farmers visited, none of the fish farmers had a different production system other than the traditional earthen ponds (100%). Efforts were made to categorize farmers into three levels; Small scale, Medium scale and large scale based on average pond area (m^2) as follows:

- A fish farmer with an average pond area of less than 50 m^2 and not greater than 590 m^2 (<<50-590) was considered small scale
- A farmer with an average pond area between 600 m^2 to 990 m^2 was considered medium scale
- Whilst a farmer with an average pond area of 1000 m^2 and above (1000>>) was considered large scale.

Referring to this grading, most fish farmers in the zone were dominated by small scale, with Kisoro shooting and Kanungu the least (Figure 5). On the other hand, comparing medium and large scale fish farmers in the zone, Kabale and Kanungu, had a high percentage number of medium scale farmers whereas Kisoro with a bigger percentage number of large scale (Figure 5).

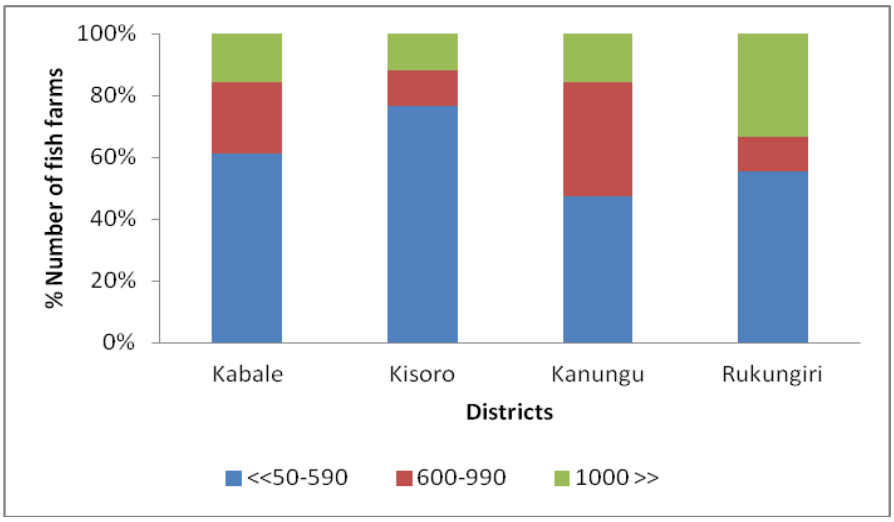

Fig 5: Percentage of fish farmers and levels of production systems in the zone

Three fish species; Nile tilapia, Catfish and Mirror carp, were only found reared/cultured in the zone. Apart from Rukungiri District with only two species of fish cultured, the rest of the three Districts cultured each of the herein mentioned species (Figure 6). However, Nile tilapia was found to be dominant among the cultured species in the Zone followed by Catfish (Figure 6).

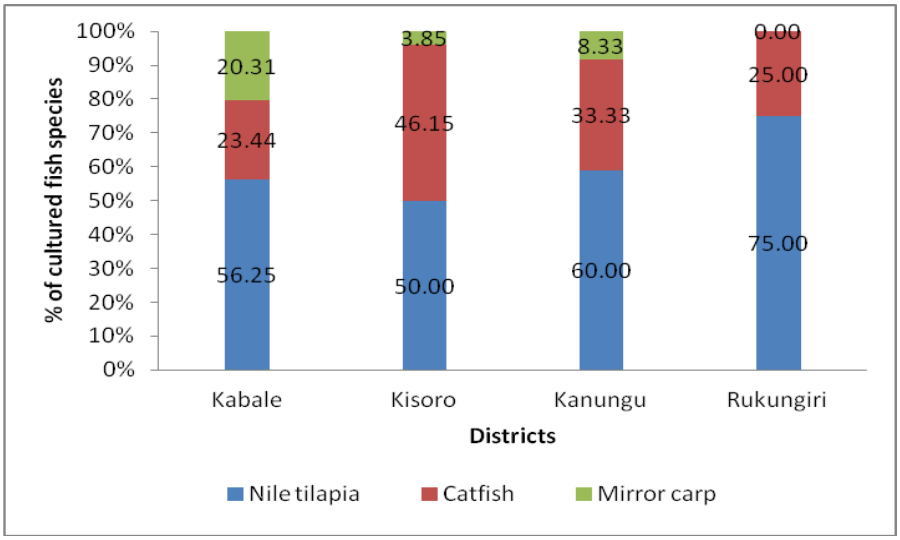

Fig 6: Cultured fish species in the zone

3.3 Feeds, feeding regimes and management levels of fish farming in the zone

Fish feeds and feeding dynamics were encountered in the zone with the majority of the farmers employing low quality feeds; vegetables, animal wastes, fruits, and maize bran among others, while others never fed at all (Figure 7 a and Annex 2). Feeding regimes as well varied among the farmers in the zone; some feeding, three times a day, twice a day, once a day, once a week and others nil (Figure 7 b and Annex 2). The feeding regimes and the quality of the feeds administered at various fish farms led us to categorize fish farmers into three systems: Subsistence, Semi-intensive and intensive farmers.

The categorization of the fish farmers followed the criteria below:

- ✓ A farmer who fed once a week, a month or who never fed at all and also who used vegetables, animal wastes/excreta, hides/skins, avocado fruits as the fish feeds among others, was regarded subsistence.
- ✓ A farmer who fed thrice, twice or once a day and used, maize bran, mash, and fish meal among others, and also with pond maintenance, was regarded semi-intensive
- ✓ A farmer who fed thrice, twice or once a day, but with complete feeds like the floating pellets or sinking pellets with proper pond management, was considered intensive.

Note that, production levels/yields of farms have not been considered here, in our categorization, because most farmers exaggerated their figures/incomes and this data was not considered. The production figures/yields and incomes were further rejected as there were no farm records to testify this.

Referring to the herein mentioned categorized criteria, the result of the study indicated that, the majority of our farmers (above 80%) in the zone was at a subsistence level (Figure 8).

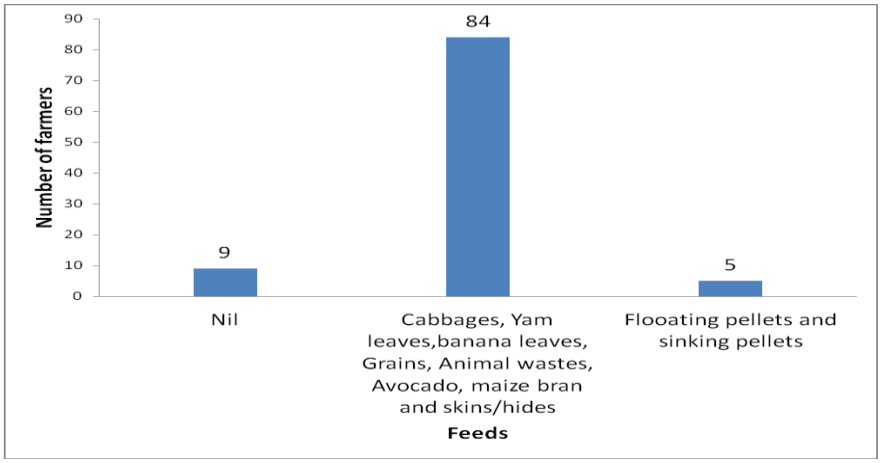

Fig 7a: Common fish feeds employed by fish farmers in the zone

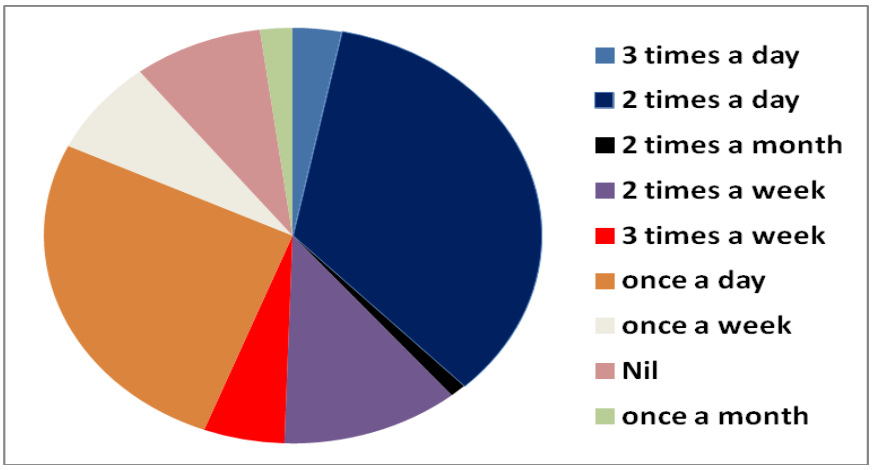

Fig 7b: Feeding regimes in the zone

In addition, out of the farmers interviewed and visited in Kabale and Kisoro Districts, there were no intensive farmers. A few intensive farmers were got in Kanungu and Rukungiri Districts. However the percentage of semi-intensive was higher in Kabale District. It should be noted that, although semi-intensive and intensive fish farmers are mentioned in our survey results, the percentages are less than 10 and therefore insignificant.

3.4 Fish farmers with hatcheries in the zone

Only five fish farmers were found with hatcheries alongside their farms in the zone. Kabale District was found to have three hatchery operators, Kisoro and Rukungiri each had one while there was none in Kanungu District (Table 1). However, all the hatcheries were nonfunctional as they were soaked in a number of challenges (Table 1). Among the major problems faced by the hatchery operators included, lack of technical

skills, especially breeding, lack of electricity (mainly for aeration), poor brood stock and lack of complete feeds especially for fry, among others (Table 1).

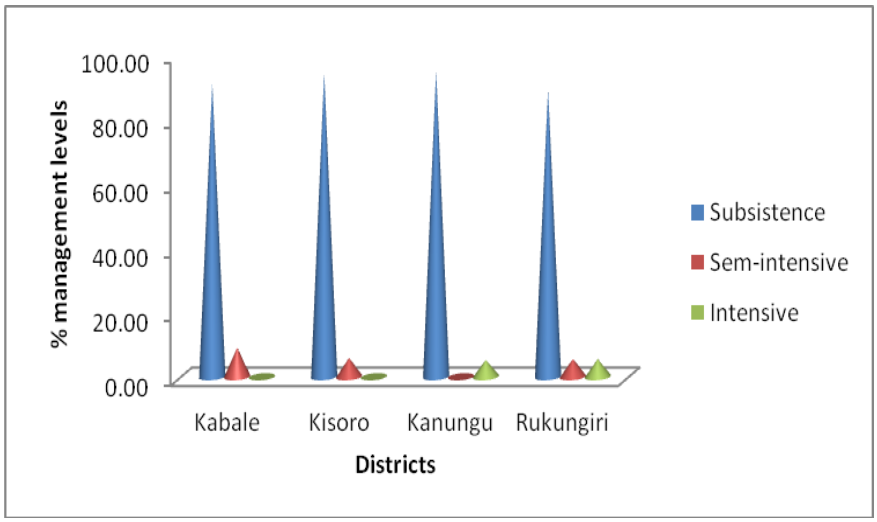

Fig 8: Fish farming management levels in the zone

Table 1: Fish farmers with hatcheries in the zone

District	Name of fish farmer	Number of Breeding tanks	Nursery tanks	Nursery ponds	Breeding ponds	Water quality kits	Problems of htachery operators
Kisoro	Bagyena Anthony	13	10	-	-	Temperature, pH & Oxygen Meters	Lack of technical knowledge, inadequate finances, lnadequate extension, lack of quality feed, unfavourable climatic conditions for the growth of fish
Rukungiri	Dr. Kamugisha Alex	2	4	4	4	Temperature and pH meters	Poor quality brood fish, lack of technical knowledge, lack of capital, theft, lack of quality feeds, predators, lack of availablity of hatchery manuals, lack of infrastructure e.g electricity, lack of hatcher equipments e.g hormones
Kabale	Kahababo Dinnar	3	5	14	4	Temperature and pH meters	Lack of improved heating system, inadequate finances, lack of infrastructure (electricity) and lack of hatchery equipment like hormones
Kabale	Mansa Allen	4	2		4	Nil	Poor quality brood stock, lack of technical knowledge, inadequate finances, inadequate extension services, lack of quality feeds, predators and lack of hatchery equipments like hormones
Kabale	Ruzindana Razaro	9		8	4	Nil	Poor quality brood fish, lack of technical knowledge, lack of capital, theft, lack of quality feeds, predators, lack of availability of hatchery manuals, lack of infrastructure e.g electricity, lack of hatchery equipments e.g hormones

3.5 Challenges of fish farming in the zone

Several challenges were put across by fish farmers in the zone. However, as noted in annex 2, some of the challenges were crosscutting among all the farmers and these included; lack of complete feeds, slow/stunting fish growth, skills, and quality and quantity fish seed, among others. It should be noted that, the stunting fish was Nile tilapia which again was cultured most. The suggested recommendations/solutions are addressed.

4. Discussion

SWHAEZ happens to be one of the pioneers of fish farming in Uganda. The fact that, the zone is famous for a high population density with limited resources in terms of land, earlier efforts were put in place to have alternative sources of income and among them was aquaculture which was spearheaded by the then Department of Fisheries Resources (DFR) and the colonials in the 1950s [6-7]. In the current study, because of the long history of the sector in the region, the number of existing farmers in the zone was expected to be higher than what was found (1,404). A Possible explanation for this arose from the prolonged political turmoil, maladministration, and economic destruction which over took Uganda in the 1970s and early 1980s [8]. The few fish farmers that are currently in the zone (Kigezi) seem to have taken the path from the 1990s to 2000s as a result of the current stable government that emphasizes and promotes commercialization of agriculture.

Gender imbalance regarding aquaculture in the zone is at a high level. In the present study, male fish farmers' participation and ownership outcompeted females in the zone. This is traditionally common in low developed countries (LDCs) where most of labor intensive jobs are considered to require a lot of energy and thus for males. In the zone (The Bakiga tribe) no doubt about this, females are taken as a weak sex and therefore not capable of, for instance excavating a pond. This is further illustrated by [10], that aquaculture sector is often taken as a male domain because of the high level of investment and the adoption of new technology associated with its development. However, this is in contrast to other developing/developed countries. For instance, in Indonesia, Cambodia and Vietnam, women carry out 42-80% of all aquaculture activities [11-12]. In many LDCs, women are often bypassed in the transfer of aquaculture technology and also remain excluded from large-scale production except as processors, confined to small-scale production. This is more pronounced in the capture fisheries sector of Uganda, where most women are just only involved in fish smoking at most landing sites and leave large scale fishery to men [13]. Gender disparities can lead to lower labor productivity in aquaculture and also inefficient in the allocation of labor at household and national levels [10]. In Uganda and other LDCs, customary beliefs, norms and laws and or unfavorable regulatory structures of the state reduce women's access to land and water resources, assets and decision making among others [14]. Generally, in Uganda, men are better educated and better placed than women [15] and as a result, they invest more than women in a number of ventures and probably that is why they are more pronounced in fish farming than women in the zone.

According to the baseline survey conducted by [16], aquaculture in Uganda is often associated with the formally educated farmers who find it easy to locate initial start-up capital for investment and as well find it easier to adopt new technologies. This is in contrary to our current baseline findings. It is worth noting that, in the current baseline survey, more fish farmers were found to have low levels of education compared to high level (formal education) farmers in the zone. This kind of education correlates very well with the production/management levels that were found in the zone. Subsistence (small-scale) farmers outweighed semi-intensive/intensive farmers. It must be noted that, fish farming requires some level of investment, especially constructing a pond and fish feeding. The more subsistence the farmers are in the zone, the lower levels of education (primary) the farmers attained and therefore the lower levels of investment. However, this may not be relied upon solely as subsistence fish farming may be coupled with a number of factors and among which include lack of technical skills and extensive services. Decentralization of extension services provided by National Agricultural Advisory Services (NAADS) has not been of benefit (to some extent) to all famers, especially the aquaculture sector in the zone (Authors personal observer and experience). This is mainly because aquaculture in some sub counties of the Districts in the zone are given a low priority compared to many other agricultural crops and livestock. In addition, the sub counties where aquaculture is given a priority in some sub counties, the extension service providers lack expertise. Inadequate expertise in aquaculture extension has led to some farmers lose million of shillings especially in pond construction which later lead the farmer to subsistence and lack of interest in the sector. This was seen at a farm that belongs to Hon. Tress Bucyanayandi, Minister of Agriculture Animal Industry and Fisheries (MAAIF) in Kisoro District. The fish ponds, 6, that were excavated by the so-called aquaculture consultants can never be drained at all and all had water seepages by the time of the visit. This has led this farmer (Hon. Bucyanayandi) to have a negative feeling about aquaculture and a very bad impression more over being a minister in the sector.

In Uganda, a number of fish species have been tried for culturing. However a few of them have succeeded and have been cultured for several decades. In the zone, out of the three fish species that are under culture; Nile tilapia, Catfish and Mirror carp, Nile tilapia dominated among the various farmers. Possible explanations for this are that; Nile tilapia can easily breed in captivity, hardy fish, can feed on a wide range of food items including artificial feeds, grows very fast among others [17]. However, it must be noted that, the growth and productivity of Nile tilapia are greatly influenced by temperatures [2]. Stipulates that, low water temperature of between 15-20 ^{o}C is a serious limiting factor for the growth of Nile tilapia. Nile tilapia prefers a temperature range of 25-30 ^{o}C [18]. Therefore, because the zone is a cooler region (high altitude), the conditions (Temperatures) have been to a greater extent affected the growth of Nile tilapia in the zone and this has as well contributed the subsistence nature of fish farming in the zone. Catfish and Mirror carp despite the fact that can grow bigger and faster than Nile tilapia, are not grown to a bigger extent simply because of their related constraints including, lack of technology/skills to breed them in captivity. Mirror carp is slowly disappearing among the farmers because of lack of fry/fish seed. [19] Further elaborate that, because of limited access to Catfish brood stock and lack of formulating feeds, these further constrain its culturing. However, it would

be polite to mention that, some of these issues are currently being addressed. All the fish species mentioned above are all reared in earthen ponds in the zone. Generally countrywide, earthen ponds are the commonest facilities for culturing fish, although diversification of production systems; cages and tanks, is being witnessed in some parts of the country especially in the central [20]. However, in other parts of the country for instance the zone, ponds are the only production systems employed. The genesis for this seems to root from the fact that, ponds are assumed to be easier to construct than cages. This is because most of the farmers in the zone do not use machinery, excavators, while constructing their ponds, they rather employ family labor to construct the ponds and this is taken to be cheap. On the other hand, considering other production systems like cages and tanks, the technology behind their design and requirements for aeration as in tanks may be limiting factors as most of the fish farmers are in remote areas where power is still a challenge.

Feeds and feeding regimes are major constraints among the fish farmers countrywide. The issue of feeds becomes worse when it comes to the Zone (Kigezi) because of the long distance from Kampala (about 450 km), the capital city of Uganda. In the current study, most farmers in zone fed fish employing feeds with low nutrient levels especially vegetable and grass. Despite the fact that farmers complained of slow growth of fish species, the issue to do with feeds must as well be put behind this. However, lack of feeds in the zone is entirely on the fact that, currently, there is only one plant that manufactures, fish feeds in the country; Uga-chick, in Kampala [21-3]. Because of this monopoly, feeds are either very expensive or are not always available due to high demand. Farmers in the zone claim that, at times one needs to spend a week waiting, having put an order at the plant. The transport costs in addition to feeds from Kampala to the zone all together frustrate fish farmers as it is not always cost effective when it comes to proper feeding the fish. Therefore, farmers resort to feeding fish with low quality feeds that are easily got available from homes, local markets and even grass. The lack of feeds also leads farmers to adjust their feeding regimes, once a day, once a week, once a month or even never to feed at all. It must be noted that, this challenge will soon be history as some farmers (like Musinguzi Jonnie from Kanungu) already have picked interest in complete floating feed pellet manufacturing.

5. Conclusion and recommendations

5.1 Conclusion

The findings of the current study will provide the foundation for intervening and promoting fish farming in Kigezi region, based on the insights generated:

i. The number of fish farmers in the zone was presumed to be higher than what was found based on the theory of long serving aquaculture in the zone
ii. The diversification of production systems from the traditional earthen pond has not yet taken root in the zone. For instance, despite a rich water resource in the zone, farmers have not yet tapped the more yielding cages which other regions, Central are is already exploiting
iii. There is a general lack of better management practices in aquaculture; this has seen very many farmers feeding fish with very low quality feeds. This again implies that, aquaculture in the zone is mainly still at a subsistence level. However, keeping it in mind that, lack of best management practices, fish feeds and stunting/slow growth of fish are major constraints to the fish farmers in the zone

5.2 Recommendations

i. Support nuclear farmers with the understanding that other farmers will learn from them
ii. Training farmers/managers on record keeping and general farm management
iii. Introduction of new fish strains that are cold tolerant in the zone, to be tried alongside the indigenous ones
iv. Encouraging investors in the fish feed formulation and manufacturing, especially the floating pellets
v. KAZARDI should construct/rehabilitate and utilize the former defunct government fry centres for fry production and demonstration purposes.
vi. Diversifying the production systems from the less productive earthen ponds to cages as there are a number of minor lakes in the zone.

6. Acknowledgment

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Annex 1: A tool/questionnaire that was used to collect field data

1. Name and sex of farm owner	Name _____sex 1. Male, 2. female			
2. Name of the farm	_____			
3. Age of the farm owner	_____			
4. Name and sex of the farm manager	Name _____sex 1. Male, 2. female			
5. Age of the farm manager	_____			
6. Ownership status of the farm	1. Individual	2. Group (**Name**)	3. Institution (**Name**)	
7. Historical data	7 a. Year farm was constructed	7 b. Number of years in operation		
8. Level of education of farm owner	1. No education, 2. Primary, 3. Secondary, 4. Tertiary			
9. Level of education of farm manager (If any)	1. No education, 2. Primary, 3. Secondary, 4. Tertiary			
10. Type of production system	1. Ponds	2. Tanks	3.Cages	4. Other, specify
11. Number and sizes of ponds/Cages/Tanks the farmer/group owns	No. of ponds _____	Average size (M^2)_____		
	No. of Cages _____	Average size (M^2)_____		
	No. of tanks_____	Average size (M^2)_____		
12. What is the source of water	1= Stream, 2= Borehole/wells, 3= River, 4=Lake, 5 = Tap, 6= Harvested rain water, 7= Underground water ,Other, specify			

13. Do you have room for expansion	1= No			2=Yes		
14a. Name of farm contractor	1. Ponds =_____			2. Cages/ Tanks=_____		
14b. How much does it cost you to construct a pond/ cage/tank?	1= Pond, Ug shs_____		2= Cage Ugshs_____		3=Tank Ugshs_____	
14c. What is your net annual income after all the costs	**Ug shs_____**					
15 a. What fish species do you culture? (***Please fill the table below***)						
Fish species	Area of pond (M^2)	Volume of cage (M^3)	Total number of fish	Stocking density (***No. of fish per m^2 or M^3)***		
Species: 1= Nile tilapia (*Oreochromis niloticus*), 2= Labeo (Nungu), 3= African cat fish (*Clarias gariepinus*), 4= Gold fish, 5= Common cap (*Cyprinus carpio*), 6= Mirror carp, 7 = Others, specify						
15 b. How much does it cost you on fish seed annually for stocking your farm?	**Ug shs_____**					
16. Name of the supplier of fish seed	_____					
17. What type of management system do you practice on your farm? (***First read below please!***)	1= Extensive system		2= Semi intensive system		3= Intensive system	
1. Extensive - Fish are kept in a culture system at ***low densities***, without any in puts such as ***feeding***						
2. Semi intensive- Fish are kept at ***moderate stocking densities, not more than 5 fish per m^2*** but there is ***supplementary feeding and fertilization of the system***						
3. Intensive- fish are kept under high control systems, with ***good water quality management with aeration and water exchange, feeding complete feeds and high stocking densities of more than 15 fish per m2***						
18. What is your culture system?	1= Monoculture			2= Polyculture		

19. If monoculture, why do you do that?	_____		
20. If polyculture, why do you do it?	_____		
21. If polyculture, what combination	1= Tilapia &Cat fish	2= Tilapia & Mirror/common carp	3=Others, specify
Fish Health Issues			
1. Do you experience disease out breaks in your farm?	1=Yes	2=No	
2. Do you sometimes experience mortalities on your farm?	1=Yes	2=No	
3. How often do you see dead fish?	1=Early morning	2= During the day	3= Others, specify
4. Describe the common diseases you have seen on your farm			
i. Symptoms of the disease			
ii. Susceptible fish species			
iii. Age of the fish			
iv. Time of the year when the fish are more susceptible to diseases			
v. Treatment/control			
vi. What do you do with the dead fish on your farm?			
Fish Feeding Practices			
1. Do you feed your fish?	1=Yes	2=No	
2. How regularly do you feed your fish?			
Species	**Feeding Frequency**		
Species: 1= Tilapia, 2= Labeo (Nungu), 3= Cat fish, 4= Mirror carp, 5= Common carp, Gold fish			
Feeding frequency: 1= morning, 2= Afternoon, 3= Evening and 4= Night (**4 times a day**)			
Feeding frequency: 1= morning, 2= Afternoon, 3= Evening (**3 times a day**)			
Feeding frequency: 1= morning, 2= Afternoon (**2 times a day**)			
Feeding frequency: 1= morning, (**1 time a day**)			
Feeding frequency: **Others, please specify**			
3. What type of feed do you give to your fish?			
Species	**Type of Feed**		

Species: 1= Nile tilapia (*Oreochromis niloticus*), **2**= Labeo (Nungu), **3**= African cat fish (*Clarias gariepinus*), **4**= Gold fish, **5**= Common cap (*Cyprinus carpio*), **6**= Mirror carp, **7** = Others, specify	
Type of feed: **1=**Grains, **2=** Vegetables, **3**= Sinking pellets, **4**= Floating pellets, **4**= Brans (Maize, Wheat, Rice etc), **5=** Cakes (Cotton seed , Simsim, Sunflower etc), **6**= fish meal, **7**= Kitchen wastes, **8**= Animal wastes, **9=**Others, please specify	
4a. Who is your fish feed supplier?	
4b. How much does it cost you on fish feeds in a production cycle?	**Ug shs_____**
Fish Farmer Networking and Marketing	
1. Do you know other fish farmers in this area?	1= Yes / 2=No
2. Do you belong to an association of fish farmers?	1= Yes / 2=No
3. If yes, do you often meet?	1= Yes / 2=No
4. If you meet, what do you often consult about?	1
	2
	3
	4
	5
	6
5. Have you ever grown fish for sale?	1= Yes / 2=No
6. If yes, what size?	1= 200 g / 2= 400 g / 3= 500 g / 4= 600 g / 5=800g / 6=1000g
	7= others specify
7. How long do you grow your fish to the above weight for your market?	
Species	**Duration of rearing (Months)** / **Weight (g) or Kg**
8. When Did you begin fish farming?	_____

9. DO you know some fish farmers who abandoned this same activity?	1= Yes	2=No
10. What do you think lead to the abandonment of fish farming?	1	
	2	
	3	
	4	
	5	
	6	
11. What do you think can bring them back to fish farming?	1	
	2	
	3	
	4	
	5	
	6	
12. After harvesting your fish, who buys it?		
13. Do you sale brood fish (**Mature fish**) or fry/ fingerling?	1= Fry/ fingerling	2= Brood fish
14. If Fry/fingerling, why?	1	
	2	
	3	
15. If Brood fish, why?	1	
	2	
	3	
16. What kind of fish value do you sale?	1= Fresh fish	2= Smoked fish
17. Give reasons to the above question		
17 a. Fresh Fish	1	
	2	
	3	
17 b. Smoked fish	1	
	2	
	3	
18 a. What fish species is liked most by the public?		
18 b. Why is this so?		
Fish Farm Management Practices		

1. What are the major problems on your farm?	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
2. What do you think can be done to solve these problems?	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
3a. Do you have a water quality kit?	1= Yes	2=No
3b. If Yes, what water quality parameters do you take?	1	
	2	
	3	
	4	
3c. If No, why?	1	
	2	
4a. Do you keep records on your farm?	1= Yes	2=No
4b. If yes, what records	1= Feeding	
	2=Breeding	
	3=Stocking	
	4=Sales	
	5=Diseases	
	6=Mortalities	
	7= Others, specify please!	
	(You can ask for these records)	
5a. Do you receive extension services?	1= Yes	2=No
5b. If yes, which organization/person?		
5c. How often?		

6. In what areas of aquaculture would you need most extension services?					
7a. Do you fertilize your ponds?	1= Yes		2=No		
7b. How often?					
7c. What type of fertilizers do you apply	1=Inorganic fertilizers		2= Organic manure		
7d. How much does it cost you on fertilizers in a production cycle?	**Ugshs_____**				
Fish Breeding On Farm (Hatchery)					
1. DO you own a hatchery on your farm?	1= Yes		2=No		
2. Historical data	2 a. Year farm was constructed		2 b. Number of years in operation		
3. Capacity (Infrastructure / equipment)	***Please indicate the number of ponds/tanks of cat fish, tilapia and carp below***				
			(a). Tilapia	**(b). Cat fish**	**(c). Carp**
	Ponds	i. Nursery ponds			
		ii. Breeding ponds			
		iii. Brood stock ponds			
		iv. Grow-out ponds			
	Concrete/Plastic tanks	i. Holding tanks			
		ii. Breeding tanks			
		iii. Larval rearing tanks			
		iv. Nursery tanks			
		v. Sex reversal tanks			
4. DO you have the following for you hatchery on your farm?					
(a) Oxygen cylinder	1=Yes		2=No		
(b) Seine nets	1=Yes		2=No		
(c) Scoop nets	1=Yes		2=No		
(d) Packaging bags	1=Yes		2=No		
(e) Screens for inlet and out let	1=Yes		2=No		
(f) Hapas	1=Yes		2=No		
(g) Weighing scales	1=Yes		2=No		
(h) Incubation facility	1=Yes		2=No		
(i) Fingerling graders	1=Yes		2=No		
(j) Water quality meters	1=Yes		2=No		

5 a. What fish species do you breed on your farm?		
5 b. Why are you interested in these alone?		
6a. Do you have a market for you fry/fingerling?	1=Yes	2=No
6b. If yes, where do you sale them?		
7. What type of tilapia fingerlings do you produce?	1=Monosex	2= Mixed sex
	3= Both monosex and mixed sexes	
8. If monosex, why do you do it?		
9a. Do you have a hatchery operator?	1=Yes	2=No
9b. If yes, what is his/her level of education?		
10. What challenges are you facing on your hatchery?	***Please tick all that apply below***	
	[1] Poor quality brood stock	
	[2] Lack of technical knowledge	
	[3] Inadequate finances	
	[4] Insecurity due to theft	
	[5] Inadequate extension service	
	[6] Lack of quality feed	
	[7] Lack of market for fingerling	
	[8] Predators	
	[9] Lack of infrastructure (Electricity, roads etc)	
	[10] Un favourable weather/climatic condition	
	[11] Lack of hatchery equipment and hormones	
11. Suggest what can be improved for better fish seed production on your hatchery	***Please tick all that apply below***	
	[1] Training of hatchery managers	
	[2] Increase extension services to hatcheries	
	[3] Financial support to hatcheries by government	
	[4] Availing good quality brood stock	
	[5] Availing good quality fish feed	
	[6] Availability of hatchery manuals	
	[7] Government to give subsidies to hatchery equipments	
	[8] Improved market connectivity	
	[9] Avail other inputs like hormones	
	[10] Avail hatchery equipments	
	[11] Others, specify	

11. Who/ where are your clients located	[1] Close near here	
	[2] Come at the time of harvesting	
	[3] Farmers from another district	
	[4] Fish manufacturing plants in Kampala	
	[5] Fish traders from another district	
	[6] No I do not have clients, I only produce for home consumption	
Name of enumerator_____		
Thank you very much indeed for you time, Please avail us your full contacts		
Name of fish farmer	***Telephone***	***e-mail address***
	_____	_____
End Of Questionnaire		

Annex 2: List of fish farmers that were interviewed in the zone

District	Fish farmer	Sex	Education	Fish farming since	Challenges
Kabale	Tumuhimbise Willson	Male	Primary	2011	Lack of feeds, Predators, slow growth of fish and lack of fishing nets
Kabale	Bishop William Rucirande	Male	Tertiary	2005	Lack of enough fish feeds, lack of market for the harvested fish and fish slow growth
Kabale	Byabagambi Fred	Male	Secondary	1976	Predators, water weeds, lack of fish feeds, lack of fish nets, limited other fish species
Kabale	Kyanamira sub county fish ponds	Group	Tertiary	1954	Pond leakages, Lack of complete and available fish feeds, poor fish species and lack of capital
Kabale	Turirwaruhanga Christopher	Male	Secondary	2002	Thieves, Lack of skilled labour, lack of fish seeds and fish feeds and poor pond construction
Kabale	Kahababo Dinnar	Female	Tertiary	2005	Predators especially birds, Thieves, poor fish strains with poor growth
Kabale	Mansa Allen	Female	Secondary	2004	High feed costs, Climate not favouring the growth of fish
Kabale	Besigye Jimmy	Male	Tertiary	1957	High costs for the fish feeds, Stunting growth of fish and limited skills
Kabale	Mrs Barugahare	Female	Tertiary	2006	Predators, thieves and expensive feeds and stunting fish growth
Kabale	Katakyeba Addy	Female	Tertiary	2002	Thieves
Kabale	Barekye Pakomo	Male	Primary	1982	Thieves, predators and poor fish growth
Kabale	Ruzindana Razaro	Male	Primary	2003	Un available fish feeds, lack of enough and better fish seed, predators and lack of electricity
Kabale	Birawate Fred	Male	Primary	1998	Predators (Otters), Poor fish growth and thieves
Kabale	Dr. Ndyanabangi	Male	Tertiary	1994	High costs of fish feeds
Kabale	Tibemanya B	Male	Tertiary	1998	Expensive fish feeds, pond flooding and predators
Kabale	Mutabarusya	Male	Primary	1989	Lack of fish farming skills, lack of quality feeds, fish stunting and thieves
Kabale	Mpiriirwe Aden	Male	Primary	2008	Predators (Birds) and lack of feeds
Kabale	Nyakiire John	Male	Primary	2004	Lack of fish seed source, predators, lack of capital and stunting fish
Kabale	Kitanga Parish fish farm	Group	Tertiary	1960	Predators (Otters)

Kabale	St Barnabas Secondary fish farm	Group	Tertiary	1956	Poor pond construction, poor fish growth and predators
Kabale	Bazohera Harbert	Male	Primary	2001	Predators, lack of fish feeds, lack of better growing fish strain
Kabale	Aspol Buka	Male	Primary	2009	Lack of feeds
Kabale	Allen Kabaza	Female	Secondary	2008	Fish feeds, lack of better growing fish strain and predators (Otters)
Kabale	Zihireyo Everisto	Male	Primary	1985	Pond floods, predators (Birds)
Kabale	Mubangizi Benon	Male	Primary	2004	Predators, stunting fish and lack of extension services
Kabale	Kururagire Neriko	Male	Nil	2008	Feeds are very expensive and fish do not grow to table size
Kabale	Karukoba Farmers association	Group	Primary	2006	Feeding, stunting fish strain and predators
Kabale	Byabagambi Stanley	Male	Tertiary	2001	Predators, thieves, fish escape and too much mud in the pond
Kabale	Nkaruzariza	Male	Primary	1990	Lack of enough source of fish seed, High costs of fish feeds, lack of better quality fish seed, lack of training and stunting growth of fish
Kabale	Ekibikirekwa J	Male	Secondary	1998	Limited knowledge on fish farming, inadequate funds, poor fish strain and Predators
Kabale	Rubereti Edith	Female	Secondary	1995	Predators, expensive fish feeds, poor fish strain and lack of fencing materials
Kabale	Frank Katama	Male	Primary	2007	Poorly pond constructed, poor fish strains, predators, lack and expensive feeds, slow growing fish species
Kabale	Mrs Katabazi Monica (Abandoned)	Female	Primary	1986	Pond management, fish seed, Predators (birds), stunting fish species and funds
Kabale	Magezi Florence	Female	Tertiary	2010 (Renovated)	Feeds, floods, stunting growth of fish and fish seed
Kabale	Byaruhanga Peter	Male	Secondary	2005	Feeding, Pond management, predators, stunting fish species and capital
Kabale	Nzirwanabo Samu	Male	Secondary	2000	Lack of funds, Predators, stunting fish species and lack of technical knowledge
Kabale	Kiibuka Benard	Male	Secondary	2008	poor fish strains, stunting fish species, and lack of fishing nets
Kabale	Byarugaba Cyrus	Male	Secondary	2011	Lack of funds for purchasing fish feeds, lack of fishing gear, lack of technical knowledge, predators (Otters) and stunting fish species
Kabale	Turyatunga Dennis	Male	Secondary	2009	Lack of nets, Fish escape, lack of better fish species and Predators
Kabale	Mugisha Ezera	Male	Tertiary	2006	Lack of fish feeds, lack of funds and stunting growth of fish
Kabale	Katabazi Peter	Male	Primary	2004	Predators (Birds), lack of feeds, limited and poor fish seed, stunting growth of fish
Kabale	Bashaija Ramathan	Male	Primary	1997	Not aware
Kabale	Karengana William	Male	Primary	2000	Predators, stunting growth of fish and stunting fish species
Kabale	Rugora Katarinyeba	Male	Primary	1997	High costs of fish feeds, Lack of enough training, stunting fish species and high costs of pond maintenance
Kisoro	Bagyena Anthony	Male	Tertiary	2000	Lack and expensive feeds, Skills, Capital, Lack of extension services and stunting fish species
Kisoro	Bahane Silver	Male	Tertiary	2009	Lack of complete fish feeds, Fish predators, Fishing gears, Lack of quality fish seeds
Kisoro	Tressy Buchanayandi	Male	Tertiary	2010	High cost of pond construction, Lack of skilled labour, Drying of the ponds during the dry season, stunting fish species and fish predators
Kisoro	Kwizera Gerald	Male	Tertiary	2002	Hard to get fish feeds and stunting fish species
Kisoro	Baziyaka John Baptist	Male	Secondary	2002	Lack of capital, lack of quality fish feeds, ponds unable to drain, lack of fish gear and stunting fish species

Kisoro	Habimaana Vian	Male	Primary	2002	Lack of fish seed, Not knowledgeable about feeding the fish, feeds are very costly, no fish gears and stunting fish species
Kisoro	Hakyizumwami Phenehas	Male	Tertiary	1992	Predators especially snakes, Thieves, Feeds, not easy to access fertilizers and stunting fish species
Kisoro	Kwigira Vian	Male	Primary	2009	Feeds are very expensive
Kisoro	Ingango Radisiraji	Male	Primary	2002	Fish feeds and feeding, weighing machines to determine fish growth, fishing gear, and stunting fish species
Kisoro	Maniragaba Henry	Male	Primary	2002	Feeding, machines for pond draining, fish seeds
Kisoro	Muraremaze Francis	Male	Primary	1975	Lack of extension services, thieves, predators (Snakes)
Kisoro	Kabambe John	Male	Secondary	1973	Capital, Predators (Snakes) no complete feeds, no extension services and stunting fish species
Kisoro	Rugyero Theophilas	Male	Primary	1997	No feeds, water pumps, No pond inlet and outlets
Kisoro	Kakwenza Julius	Male	Primary	1984	Little water in the pond, Much mud in the pond, poor fish species that can't grow, floods in rainy season
Kisoro	Monday Phillipo	Male	Primary	2007	Predators especially snakes, Thieves & Feeds and stunting fish species
Kisoro	Kato Lawrensi	Male	Primary	2007	Lack of feeds, Erosion effects, lack of capital, poor management of ponds and stunting fish species
Kisoro	Uwayezu Urban	Male	Tertiary	2000	Feeds are very expensive, low fish production, Lack of skills, lack of motivation by the government, lack of fish nets
Kanungu	Mworozi John	Male	Primary	1995	Lack of quality feeds, Lack of capital, and predators (birds and snakes) and stunting fish species
Kanungu	Katabaguza James	Male	Tertiary	2006	Predators (Birds, Snakes), Feeds are very costly and lack of fishing nets
Kanungu	Mugyisha Matayo	Male	Primary	2004	Quality fish feeds, Lack of funds and stunting fish species
Kanungu	Ninsiima Molly	Female	Secondary	2002	Nil
Kanungu	Kazigaba Johnson	Male	Tertiary	2011	No machine for slashing the grass, lack of fencing materials, stunting fish species
Kanungu	Zoreeka Patrick	Male	Primary	1991	Predators (Otters, Snakes and Birds) and stunting fish species
Kanungu	Bibangamba Barnabas	Male	Tertiary	2006	Predators (Birds and snakes), lack of fishing nets and poor fish growth
Kanungu	Owabera Emmanuel	Male	Primary	2005	Predators, No fencing materials and poor fish growth
Kanungu	Kamasheija Peter	Male	Secondary	2002	Lack of complete feeds, Poor extension services and poor fish strains
Kanungu	Waku Sam	Male	Tertiary	2002	Expensive fish feeds, Poor fish species, Predators, no available fish seed quality and lack of extension services
Kanungu	Turyasingura George	Male	Primary	1998	Lack of complete feeds, lack of knowledge on pond management, un availability of fish fry especially Catfish, poor fish growth and predators
Kanungu	Kiconco Joab	Male	Secondary	2002	Expensive feeds, predators and high costs of pond construction and management
Kanungu	Kazeemera James	Male	Primary	2002	Predators, expensive feeds, high maintenance costs, poor fish growth and lack of technical knowledge
Kanungu	Musinguzi Jonnie	Male	Tertiary	2011	Poorly trained staff, Theft, poor fish feeds and fish species and predators
Kanungu	Asiimwe Onesimus	Male	Secondary	2010	Thieves, poor fish growth and lack of fishing

					nets
Kanungu	Busingye Isiah	Male	Tertiary	2005	Pond floods, predators, malicious people who put oil in the ponds, lack of funds
Kanungu	Kihihi fish fry center	Group	Tertiary	1965	Theft, No available complete feeds, pond leakages
Kanungu	Kizirimpa Emmanuel	Male	Nil	2006	Pond floods, reduced water during the dry season, predators, lack of enough fish feeds and lack of fish seed
Kanungu	Rurwoma Ally	Male	Secondary	2001	Thieves, lack of enough fish seed, predators, lack of fish feeds and lack of fishing nets
Rukungiri	Kawawa David	Male	Tertiary	2006	Pond leaking, lack of motivated workers and poor fish growth
Rukungiri	Kisizi hosipital	Group	Tertiary	1962	Nil
Rukungiri	Tindimweba Beatrice	Female	Secondary	2002	Not versed with aquaculture
Rukungiri	Kateziriza Kedres	Female	Primary	2002	Lack of feeds, Labour shortage, Lack of funds, lack of fishing gear and poor fish growth
Rukungiri	Tibahurira Adrian	Male	Tertiary	2002	Fish feeding a problem and poor fish growth
Rukungiri	Canon Ben Ruronga	Male	Tertiary	2002	Too much mud in the pond, fish predators, limited fish seed and poor species
Rukungiri	Rwakanoni Xvier	Male	Secondary	1981	Fencing nets to prevent predators, Fishing gear, lack of funds and poor fish growth
Rukungiri	Tibasiima Tom	Male	Primary	1997	Predators, limited fish species especially Catfish, inadequate funds to purchase fish species
Rukungiri	Rev. David Tibandeba	Male	Tertiary	2000	Inadequate fish feeds and poor fish growth
Rukungiri	Vasta Rwamburara	Female	Primary	2004	Thieves, lack of fishing gear, labour and poor fish growth
Rukungiri	Rev. Rabika Baker	Male	Tertiary	2011	Don’t know problems in aquaculture and poor fish growth
Rukungiri	Ruranganwa Idi	Male	Primary	2000	Thieves, Predators especially snakes and poor fish growth
Rukungiri	Dr. Kamugisha Alex	Male	Tertiary	2005	Theft, Skilled labour, Lack of electricity, expensive fish feeds and poor fish growth
Rukungiri	Katusi (Justice)	Male	Tertiary	2005	Pond flooding, Pond leakages
Rukungiri	Turigye Asuman	Male	Secondary	2010	Expensive feeds, pond floods, lack of labour and stunting fish species
Rukungiri	Mukama David	Male	Secondary	2008	Pons construction, lack of better fish species, lack of constant water supply, lack of fish feeds, lack of fish seeds
Rukungiri	Kyamugunda Charles	Male	Primary	1995	Lack of labour, thieves, fish feeds and seed, fishing gear, extension services and stunting fish species
Rukungiri	Kinoni Kyanika cattle and fish farming group	Group	Primary	2005	Lack of enough fish feeds, no extension services, thieves, predators, stunting fish species and lack of fishing gears

Annex 2: Fish farmers, feeds, feeding frequency and levels of management

District	S/No	Name of farmer	Feeds	Feeding Frequency	Management level
Kabale	1	Kahababo Dinnar	Maize bran	2 times a day	Semi-intensive
Kabale	2	Mansa Allen	Sinking pellets, fish meal and vegetables	2 times a day	Semi-intensive
Kabale	3	Besigye Jimmy	Floating pellets	2 times a day	Semi-intensive
Kabale	4	Ruzindana Razaro	Vegetables, Sweet potatoes and floating pellets	Once a day	Semi-intensive
Kabale	5	Tumuhimbise Willson	Vegetables, Sweet potatoes	once a day	Subsistence

Kabale	6	Bishop William Rucirande	Vegetables, fish meal, animal wastes	once a day	Subsistence
Kabale	7	Byabagambi Fred	Vegetables and bread	2 times a day	Subsistence
Kabale	8	Kyanamira sub county fish ponds	Fish meal and animal wastes	2 times a day	Subsistence
Kabale	9	Turirwaruhanga Christopher	Animal wastes and vegetables	Once a day	Subsistence
Kabale	10	Mrs Barugahare	Maize bran, Blood and animal wastes	once a day	Subsistence
Kabale	11	Katakyeba Addy	Yam leaves, Cabbages and cow dung	once a day	Subsistence
Kabale	12	Barekye Pakomo	Vegetables	Once a week	Subsistence
Kabale	13	Birakwate Fred	Mash , cabbage leaves	2 times a week	Subsistence
Kabale	14	Dr. Ndyanabangi	Grains, Fish meal and cakes	2 times a day	Subsistence
Kabale	15	Tibemanya B	Vegetables, animal wastes and grains	once a day	Subsistence
Kabale	16	Mutabarusya	Nil	Nil	Subsistence
Kabale	17	Mpiriirwe Aden	Yam leaves and porridge wastes	Once a day	Subsistence
Kabale	18	Nyakiire John	Pig intestines, blood and kitchen wastes	Once a day	Subsistence
Kabale	19	Kitanga Parish fish farm	Nil	Nil	Subsistence
Kabale	20	St Barnabas Secondary fish farm	Yam leaves, Cabbages and posho	3 times a day	Subsistence
Kabale	21	Bazohera Harbert	Mash , cabbage leaves and grass	2 times a day	Subsistence
Kabale	22	Aspol Buka	mash, cabbages and posho	3 times a week	Subsistence
Kabale	23	Allen Kabaza	Mash, Mukene and posho	2 times a week	Subsistence
Kabale	24	Zihireyo Everisto	Mash, Mukene, leaves and cabbages	2 times a day	Subsistence
Kabale	25	Mubangizi Benon	mash, posho and matooke	2 times a day	Subsistence
Kabale	26	Kururagire Neriko	Mash, posho and banana peelings	once a week	Subsistence
Kabale	27	Karukoba Farmers association	Posho, mash, cabbages	2 times	Subsistence
Kabale	28	Byabagambi Stanley	Grains, vegetables and animal wastes	2 times a day	Subsistence
Kabale	29	Nkaruzariza	Vegetables, Cotton seed cake and animal wastes	2 times a day	Subsistence
Kabale	30	Ekibikirekwa J	Vegetables, Grains and Animal wastes	once a day	Subsistence
Kabale	31	Rubereti Edith	Grains, vegetables and animal wastes	2 times a day	Subsistence
Kabale	32	Frank Katama	Animal wastes	once in a month	Subsistence
Kabale	33	Mrs Katabazi Monica (Abandoned)	Cabbages, Kitchen wastes and maize bran	2 times a day	Subsistence
Kabale	34	Magezi Florence	Blood meal, maize bran, cotton and soya (Stoped feeding)	3 times a day (Used)	Subsistence
Kabale	35	Byaruhanga Peter	Vegetables, Kitchen wastes	once a day	Subsistence
Kabale	36	Nzirwanabo Samu	Posho, Cabbages and cow dung	Once a week	Subsistence
Kabale	37	Kiibuka Benard	Manure, porridge and mash	once a day	Subsistence
Kabale	38	Byarugaba Cyrus	Cabbages and maize	3 times in a month	Subsistence
Kabale	39	Turyatunga Dennis	Maize and Mukene	2 time a day	Subsistence
Kabale	40	Mugisha Ezera	Yam leaves	once a day	Subsistence

Kabale	41	Katabazi Peter	Yam leaves	once a day	Subsistence
Kabale	42	Bashaija Ramathan	Animal wastes, Vegetables and posho	2 times a day	Subsistence
Kabale	43	Karengana William	Vegetables, Maize and Yam leaves	2 times a day	Subsistence
Kabale	44	Rugora Katarinyeba	Maize bran and animal wastes	2 times a day	Subsistence
Kisoro	45	Bagyena Anthony	Pellets and maize bran	once a day	Semi-intensive
Kisoro	46	Bahane Silver	Animal wastes, Vegetables, mash	2 tmes a day	Subsistence
Kisoro	47	Tressy Buchanayandi	Nil	Nil	Subsistence
Kisoro	48	Kwizera Gerald	Vegetables	2 times a week	Subsistence
Kisoro	49	Baziyaka John Baptist	Fish meal, vegetables, kitchen wastes	2 times a month	Subsistence
Kisoro	50	Habimaana Vian	Vegetables, mash, brans	2 times a week	Subsistence
Kisoro	51	Hakyizumwami Phenehas	Leaves of Cabbages, Yams, Cassava & Maize flour	Once in two days	Subsistence
Kisoro	52	Kwigira Vian	Mash, grass,Avocado, cooked food like poshoa and matooke	2 times a week	Subsistence
Kisoro	53	Ingango Radisiraji	Cabbages, leaves grass, mash	4 times a week	Subsistence
Kisoro	54	Maniragaba Henry	Cabbages,Kitchen food and maize flour	Once a wek	Subsistence
Kisoro	55	Muraremaze Francis	Spinach, Yam leaves and mackdonald weed	2 times a week	Subsistence
Kisoro	56	Kabambe John	Animal wastes, Vegetables & Grains	once a week	Subsistence
Kisoro	57	Rugyero Theophilas	Nil	Nil	Subsistence
Kisoro	58	Kakwenza Julius	Animal wastes, Vegetables & Grains	2 times a week	Subsistence
Kisoro	59	Monday Phillipo	Nil	Nil	Subsistence
Kisoro	60	Kato Lawrensi	Nil	Nil	Subsistence
Kisoro	61	Uwayezu Urban	Mash (Bran)	once a week	Subsistence
Kanungu	62	Mworozi John	maize brans, Vegetables	3 times a week	Subsistance
Kanungu	63	Katabaguza James	Vegetables	once in two days	Subsistance
Kanungu	64	Mugyisha Matayo	Yam leaves, Grass and animal wastes	2 times a day	Subsistance
Kanungu	65	Ninsiima Molly	Nil	Nil	Subsistance
Kanungu	66	Kazigaba Johnson	Blood mill mixed with posho, Maize flour and Yam leaves	Once a day	Subsistance
Kanungu	67	Zoreeka Patrick	Grass and Yam leaves	2 times a week	Subsistance
Kanungu	68	Bibangamba Barnabas	Grains, Vegetables, animal wastes, Maize bran	2 times a day	Subsistance
Kanungu	69	Owabera Emmanuel	Maize bran, Animal wastes and Vegetables	Once a day	Subsistance
Kanungu	70	Kamasheija Peter	Vegetables, Avocado, Jack fruit and animal wastes	2 times a week	Subsistance
Kanungu	71	Waku Sam	Mash, hides and skins	Once a day	Subsistance
Kanungu	72	Turyasingura George	Grains,and animal wastes	2 times a day	Subsistance
Kanungu	73	Kiconco Joab	Animal wastes	2 times a day	Subsistance
Kanungu	74	Kazeemera James	Grains and vegetables	2 times a day	Subsistance
Kanungu	75	Musinguzi Jonnie	Soya bean meal, cotton seed cake, blood meal, floating pellets and fish meal	2 times a day	Intensive
Kanungu	76	Asiimwe Onesimus	Fruits, Hides, Cow dung and greens	Once a day	Subsistance

Kanungu	77	Busingye Isiah	Casava flour, Cabbage leaves, maize bran and yam leaves	2 times a day	Subsistance
Kanungu	78	Kihihi fish fry center	Cabbages, Yam leaves and banana leaves	2 times a week	Subsistance
Kanungu	79	Kizirimpa Emmanuel	Vegetables	2 times a day	Subsistance
Kanungu	80	Rurwoma Ally	Maize bran, Vegetables, Hides, kitchen wastes	Once a day	Subsistance
Rukungiri	81	Kawawa David	Pellets	2 times a day	Intensive
Rukungiri	82	Kisizi hosipital	Mingeled posho, vegetables	2 times a day	Subsistance
Rukungiri	83	Tindimweba Beatrice	Nil	Nil	Subsistance
Rukungiri	84	Kateziriza Kedres	Vegetables	2 times a week	Subsistance
Rukungiri	85	Tibahurira Adrian	Leaves, cow dung, chicken litter, maize bran	3 times a week	Subsistance
Rukungiri	86	Canon Ben Ruronga	Grains, vegetables, hides and skins, animal wastes	Once a day	Subsistance
Rukungiri	87	Rwakanoni Xvier	Animal wastes, Vegetables and grains	Once a week	Subsistance
Rukungiri	88	Tibasiima Tom	Grains, vegetables and brans (maize, wheat)	Once a month	Subsistance
Rukungiri	89	Rev. David Tibandeba	Animal wastes	Once a day	Subsistance
Rukungiri	90	Vasta Rwamburara	Vegetables	Once a day	Subsistance
Rukungiri	91	Rev. Rabika Baker	maize brans	Once a day	Subsistance
Rukungiri	92	Ruranganwa Idi	Grass	5 times a month	Subsistance
Rukungiri	93	Dr. Kamugisha Alex	Floating pellets (at moment, not active)	2 times a day	Semi intensive
Rukungiri	94	Katusi (Justice)	Yam leaves and mash	2 time a day	Subsistance
Rukungiri	95	Turigye Asuman	Animal wastes, maize brans,	3 times a day	Subsistance
Rukungiri	96	Mukama David	Vegetables, animal wastes, sweet poatato leaves	2 times a day	Subsistance
Rukungiri	97	Kyamugunda Charles	Vegetables	once a day	Subsistance
Rukungiri	98	Kinoni Kyanika cattle and fish farming group	Cabbage leaves, potato leaves and animal wastes	2 times a day	Subsistance