

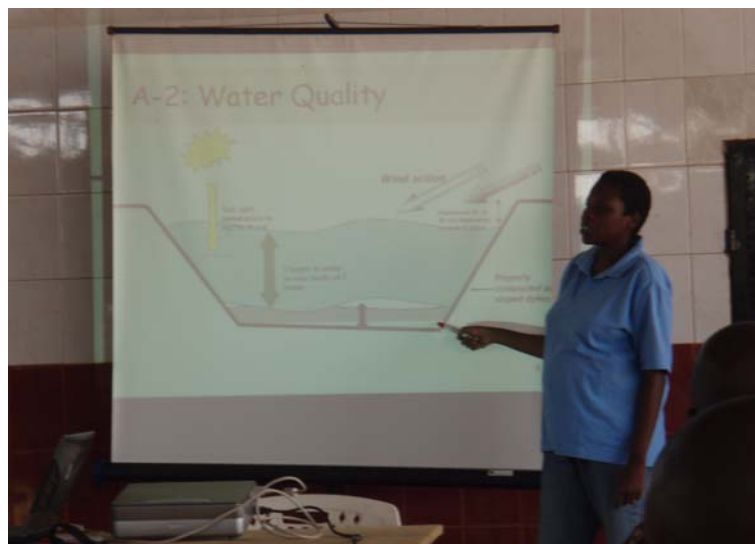
# Fisheries Investment for Sustainable Harvest



**USAID**  
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**Annual Report: October 2006 - September 2007**



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Department of Fisheries and Allied Aquacultures; Auburn University, Alabama

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## List of Acronyms

APEP	Agricultural Productivity Enhancement Program
ARDC-Kajjansi	Aquaculture Research and Development Centre, Kajjansi
ASA	American Soybean Association
AU	Auburn University
APS	Annual Program Statement
BMUs	Beach Management Units
BMPs	Best Management Practices
CTO	Cognizant Technical Officer
CO	Contracting Officer
COP	Chief of Party
DANIDA	Danish International Development Agency
DWD	Department for Water Development
FAO	Food & Agricultural Organization
FIRRI	Fisheries Resources Research Institute
FISH	Fisheries Investment for Sustainable Harvest
FTI	Fisheries Training Institute
GOU	Government of Uganda
IFPRI	International Food Policy Research Institute
LVHD	Low Volume High Density
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MAK (MUK)	Makerere University, Kampala
MEMS	Monitoring & Evaluation Management Services
MOU	Memorandum of Understanding
NAADS	National Agricultural Advisory Services
NAFIRRI	National Fisheries Resources Research Institute
NARO	National Agricultural Research Organization
NEMA	National Environment Management Authority
NGOs	Non Governmental Organizations
PEAP	Poverty Eradication Action Plan
PIR	Project Intermediary Results
PMA	Plan for Modernization of Agriculture
PMP	Performance Monitoring Plan
PRIME	Productive Resource Investments for Managing the Environment
RFP	Request for Proposal
RURAL SPEED	Rural Savings Promotion & Enhancement of Enterprise Development

SAF	Special Activities Fund (Strategic Activities fund)
SAFSC	Strategic Activities Fund Selection Committee
SCOPE	Strengthening the Competitiveness of Enterprise Development
SO	Strategic Objective
SO7	Strategic Objective Seven
STTA	Short Term Technical Assistance
USAID	United States Agency for International Development
USD	United States Dollars
USH	Uganda Shillings

## INTRODUCTION

Uganda is blessed with five major lakes, including Lake Victoria and 160 smaller lakes which cover 18% of the country's area. Fish and fish products account for almost 30% of the value of Uganda's total exports with US \$ 100 million in revenues in 2004. Fisheries employs some 150,000 full-time fishermen and member of "harvest" sector and perhaps another 550,000 in the secondary and tertiary sectors involving processing, handling and marketing (Walekhwa, 2005). In view of these facts one might question, "Why develop fish farming?"

Fish accounts for some 50% of the animal protein intake of the Ugandan population which has a high growth rate of 2.5%. Demand for fish is increasing at a similar rate and yet a fishery in Lake Victoria, the major source of fish, has been in decline for more than ten years. Catch per unit of effort has decrease as have revenues for fishermen who are now seeking alternative livelihoods. With the growth of Nile perch long lining fishery which accounts for the majority of revenues from fish from Uganda, bait fish of juvenile African Catfish, *Clarias Gariepinus* have been sought from the wild and this is the only exacerbating environmental concerns in a bio-diverse water body which has had some 200 fish species disappear over the past 20 years.

Fish farming offer sustainable way to provide for bait fish market and the growing used demand for table fish in Uganda. Currently farming raise fish accounts for less than 10% of the bait fish. With all the problems of declining catch and over fishing common to most of the world's fisheries, Uganda is ripe for smoked catfish. Pond fish farming offers opportunities for investors across the country and into the North, a post conflict area in need of increased food production. Cage fish farming also offers opportunities to investors for development of cage fish farms on the lakes and this could help diversify livelihood of fishing communities.

The Fisheries Investment for Sustainable Harvest (FISH) project cooperative agreement was signed in May 2005 and after 28 months of its 40 moth time has made significant progress towards achieving its mandate of developing feed-based, pond and cage technical packages for commercial fish farming. The projects commercial approach responds to the Government's Plan for Modernization of Agriculture (PMA) of 2000, which called for "eradicating poverty by transforming sustainable Agriculture to commercial Agriculture". Studies carried out by Rutaisire and Nyamutare (2004) of FIRRI/ ARDC Kajjansi indicate yields from individuals fish farms were not clearly know due to lack of follow up in extension and the lack of records kept by the largely subsistence fish farmers who were found to lack inputs inputs or to inappropriately utilize key inputs such as quality seed and feeds. A baseline survey carried out by Akunda and Mwesigwa (2006) indicate fish farmers were obtaining fish productions of only 1000kg/ha/year (quoted as 10kg per 100 square meters). This situation set the stage for the launching of the USAID-funded FISH Project.

The FISH Project was requested by private fish farmers and has traversed a challenging start up due to the lack of basic development in this sub-sector. Given this situation, the project has worked diligently in developing key components of the value chain from scratch as depicted below in Table 1.

Access to qualified technical advice is still a limiting factor to expansion of the FISH project's activities and impacts beyond the demonstration farms. So, although the status of commercial fish farming has made great strides in just two years, fewer than 20 farmers have been able to progress and actually become commercial fish farmers.

**Table 1. Typical Progression of Aquaculture Development**



Development Criteria	Subsistence Level	Emerging Fish Farmer Level	Start Up Commercial Fish Farmers	Developing Commercial Fish Farmers	Aquaculture Industry
1. Quality Fish Farm Design & Construction	None	None	Limited based upon visits to other farms/facilities with incomplete or poor designs	Development of core group of commercially viable producers and poor copycats; Design by academia or government support	Establishment of specialized services by private sector-Engineering, design and construction services
2. Quality & Quantities of Feeds	Compost or supplemental feeds (Ag/household wastes)	Supplemental or on-farm feed production	Limited access, incomplete on-farm produced sinking feeds	Development of nutritionally complete pelleted feeds with increased access, but limited understanding of feed application and its economics	Extruded and pelleted feeds widely available with quality control measures in place; Feed costs decrease or remain the same (but quality increases) as market expands and competition increases.
3. Quality & Quantities of Fish Seed from Hatcheries	Irregular, limited availability; Usually natural pond production or government supplied	Government supplies seed; Limited hatchery design; Limited artificial spawning techniques	Improved Hatchery Design with Aeration; Use of Artificial Spawning Techniques	Increased use of artificial spawning with greater production intensity through improved aeration/water quality management	Variety of spawning techniques available and implementation of quality control management plans; Fingerling producers become specialized and foodfish producers purchase fingerlings from hatcheries.
4. Record Keeping (Inventory & Budgets)	None	None or little; mostly in journal format.	Awareness and Started	Greater need as intensity and required inputs increase. Records used to make management decisions.	Business plans implemented and used by banks for loan qualification. Farm records assure traceability of produce on-farm and are used to make management decisions
5. Water Quality Monitoring & Management	None	None; Limited flushing for control	Awareness but no equipment	Water Quality Monitoring & Management increases requiring increased access to equipment	Widespread use of water quality monitoring for intensive farm management and environmental/marketing requirements.
6. Understanding of Holding & Transport Live Fish	None	None to poor	Awareness but no equipment	Increased need for holding and transporting fingerlings and foodfish; Introduction of specialized methods and equipment	Specialized private-sector services for harvesting, transporting and live holding for markets
7. Fish Farm Production Management Plans	None	None to Limited	Awareness	Limited numbers of technical packages available for farmers for field implementation and testing	Widespread use of field-proven technical packets with development of additional systems/species by academia/government
8. Fish Health Management	None; disease outbreaks limited or not recognized	None; disease outbreaks limited or not recognized	Awareness due to increased outbreaks, but limited planning	Limited development of support services and limited understanding of management relationship to disease occurrence	Widespread use and private and public service providers available for on-farm management advising plus developed disease diagnostic services
9. Quality Training in Aquaculture	None	Limited training by NGOs and local government	Limited Government & Academic Delivery	Training emphasis provided in hands-on, commercial-scale production by NGO/academia	Level of training increases to strengthen technical knowledge and provided by academia and on-farm experience
10. Availability of Trained Farm Staff	None	None	Very limited; mostly theoretical training	Increasing in number and quality but still limited	Widely available with practical knowledge & highly competitive (i.e., higher pay)
11. Quality Advisory Services	None	Limited Extension Services by Government	Limited Extension Services (i.e., NAADS), but no certification of qualifications	Quality increasing but still mostly farm based support (farmer to farmer transfer)	Network of Service Providers with certification
12. Equipment & Suppliers/ Tech Support Capacity	None	None	Self-served by farmers or NGO-driven	Very few with some farmer cooperatives forming to facilitate purchasing	Network of Suppliers with technical back-stopping
13. AQ Regulations & Laws	None or Limited	None or Limited	Developing but often conflicting	Understood need to develop and harmonize	Need to facilitate industry development but set reasonable limits
14. Markets	Mostly household consumption	Mostly household use and pond bank sales	Local sales	Local sales (retail) with expanding wholesale market	Range in retail and wholesale markets with regional distributors and exporters

**Priorities for the second complete year of the F.I.S.H. project (Oct 2006-Sep 2007 as defined in the work plan)**

1. Continue to work with feed manufacturers to produce quality sinking pellets and begin production of floating feeds.
2. Improve record-keeping on fish farms and use actual field data to improve management and evaluate economic viability.
3. Improve farmer's capacity to train other farmers at their demonstration sites.
4. Conduct training at demonstration sites for more farmers and for prospective farm managers, including 3-day sessions for farmers from districts outside of the project districts.
5. Launch Strategic Activities Fund (with special effort to fund feeds development and improve quality of advisory services)
6. Improve quality of data used in monitoring and evaluation.

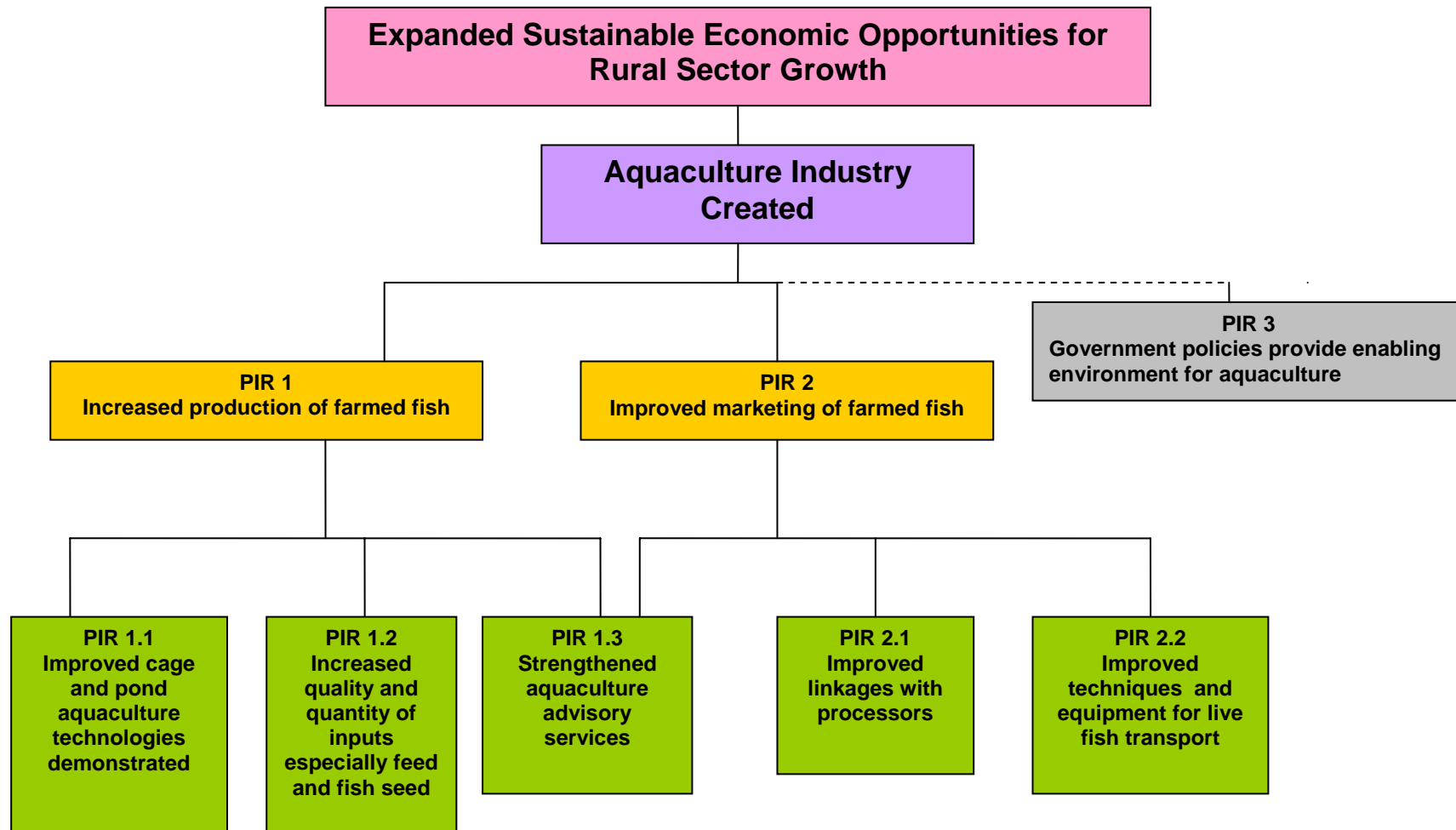
Progress was made on all of the listed priority actions but many will remain priorities for the coming year. As regards training, the foreseen 3-day sessions took place somewhat differently as planned, and included a 3-week session held for FTI students and one 3-day such session on harvesting, sexing and handling held at SON farm in Jinja. Follow-up of demonstration farmers took up most staff time and left little for large training programs. Still, one demo farmer, Mr. Ssebinyansi was able to take on 3 youths from an orphanage to train in fish farming, and another group from Western Uganda.

There is still a backlog of training requests that needs to be addressed. It is impossible for the staff of the FISH project to train all interested farmers in Uganda. However, the demo farmers are not fully up to the task nor are the present extension services.

Marketing issues again took low priority because production was not yet sufficient to sustain a steady market. There are indeed isolated marketing problems but these mostly stem from lack of steady supply which requires farmers to redevelop the market each time they harvest.

The remainder of this report covers the different intermediate results in each of the sections of the FISH project Results Framework as summarized in Figure 1.

Figure 1: FISH Results Framework



## **STRATEGIC OBJECTIVE 7: Expanded Sustainable Economic Opportunities for Rural Sector Growth**

### **Intermediate Result 7.2: Increased Productivity**

#### **Project Intermediate Result 1: Increased production of farmed fish**

##### **Targets to attain by September 30, 2007:**

**Indicator SO7c<sup>1</sup>:** Number of new on- and off-farm jobs created as a result of FISH funded activities: **Target: 200, Actual number: 88.** This is comprised of 60 male laborers, 13 skilled female and 15 skilled male employed

It has been very difficult to gather reliable information on this indicator because farmers often under-report. The jobs reported here are all on-farm as per the fish farmers' quarterly reports. However, only 19 farms report so far. The skilled laborers are usually graduates of FTI or a university and are employed as hatchery managers, or farm managers.

Peter Okisopi has been contracting to do pond construction in various districts. He employs a crew of 9 men, has his own compactors, and other construction equipment. All ponds are built by hand using simple tools. Costs ranges from 2,000 to 2,500 per square meter depending on the site and size of the pond (smaller ponds cost more per sq. meter. This does not include costs of pipes and cement but does include labor to install pipes and harvest basins. This year, he has constructed more than 20 ponds on 6 sites sizes from 50 to 1500 sq. meters. Peter was trained by the FISH project in pond construction in October 2005 and still gets advice from project staff on construction questions. He was hired by SON farm in 2006 and worked as assistant in construction, where he learned design and installation of harvest basins.

The source of anticipated jobs was to be the large farms that employ many laborers to construct ponds. There is only one large farm to date and it was required to use prison labor to build the ponds as part of the lease agreement for prison lands. The agreement has resulted in better meals for prisoners and better living quarters for guards. While 300 prisoners are "employed for the fish farm", these cannot be counted as labor by USAID standards.

**Indicator SO7d<sup>1</sup>:** Number of new commercial on- and off-farm enterprises created as result of FISH-supported activities: **Target 10 Actual number: 5**

**Kasenge Farm:** this is an abandoned fish farm that was purchased and put back into production following some renovations. The land is pitted from digging of clay to make bricks thus making it difficult to add more ponds. The owner and workers have attempted to fill in these deep depressions in the pond bottoms to facilitate harvesting. They stocked the ponds in January 2007 and expect to make their first harvests in October 2007.

**Uganda Fishnet Manufacturers** now makes cages and commercial fish farm seines. They did not employ more workers for this but the new business allows them to keep from laying off workers.

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<sup>1</sup> It has been determined that SO7a, SO7b, and other SO indicators are not appropriate for this cooperative agreement.

**Nakasozi Fish Farm** was created in Mpigi District, owned by Janet Mutagamba. Total surface area of ponds is 4,200 square meters.

**Namuyenge Fish Farm** has added a catfish hatchery and has begun production.

**Nuvita feed mill** has begun making formulated fish feed: both powder for fry and pellets.

**Indicator 1a:** Metric tons of farmed fish produced annually: Target :**150 Actual: 11.8 tons reported sales of food-size fish (not fingerlings).**

The project was only able to record 11.8 tons of **fish sales** in total because only 19 farms reported and most of them did not have any sales. In fact, these sales stem from less than a dozen farms. The project does not have sufficient staff to collect data from farms other than demo farms and the government does not collect production data. However, using a feed conversion ratio of 2.2, the 196 tons of locally made feed would result in 89 tons of fish produced and the 24 tons of floating feed brought in by the project at feed conversion 1.7 would result in an additional 14 tons of fish production. This would make 103 tons of fish produced, which is still below target.

**Indicator 1b:** Number of farms producing  $\geq 5000$  kg/ha/yr: Target: **7 Actual: 7**

The level of farm management indicates that there are certainly more than 7 farms on their way to reaching this level, but the staff waits for pond draining to verify the actual pond productivity. Farmers who follow the FISH project's production recommendations are obtaining 12,000 to 20,000 kg/ha/yr for catfish production and 5,000 to 9,000 kg/ha/yr for tilapia production.

**Indicator 1c:** Increase in total water surface area used for commercial fish farming: **ha 40 (changed from 20 in earlier PMP) Actual: 29**

The increase in total water surface area was mainly due to cages being placed in Lake Victoria. Every 5 cubic meters of cage volume is estimated to require 1 ha of water, based upon maximum allowable feed for best management practices of cage culture. The project is NOT encouraging the construction of new ponds because there is a lack of qualified advisors in pond construction and planning. The increases have come from existing farms that were previously subsistence and who have "gone commercial", plus a few new constructions, especially at SON farm near Jinja where the farm continues to slowly expand.

It would have been better to leave the target at 20 ha.

### **Intermediate Result 7.2.2: Access by Producers to Improved Production technologies and Practices Increased**

#### **Project Intermediate Result 1.1: Improved cage and pond aquaculture technologies demonstrated.**

The FISH project is based on farmer to farmer technology transfer. The demonstrations planned for the project were to serve as "applied research" trials and produce some of the most useful information on feed-based aquaculture in Uganda and Africa. As the core of the project, demonstrations impact on almost all fundamental objectives and higher targets of the program. Demonstrations were meant to:

- a) *Provide verifiable case information supporting aquaculture training (e.g., seminars and short courses) of extension technicians and others. The farms are used frequently as sites for conducting training.* Only 2 demo farms have not been used for training programs because the overall farm is not managed well and would show a rather bad example of how to do fish culture.
- b) *Provide verifiable facts for promoting feeds and feed-based technologies to farmers and technicians.* This has started but needs to be continued throughout the project life.
- c) *cause direct farmer-to-farmer diffusion of technologies.* The farmers complain about too many visitors. Some have begun charging for visits and others have begun setting up appointed days. This is a normal and healthy development. The commercial farmer knows that time is money. The hatcheries do most of the advising because they see it as a way of promoting their product and successful customers will return to the same hatchery.
- d) *serve as the primary source of extension literature.* The lessons learned by interacting with the farmers and their staff allow the project to anticipate problem areas in communication of technical guidelines. The forms used by the project are available at the demo farms and are often multiplied by farmers for their own use.
- e) *provide a strong base of cooperation within and between the project and provincial and local institutions and agencies.* FISH project has recently have been coordinating with NAFIRRI Kajjansi to develop guidelines for catfish production using formulated feeds. Management recommendations will be published under NAFIRRI's heading.
- f) *help promote project visibility and professional credibility among the aquaculture sector and government.* Project visibility has increased, especially after the fish farmers meeting in April 2007. However, this has resulted in frequent criticism of the project's small zone of operations.

#### **Targets to attain by September 30, 2007:**

**Indicator 1.1a:** Number of tilapia and clarias production systems demonstrated: Target **6**  
**Actual: 5**

The following production systems have been demonstrated and provided results that are used to generate management recommendations:

1. **Pond production of clarias using formulated feed:** at Uganda Fish Packers, Samarieza Farm, and Naluvule Farm.
2. **Pond production of tilapia using formulated feeds:** Uganda Fish Packers, Namuyenje Fish Farm and Nansana Fish Farm. Nansana Farm lacked oversight by the owner, the staff began stealing the feed and records were incomplete on fish feeding and production. The project withdrew the intern from the site, and ceased providing feed. Initial growth data are available but no data on feed conversion or total pond production were obtained.
3. **Tilapia fingerling production using happas in ponds:** Mpigi Fish Farm, SoN fish Farm.
4. **Clarias fingerling production using various levels of intensity:** Sunfish Farm, Umoja fish farm, Mpigi Fish Farm, MuSO4 Fish Farm.
5. **Production of tilapia in cages:** SoN Fish Farm, Namuyenje Fish Farm, Blessed Investments, Industrial Inputs (Garuga) and Uganda Fish Packers.

**Indicator 1.1b:** Number of farms demonstrating model systems: Target: **10** Actual: **12**

The current demonstration sites are listed below. No new demonstration sites are planned for 2007 because the current number is already more than what project staff can adequately advise. The Memoranda of Understanding will be reviewed for each farm and conditions for cancelling a

demo site will be strictly adhered to. Some of the sites have only just begun and their performance in terms of management, record-keeping and information-sharing is yet to be evaluated. Demonstration farmers that are not able to keep records and those who did not get started by September 2006 will be dropped from the demo farmer program. There is still a need for further testing of tilapia production, especially using Ugachick feeds so some trial farms will be added in the coming year.

Large farms (>5ha water surface area) receiving advice from FISH staff will be used as additional demonstration sites as the need and opportunity arises. Two farms (SoN and Ekitaangala) have already served as training sites for the FISH project.

<b>Name of Farm (farms denoted with * are best sites for improved pond construction)</b>	<b>Location</b>	<b>Types of technology</b>
Samarieza Mixed Farm, Mary Zaramba	Mukono	Catfish grow-out. This farm will have to be withdrawn due to lack of oversight by owner and lack of qualified workers on the farm. Owner has been notified.
Umoja Mixed Farm, Jocelyn Rugunda	Wakiso	Catfish hatchery (low-cost and moveable hatchery tanks, aeration, grading, belt feeder)
Nansana John Rucogoza	Wakiso	Tilapia grow-out (first trial is with monosex tilapia). Began harvesting demo pond in December 2007 but the owner failed to keep records and was removed from demo list.
*Mpigi Fish Farm and Water supply, Paul Ssebinyansi	Mpigi	Tilapia fingerling production and low technology catfish hatchery.
Namuyenje Farm Eng. Wada	Mukono	Tilapia grow-out (in cage in reservoir and in ponds)
Naluvule Farm Kibirige	Wakiso	Catfish grow-out; to begin harvesting in October 2007.
Blessed Investments Eng. Alex	Mityana	Tilapia grow-out using cage in reservoir. Harvest in late 07.
*4F's Musomerwa	Iganga	Catfish hatchery (pond-based) and tilapia fingerling production
Sun Fish Farm Ltd. Digo	Wakiso	Catfish hatchery under greenhouse with aeration and water reuse. Grading and belt feeders.
*Uganda Fish Packers	Jinja	Pond culture tilapia; catfish in ponds, cages with tilapia one cage with catfish; completed trials May 07
Ekitangaala Farm	Nakasongola	Pond culture of tilapia. Training is done here but it is not considered a demonstration farm and does not receive frequent visits from project staff.
S.O.N. Fish Farm Ltd	Mukono	Pond culture of tilapia; tilapia fry production in happas; cage trials
*Industrial Inputs, P. Borel	Wakiso	Cage trials and some catfish fingerling production in ponds

Results of all demonstrations were to be evaluated in an annual one-day workshop. The workshop scheduled for 2006 was not held due to the late start-up of most of the demonstration farms. However, this year the workshop was held on April 26, 2007. Demonstration results were presented to the workshop by the farmer or farm manager. A summary of the workshop is included in Annex 1.

#### **Planned Activities for cage culture demonstration sites:**

1. Set up more organized testing of treatments at sites: feeding frequency, stocking density male vs female growth and sinking vs floating feed may be tested. [SON fish Farm is used as the new site. First trial was started in June.](#)
2. Begin feed testing at Garuga site and on two demonstration farms. (Dec.06). [The cage trial did not begin until March 2007 and was terminated in September 2007. This was the MS thesis research of David Patrick Kadobera.](#)
3. Invite authorities and farmers' representatives to harvest of fish from cages in Jinja. (Nov and Dec 06) [Done in Dec 06 and Jan 07](#)
4. Hold training programs on cage-making and techniques for growing fish in cages. [Trained the net manufacturing company on cage making; seminar for policy makers on cage fish farming was held on 13 March 2007](#)
5. Start one group of fishers on cage culture ONLY AFTER A PROPOSAL FOR FEED MILL HAS BEEN FINALIZED. [Several candidate groups have presented themselves to begin cage culture but the feed mill equipment has not yet been purchased and locally available sinking feed proved to be uneconomical partly because the feed quality and partly because the people feeding the fish could not determine when feeding ceased and tended to overfeed.](#)

**Indicator 1.1.c:** Number of producers using improved production technologies: **40** (revised from 20 listed in earlier version of PMP) **Actual: 19**

As the farmers adopt technologies on the rest of their farm (not just the demonstration pond) the project will document the adoption. The types of improved technology that are being tracked are:

- Improved pond construction
- Use of formulated feeds and associated record-keeping
- Production plan
- Pond records (and associated pond inventory report)
- Use of aeration (where appropriate)
- Water quality measures and records
- Health management plan

Other farmers who visit the demonstration farms have begun adopting these technologies as well. However, documenting the adoption requires additional manpower which the project does not have. Therefore only known adopters are recorded. Adopters who have implemented the first 4 improvements listed are reported in Indicator 1.1.c. The fish farm sales and inventory reports are one means used to verify the adopting farmers.

#### **Project Intermediate Result 1.2: Increased quality and quantity of inputs especially feed and fish seed**

## FEEDS

**Strategy: *Import one more shipment of floating feeds for the tilapia trials and source floating feeds locally or regionally if possible.***

A final shipment of floating feed was ordered at the end of this fiscal year but is not expected to be delivered until November 2007.

There are three types of feed that can be used by fish farmers in Uganda:

**1. Steam-extruded floating pellets** are currently not made in Eastern Africa and the machinery to do this is expensive. Two meetings were held to assemble potential investors in a fish feed mill. At each of these meetings, prospective feed usage was tabulated for the near future to provide some kind of assurance that an extruder would be a wise investment. A proposal was submitted to the Netherlands government-funded PSOM program for a joint venture investment in extruder equipment. The joint venture would be between a Dutch company, ALMEX and Nuvita, a feed mill in Jinja.

### **2. Formulated sinking pellets**

Two feed mills produce sinking pellets for fish: Ugachick, and Nuvita. Production and sales continue to grow. Before the project, Ugachick produced less than 1 ton of feed in 2006, it sold about 50 tons and in 2007 sales raised to almost 200 tons. Nuvita began producing for SON farm, based on their formulation and specifications, but encountered problems with its pelletizer so ceased production of pellets in September 2007. Both feed mills have had problems with their equipment, especially spoiling of the small 3 mm dies. Part of the source of the problem seems to be contaminants such as stones and nails in the feed ingredients that somehow get past the magnets and screens and inexperienced staff at the feed mills.

### **3. Larval diets for catfish hatcheries**

The supplier of catfish weaner and fry diet is RMC feed company in Israel, who ships to Balton Uganda who then re-packages into smaller bags for re-sale. The company has recently discovered that 1 kg bags of weaner diet allow the farmer to try the feed without having to pay for a very large amount. This in turn results in more farmers trying the feed, many of whom decide to purchase larger amounts for their hatcheries, once they see the results. The record-keeping trainings that FISH held for hatcheries has helped the farmers make informed decisions regarding use of imported larval diets. There are about 10 hatcheries that purchase feed from Balton Uganda. Total amount imported from RMC Israel so far is 12 tons.

Local production of catfish weaner diets is not foreseen for Uganda at this time.

### **Planned Activities:**

1. Make contacts with large farms to document their anticipated purchase of feeds for FY 07 and FY08. By the end of Dec. 06, this listing should be fairly complete and will be updated as farms come into production or expand or contract. [Done \(reported in minutes of feed forum\)](#)
2. Continue gathering data on quality, quantity and prices of feed ingredients. (all year) [Continues.](#)

3. Contact a second feed maker (Engaano), review their feed formulation for fish and suggest improvements. Dec. 06 **Done; Contacts were made but formulation was taken over by SON farm.**
4. Bring together interested feed manufacturers, fish feed users and potential sources of funding to discuss the requirements for a high quality fish feed and possible joint ventures for a fish feed mill. **Done October and December 06.**
5. As part of feeding demonstrations conducted throughout the year, farmers were
  - a) Educated on the use of feeds in commercial aquaculture
  - b) Trained in the proper storage and application of feeds
  - c) Taught standardized feeding practices for the production of tilapia and catfish.
  - d) Taught how to compare feeds so they can make informed decisions on what type of feed to use.

### **Targets to attain by 2007**

**Indicator 1.2.a:** Annual production of feed meeting quality standards:

Revision of PMP target: Annual production of quality feed

Disaggregated by feed type:

**Sinking pellets: Target: 100 tons: Actual: 196 tons**

**Floating pellets: test pellets only (less than 1 ton) Actual: zero. There has been no machinery identified in country that can do this.**

**Powdered starter diets:** no target was set. Balton Uganda has imported a total of 12 tons of larval diet.

### **SEED**

#### **Introduction**

Although fish packaging and transport methods have improved markedly since 2005, vendors (including the government station at Kajjansi) continue to sell small fry for stocking production ponds. This can result in low survival, even if the transport was carried out correctly. Farmers need to be educated on the size of fingerling to stock in production ponds and if they cannot locate fish of the right size, they should be encouraged to do an initial production as nursery.

**Strategy: *Use demonstration farms as sources of high quality fingerlings; educate farmers on what quality means***

#### **1. Certify farms that produce fingerlings that are high quality**

The demonstration farmers who work in tilapia seed production will be the source of information for other seed producers. Information generated from their farms will allow some demonstration of feasibility of the current pricing of tilapia fingerlings versus the cost of production. The main problem with tilapia seed quality is unknown age and parentage as well as lack of pre-transport conditioning. The former can be solved by improved record-keeping coupled with exchanges of brood stock and other advice based on the farmer's records. The latter can be remedied through demonstrations of inexpensive holding tanks and use of oxygen measurements to show farmers when fish are in a state of low-oxygen stress.

The project has worked with commercial seed producers to promote improved quality of seed that they sell. A recommended size of fingerling to stock into a production pond will also be provided in the training manual. In return, the vendor of the improved seed will be named on a list of recommended tilapia and catfish seed suppliers. A list of certification requirements will be made. After one year of certifying, the project will hand over the process to the fish farmers' association.

## **2. Improve fingerling transport methods**

The project will continue to work with private fingerling producers to demonstrate proper fingerling handling and transport methods. Three transport tanks are available at the project offices for loan to farmers wishing to transport fish in tanks with compressed oxygen. Otherwise, seed suppliers will have plastic bags and oxygen available for smaller quantities of fingerlings and fry. Only those farms (private and government) that practice correct fingerling handling and packaging will be listed on the project's recommended seed supplier list. The fingerling transport problem will probably not exist after this year in project zones.

### **Planned Activities:**

1. Distribute guidelines for quality fingerling producers. Avail record sheets and all training needed for interested fingerling producers to become "certified". **Done**
2. Make certification visits to interested farms. **Done**
3. Publish announcement in paper describing what quality means and names of farms that have completed the certification requirements. **Delayed because this may upset government authorities who should be doing this themselves. It was decided to work through a fish farmers group and let them approve the suppliers to their farmers.**
4. Workshops on fingerling handling and transport: **Done, one workshop on harvesting/handling in Nov 2006 (30 participants) and one on use of oxygen for fish transport in January 2007; (39 participants).**

### **Targets**

**Indicator 1.2.b:** Number of hatcheries producing fingerlings meeting quality standards: **Target: 12 Actual: 6 tilapia producers and 8 catfish producers but some of hatcheries produce both. Total is 9 different hatcheries.**

**Indicator 1.2.c:** Number of standard-meeting fingerlings produced: **Target: 1,000,000 revised from 500,000.** This number would include baitfish.

**Actual: 1.6 million catfish for a total value of 247.6 million US\$ and 223,000 tilapia sold at total 12.2 million US\$.**

## **Intermediate Result 7.4.2: Agricultural Training becomes more demand driven and private-sector oriented**

### **Project Intermediate Result 1.3: Strengthened aquaculture advisory services**

#### **Introduction**

In an effort to privatize the extension service, the NAADS has implemented a program whereby districts select the services they need and NAADS contracts private extension agents to provide advisory services in a cost-sharing arrangement with the private producers. Only four aquaculture advisors were contracted this way previously and now none are contracted by NAADS. Fisheries

Officers based in the districts are expected to serve as extension advisors but they are not under NAADS. Fisheries Officers working under local governments possess varying levels of skill and understanding of aquaculture principles, but it can be stated that none of the government extension staff has direct experience in commercial-scale, intensive aquaculture. Some interested investors seek assistance from FIRRI staff at Kajjansi and Jinja. Given that Kajjansi station has not yet produced a ton of market-sized fish in a year, and its ponds are not up to construction standards, the reliability of recommendations emanating from this station should be questioned. Therefore, if any government staff or newly initiated private service providers are expected to be useful to the development of the commercial aquaculture industry, they will need additional training in the form of first-hand experience on commercial farms.

A source of trained farm managers and laborers is required for the aquaculture sector to develop. The project intends to facilitate the training of managers and laborers by using the demonstration farms and by holding short, one-day subject-specific workshops.

Further efforts were made to provide the Fisheries Training Institute and Makerere University instructors with field experience and contacts so they can update their own skills and provide on-farm experiences for their students.

***Strategy: Increase training of prospective fish farm managers; inform clients what it takes to be a qualified advisor***

Due to the overwhelming demand for personnel trained by the project, an attempt has been made to better target training efforts. The project cannot increase its training effort without increasing its staffing level. Recent graduates of FTI and Makerere are the most likely to benefit from the sort of hands-on training the project staff provides. The FISH project can help prospective farmers locate a qualified advisor by providing information on those individuals that have attended the training workshops and field days at demonstration farms.

The Fisheries Training Institute at Entebbe is a potential source of trained personnel that commercial fish farmers can employ. However, the training curriculum does not include commercial-level pond construction, pond management and hatchery management information. Graduates have almost no field experience. The project will work with FTI staff to update the curriculum and provide field training opportunities to students and staff.

### **1. Interns**

A 3-week intensive training was held for prospective interns in September and October 2006. These were selected from Fisheries Training Institute (FTI) graduates and students as well as a few graduates of Makerere University and one from Busoga University. The project paid a stipend to 10 of these interns to work on the demonstration farms for the coming year. Some of the farmers topped off the small stipend given by the project. Others who finished the intensive training were employed directly on farms.

Other farms have requested to send a worker to the project to work with staff in the field. So far, FISH has accepted one worker from Ekitangaala farm to spend about one week per month with them. All costs are paid by the farm and FISH has benefited from the efforts of this individual. He has proven to be a valuable helper in training sessions. Other recent graduates of Makerere University have been allowed to tag along with FISH staff to gain practical field experience.

### **2. Workshops on specific topics.**

Training has become a major aspect of the FISH project and the requests for training continue to increase. The staff indeed spends much of its time on training activities such as training staff at the fish farms, training students who accompany FISH staff on farm visits, and at more formal, announced training days. Auburn University STTA's have been of immense help in training as well. The training table in Annex 3 presents the various training programs held.

Training notes are distributed to all attendees and have become part of the courses taught at Makerere University and at FTI.

### **3. Friday walk-in advisory sessions**

The Friday open sessions were indeed discontinued as planned but the project continues to be contacted by interested prospective fish farmers and practicing fish farmers seeking advice. A log of visits is kept at the project's Kajjansi office. Farmers are usually referred to a particular training session that will provide the information they need.

### **4. One-on-one extension visits by project staff**

These have been kept to a minimum as only two of the large farms that were proposed have actually materialized and staff has too little time for this activity. One other planned large farm has been indefinitely delayed due to lack of floating feed.

#### **Targets:**

**Indicator 1.3a:** Number of aquaculture practitioners trained in improved production technologies: **Target: 100** this number represents new attendees. **Actual: 162**

In 2006, the total number of different individuals attending training was 400. The current total is 562, so an additional 162 different individuals have received some form of training under the FISH project.

**Indicator 1.3b:** Number of farmers receiving advice at FISH office visits at Kajjansi or Jinja: **Target: 50** (this number was expected to decrease as the demonstrations took over this obligation). These are often new or prospective farmers and there will be one or two training days dedicated to this client group. **Actual recorded farmers receiving one-on-one advising from one of the 3 technical staff at office: 54 (8 female and 46 male)**  
**Visits to our office by demonstration farmers are not recorded and they can often be frequent.**

## **Intermediate Result 7.3.3: Market Access Increased**

### **Project Intermediate Result 2: Improved marketing of farmed fish**

#### **Introduction**

The project staff members have identified markets for every demo farmer and in some cases have identified several opportunities for particular farmers in an effort to encourage them to sell their fish as they become market size.

Recently, farmers have been developing their own markets and have passed on the contacts to the project so other farmers can benefit from the information. Farmers are now beginning to realize

that if they cannot satisfy a market demand they have developed, they are better off passing that market information to another fish farmer so they can maintain the “farmed fish” market share.

The farm inventory sheets were used to link baitfish buyers with baitfish producers. However, baitfish producers did much of their own market development with very little assistance from the project.

**Strategy: *Help in marketing to give farmers confidence but do not actively seek new market outlets until the supply of farmed fish is increased. Use farm inventory sheets to track availability of fish from market.***

## **Targets**

**Indicator 2.a:** This indicator has been deleted because it is not useful. The original intention was to track fish farmers’ confidence in the various markets for their product. However, due to lack of farmed fish, it became clear that farmer confidence in markets was a minor constraint and that the project should put its efforts into helping farmers produce something before the marketing effort takes off.

The fish farm sales reports track the buyers of the farm-raised fish. For example, in this FY 2007, the majority of catfish were sold to middlemen. Tilapia sales were split between retail, middlemen and processors. The trend is going towards direct retailing where profit margins are highest.

## **Project Intermediate Result 2.1: Improved linkages with processors**

**Strategy: *Develop and maintain communications with processors so their product needs are known. Tailor production recommendations to provide what processors need. Show processors a live fish delivery system for farmed fish.***

Several processors (Greenfields, Gomba and Ngege) export small amounts of wild-caught tilapia to EU markets. World tilapia markets are very competitive and Uganda has trouble competing on the frozen fillet market due to high transport costs. The processors are able to compete on the chilled fillet market. However, the EU has not yet approved aquaculture-reared tilapia from Uganda. Regional demand for tilapia is high enough that for the next 2 years, fish farmers could sell to processors who supply local and regional markets.

Processors who were interviewed have markets for tilapia fillets of 150 g or more. This means a live weight of 600g, which is the minimum size presently desired by processors. Local and regional markets can take a smaller fish (300 to 500g) and this will be especially interesting to the smaller producers, who directly retail their produce.

Clarias catfish are not well known or desired on the Kampala market. However, recent demonstrations have shown that Ugandans are pleasantly surprised when they taste smoked clarias. Further market development is anticipated as farmers are shown the different options for processing and presentation. There is one clarias processing plant in Uganda that produces a cold-smoked product for sale in Europe and Canada, but total volume is not very high and they have

lost their permit to export. Presently, the regional markets for clarias are very strong in Southern Sudan and Congo. The FISH project's role will be to identify sources of farm-raised catfish for the processors and fish vendors who are developing the regional market and to help processors identify the various catfish products that can be offered.

#### **Planned Activities:**

- Develop and demonstrate protocols for producing tilapia of preferred size for processors. *Delayed because processors pay lowest prices.*
- Help small-scale clarias processors source catfish of the desired size for local and regional markets. *The catfish were available but the processor lost its permit so ceased buying catfish.*
- Assist processors in locating supplies of farmed fish for local and regional export, initially. *Some assistance was provided but the farmers prefer higher prices so sell retail.*

#### **Targets**

**Indicator 2.1a** Increase in amount of farmed fish used by commercial processors: **Target: 25 tons** **Actual: 2.7 tons**

The target was not met because the tilapia farmers prefer to sell retail or to local middlemen who sell retail where they get better prices. If the catfish processor had not lost their license, their need for catfish could have been met by farmed fish. The plant closure meant that catfish farmers had to develop local markets, which takes time.

#### **Project Intermediate Result 2.2 Improved techniques and equipment for live fish transport**

**Strategy:** *Demonstrate live-hauling techniques and practice these techniques through a live fish selling point in Kampala and transport of live fish to processors.*

For the farmer, getting the fish to market alive has two advantages: it draws a crowd, so free publicity, and it gives the farmer the flexibility to accept or reject the prices offered. After all, the fish is not going to spoil.

As written in last year's work plan, prior to the first offer of live fish on the market, three conditions must be met:

1. Any vending permits or other government approvals must be obtained
2. A steady supply of appropriate-size fish must be identified and programmed to provide fish at least on a weekly basis
3. Logistics must be worked out regarding holding and pick up of fish from producers' ponds.

As this reporting year closes, there are enough catfish available to sustain a live fish market in the Kampala vicinity, and some farmers now know how to harvest in an hour and get their fish on the road. The project therefore plans to make live fish marketing a major activity for the next year.

There are still very few tilapia available from farms. Besides direct retail, buyers are restaurants, grocery stores, processing plants and "bicycle vendors". So far, the demo farmers have not had a

problem selling tilapia but they sometimes elect to shop around for the highest price. Processing plants continue to seek tilapia for their own set of local clients. Most of the farm-raised tilapia sold to processors were produced in the trial cages at Uganda Fish Packers

Current prices for tilapia are being tracked for various sales venues. The range is 1500 to 3500 US\$ per kg. Breakeven price for farmers is about 1500 so, combined with the small size of the farms and therefore the small volumes; this explains why fish farmers are going for retail and restaurant outlets. They will need to harvest frequently, transport fish once or twice weekly and make several drops in large towns to get the best prices. The efforts made in training on transport and harvesting methods plus the improved harvesting gear will be of great assistance to farmers who wish to supply a weekly market.

## Targets

**Indicator 2.2a:** Increase in number of live fish “outlets”: **Target: 1 Actual: 0 (one started but was premature and could not source enough fish).**

**Indicator 2.2b:** Number of live fish transport tanks in use by farmers: **Target: 9 (6 new tanks plus 3 from the year previous) Actual: 9 but not always in use.**

Several farmers are taking their fish to market almost alive and then selling very quickly. The project will attempt to demonstrate the sale of live fish the coming year and help anybody who wishes to set up a live fish market by supplying them with advice and some equipment to help hold the fish alive.

## STRATEGIC ACTIVITIES FUND

A total of 11 proposals were invited from approved SAF concept papers. The SAF manager, James Sekatawa, guided the applicants to fulfill their obligations under the terms stated in the SAF operation manual of the project, and to fill in their application forms. Much of the work that Mr. Miller did during his two-month STTA revolved around getting the various proponents of the approved concepts to develop their proposals. The only proposal submitted so far, with accompanying application form has been from Uganda Fishnet Manufacturers. However, this proposed SAF project will not be approved until a workable SAF proposal for feed development is received. A summary of the SAF proposals in progress is presented in Table 6.

## PROJECT MONITORING AND EVALUATION

Gathering production data from farmers is often expensive and time-consuming. The Fisheries Officers working under MAAIF admit that they do not have the resources to gather data on pond production so they rely on an estimate based on perceived total surface area of ponds and an assumed productive capacity that is 10 times higher than what has been observed in the field. More than 50% of existing ponds are not stocked in some districts, so should really not even be attributed with the hypothetical production level. It is therefore extremely difficult and highly misleading for a project to use MAAIF fish farming statistics for any type of planning and evaluation.

Several improvements in the FISH project's monitoring and evaluation have been made. The fish farmers' quarterly inventory and sales reports give much of the data used in this annual report. The fact that farmers can even report inventory indicates they have been keeping records (something which was rare at the beginning of the FISH project). Additionally, the training database, based on the sign-in sheets from the training sessions has been a way to track interest in commercial fish farming. Whereas the FISH project is supposed to work mostly in Wakiso and Mukono, farmers from more than 25 different districts have attended training programs.

Currently, only verifiable data are reported and therefore many impacts of the project go unreported. For example, in order to document adoption of technology by farmers other than demonstration farmers, a huge number of farm visits are required throughout the country. A project technical staff of 3 does not allow for such visits.

Although more than 400 individuals have attended at least one training session, the impact of these trainings is difficult to gauge on the long term. Even if a person learns something new, the actual application of the knowledge will have to be verified.

**One of the best indicators, however, and the easiest to track is the sale of fish feed. In one year, the production and sale of fish feed has quadrupled.**

### Other Partners

Makerere University

Four students are involved in carrying out studies for the project as part of their course work. The students involved and their subject matter is presented below.

Student Name	Subject of Research	Status of Work
1. Mr. Idi Muzige	Fisher's Issues in Jinji	Data collection completed and on 3 <sup>rd</sup> draft of thesis
2. Mr. David Patrick Kadobera	Fish Feeding: Feeding fish in cages at Garuga using 2 types of feeds: local and imported; floating versus sinking	Fish fed the floating feed obtained a FCR of 1.78 while those fed the sinking pellets obtained an FCR of 2.59 at 3 months from stocking. Field work continues and the next sample is planned for 15 July
3. Mr. Moses Mwesigwa	Economic Analysis and Marketing of Fish products. Data was collected from fish farms, fishermen, etc..	Field work has progressed and data have been presented to COP
4. Mr. Andrew Tamale, DVM	Factors affecting fish health in hatcheries	Field data collection and demonstrations on farms regarding fish health issues; training. Data have been presented to the COP.

Students are supposed to be spending five days a week in the field. Increased supervision of these students is needed from their professors but will most likely need to come from project staff.

During his annual visit, Dr Davis spent considerable time helping the feeds analysis lab at the Vet School of Makerere improve the procedures used for proximate analyses of feeds.

**FISH Steering Committee Meeting held on 20 June 2007.**

This 4<sup>th</sup> FISH Steering Committee Meeting was held in the ARDC Conference Room at Kajjansi and had 22 participants. The meeting covered a wide range of issues and included a call for more frequent meetings since it had been about a year since the last meeting. Comprehensive minutes of this meeting have been completed and widely circulated.

The 5<sup>th</sup> Steering committee meeting was held on ...

## **OTHER SO7 PROJECT LINKAGES**

**PRIME WEST** -assisted fish farmers have begun to attend FISH project training programs.

**APEP** has been very helpful to the FISH project by sharing information on Special Activities Fund procedures and by helping to link buyers of fish feed ingredients (soy and sunflower) with producers and suppliers.

### **Other donor-funded projects**

The project has ongoing informal collaborations with CDE, NORAD, DANIDA, and CIRAD. These amount to technical advising on fish farming interventions, and making linkages with fish farmers and government officials concerned with fish farming.

### **Short-Term Technical Assistance (STTA)**

As part of the cooperative agreement, salary of Auburn-based STTA are provided as cost sharing. A daily rate was paid to Dr Schmittou, who is no longer an Auburn University employee. He agreed to provide services at a “friendly rate” of only 200USD per day. A second non-Auburn staff was brought in to fill in for Chief of Party who took leave, and once again a reduced rate was negotiated. Cost savings on lodging were realized with the renovation of the guest house at Kajjansi, which allowed for substantial savings on hotel.

A Ugandan Technical Assistant, David Kahwa was hired for some short-term work on the demonstration farms. His work with the project was shared with teaching duties at Makerere University School of Veterinary Medicine. The experience he gained working with project farmers has allowed him to incorporate a great amount of practical examples in his teaching and he has used the contacts made to provide field experience for students.

The following short-term technical assistance sourced through Auburn University was provided this year:

December 2006: Dr Allen Davis for 2 weeks to conduct seminars on feeds and feed management; consult with feed makers, provide advice on feed formulation and advise on quality control for the feeds analysis lab at the Veterinary School of Makerere University.

January 2007: Dr Bill Daniels for 2 weeks to help revise and improve the PMP; follow up on agreements with NAFIRRI and Makerere, give seminar on aquaculture management. He was accompanied by 2 more Auburn staff: Department Head, Dr David Rouse and IT specialist, Troy Hahn. All travel and allowances were paid with Auburn’s funds for these two individuals; not project funds.

March 2007: Dr. R. Schmittou: review cage culture results, work out materials and methods for LVHD cage trials; assess ongoing project strategy, evaluate project progress, conduct trainings on extension methods and on LVHD cage culture. Meet with government officials concerned with regulation of cage culture.

May 2007: Dr Jeff Terhune for 2 weeks to advise on fish health management, go over health management plans for demonstration farmers, review disease incidence reports and train workers from the Dept. of Animal Health and Makerere Veterinary Medicine in fish disease diagnostics.

June-August 2007: James Miller to fill in for the COP and provide technical backstopping and reporting assistance to project staff. He also helped organize steering committee meetings and increased awareness of project activities with other donors. He made a great effort to summarize project outputs.

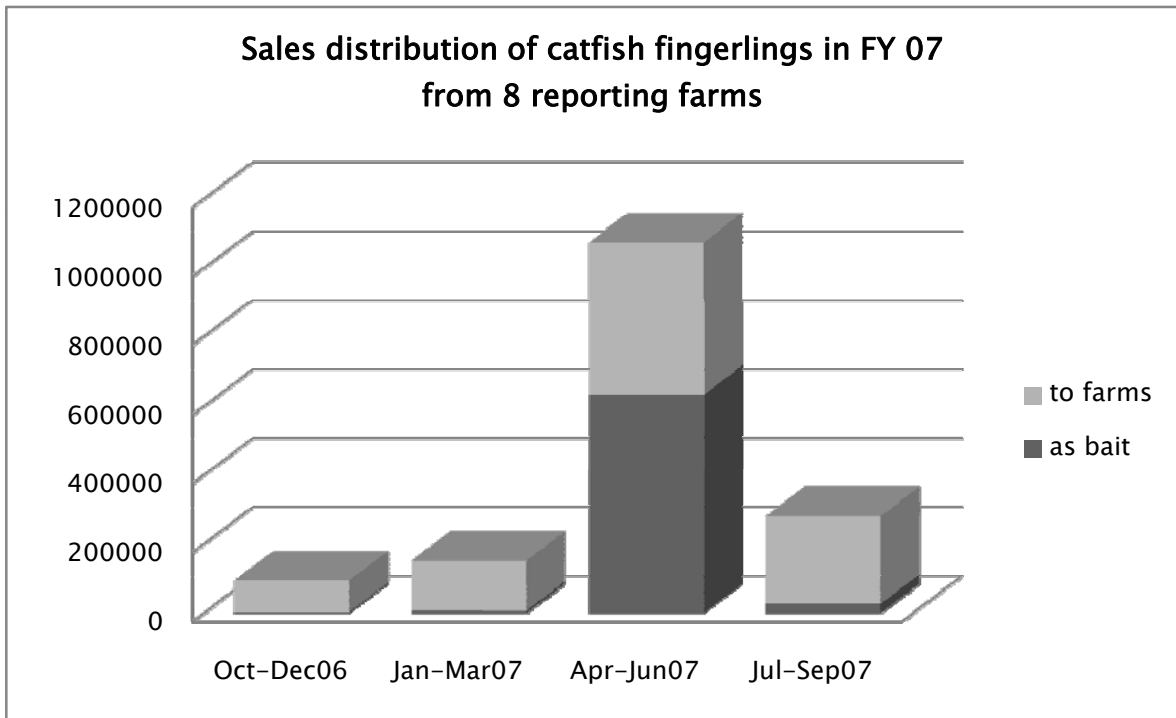
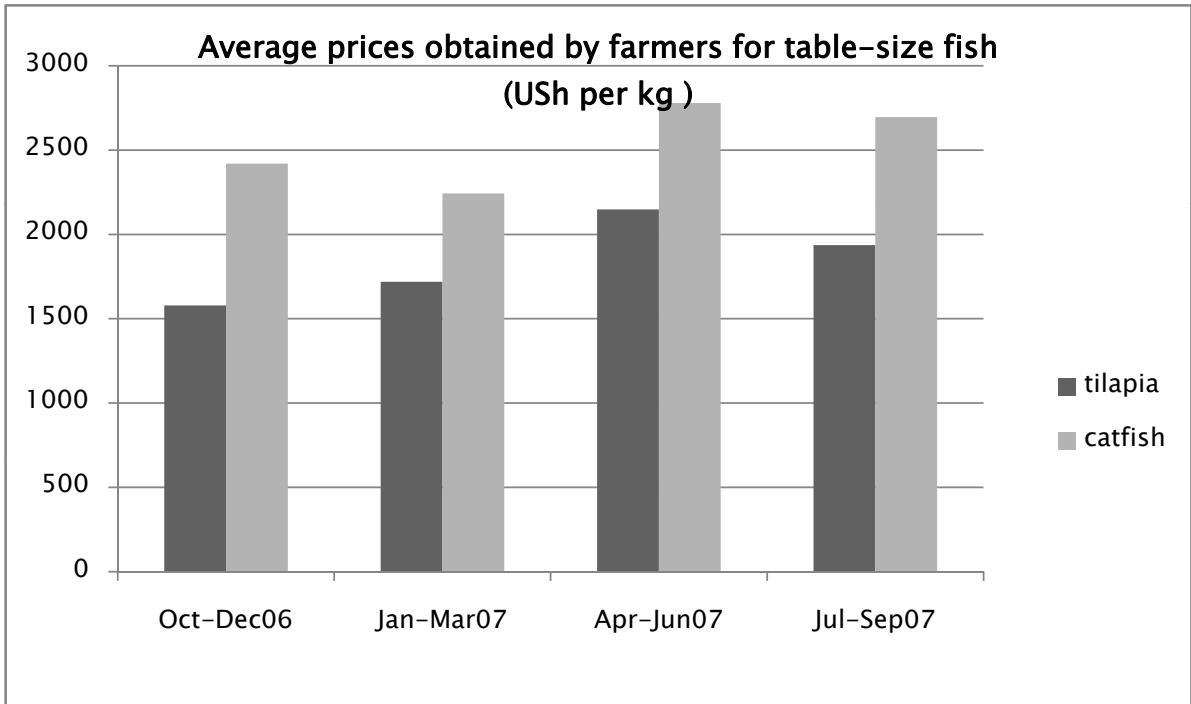
**COMMERCIAL FISH FARM SALES REPORT**  
**1 Oct 2006-30 Sep 2007**

Number of farms reporting sales:

Catfish hatchery: 8  
 Catfish table-size: 11  
 Tilapia hatchery: 6  
 Tilapia table-size: 9

PERIOD	(All)
FARM	(All)

TYPE	SIZE 1	SIZE 2	Number (Qty)	Weight (Kgs)	Total Price per Head	Total Price @ Kgs	Average price for Period @ Head	Average price for Period @ Kg	% sold as Bait Fish	% sold to other farmers	% Sold Retail	% Sold to Middlemen	% Sold to Processors
CATFISH	Grow-Out	Broodstock		661		1,679,760		2540	0	91	9	0	0
		Submarket		99		172,440		1742	0	0	15	85	0
		Table Size		4,015		9,981,083		2486	0	0	18	76	6
	<b>Grow-Out Total</b>				<b>4,775</b>		<b>11,833,283</b>		<b>0</b>	<b>13</b>	<b>17</b>	<b>66</b>	<b>5</b>
	Hatchery	SM Fingerling 7-10cm	491,764		85,164,680		173		5	95	0	0	0
		MD Fingerling 10-12cm	166,615		29,243,975		176		18	82	0	0	0
		LG Fingerling 12-15cm	721,839		122,157,930		169		86	13	0	0	0
		XLG Fingerling >15cm	10,279		2,890,040		281		40	60	0	0	0
		Fry <7cm	227,750		8,181,000		36		0	100	0	0	0
	<b>Hatchery Total</b>			<b>1,618,247</b>		<b>247,637,625</b>			<b>42</b>	<b>58</b>	<b>0</b>	<b>0</b>	<b>0</b>
TILAPIA	Grow-Out	Broodstock		109		436,496		4019	0	95	5	0	0
		Submarket		1,862		4,939,798		2654	0	0	66	28	6
		Table Size		4,584		7,796,608		1701	0	0	24	20	56
	<b>Grow-Out Total</b>				<b>6,555</b>		<b>13,172,901</b>		<b>0</b>	<b>2</b>	<b>35</b>	<b>22</b>	<b>41</b>
	Hatchery	Fry 1g or less	13,000		325,000		25		0	100	0	0	0
		SM Fingerling 1-5g	139,379		7,102,250		51		0	100	0	0	0
		Fingerling 5-20g	53,200		2,946,350		55		0	100	0	0	0
		Stocker 20-100g	18,180		1,821,000		100		0	100	0	0	0
	<b>Hatchery Total</b>			<b>223,759</b>		<b>12,194,600</b>				<b>100</b>	<b>0</b>	<b>0</b>	<b>0</b>



**Farmer Training: 1 Oct 2006-30 Sep 2007**

Date	Training title	Objective	Location of training	Number Trained			Duration (days)	Resource Persons
				Male	Female	Total		
23 & 24 Nov-06	Seine Making	Mounting of seine material to float and lead lines at proper hanging ratio; installation of a bag; mudline and seining techniques	ARDC Kajjansi	52	14	66	2	Veverica, Asimwe
30th-Nov/ 1st Dec-06	Seining, Handling, Harvesting	Seining techniques, fish handling and transfer , use of harvest basin; pond records	S.O.N	24	6	30	2	Veverica
7-Dec-06	Fish Nutrition & Feed Management	Principles of fish nutrition; qualities of fish feed; fish feeding techniques.	FIRRI, Jinja	42	9	51	1	Dr. Davis
12-Dec-06	Fish Nutrition & Feeding	Principles of fish nutrition; qualities of fish feed; fish feeding techniques.	ARDC Kajjansi	24	19	43	1	Dr. Davis
10-Jan-07	Oxygen & Transport Training	Safety and use of compressed oxygen in fish transport. How to use oxygen regulators and flow meters. Correct handling before and after transport.	Garuga, Entebbe (IIL fish farm)	25	14	39	1	Veverica
22-Feb-07	Fish Feeding & Carrying Capacity	To explain carrying capacity and show why it is the basis for stocking density and feeding recommendations. How to get the most out of your feed. Field demonstration on feeding techniques.	Nafirri, Jinja and SON farm	20	7	27	1	Veverica, Isyagi
7-Mar-07	Fish Feeding & Carrying Capacity	To explain carrying capacity and show why it is the basis for stocking density and feeding recommendations. How to get the most out of your feed. Field demonstration on feeding techniques.	NAFIRRI, Kajjansi and Kasenge Fish Farm, Sseguku	31	15	46	1	Isyagi
13-Mar-07	Cage Culture	How cage culture is practiced in other countries. The basis for cage design and management. Results from cage culture trials in Uganda.	NAFIRRI, Jinja, and Uganda Fish Packers cage site	35	9	44	1	Schmittou, Veverica, Asimwe
23-Mar-07	Pond Rehabilitation	Session held at pond side where renovations were about to take place. Staking out dike limits, how to displace soil effectively, pond design criteria	Blessed Investments Fish Farm	3	1	4	1	Isyagi
13th/14th April, 10th/17th May 07	Cage and seine making	Held exclusively for employees of Uganda Fishnet Manufacturers at their factory. Trained a team of workers to make cages and commercial fish farm seines so the UFM can sell the ready-made products.	UFM premises, Kampala	1	6	7	4	Asimwe, Veverica
4-May-07	Overview of Nigerian Aquaculture	FISH staff took advantage of a visit by Jim Miller who was visiting from Sudan to have him give a presentation on aquaculture in Nigeria where he worked thru FAO.	NAFIRRI, Kajjansi	19	8	27	1	Miller
19-May-07	Field techniques for fish health management	Show in a real hatchery: sample collection , visual signs of disease, review of records to ascertain causative factors	Umoja Farm	31	6	37	1	Terhune, Isyagi
21-May-07	Fish Health practical	Lab session held to introduce clinical methods in fish disease diagnostics and sample collection to students, technicians, lecturers, hatchery managers and FISH interns	Faculty of Vet. Med., Makerere Univ.	31	4	35	1	Terhune, Walakira, Kahwa, Isyagi
23-May-07	Fish Health Management & Plan Development	Field and lab work conducted at SON Farm, for staff and visiting students.	SON Fish Farm	5	5	10	1	Terhune, Isyagi, Walkira
24-May-07	Vaccination & Pathogenesis Management of Fish Diseases	Advances in vaccination of fish and disease control methods in aquaculture	Faculty of Vet. Med., Makerere Univ.	47	10	57	1	Terhune
14-Jun-07	Fish Smoking using a chokor smoker	Training done by request for farmers who wanted to begin smoking catfish for local retail sales	NAFIRRI, Kajjansi	4	0	4	1	Asimwe
20-Jun-07	Engineering Aspects of fish Hatcheries	Parameters for designing catfish hatcheries held for AETRIC and lecturers and private sector suppliers	Nelly's Home	5	3	8	1	Isyagi, Miller
23-Jul-07	Chokor smoker construction	Construction of a chokor smoker with multiple tiers	Kasenge Fish Farm	4	2	6	1	Asimwe, Miller
28-Aug-07	Fish Grading & Feeding	Held for student interns from Makerere University at Kajjansi station	NAFIRRI, Kajjansi	4	0	4	1	Asimwe
24-Sep-07	Interpretation and use of Feed Records	For fish farmers and interns: analysis and interpretation of pond and feed records; trouble shooting and means of improving FCR	Kasenge Fish Farm	18	8	26	1	Isyagi
<b>TOTAL</b>				<b>425</b>	<b>146</b>	<b>688</b>	<b>person-days</b>	

### Consultative workshops

Date	Workshop Description	Objective	Location of workshop	Number Attending			Duration (days)	Resource Persons
				Male	Female	Total		
25-Oct-06	Fish Feed Makers Meeting	Plans for feed manufacture and possibilities for farmer-owned feed mill	ARDC Kajjansi	13	3	16	1	Veverica
14-Dec-06	Fish Feed Makers Meeting	Recent developments in extruded feed mill investment. Summarize total feed demand next year	USAID APEP Boardroom	8	3	11	1	Dr. Davis, Veverica
19-Mar-07	Cage Culture seminar and consultative workshop	Basis for cage design and management. Results from cage culture trials in Uganda; Discussions with government authorities on needs of investors regarding policy on cage culture.	Fisheries Training Institute, Entebbe	10	3	13	1	Schmittou, Veverica
26-Apr-07	Fish Farmers Symposium	Presentations from government agencies and suppliers on permits required & sources of inputs. Presentations from demonstration farmers on lessons learned and current production results. Many questions form audience.	UMA Conference Centre	165	50	215	1	Commissioner for Fisheries FISH team
29-May-07	Seminar on Fish Health	Provide updates to fish health specialaists on fish health activities carried out for the year.; presentation of A. Tamale's research proposal	NAFIRRI, Kajjansi	7	4	11	1	Terhune
9-Aug-07	Fish Farmers Meeting	Discuss issues raised by demonstration farmers and what farmers expect out of the project.	ARDC Kajjansi	9	2	11	1	Miller
<b>TOTAL</b>				<b>212</b>	<b>65</b>	<b>277</b>		

### Internships: 3 week training period per group

Date	Training Description	Objective	Location of training	Number Trained			Duration (days)	Resource Persons
				Male	Female	Total		
Sept to Oct-06	Pre-Internship training program	Providing practical training to recent graduates from the Fisheries Training Institute, Entebbe, Makerere University Zoology Department and Busoga University. Students were trained in 3 groups of 7 each in: pond construction, pond management, feeding fis	ARDC Kajjansi, Source of Nile Ltd - Jinja, Ekitangala Fish Farm - Nakasongola, Demo-Farms	12	10	22	21	K. Veverica, N. Isyagi, R. Asimwe, J.B. Kakuru

Annex 5. Indicator summary sheet

note that indicators are to be reported on an annual basis but where possible, they are reported quarterly

Indicator	Target for 06-2007	OCT-DEC06	JAN-MAR07	APR-JUN07	JUL-SEP07	Cumulative	
		1st 07	2nd 07	3rd 07	4th 07	total FY07	%achieved
Indicator SO7c: Number of new on- and off-farm jobs created as a result of FISH funded activities	200	8	59	6	15	88	44
	laborer; female					0	
	laborer; male		58	2		60	
	skilled:female	5		3	5	13	
	skilled: male	3	1	1	10	15	
Indicator SO7d : Number of new commercial on- and off-farm enterprises created as result of FISH-supported activities.	10	NA				5	50
	owner female owner male	0 1		2	1	1 4	
Indicator 1a: Metric Tons of farmed fish produced annually	150	5.06	1.6	3.15	1.946	11.756	8
	Tilapia	2.81	1.1	2.884	0.667	7.461	
	Catfish	2.25	0.5	0.266	1.279	4.295	
	Other					0	
Indicator 1b: Number of farms producing 5000 kg/ha/yr	7	NA	NA	3	4	7	100
Indicator 1c: Increase in total water surface area used for commercial fish farming (ha); for cages am using 1 ha per 5 m3 of cage.	40	0		2.045		28.945	72
	pond cage	0.65	1.25		24	3.695 25.25	
Indicator 1.1a: Number of tilapia and clarias production systems demonstrated	6	0	5			5	83
Indicator 1.1b: Number of farms demonstrating model systems.	10	0	12	13	0	13	130
	catfish hatchery			3	3		
	tilapia hatchery			2	2		
	catfish growout			3	3		
	tilapia growout			1	1		
	cages			3	4		
Indicator 1.1.c: Number of producers using improved production technologies Note: adoption means that the technology is used on the majority of the farm; not just the demonstration pond	40	NA				19	48
	pond construction			15	1	2	
	formulated pelleted feed			10	1	3	
	pond records			10		2	
	water quality monitoring			8			
	aeration			5			
	holding,grading,handling facilities			3			
	production plan			8			
	disease management plan			0		1	
Indicator 1.2.a: Annual production of fish feed meeting quality standards- note initial target of 0 was meant for extruded (floating) feed.	100	42.87	45.39	52.7	55.07	196.03	196
	sinking pellets	42.87	45.39	52.7	55.07	196.03	
	floating	0				0	
	powder (larval)	0				0	
Indicator 1.2.b: Number of hatcheries producing fingerlings meeting quality standards	12	7	0	2	0	9	75
	Tilapia	3		1		4	
	Catfish	4		1		5	
Indicator 1.2.c: Number of fingerlings produced that meet quality standards (this only reports sales; not what is used on-farm).	1,000,000	121,490	552,879	818,487	349,170	1,842,026	184
	Tilapia	29,200	53,909	48,100	92,550	223,759	
	Catfish	92,290	498,970	770,387	256,620	1,618,267	
	other					0	
<b>Indicator</b>	<b>Target for 2007</b>	OCT-DEC06					
Indicator 1.3a: Number of aquaculture practitioners trained in improved production technologies. <b>Note:</b> target indicates only those who have received 3 or more days of training. See table 3 for full report.	50	190	160	187	36	573	1146
	1day technical F	48	46	44	10	148	
	1 day technical M	142	114	143	26	425	
	3day+; F	11	1			12	
	3 day+; M	12	4			16	
Indicator 1.3b: Number of farmers receiving advice at FISH office visits at Kajjansi or Jinja	50	15	12	17	10	54	108
	female male	4 11	1 11	1 16	2 8	8 46	
Indicator 2.a: Percent of marketing alternatives perceived as good or very good (Must revise)	25 20	NA	NA	NA	NA	NA	0
Indicator 2.1a Increase in amount of farmed fish used by commercial processors (tons)	25	2.288	0	0	0.4	2.687	11
	Tilapia Catfish	2.288 0			0.4		
Indicator 2.2a: Increase in number of live fish "outlets".	1	0	0	0	0	0	0
Indicator 2.2b : Number of live fish transport tanks in use by farmers	9	6	2	1	0	9	100

The following SAF applications are in the final phase of revisions and should be sent to USAID this month for approval.

<b>Applicant</b>	<b>Title</b>	<b>Requested amount \$</b>	<b>Types of expenditures with SAF monies</b>
1. *WAFICOS	EXTENSION SERVICE SUPPORT, TRAININGS AND EQUIPMENT TO LOAN OUT TO FARMERS FOR TRANSPORT AND POND CONSTRUCTION	\$28,139	Equipment to loan out; training, advisor services.
2. *Fisheries Training Institute	OPERATING INTERNSHIP AND AQUACULTURE STAFF TRAINING	About \$ 25,000	Train FTI staff; Interns training and internship stipends and some supplies
3. * Uganda Fishnet Mfg	Purchase of new machines for making seine and cage materials.	\$50,000	Partial cost of a new netting machine to be imported from Japan to make better cage and seine materials.
4. *Umoja Integrated Farm	Training of aquaculture technicians for hatchery and catfish fingerling production.	\$37,000 approx	Furnishings, training supplies, Trainers fees; and training costs (meals for trainees)
5. Plastic Recycling industries Ltd	Biofilter media production using recycled plastics.	50,000	Machinery to pelletize recycled plastic to use for biofilters
6. UFFA	Creation of a National Fish Farmers' Organization and hosting fish farmers symposium and trade show	\$50,000	Executive secretary's salary, other office staff, office rent,
7. Sunfish farms?	Final growout technology, distribution and marketing services for baitfish.	About 20,000	Supplies for transport and holding systems; inputs for final stage growout experiment and broodstock nutrition trials.
8. *Balton Uganda	Hatchery installations at FTI, Gulu Univ, and demo unit plus first cycle inputs and technical backstopping	25,000	Equipment and feed for one cycle hatchery production plus small hatchery installation.
9. *Auburn	Feed mill design help, and feed manufacture	\$33,388 already approved	Feed mill design engineer, International travel and consulting and 12 tons feed; Overseas staff training costs
10. AEATRIC (a NARO org.)	Engineering services for fish farm construction	Need to drop down to 10,000	Equipment (most of it) must be sourced outside Uganda and supplies
11. Uganda Fish Farmers Assoc.??	Training for Improved Fish Hatchery Management and Increased Fingerling Production	15,700 SAF 6,500 C/S	Int'l Travel= \$2,500 Daily consultants fee, \$130/d= 11,700 Materials and supplies = \$1,500
11. Auburn	Certificate training for teaching staff and service providers	24,920 SAF	Travel, international and in Uganda= \$18,670 Supplies= \$1,000 Contractual = \$5250