

## **Market Assessment and Profitability Analysis of Aquaculture Enterprises in Uganda**

Marketing, Economic Risk Assessment & Trade/Study/09MER01AU

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### **ABSTRACT**

By focusing on aquaculture technology for smallholder farmers, this project conducted market assessments and profitability analysis of smallholder aquaculture enterprises in Uganda. Aquaculture farm-level production costs, management practices, and marketing arrangements were assessed by documenting the number, size, and location of existing aquaculture producers and processors and the current markets they serve. The risk-return tradeoffs associated with a given aquaculture enterprise were quantified in isolation and in conjunction with alternative enterprises using enterprise budgets and portfolio analysis frameworks. Fish marketing and credit issues in the country were identified using secondary data and literature reviews. Information on marketing and credit flows was gathered using a combination of face-to-face interviews/survey questionnaires and purposeful selection of respondents. This report presents a summary of the activities accomplished that relate to profitability analysis of aquaculture enterprises, fish marketing, credit for fish marketing and production, and economic modeling for fisheries marketing development.

### **INTRODUCTION**

Growing evidence and experience indicate that sustaining success in productivity-based agricultural growth critically depends on expansion of market opportunities (Diao and Hezel, 2004; Gabre-Madhin and Haggblade, 2004) and requires thinking beyond productivity to incorporate profitability and competitiveness (Kaplinsky, 2000). It is now increasingly evident that smallholder farmers' key concern is not only agricultural productivity and household food consumption, but also increasingly better market access. Virtually all African farmers depend on trading for some household needs, and hence seek income generating activities. Enhancing the ability of smallholder, resource-poor farmers to access market opportunities, and diversify their links with markets is one of the most pressing development challenges facing both governments and nongovernmental organizations in Sub-Saharan Africa (IFAD, 2001; IFPRI, 2002; Kindness and Gordon, 2002). Agricultural markets can therefore play significant roles in reducing poverty in poor economies, especially in countries which have not already achieved significant agricultural growth.

In Sub-Saharan Africa, more countries are increasingly putting emphasis on transforming subsistence agriculture to make farming a business and to an entrepreneur culture in rural communities, where farmers produce for markets rather than trying to market what they produce, to better understand how communities in diverse situations can best achieve their income and other livelihood aspirations through better links with markets. What is not obvious, however, is how to make small-scale farming more market orientated, and how to make markets work for the poor. Experience has shown that markets can fail the poor, especially poorest and marginalized groups, including women.

By focusing on aquaculture technology for smallholder farmers, this project conducted market assessments and profitability analysis of smallholder aquaculture enterprises in Uganda. Until recently, most fish farmers were poor people in villages who practiced aquaculture for subsistence with ponds of usually less than 500 m<sup>2</sup> constructed using family labor (Jagger and Pender, 2001; Nyombi and Bolwig, 2004). These were low or no input production systems, with little or no need for routine management. However, with rising market prices for fish, the quest for profitable production, and stagnating supply from capture fisheries, farmers are beginning to build more and larger ponds of 1,000 m<sup>2</sup>, and using higher stocking densities (Department of Fisheries Resources 2005). Before deciding whether to undertake, continue or to expand a commercial aquaculture enterprise, aquaculturist needs to evaluate potential profitability. This report presents a summary of the activities accomplished that relate to profitability analysis of aquaculture enterprises, fish marketing, credit for fish marketing and production, and economic modeling for fisheries marketing development.

### **METHODS AND MATERIALS**

Aquaculture farm-level production costs, management practices, and marketing arrangements were assessed by documenting the number, size, and location of existing aquaculture producers and processors and the current markets they serve. The risk-return tradeoffs associated with a given aquaculture enterprise were quantified in isolation and in conjunction with alternative enterprises using enterprise budgets and portfolio analysis frameworks. Fish marketing and credit issues in the country were identified using secondary data and literature reviews. Information on marketing and credit flows was gathered using a combination of face-to-face interviews/survey questionnaires and purposeful selection of respondents.

### **RESULTS**

#### **Main Results from the Farmers' Survey**

Only 36 percent (n=72) of the farmers interviewed had fish farming as their main source of income. The other 64 percent (n=128) farms had a wide range of other livelihood activities. Although some of the farmers interviewed had been involved with fish farming for many generations, there appeared to be an increasing number of people who were starting to practice aquaculture.

Although many farmers regarded it as source of income, it is not regarded as important as other sources of income, rather one that could be used sporadically. More farms cultured tilapia and catfish compared with any other fish species. When asked to indicate the species grown for their last harvest, the majority (82 percent) reported tilapia. The majority (61 percent) of the farms solicited additional labor (1 to 5 people) during harvest and most of this additional help was paid labor.

The majority of farms fed their fish with maize bran (47 percent) followed by Ugachic feed (24 percent), but a proportion also used crop leaves and pellets. Nearly all of the farmers interviewed cultured fish in ponds rather than cages. A high number of farmers (64 percent) owned between 1 or 2 ponds

Farmers obtained their fry/fingerlings from a variety of different sources with the most common source of fish seed being from Kajjansi fisheries institute (58 percent) followed by Mpigi and Umoja fish farm. The stocking density of fingerlings ranged from 100 fish to 9,050 fish with most farmers stocking at between 351-550 fish. Only 45 percent of the farms surveyed made a profit from the last completed harvest. Over 90 percent of the farms surveyed used personal funds to finance their production.

The majority of the farms (76 percent) are not associated with any organization. Only 48 percent of the farms kept some form of written records related to their fish farming activities, relating mainly to

production costs. Only 10% of farmers claimed to contact the extension officers with most farmers relying on their own experience or advice from other farmers.

### **Main Results from the Traders' Survey**

The majority of the respondents (41%) were from Kampala district followed by Wakiso (23%), Mukono (20%) and Mpigi (16%) districts. Over half of the respondents (52%) were retail operators, and over 80 percent were business owners who use personal funds (not loans) to finance their fish businesses. About 77% of the respondents have been in the fish business for more than 5 years and most sold their fish at Busega (30%), Mukono (20%) and Mpigi (16%) markets.

Less than 1% of the traders sold farmed fish and when asked why they did not sell farmed fish, the most frequent response was lack of supply/scarcity. Tilapia is the most traded species and most of the respondents (60%) indicated buying fresh tilapia on a daily basis. Quality and freshness rather than price were considered to be most important factor considered when buying fish.

The majority of the traders (82%) lived closer (within 7 miles) to the markets where they sale fish. Refrigeration and smoking were the most common methods used to preserve unsold fish. July was reported by 57 percent of the respondents as the month when fish is in low supply and May, June and August as the period when fish is in high supply. Fish price (22%), fewer customers (10%), corrupt fish officers (8%) and immature fish (8%) were the main problems identified by the traders as impediments to the sector. The majority (73%) of the traders did not belong to a traders' association.

### **Main Results from Enterprise Budgets and Profitability Analysis**

All model farms made profit with net revenue ranging from Ushs 1,347,463 (US\$ 596.60) to Ushs 2,643,818 (US\$ 1,164.68). The enterprise budgets also indicated that it is profitable to farm one variety of fish rather than mixing. Farming catfish turned out to be more profitable than farming tilapia alone or mixing tilapia and catfish. The results also showed that keeping records as well as managing the pond using recommended practices results in higher returns.

## **DISCUSSION**

Small-scale fish farmers located relatively close to markets or all-season roads, and who can supply consistent and high quality produce, have the widest range of marketing opportunities, and will likely be within the area of operation of potential traders and intermediaries that deliver fish to markets. Fish farmers that are not close to roads, or produce unreliable quantities and variable quality products are facing high transaction costs of marketing their product, and decreasing net returns to production. We also find that access to input markets are important factors leading to positive net returns to fish production.

The data show a need for improved market access and to develop new semi-processed and value-added products. There is a need for improved handling of the fish at the point of capture to diminish post-harvest losses. There are considerable losses through spoilage owing to lack of proper infrastructure exhibited by poor roads and landing sites. Another factor is the inadequate funding for effective fisheries regulations enforcement.

## **LITERATURE CITED**

- Department of Fisheries Resources. 2005. National Fisheries Planning Overview 2005. Department of Fisheries Resources, Ministry of Agriculture, Animal Industry and Fisheries, Entebbe, Uganda.
- Diao, X and Hazell, P. (2004). Exploring market opportunities for African smallholders. Paper prepared for the 2020 Africa Conference "Assuring food security in Africa by 2020: Prioritizing actions, strengthening actors, and facilitating partnerships. Kampala, Uganda. April 1-3, 2004.

- Gabre-Madhin, E and Haggblade, S. 2004. Successes in African Agriculture: Results of an Expert Survey. *World Development* 32(5) 745-766
- IFAD (International Fund for Agricultural Development). (2001). Rural poverty report 2001: The challenge of ending rural poverty. Rome, Italy: (IFAD). [www.ifad.org/poverty/index.htm](http://www.ifad.org/poverty/index.htm).
- IFPRI (International Food Policy Research Institute). (2002), Cutting hunger in Africa through smallholder-led growth. <http://www.ifpri.org/themes/aicha.htm>
- Jagger, P. and Pender, J. 2001. Markets, marketing and production issues for aquaculture in east Africa: the case of Uganda. Washington DC, International Policy Research Institute.
- Kaplinsky, R. (2000) Globalisation and Unequalization: What Can Be Learned from Value Chain Analysis? *Journal of Development Studies* 37 (2), pp. 117-146.
- Nyombi, K and Bolwig S. 2004. A qualitative evaluation of alternative development strategies for Uganda fisheries. International Food Policy Research Institute