WOMEN IN UGANDA AQUACULTURE: NUTRITION, TRAINING, AND ADVANCEMENT

Human Nutrition and Human Health Impacts of Aquaculture/Activity/16HHI04AU

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ABSTRACT

The study used discussions and interviews with selected respondents to generate relevant information for training fish farmer groups and other actors involved in aquaculture. The trainings followed data collection so as to make sure that training focused on identified knowledge gaps among target groups. The study focused on selected districts in central and northern regions of Uganda. Purposive sampling was used to identify respondents. Supplementary information was obtained from interviews with members of fish farmer organizations. Findings revealed that women's involvement in the various segments of the value chain performing different roles and activities individually or jointly with men. Factors such as land ownership, decision making over utilization of land, membership to producer and farmer groups, and access to production inputs and extension services influence women's roles in the aquaculture value chain. Participation in farmer groups increases women's opportunities but challenges prevail in the formation, organization and operations of the groups. In addition, specific production and marketing information needs, such as appropriate techniques of feeding fish, processing and marketing fish products to niche markets were noted as directly relevant in enhancing women's role in aquaculture. Stakeholder understanding of the role of fish in child and maternal nutrition is wide and recognized among other key drivers to increasing aquaculture productivity.

INTRODUCTION

This activity addressed a capstone series of events that engaged Uganda AquaFish with institutional partners and the industry to propagate understanding of the nutritional value of a new species and enhance the status and role of women in aquaculture. It built on the previous project by connecting the project of fish farmer cooperatives across the country, women's groups working in aquaculture, and to Nutrition Innovation Lab researchers in Uganda working on nutrition issues so as to amplify and refract the scientific information about fish culture produced by the project.

The work described here endeavors to advance the role women in the provision of fish, an important food item in Ugandan diets. The activities focused on understanding the role of women in aquaculture so as to identify mechanisms for improving household nutrition. Knowledge gaps identified through interactions with women aquaculturalists and fish processors provide basis for right targeting of training content to specific categories of women. We sought to expand the participation of women in production, market development, and use of lungfish and other fish species through training, demonstration, and dialogue among stakeholders. New understanding about how to reproduce and grow this fish will advance farm income and household nutrition.

Poor families in developing countries typically spend between 50 to 70 percent of their income on food (Msangi and Batka 2015). When meat, fish, eggs, fruit and vegetables become too expensive, families often turn to cheaper cereals and grains, which offer fewer nutrients. Widely available,

affordable, and wholesome fish can have profound impacts on human development, particularly in the critical first 1000 days of life (Save the Children 2012). Women tend to cut their food consumption first, and as a crisis deepens, other adults and eventually children cut back. Lungfish are a plentiful source of iron, a critical dietary requirement for children and potentially countering anemia, a significant problem for women.
Lentisco and Lee (2015) identified three main ways in which women access fish as a food item. First is primary access through fishing and financing/owning fishing operations; second is through close personal relationships including family; and third is through the normal purchases in local markets. Fish farming presents a fourth path for women's access to fish. Women producing fish from ponds in Uganda are members of the segment involved in fish-harvesting as primary users; secondary users are those that access fish through kinship or other relationships; and women who buy fish directly from fishers or traders are tertiary users (Lentisco and Lee 2015).

Communication is a fundamental aspect of value chain development and mobile phones have become a central means for advancing these processes. Yet women face continuing barriers to participation. While mobile phone penetration is very high in Africa at almost 80 percent, women in sub-Saharan Africa are on average 23 percent less likely to own a mobile phone (GSMA 2014). One critical obstacle to women's access to mobile phones is affordability: expensive mobiles are reserved for use by men, and women tend to get second-hand phones. Technology is often viewed as a tool for men, so it seems that culture and attitudes toward ownership of productive assets can still be impediments to women's access to technology (GSMA 2014). Trainings and conferences must the address the role of cell phones in women's empowerment.

As aquaculture is often an activity that can be done close to the household, increasing the participation of women can be a strategy for empowerment, but it must be accompanied by secure rights to the resources such as farm space (Lentisco and Lee 2015). For example, lungfish (*Protopterus aethiopicus*) is an emerging culture species in Uganda and there may be opportunities for women to participate in the development of this value chain in a fundamental way (Walakira et al. 2012). The study further shows that lungfish is a popular species marketed in value added form and evident in some women-operated kiosks. In Kampala suburbs and some rural centers, women own the majority of these kiosks, selling fried lungfish chunks and boiled lungfish soup during the evening. report that a small number of restaurants have lungfish on their menu, preparing fresh, smoked and fried fish meals. Some restaurants in Kabusu and Owino centers (Kampala district) specialize in selling fried lungfish pieces.

Following the introduction of aquaculture in Uganda in the late 1940s, aquaculture has been dominated by rearing of fish in earthen ponds operated by households. The practice is regarded a man's activity in accordance with the socio-cultural norms embedded in the patriarchal system that ascribes ownership of household assets such as land to males. Dynamics surrounding ownership of land at household level in turn determine the roles women play in agricultural activities including aquaculture. Similar observations about gender disparity in ownership of land and fish ponds were noted in an earlier study on gender issues in fish farming (Rutaisire et al., 2010). Whereas gender relations influence decisions and actions in undertaking fish farming including utilization of benefits, the level of involvement is not clearly understood to enable identification and analysis of constraints likely to limit achievement of expected benefits (Kruijssen et. al 2018). Despite the limited rights to land ownership, women bear the responsibility of food provisioning for the family.

Women's individual agency is crucial for development as it enhances one's capacity to navigate the psychological, socio-cultural and structural challenges that are faced on a daily basis. It is important that efforts move beyond technical training, although that remains a fundamental, continuing unmet need, to a broader vision of fish farming as a source of nutritional security and income for Uganda

families. Women's empowerment is a potential by-product of improved access to inputs and markets, but there is also a need to move to amplify women's roles, agency and voice in this sector. Without direct and active involvement of women the industry will not progress. Some of the gains of empowerment include: women's own income; membership in decision-making bodies; exercise of influence in their communities for aspects that are important for them, such as education for their children and dealing with alcoholism. Lentisco and Lee (2015:21) also cite gains in self-esteem and bargaining power within their households.

OBJECTIVES

1. Train women participating in the value chains of new and established culture species on marketing and nutrition, promoting the understanding of fish as a dietary asset for women and children.
2. Support events among the target populations of fish farmers focusing on women.
3. Develop capacity to access fish production, nutrition, and market information through a series of conferences, workshops, and a national symposium.

METHODS AND MATERIALS

The study combined data collection using discussions and interviews with selected respondents and training during workshops and conferences. The rationale for combining the two approaches was to ensure that training focuses on identified knowledge gaps among target groups. During the training sessions, presentations to fish farmer cooperatives addressed technical needs and issues, as well as specific gender-related concerns in the operation of farmer associations.

The study focused on selected districts in central and northern regions of Uganda (see Figure 1 in Appendices). The two regions differ according a number of characteristics. For example, the central is more densely populated with 176 persons per square meter compared to 65 for the north. Poverty levels are lower (6%) in central compared to 47% in the northern region (UBOS 2016). The central is generally hilly with swamps as main sources of water for fish farming while topography in northern region is mostly low lying with springs as main sources of water.

The respondents were purposively sampled from Bukomansimbi, Kalungu and Lwengo and districts in central region. From the northern region, Alebtong, Gulu, Kole, Lira and Omoro districts were selected. Supplementary information was obtained from interviews with respondents from fish farmer organisations particularly WAFICOS and Women FishNework, based in Kampala. Ogur Fish Farmers' Association in Lira district and Greater Masaka Ssabawali Fish Farmers Cluster based in Masaka were also included in the study. The geographical scope of the study included fish farmers outside Kampala because they are often overlooked by project activities.

Data were analyzed using Atlas.ti computer software where special attention was put on generating results under the themes identified for training activities aimed at advancing the role of women in aquaculture. The themes include aquaculture production, aquaculture marketing, fish and human nutrition, organization of farmer groups/association and women's role in aquaculture.

RESULTS

Development of capacity through training activities and supported events

This activity focused on capacity building of various actors organized in groups and cooperatives, involved in the aquaculture value chain. While most of the groups are comprised of men, women are fairly represented and involved in fish production related activities. The training targeted members of the Walimi Fish Farmers Cooperative Society, the Women Fish Network (both based in Kampala), and selected district based farmers' associations in central and northern Uganda (Table 1).

1. Conducted an edition of the Annual Fish Farming Conference and Trade Show with a focus on women in aquaculture

The Annual Fish Farming Symposium and Trade Show is an activity that brings together various actors in aquaculture. While participation involves men and women, specific groups of women in the aquaculture value chain tend to be underrepresented. The edition of the Annual Fish Farming Conference and Trade Show with a focus on women in aquaculture provided opportunity to reinforce and infuse gender related activities in the ways that women can advance aquaculture in Uganda. The conference was organized by the WomenFish Network in collaboration with NaFIRRI and was attended by 65 women and 35 male participants.

Presentations to fish farmer cooperatives addressed technical needs and issues, as well as specific gender-related concerns in the operation of farmer associations. The importance of ensuring group cohesion was emphasized. Attention was drawn to the social, economic and governance aspects in group operations that often affect groups' attainment of objectives (Stutzman et al, 2017). Characteristics and challenges facing fish farmer groups were pointed out during presentations for purposes of providing lessons to women's groups. Participants

Following discussions carried out in small groups of participants, it was noted that the social aspects underlie effective performance of groups since values such as mutual trust and shared learning are fundamental in ensuring good governance and the attainment of economic gains. Other presentation during the conference highlighted the importance of aquaculture, and the role of women in contributing to income generation, food security and nutrition.

Representatives from the private sector provided useful information about financing opportunities for accessing matching grants to support lawfully registered businesses along the agricultural value chain including the fisheries and aquaculture sub-sectors.

2. Evaluation of women's participation in the aquaculture value chain

Results presented in this section were obtained from discussions and interviews held with women fish farmers, leaders of fish farmers associations and aquaculture extension workers. Results from the discussions elucidate the level of women's involvement in aquaculture. In addition, the discussions helped to identify specific challenges women face in attaining individual and household level benefits from aquaculture.

Results from the discussions were used to map women's participation in the various segments of the value chain as they perform activities individually or jointly with men (Figure 2). While the majority of the women include wives of heads of households and to a lesser extent women heads of households, there are a few employed in the production, processing and marketing segments. Women participate in all pond fish production work though most of the activities are predominantly carried out by men and they include pond site selection and construction, stocking ponds with fingerlings, sampling, sourcing of inputs, harvesting, selling fish, and record keeping. Women are mostly involved in daily routine activities particularly feeding fish, and supervising workers during pond maintenance activities.

The study identified a number of factors that influence women's role in the aquaculture value chain. Some of the factors emanate and manifest at household level while others emerge from outside the household sphere. Among the household level factors is socio-cultural perceptions and practices regarding household resources particularly land. Land is often owned by men who have rights and decision making power on how the land should be utilized including apportioning of the land for different agricultural enterprises. The decision to utilize part of the household land for fish farming lies with the head of the household, who is often a man in the majority of cases. The second factor

relates to the decision about whether the purpose of food production is to generating income or to meet home consumption needs. Increasingly, households undertake fish farming as an income generating venture. Men therefore primarily bear the social responsibility of meeting income needs of the household and hence tend to claim ownership of such income generating ventures.

Thirdly, while there are fish farmer groups, membership is often extended to the man because of his ownership status over the fish ponds even when most of the day to day activities are performed by the women. Farmer groups provide opportunities for information sharing, training, access to production inputs and marketing of farm products. While men get opportunities to share benefits of belonging to groups, women remain limited in terms of knowledge and skills needed to enhance their roles. Lastly, limited access to capital negatively influenced the way women operate their agricultural enterprises including aquaculture. During interviews, a female head of household reported having opted to partner with a group of youths to operate her fish ponds on a cost share basis citing lack of capital to repair ponds. The deal provided a win-win situation to both parties since the group of youths lacked land to engage in fish farming but had their own physical labour to renovate the ponds as a way of cutting costs.

Among factors outside the household sphere noted by respondents included extension advice that is often biased towards men who often are ideally regarded as the farmers. In addition, there is limited use of Information and Communication Technologies (ICTs) particularly mobile phones in availing extension advice to fish farmers, a measure that can enable improved access to information by both men and women. The tendency of extension workers to schedule training activities during mid-morning hours that are often not convenient to women was also pointed out. The training schedules coincide with time for preparing lunch hence disadvantages women.

Opportunities and challenges of women's participation in fish farmers' associations

Farmer groups are a form of farmer institutions that were promoted by the Ministry of Agriculture Animal Industry and Fisheries (MAAIF) as a strategy to realize farmer empowerment through effective demand for agricultural advisory services. The groups were formed around priority enterprises agreed upon by members of the farmer group. This strategy was part of the National Agricultural Advisory Services (NAADS) programme introduced following reform of agricultural extension through the National Agricultural Advisory Services Act of 2001. While farmers responded by forming groups at village level, the proposed mode was not favorable to fish farmers because of the isolation by geographical location. Instead, individual fish farmers from a wide geographical area opted to form associations, a strategy deemed as most feasible. Interviews and discussions with members of the associations revealed opportunities and challenges critical to achievement of improved fish production, marketing and nutrition benefits from fish farming. Some of the challenges identified such as weak leadership, inactive members and lack of commitment to towards achievement of stated goal are in agreement with Stutzman et al., (2017). The results provide lessons for appropriate interventions through training of members of the various fish farmers' associations.

Opportunities

1. Big membership (over 50) comprising small and medium scale grow-out and hatchery operators
2. Readily available market in Rwanda and Democratic Republic of Congo (DRC) for large volumes of farmed fish (minimum of 2 tons)
3. Support in form of grants (funds, equipment including training) by government or soft loans by feed companies
4. Processing fish into various products for the local market targeting consumer preferences and nutritional needs of specific categories of consumers such as infants and school children
5. Developing partnerships with national and international organisations/institutions involved in research

6. Developing linkages with similar organisations in the East African Community
7. Gender inclusiveness; women fish farmers are encouraged to join fish farmers' groups even though they are largely dominated by men.

Challenges

1. In-formal membership (no membership and or subscription fees)
2. Lack of institutional recognition/updated registration with relevant authorities such districts or Uganda Cooperative Alliance
3. Weak leadership
4. Weak membership
5. Poor communication between leaders and members and amongst members
6. Poor linkage with relevant local institutions (e.g districts, MAAIF HQs, NARO, NAADS)
7. Lack of operating funds
8. Unclear common goal and demonstrated commitment towards its achievement
9. Inadequate documentation of the operational procedures of the associations
10. Lack of demonstrated visibility of women fish farmers during meetings and other for a of the associations

Aquaculture production and marketing information needs for women fish farmers

While there are a few fish farming households headed by women, majority are households headed by married men. In both types of households, women play significant roles along the aquaculture value chain from production, processing, retailing to consumption. These roles need to be supported through provision of necessary information in order to improve aquaculture productivity. The study noted concerns about how training workshops organized by extension workers target men without recognizing women's roles and information needs.

Analysis of gender division of labor in aquaculture shows women's predominance in pond maintenance work, feeding fish and general supervision activities carried out by employees. Respondents noted lack of information regarding fish feeding, an important activity they carry out on a daily basis. Specifically, respondents needed information on adequate rations and frequency of feeding fish in relation to the culture period. Information to increase fish production was equally expressed in central and northern regions.

Differences in marketing farmed fish existed in central and northern regions due to the varying levels of volumes of fish produced. Fish farmers in the central produced relatively more fish than in the north as evidenced by the type of customers for the fish. While the low volumes of fish produced in the north were easily sold at the pond side, bulk sales were needed in the central. Among the fish farmers in the central region, women headed households produced relatively lower volumes of fish and were sometimes not informed about the opportunity to bulk with other fish farmers and sell to traders from Rwanda and DRC. The women fish farmers needed information about strategies to promptly link with bulk buyers. They also attributed the problem of alienation from information to inactive farmer associations.

For women involved in processing fish, techniques for producing quality products such as fish sausages and fish powder for niche markets in urban areas was the major need. In addition, the main marketing aspects for which they needed information were marketing skills, quality packaging techniques and loans.

Stakeholder understanding of the role of fish in child and maternal nutrition

The study found that understanding of the role of fish in child and maternal nutrition is wide across respondents interviewed. The general perception about the value of eating fish is that it is good for

general health of people of all ages and that it boosts appetite among the sick. Respondents in central and northern region cited perceived medicinal attributes of species such as silver fish (*Rastraneobola argenta*) and Haplochromines. The species are perceived to cure measles, kwashiorkor and smallpox among infants. Female respondents however disputed claims that lungfish (*Protopterus aethiopicus*) boosts men's sexual prowess reaffirming that all fish are nutritious. Most of the respondents had knowledge about the health benefits of fish to pregnant women and children under the age of five. The respondents in child bearing age echoed lessons they learn during ante-natal and post natal visits to health centres where importance of good nutrition is emphasized for pregnant and breast feeding women. They also sensitize men about the need to provide good diet to mothers and children. These assertions were reiterated by a leader of a women's savings group in Alebtong district saying:

'…of recent, women are aware of the value of fish because they get information from antenatal visits at the health centers. Also, Village Health Workers trained by the Ministry of Health carry out door to door mobilization of women which has increased antenatal visits. As a group leader, I also preach the same gospel to our members during meetings.'

Consumption of fish was found more frequent in the central than in the northern region. On average, households in the central consumed fish at least once a week compared to about twice a month in the north. This disparity can be attributed to closer proximity of respondents in the central to Lake Victoria. Comparatively, respondents in the north were not close to Lake Kyoga. At the same time though, differences in wealth levels cannot be ruled out as the determinant factor. Households mainly purchased fish from retailers in the markets who obtain it from fish landing sites at the lakes.

Comparison of frequency of consuming animal protein foods showed that fish is most frequently consumed followed by beef and chicken. While fish is more expensive than beef or chicken, social and economic factors influence consumption of fish. In the first instance, respondents reported preference for fish above beef and chicken due to the good taste and perceived health benefits as the main driving factors. In addition, it was explained that fish is readily available in the markets and not sold by weight like meat and therefore provides opportunity to purchase any amount affordable by the buyer. A related factor mentioned was that fish was mostly available in smoked form and in different sizes whereby a buyer can opt for a particular number of whole fish corresponding to number of persons in the household regardless of size of the fish. These results correspond with findings in Kenya where availability, taste, health benefits and price influenced fish consumption and purchasing behavior (Obiero et al., 2014, Githukia et al., 2014).

Regarding consumption of farmed fish, respondents in both regions reported eating fish from their ponds on very rare occasions particularly during harvesting of fish. Occasionally, farmers harvested a few fish from the ponds to avail a special meal for visitors or children who have returned from boarding school.

CONCLUSIONS

The study highlighted issues important to enhancement of women's benefits and participation in aquaculture. The main goals of aquaculture are food security and income generation. Since women are primary providers of food for household members, understanding and enhancement of their role in aquaculture value chain is key. Data collection focused on individuals, households and groups where benefits from aquaculture are realized. Analysis of women's participation in the aquaculture value chain revealed shared roles between men and women implying the need for gender responsive interventions. Farmer groups offer opportunities for improving aquaculture production and marketing but organizational challenges prevail and limit achievement of anticipated benefits.

In particular, understanding of the role of fish in child and maternal nutrition is recognised as a factor that can drive efforts geared at increasing fish production while enhancing the role of women. Training activities conducted for the different farmer groups provided knowledge and skills in ensuring cohesive and active groups that can realize their goals.

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TABLES AND FIGURES:

Table 1. Summary of training activities undertaken

Event	Target Group/category	Number of participants	Focus of training/presentation
Conference onwomen in aquaculture	- Women fish farmers - Women fish processors - Women in academia, policy, research and extension		- Sharing experiences of the different categories of women in aquaculture - Identification of areas for support - Role of Aquaculture in child and maternal nutrition
WAFICOS and WomenFish Network Joint meeting	- Leaders and selected members of WaFICOS - Leaders and selected members of WomenFish Network	26 women 9 men	- Effective Leadership with focus on gender inclusivity - Dealing with group dynamics - Role of women in aquaculture associations - Role of Aquaculture in child and maternal nutrition - Aquaculture fish products [Value addition: fish fingers, deep fried tilapia 20g and below] - Business planning
WAFICOS Annual Symposium	- Fish farmers - Fish processors	37 women 87men	- Role of women in aquaculture associations - Aquaculture and nutrition
Greater Masaka Fish Farmers' Cluster Meeting	- Members of the cluster - Non-members of the cluster - District Fisheries Officers - Representatives of Buganda Kingdom	6 women 25 men	- Role of women in fish farmers' associations/groups - Dealing with group dynamics - Increasing women's participation in leadership roles - Organised fish production and bulk sales to markets in Rwanda and DRC - Partnership with feed companies for feed loans - Raw material for women's fish processing enterprises
Ogur Fish Farmers Association, Lira district	- Members and non-members	6 women 16 men	- Effective Leadership with focus on gender inclusivity - Dealing with group dynamics - Role of women in aquaculture associations - Aquaculture and nutrition - Business skills - Farmer to farmer extension modalities
Kole district fish farmers meeting	- Fish farmers in Kole district	7 women 4 men	- Effective Leadership with focus on gender inclusivity - Dealing with group dynamics - Role of women in aquaculture associations - Aquaculture and nutrition - Farmer to farmer extension modalities
Lwengo, Kalungu and Alebtong district fish farmers meeting	- Fish farmers	22 women 16 men	- Modalities of forming fish farmers association/group - Enhancing women's role in fish farming and farmer groups -

Table 2. Technology developed

Item	Mechanism (e.g. podcast reports factsheets etc.).
Conference on Women in Uganda Aquaculture	Fact sheet on women's roles in Uganda aquaculture
One training on women's organizations in development for women farmers and service providers	Leaflet providing practical guidance to women's groups
One training on value chains and marketing in aquaculture for farmers	Leaflet providing practical guidance to women's groups with focus on nutritional value of lungfish
One presentation to fish farmer cooperative members and leaders	Fact sheet for leaders and participants in cooperatives with emphasis on lungfish as a new market item

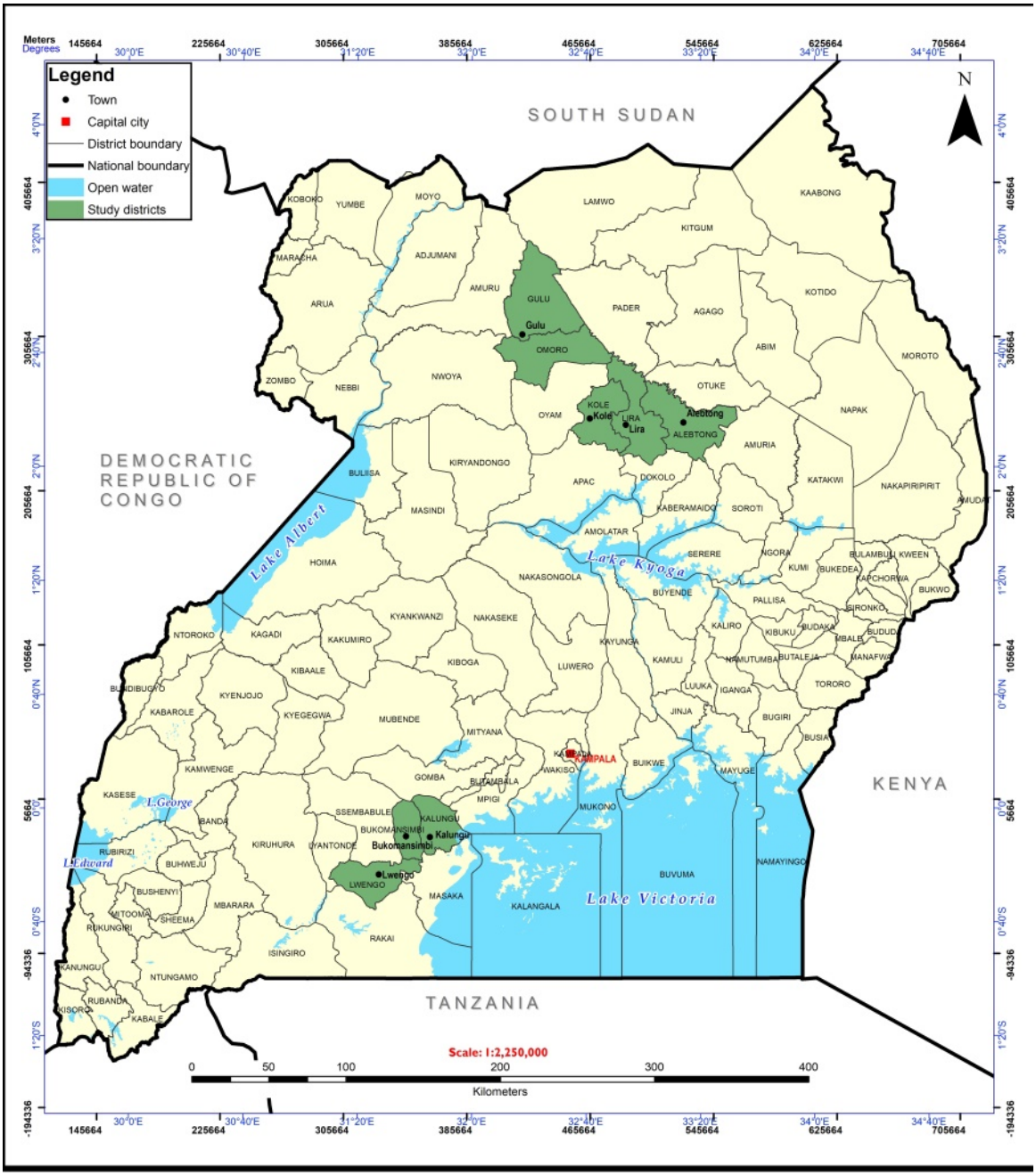

Figure 1. Map of Uganda showing study districts

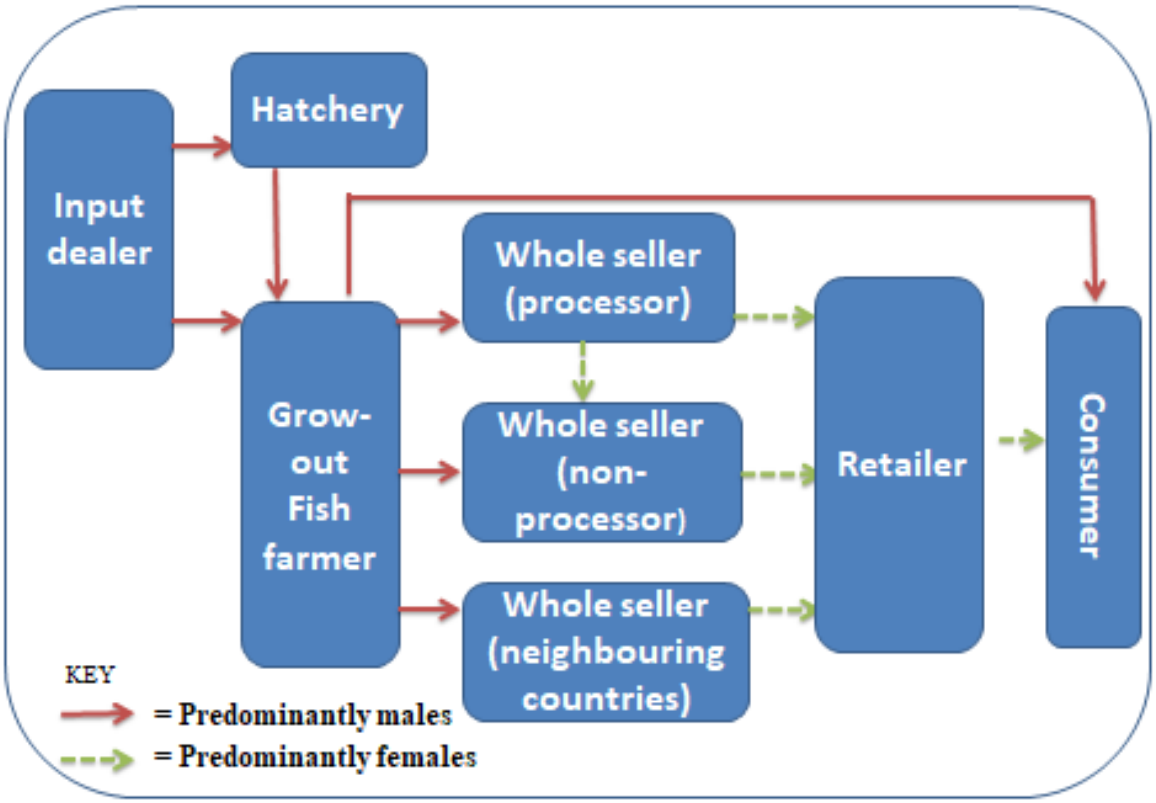

Figure 2. Aquaculture value chain actors by gender (Source: Group Discussions with men and women in central and northern regions of Uganda, 2017).