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Contribution of Small-scale Aquaculture to Farmers' Livelihood in Uganda

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Introduction

Aquaculture in Uganda is dominated by the farming of various species of Tilapia in household ponds. At present, an estimated 10,000 farmers cultivate a total pond area of about 220,000 m^2. Very few of these farmers are specialised fish farmers for whom aquaculture is the main means of livelihood. The great majority manage their ponds as one of many components of a mixed farming system in which crops and/or livestock production take priority over the fish pond.

This paper attempts to answer the question what contribution fish farming makes to the livelihood of Uganda's rural poor. To this purpose, it uses the results of a Baseline Survey (BLS) and of a study on Knowledge, Attitudes and Beliefs (KAB) of Fish Farmers in Uganda. Both studies were carried out in 1999/2000 by the Small-scale Fish Farming Project under the National Agricultural Research Organisation (NARO) and the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) with support from the Department for International Development (DFID) of United Kingdom.

The main purpose of carrying out these studies was to establish and make available information about aquaculture in Uganda. Information is very important for planning aquaculture development in order to increase its contribution to poverty reduction. Lack of reliable information has been realised as one of the factors that have constrained identification of appropriate interventions for aquaculture development.

The paper begins by examining the place of the fish pond in local farming systems and in farmers' livelihood strategies. It then quantifies the current level of aquaculture production and the benefits farmers reap from fish farming. The paper further presents the level of fish consumption and the extent to which income from farmed fish contributes to household income and ultimately to poverty reduction. Finally, some of the constraints to fish farming are highlighted and recommendations for improving the aquaculture sub-sector are given.

Fig. 1. Average yearly income of fish farmers and non fish farmers

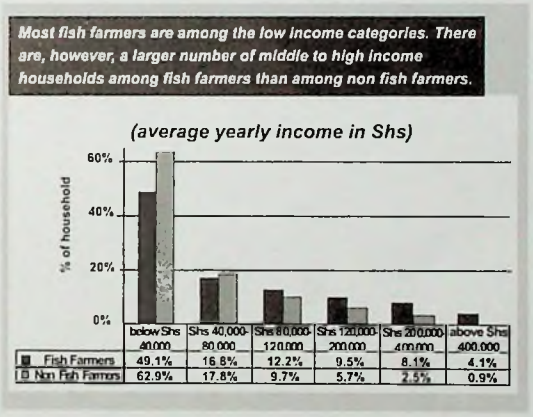
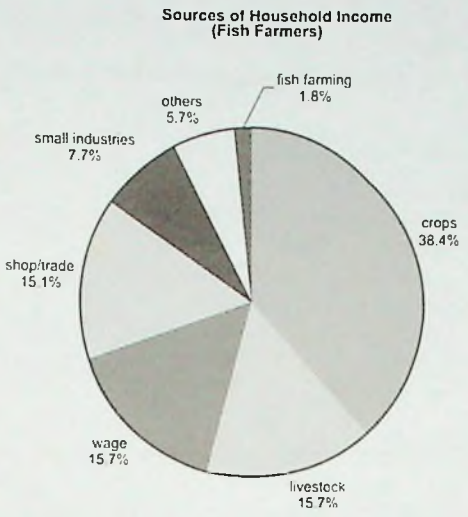


Fig. 2. Fish farmers' sources of household income



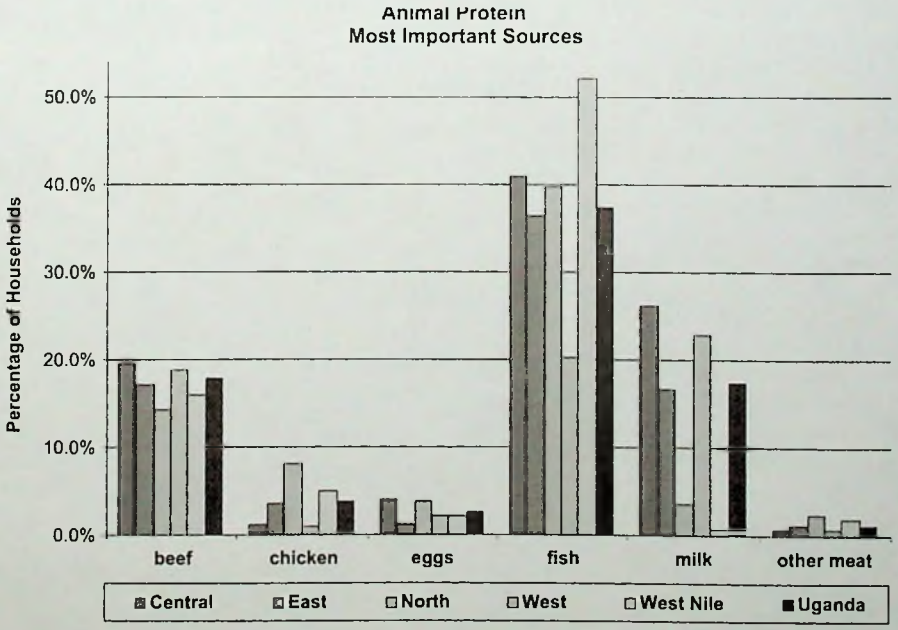
Fish farming in Uganda is an activity of the average income farmer. Data on income reveal that about 50% of fish farming households earn less than Ug Shs 40,000 (=US$ 25) a month, compared to slightly over 60 % among non-fish farmers. On the whole, the average income of majority Ugandan rural farming households is low.

Other social and economic indicators substantiate this picture; with two exceptions. Fish farming households have on average larger land holdings, and they are more predominantly male headed than households without a fish pond. The first factor hints at the point that aquaculture is a low priority land use system affordable to those with land holdings beyond their crops and livestock needs.

Comparatively, the sources of household income are by and large the same for fish farming and non-fish farming households. Fish farming itself makes a small contribution to household income when data are aggregated for all households with ponds. Crops and livestock contribute only about a half of rural incomes. A significant portion of incomes (45% and 38.5% respectively) are derived from non-agricultural activities, mainly wage labour (including casual labour and formal employment), trading/shop keeping, and small scale industries (including brick making, brewing and artisanal workshops.

The second factor relates to gender issues that place females (female headed households [FHH]) and women in general, in a particular social status. The low representation of FHH may be explained by a number of factors. Most women household heads are widows and therefore less likely to have started fish farming in the past 10 years (when the great majority of today's ponds have been excavated). Adoption of fish farming has been driven by male biased extension service. FHH are generally poorer and therefore less likely to adopt a

Fig. 3. Most important sources of animal protein



new technology. Not only are they older on average than other household heads, they would also find it difficult to change the land use system on a land holding over which customarily they only have temporary use rights.

Pond Fish Production

The level of fish production from fishponds is an important issue if benefits from fish farming are to be realised. Obtaining good data on fishpond production was hindered by lack of records at farm and district levels. Analysis of production levels was thus based on data provided by farmers (respondents) through recalling estimates of fish they had harvested. The data may not be valid due to the likely overestimation. The analysis indicated that pond production stood at 10 kilograms per 100m^2 pond area per year (BLS 2000) a figure considered quite low.

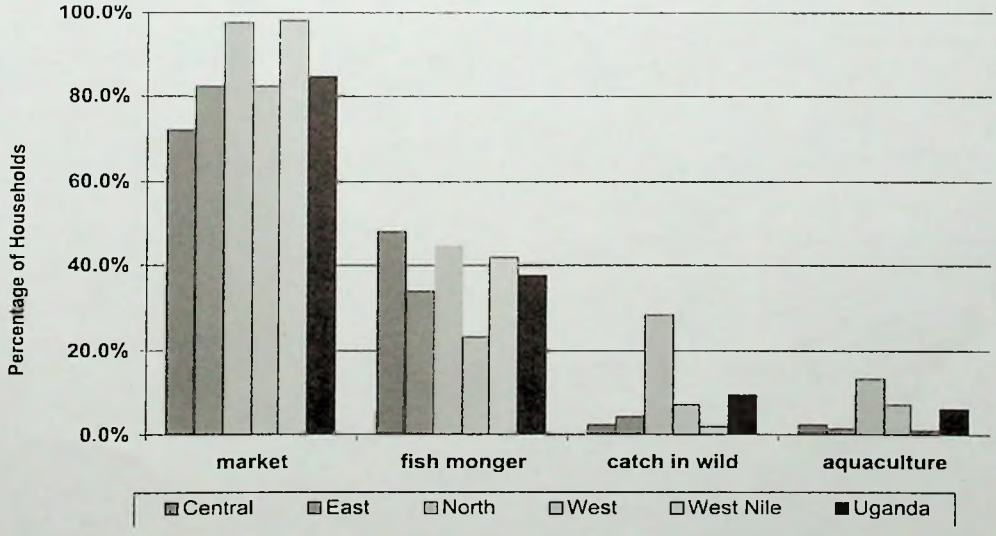
Fish Consumption

Fish is the most important source of animal protein in Uganda. During a recall period of 2-3 days, more than twice as many households (37.4 %) have consumed fish than the second most important sources...beef (17.9 %) and milk (17.4 %). Only in the Western region are the cattle products of equal significance. Any other sources of animal protein appear to be significant only among few households.

The overwhelming majority of fish consumers get their product at local markets and or from itenerant fish mongers. Very few Ugandans catch their own fish, except in the North, where almost 30% of households periodically get fish from the wild. Aquaculture contributes only a modest portion to the national fish supply (6%), more significantly, however in the North (13%).

Utilisation of pond fish falls into three types: fish are consumed by the producer's household, sold or given away/bartered. Survey data suggest that, over all, Ugandan fish farmers sell slightly more than half (53%)

Fig. 4. Consumers' main sources of fish supply



of their harvest, while they eat almost a third (33%) and give away the rest.

A closer look at those farmers who engage in fish sales from their ponds shows that while they eat a smaller percentage of their harvest compared

Utilisation of Farmed Fish

Table 1. Utilisation of farmed fish

Region	Percentage of Fish...		
	Sold	Given Away	Eaten
West Nile	37	20	43
Central	37	20	43
East	43	17	40
West	67	11	22
North	42	14	48
Average	**53**	**14**	**33**

to the average fish farmer, they in fact eat larger amounts of pond fish. Their overall harvest is on average almost twice as big as that of average fish farmers. This trend continues among fry producers who enjoy both the highest incomes from fish farming and the biggest fish consumption from their ponds.

These findings suggest that even at the current low level of production, commercial use of pond fish is well established in Uganda. Further, the sale of fish does not reduce the amount of fish consumed in the producer's household. The most successful fish farmers, in other words, indeed realise the dual benefits of food and income.

Benefits Gained from Fish Ponds

During a study of Knowledge Attitudes and Beliefs (KAB) of fish farmers, farmers were asked to mention the benefits they have gained from their fish ponds. Results indicate that farmers' benefits from fish ponds are not only economic but also social. However, one in every five fish farmers thinks they have not gained any benefit from their fish ponds. Lack of fry to stock ponds, stunted fish and lack of harvesting gear were some of the reasons given.

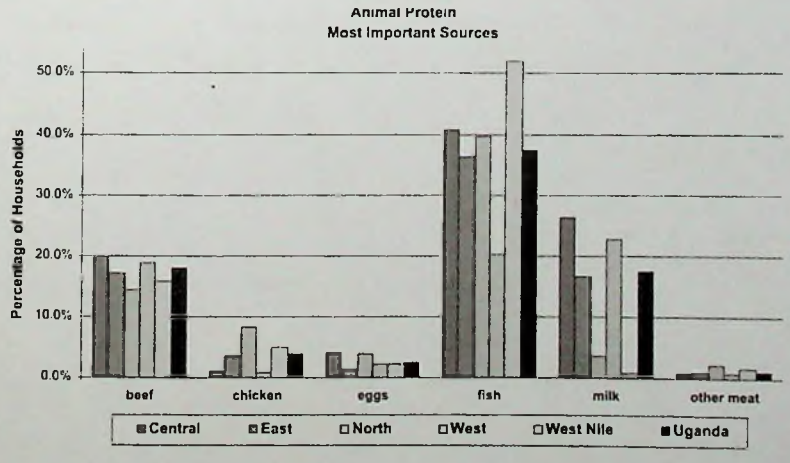
Food was mentioned by a majority of farmers as the most important benefit they have gained from fish farming. Close to half of the farmers interviewed were participating in the project's On Farm Trial (OFT) programme. During the trials farmers were encouraged to carry out periodic partial harvesting after which, some of the fish were consumed by the households.

Table 2. Benefits Gained Since Starting Fish Farming

Most Important Benefit	%of Farmers
Food	47%
Income	17%
Received Visitors	7%
Water for Animals	3%
Knowledge/skills	2%
Water for Irrigation	1%
Recreation	1%
Prestige	1%
none (no benefit)	21%

Source: KAB Study, 2000

Fig. 5. Most important sources of animal protein



Food Security Benefits

Fig. 5. Most important sources of animal protein

Fish provides the richest source of animal protein. It is preferred by the majority of households (87%) over and above other sources animal protein. The reasons given by most respondents include among others that it is more nutritious (41%) and cheaper (32%).

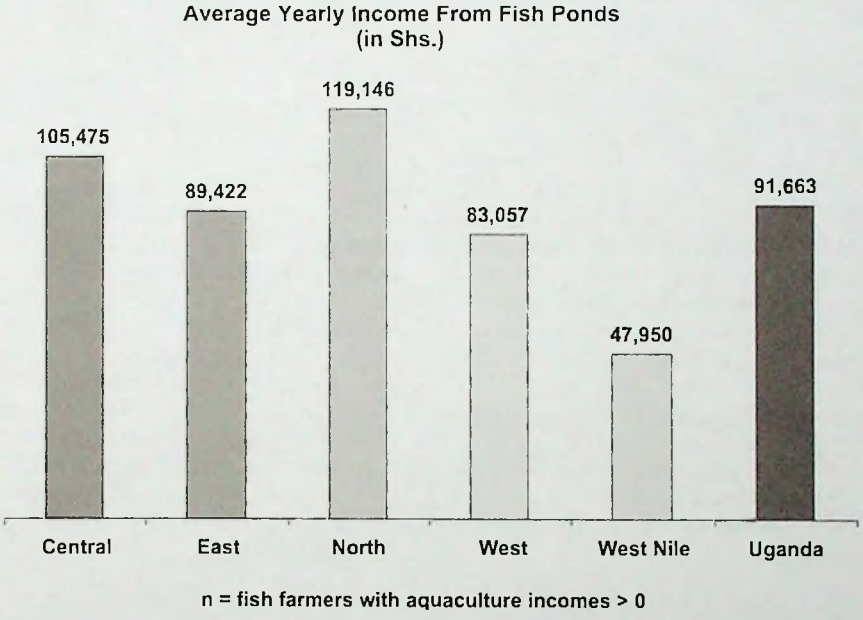
Consumers Main Source of Fish Supply

Fig. 4. Consumers' main sources of fish supply

Although most fish farmers have gained and regard food as the most important benefit from their fishponds, they perceive income as the most important future benefit they expect. This therefore implies that production of pond fish is perceived as one of the activities that can contribute to household income.

Income

Three in four households with fish ponds in Uganda do not earn income from their ponds. These include farmers who have abandoned or not yet stocked their ponds.



Yet even among those whose ponds are presently stocked, only 21.2 % have earned income from selling fish and/or fry within a period of the previous six months.

Fig. 6. Average yearly income from fish ponds

Among those fish farmers with pond income, the majority earn less than Ug Shs. 50,000 per year. The average yearly income lies at Ug Shs. 91,000 for Uganda, yet it shows considerable regional variation. Income in the Central and especially in the Northern parts of the country are above the national average.

Compared to overall household incomes, these figures seem to suggest that aquaculture makes only a modest contribution to fish farmers' income. On national average 7.5% of fish farmers' income

Fig. 7. Contribution of fish farming to household income (by region)

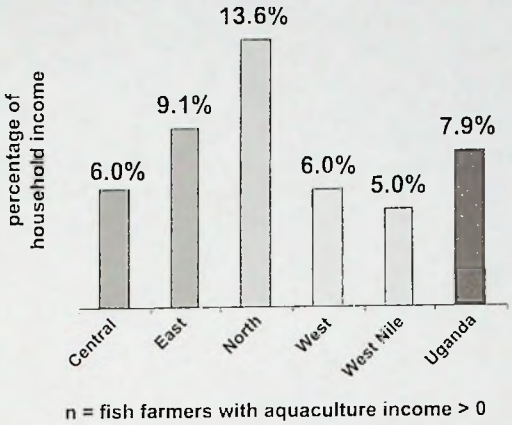
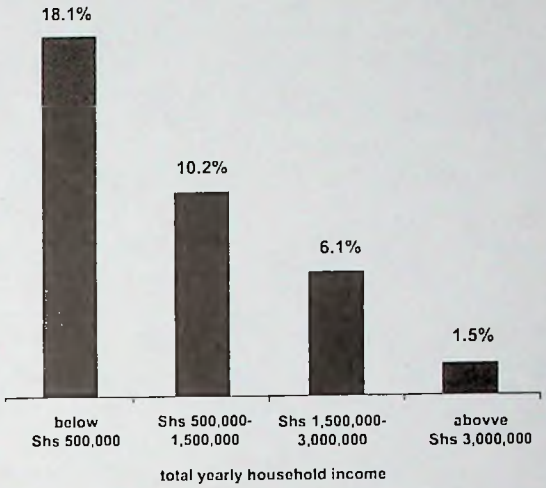


Fig. 8. Contribution of aquaculture to household income (by income bracket)



are derived from the sale of fish and/or fry. This figure is, however, almost twice as high for Northern Uganda, the region with the highest fish farming income as well as the lowest overall income levels. Closer analysis of Survey data shows that almost 40% of fish farmers in Northern Uganda gain a substantial share of their income (i.e. over 25%) from their fish ponds, compared with less than 17% nationally.

The suggestion that fish farming yields more substantial income benefits to poorer households is substantiated when we compare pond income benefits across income brackets. Although income from ponds predictably increases with rising household income, it doesn't do so proportionately. Among fish farmers with a yearly income of less than UShs 500,000 fish farming contributes close to 24% to household income. This share declines with increasing household income, to a level of below 3% among the highest income bracket. In other words, fish farming contributes more significantly to poor farmers income than to that of better off farmers.

9. Gender Issues in Aquaculture

Women participate at all stages of the aquaculture production cycle. Their involvement is highest in routine labour tasks such as feeding and fertilising. Their participation is lowest in activities

Table 3. Women in the aquaculture production cycle

Task	Men	Women	Children	Hired Labour	Extension staff
Pond Construction	75%	24%	25%	56%	8%
Pond Maintenance	74%	23%	26%	18%	3%
Purchasing fingerlings	76%	14%	2%	-	35%
Stocking	71%	13%	6%	4%	46%
Purchasing feeds	85%	25%	6%	-	13%
feeding	82%	59%	44%	4%	1%
fertilising	79%	38%	33%	5%	2%
harvesting	78%	23%	32%	17%	25%
selling	60%	17%	8%	2%	1%

surrounding the purchasing, handling and /or selling of fish fry. Generally, labour for pond management and utilisation of pond fish are largely governed by male dominated decisions.

Women's participation in harvesting (i.e. providing labour and deciding when to harvest) is low. [Harvesting is a crucial stage in the production cycle as it turns stocked fish into a usable commodity]. Reasons for low women's low participation in harvesting include:

- pond fish are commonly regarded as the property of men, and women are often not allowed to make independent harvesting decisions.
- harvesting gear is either owned by men or borrowed/ hired from men (neighbour or extension workers).
- harvesting process is often carried out by groups of men.
- harvesting pond fish is likened to fishing in the lakes and rivers which is predominantly a men's activity.
- alternative harvesting gear (hooks, basket traps etc) that can easily be used by women are often consid ered ineffective or "backward" by those who do not use them but who make harvesting decisions (i.e. men and extension workers).

10. Aquaculture Constraints

Despite considerable efforts that have been invested in pond construction and growing fish in ponds by some farmers, fish supply are still minimal. Only few farmers are able to produce enough fish for home consumption, let alone for sale. Information available indicate that reasons responsible for this kind of situation are technical, socio-economic and institutional. They include among others:

- poor quality seed
- poor pond management
- bias against small size fish
- inadequate extension service delivery

11. Conclusion

In conclusion, small-scale aquaculture in Uganda is one of the ways of diversifying household incomes, though its contribution is still small. Information available show that small-scale fish farming is a profitable venture which provides farmers with benefits, particularly food and income. Currently, the percentage of farmers enjoying the benefits is small and the benefits themselves are still of limited amounts. However, aquaculture income is most significant among poorer fish farmers. There are a number of factors constraining aquaculture development at local and national level. Present strategies and interventions are geared to addressing the constraints in order to improve smallholders' pond production, and significant improvement is being realised. The strategies include among others identifying aquaculture technologies that are appropriate for use by the rural poor, and improving the delivery of extension services by targeting the poor.

12. Recommendations

Emphasis should be placed on addressing the needs of fish farmers and ultimately maximise benefits. This entails continuous information gathering and dissemination to all levels in order to provide a reliable base for aquaculture planning and development. There is need to monitor and evaluate the performance and relevance of the technologies in order to establish their appropriateness in contributing to poverty reduction. Farmer-to-farmer exchange of information, especially between fish seed producers and other fish farmers should be encouraged. Aquaculture planning and development efforts should ultimately be geared to raising the present level of aquaculture from small-scale to larger scale and become more market oriented.