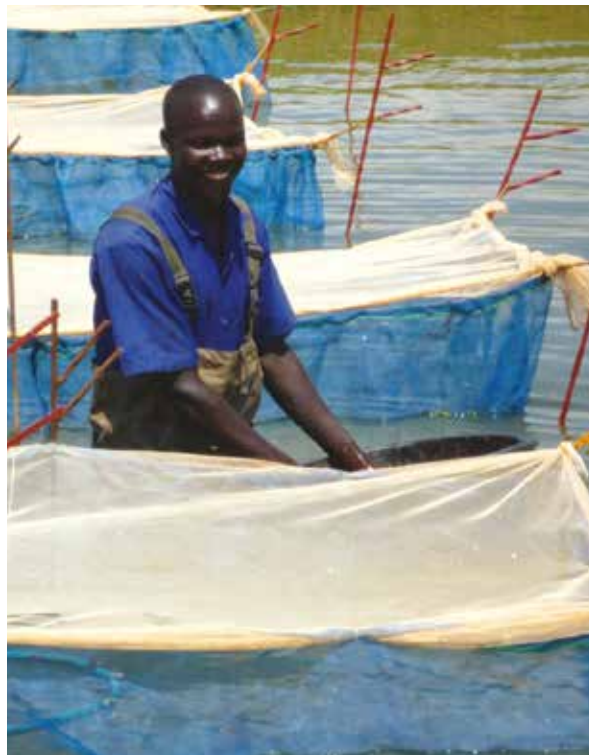




Secure Fisheries
Secure Futures



CAPACITY BUILDING WORKSHOP ON CONDUCTING AQUACULTURE AS A BUSINESS

Uganda



INDIAN OCEAN
COMMISSION



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Capacity building workshop
on conducting aquaculture
as a business

Uganda

GCP/RAF/466/EC SmartFish Project

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Executive summary

The workshop, “Conducting Aquaculture as a Business”, was jointly organized by the Government of Uganda and the Food and Agriculture Organization of the United Nations (FAO) within the framework of the SmartFish programme: GCP/RAF/466/EC **“Implementation of a Regional Fisheries Strategy for the Eastern and Southern Africa and Indian Ocean Region”**. SmartFish is funded by the European Union through the Indian Ocean Commission (IOC) and partially implemented by FAO (Results 1 and 5). This workshop falls under one of the SmartFish activities of Result 5. It responds to African countries’ desire and contributes to their efforts to transform aquaculture from a non-viable subsistence and public sector driven activity to an economically vibrant, private sector led, sustainable business.

The workshop was opened by Mr Alhaji M. Jallow, the FAO Representative in Uganda and Mr Jackson L. D. Wadanya, the Acting Commissioner for Fisheries in Uganda who was present on behalf of the Hon. Ruth Nankabirwa, State Minister for Fisheries. The latter was unable to attend the event at the last minute due to unforeseen circumstances.

The training was conducted by aquaculture economists from FAO who were assisted by a local consultant. The Department of Fisheries Resources, under the Uganda Ministry of Agriculture, Animal Industry and Fisheries, and FAO Representation in Uganda provided logistical support. Twenty participants came together for this workshop that took place from 30 July to 3 August 2012, from amongst private aquaculture entrepreneurs, fish farmers, public aquaculture managers and Local Government District Fisheries Officers.

The workshop was aimed at providing an understanding of aquaculture as a business and what such a practice would entail. The objective was also to train participants in the use of planning and evaluation tools for implementing aquaculture as a business. Thus, the workshop covered the following main topics: understanding aquaculture as a business; planning for aquaculture as a business at the farm level (essential elements to account for and common steps to follow); preparing a business plan through hands-on exercises to determine and simulate the profitability level and financial feasibility of an aquaculture project under different scenarios (management, prices, etc.) by means of a user-friendly assessment tool developed for this purpose; components of managing an aquaculture farm as a business; and elements of fish marketing. A field visit was also undertaken.

At the end of the workshop, 90 to 100 percent of participants found the training useful to very useful and 75 to 95 percent were satisfied to very satisfied with the training.

Moreover, participants identified the following key areas in which further assistance is required for aquaculture to be conducted as a business in Uganda:

- Concerted efforts to establish a reliable baseline data;

Need to review and update provisions for aquaculture in the National Fisheries Policy;

- Support the establishment of a national fish farmers federation with a technical secretariat for strengthening or creating farmers associations or cooperatives;
- Need to adapt the user-friendly tool for assessing economic feasibility and profitability of aquaculture to some of Uganda's non-typical aquaculture systems and situations, as well as popularization of the tool by working with farmers in local farmer groups or associations;
- Undertake a study to establish a national baseline of aquaculture information.

Résumé exécutif

L'atelier « Faire de l'aquaculture une entreprise » a été organisé par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO) en collaboration avec le Gouvernement Ougandais dans le cadre du projet GCP/RAF/466/EC « **Mise en œuvre d'une stratégie des pêches pour la région Afrique Orientale et Australe – Océan Indien** », également connu sous le nom de **SmartFish**. SmartFish est un programme de la Commission de l'Océan Indien (COI) financé par l'Union Européenne et partiellement mis en œuvre par la FAO (Résultats 1 et 5). L'atelier fait partie d'une des activités du Résultat 5 de SmartFish. Ceci répond au désir même des pays Africains et appuie leurs efforts de transformer l'aquaculture basée sur une subsistance non profitable et dirigée par le secteur public à une entreprise économiquement performante, pérenne et menée par le secteur privé.

L'atelier a été officiellement ouvert par M. Alhaji M. Jallow, le Représentant de la FAO en Ouganda et par M. Jackson L. D. Wadanya, l'intérim du Commissaire des pêches en Ouganda, qui agissait au nom de l'Hon. Ruth Nankabirwa, la Ministre des pêches de l'État. Cette dernière n'a pas pu assister à l'évènement dû à des circonstances imprévues de dernière minute.

La formation a été dirigée par des économistes en aquaculture venant de la FAO et ils étaient assistés d'un consultant local. Le soutien logistique a été apporté par le Département des ressources halieutiques du Ministère de l'agriculture, de l'industrie animalière et des pêches de l'Uganda, et par le bureau de la FAO en Ouganda. Cela était étendu sur une période allant du 30 juillet au 3 août 2012. Il y avait 20 participants venant du privé (d'entreprises d'aquaculture, d'éleveurs de poissons) et du public (des directeurs d'aquaculture et des responsables de district de l'administration locale pour les pêcheries).

Le but de l'atelier de formation était de comprendre l'aquaculture comme une entreprise et ce que ses pratiques impliqueraient. Cela comprenait également de former les participants à utiliser un outil de planification et d'évaluation pour faire de l'aquaculture une entreprise. L'atelier a donc couvert les éléments clés suivants: comprendre l'aquaculture comme une entreprise; planifier l'aquaculture comme une entreprise au niveau de la ferme (les éléments essentiels à prendre en compte et les étapes habituelles à suivre); les éléments pour préparer un business plan à travers des exercices pratiques afin de déterminer et de simuler le niveau de profitabilité et la faisabilité financière d'un projet aquacole sous différents (gestion, prix, etc.) scénarios en utilisant un « outil d'investissement convivial » élaboré à cet effet; les éléments pour gérer une ferme aquacole comme une entreprise; et les éléments de commercialisation des poissons. Une visite de terrain a également eu lieu.

A la fin de l'atelier, 90 pourcent à 100 pourcent des participants ont trouvé cette formation utile voire très utile et 75 pourcent à 95 pourcent d'entre eux étaient satisfaits voire très satisfaits de la formation.

De plus, les participants ont identifié des domaines clés nécessitant plus d'assistance pour que l'aquaculture devienne comme une entreprise en Ouganda:

- Des efforts concertés afin d'établir des données de base fiable.
- Le besoin de revoir et de mettre à jour les clauses juridiques de l'aquaculture dans la Politique nationale des pêches.
- Soutenir l'établissement d'une fédération nationale des éleveurs de poissons avec un secrétariat technique pour renforcer ou créer des associations ou coopératives d'éleveurs.
- Le besoin d'adapter « l'outil convivial pour évaluer la faisabilité économique et la rentabilité de l'aquaculture » à quelques-uns des systèmes et situations d'aquaculture atypiques en Ouganda, ainsi que la vulgarisation de l'outil en travaillant avec des éleveurs faisant partie de groupes ou d'associations locales d'éleveurs.
- Entreprendre une étude pour établir des informations nationales de référence pour l'aquaculture.

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Acronyms and abbreviations

CBO	Community-based organization
CCRF	Code of conduct for responsible fisheries
CCF	Commissioner for Fisheries
CIFAA	Committee for Inland Fisheries and Aquaculture of Africa
DFO	District Fisheries Officer
DFR	Department of Fisheries Resources
DSIP	Development Strategy and Investment Plan
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAO/FI	FAO Department of Fisheries and Aquaculture
FCR	Feed Conversion Ratio
FO	Fisheries Officer
FSSP	Fisheries Sector Strategic Plan
FTI	Fisheries Training Institute
IOC	Indian Ocean Commission
LVFO	Lake Victoria Fisheries Organization
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MCS	Monitoring, Control and Surveillance
MOLG	Ministry of Local Government
NaFIRRI	National Agricultural Fisheries Resources Research Institution
NARO	National Agricultural Research Organization
NGOs	Non-governmental organizations
PS	Permanent Secretary
QCA	Quality Control and Assurance
S/CFO	Sub-county Fisheries Officer
WAFICOS	Walimi Fish Farmers Cooperative Society

1. Introduction

1.1 Fisheries sector in Uganda

The fisheries sector in Uganda comprises of both capture and culture-based fisheries which are planned and managed under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) as one of the three subsectors of crop resources, livestock and fisheries under that Ministry. The fisheries sector is very significant in Uganda with an estimated production capacity of 800,000 tonnes, worth US \$2 billion annually. Current production is estimated at 475,000 tonnes of which aquaculture contributes approximately 20 percent.

The fisheries sector accounts for 12.6 percent of the agriculture share of gross domestic product (GDP) and provides for 2.8 million livelihoods. The sector provides up to 1,100,000 jobs in both formal and informal employment. Fish exports to both regional and international markets bring in foreign exchange equivalent to an estimated US \$200 million annually, whilst the value of fish consumed locally is an estimated US \$500 million annually. Fish remains the leading animal protein provider for rural communities in Uganda with over 50 percent of households depending on fish as the major source of animal protein for dietary purposes. The national average for fish consumption is 8.3 kg/capita/year. This is above the sub-Saharan average of 6.6 kg per capita but only about half of the world average, which stands at 17 kg per capita.

1.1.1 *Status of the aquaculture subsector*

Aquaculture in Uganda has been growing at an annual rate of 300 percent over the last ten years; aquaculture production has risen from 285 tonnes in 1999 to over 90,000 tonnes in 2010. Current aquaculture production is estimated at 100,000 tonnes/year. This increase has largely been driven by the entry of commercial aquaculture producers and the adoption of intensive production technologies. However, most of the recent expansion in aquaculture production is accounted for by managed stocked communal water bodies across the country; 55 dams have been stocked with catfish and tilapia since 2002. The adoption of cage culture – regulated artificial enclosures in natural water bodies such as Lake Victoria (Mukono, Ssesse Islands), Lake Nabisojjo (Luwero/Nakaseke) and Lake Banyaruguru – also accounts for a significant contribution to aquaculture production. Nearly 2,000 farmers are considered to be emerging commercial aquaculture entrepreneurs whilst an additional 3,000 are considered to be progressive small-scale fish farmers. A further 21,000 remain in the category of subsistence producers (Department of Fisheries Resources, 2010). There are currently more than nine medium-sized commercial hatcheries and another 81 small business operated hatcheries – all of which are privately owned.

1.1.2 *Aquaculture policies, plans and regulations*

Aquaculture is regulated according to the Fish Act (2000) using the Fish Rules (Aquaculture), 2003.

These Rules are currently under revision to incorporate aspects of aquaculture product certification and quality assurance. The regulatory framework follows the National Fisheries Policy that was passed in 2004. There are currently two approved fisheries sector plans:

1. Fisheries Sector Strategic Plan (MAAIF/FSSP 2004);
2. MAAIF Development Strategy and Investment Plan (MAAIF/DSIP, 2010).

Elaborate provisions of the existing Fisheries Sector Plan, with support from FAO, have led to the development of the first Aquaculture Strategy (MAAIF is currently reviewing a final draft); a draft National Aquaculture Development Plan (final draft); and a draft 'Concentrated Aquaculture' or 'Aquaculture Parks Investment Policy', produced with support from international funders.

Photo 1: Cage fish farming at SON



1.1.3 Current fish market prices in Uganda

Country	Price
Bargrus	15,000 UGX per kg
Tilapia	10,000 UGX per kg
Nile perch	9,000 UGX per kg
Catfish	5,000 UGX per kg
Mukene	2,800 UGX per kg

(Source: MAAIF report, 2011)

1.1.4 *Aquaculture production systems*

- Pond culture (most commonly used);
- Cage/pen culture (second most used);
- Tank/raceways culture (just starting up).

1.1.5 *Estimated yields from aquaculture*

- Subsistence farmers – approx. 1,000 kg/ha/yr.
- Small holders, commercial – 1,500 kg/ha/yr.
- Emerging commercial farmers – 15,000 kg/ha/yr.

1.1.6 *Summary of aquaculture production*

1999	285 MT
• Number of ponds	12,000
• Average pond size	200 m ²
• Average number of farmers	10,000
2007	50,000 MT
• Number of ponds	18,000
• Average pond size	400 m ²
• Average number of farmers	14,000
2010	90,000 MT
• Number of ponds	30,000
• Average pond size	500 m ²
• Average number of farmers	21,000
• 2011	100,000 tonnes
• 2015 (projection)	600,000

1.1.7 *Most common mistakes by Ugandan fish farming entrepreneurs*

- Starting aquaculture as a business without any planning;
- Improper farm site selection;
- Poor pond design and construction;
- Stocking bad seeds (hybrid, mixed sizes, etc.);
- Uncontrolled breeding of Tilapia in ponds;
- Use of poor quality feeds (own farm mixed);
- Not knowing when and how to feed fish;
- Failure by most farmers to sell fish below 200g (unaware of marketable fish size);
- Continuous running of water through ponds;
- Failure to carry out regular sampling;
- Failure to keep and utilize farm records.

2. The training

2.1 Rationale for aquaculture as a business training workshop in Uganda

When the Government of Uganda stepped up the promotion of commercial aquaculture in the early 2000s, aquaculture received substantial technical and financial support and incentives from the government and development partners.

As a result, the subsector registered a tremendous growth in production and ranking as one of the fastest growing animal food and income generating industries in Uganda. Indeed, many farmers and enterprises have registered increased income from aquaculture production related businesses including those involved in the actual production and those concerned with inputs and the provision of services.

This was especially true for seed producers (hatchery operators) who were selected to supply fingerlings to re-stock community dams, minor lakes and farmers' ponds; the government offered them a good price as an incentive to trigger a good production capacity of private farmers.

Today, whilst the subsector continues to grow, it is faced with many challenges mostly relating to failed business practices. It is a bitter fact that many Ugandan farmers have lost a substantial amount of money in aquaculture businesses. The major reasons put forward for their losses are:

a) High input costs

The cost of fish feeds and fish seeds are very high either due to the producers' monopoly or the fact that producers and suppliers are equally facing high production costs.

b) Low fish prices on the market

The lack of formal organized markets for farmed fish and competition from increasingly illicit trade in immature fish from the wild are two factors that combine to limit the prices which farmed fish can fetch. This is also coupled with the limited marketing skills of aquaculture farmers, as well as poor business planning.

c) Limited planning and production management skills of farmers

Most Ugandan aquaculture farmers are not skilled and do not have the requisite experience to design and operate sustainable, profitable aquaculture farms. This situation is made worse by the equally unskilled and inexperienced extension services from both the government and private service providers.

d) Hand-outs from the government and development partners

The significant support from the public sector for rural fish farmers has created a dependence syndrome where most rural farmers have only practised aquaculture over several years when provided with free inputs and technical support from the

Government and development partners. Whilst this cost-free assistance is beneficial, it tends to compromise the development of commercial aquaculture and maintain the predominance of subsistence aquaculture in the country as rural farmers come up with wrong and unsustainable production models, which without support, cannot run profitably.

This training workshop was therefore timely and very much appreciated by the government and the participants who expressed that recommendations be taken on board. These recommendations will go a long way in helping to put in place tools and mechanisms for planning and practising aquaculture as business in line with the Government of Uganda's goal of transforming agricultural production from subsistence to profit or commercially oriented agricultural enterprises.

2.2 Objectives of the workshop

1. To entice and/or enhance farmers' capacity to develop business acumen in aquaculture;
2. To empower farmers to plan properly when conducting aquaculture operations in order to maximize production and profits;
3. To guide farmers on how to obtain loans when needed to initiate and/or operate farms, and how to implement their business plans;
4. To help farmers assess the profitability level and financial wealth of their aquaculture farms to convince banks of their capacity to pay back loans when required and to help them make the right investment decisions.

2.3 Agenda/programmes/schedules of training programme

The workshop was held over five days from 30 July to 3 August 2012. A detailed programme of the workshop can be found in Annex 3.

A field visit was made to one of the model farms (Manjore Fish Farm), which was also represented at the workshop. The farm is located within 5 km from the workshop venue.

2.3.1 Selection and attendance of trainees

The workshop participants were selected by the Department of Fisheries Resources (DFR) under the MAAIF, and confirmed by FAO Uganda. The participants included nine farmers, nine District Fisheries Officers (DFO) and two private service providers (private extension agents). Attendance was 100 percent and all the participants were generally very active and easy to train.

2.3.2 *The approach used for the training*

Mr Alhaji M. Jallow, the FAO Country Representative and Acting Commissioner for Fisheries, Mr Jackson L. D. Wadanya, who represented the Minister of State for Fisheries, Hon. Ruth Nankabirwa, were present at the official opening ceremony. The latter was not able to attend the event at the last minute due to unforeseen circumstances. The opening speeches can be found in Annex 2.

After the opening ceremony, the presentations got underway as per the programme given in Annex 3.

On the second day of the workshop, the FAO officers introduced the investment tool. However, before the presentation, they sought a common understanding of what is meant by the term 'aquaculture as a business' and why aquaculture as a business. Consensus was reached that aquaculture as a business must have the following basic components:

- profit making: this should be the goal/guiding principle;
- proper business planning and management;
- good marketing strategies and market environment;
- appropriate production technologies;
- good record-keeping and management;
- ability to measure profitability and shareholder returns.

Upon agreement of the basic elements of aquaculture as a business as listed above, the officers took the participants through the key elements of a good business plan by engaging the trainees with the following questions:

- What and how to produce the intended product?
- What is the cost of production?
- To whom will the product be sold?
- At what price will the product be sold?
- What are the resources required to sustain the operation?
- Where is the source of information and technologies required?
- Measuring profitability of the venture?

This was then followed by hands-on exercise through the application of a user-friendly investment tool. This aspect of the training took up most of the workshop time. Participants were divided into four working groups consisting of farmers, service providers and District Fisheries Officers. The farmers in the groups provided their actual farm data, which was used to practice the investment tool and later each group presented their findings and recommendations to the floor.

After the first rounds of presentations, the consultant gave hypothetical data aimed at testing the participants' understanding and use of some of the aspects of the investment tool.

The following sections give an overview of the presentations made by the facilitators during the workshop.

2.3.3 Overview, objectives and content of the workshop (Hishamunda, FAO)

This PowerPoint presentation highlighted the background, objectives and content of the workshop. The participants were informed that the training workshop sought to:

- seek a common understanding of aquaculture as a business;
- explain how to plan for aquaculture as a business (essential elements to account for; steps to follow);
- provide hands-on exercises: application of a user-friendly investment tool;
- draw up lessons learnt and develop the way forward.

Key points of the presentation were:

1. Training organized within the framework of SmartFish project GCP/RAF/466/EC "Implementation of a Regional Fisheries Strategy for Eastern and Southern Africa and Indian Ocean Region", funded by the European Union to the tune of US \$8.5 million.
2. The project covers 19 countries including the Republic of Uganda and will run for two years having started in December 2011.
3. Africa produces less than one percent of global aquaculture production; yet the region is endowed with potential for fish production in the form of abundant land, water resources, human resources and a highly conducive climate.
4. Recognition of past policy, which emphasized that promotion of aquaculture for subsistence, may not be optimal to achieve the growth potential of aquaculture in the region.
5. Lessons learnt from Africa's experience show that subsistence aquaculture is not sustainable as it is not operational or and does not generate profit; governments and development partners cannot sustain the hand outs required to keep subsistence aquaculture productive.
6. Treating aquaculture as a business is vital to ensure sustainable aquaculture development in Uganda.
7. Sustainable commercial aquaculture operations need to be:
 - environmentally friendly (ecologically sustainable);
 - technically feasible;
 - economically feasible (economic sustainability through competitive profits);
 - socially sound, ensuring social harmony and equity;
 - legally secured at all times through stable and appropriate investment regulations.

2.3.4 Overview of aquaculture development worldwide, in sub-Saharan Africa and Uganda (Cai, FAO)

The participants were taken through the global, regional and national fisheries and aquaculture production and development trends where it was noted that despite its vast socio-economic and natural potential, the development of Ugandan aquaculture is lagging behind the rest of the world in terms of aquaculture development due to the following constraints:

- expensive and low-quality seed and feed;
- inappropriate practices and management;
- poor infrastructure;
- long-standing production oriented (subsistence) policies.

The training highlighted the need to change from subsistence production towards market-oriented production by conducting aquaculture as a business.

2.3.5 Overview of the aquaculture sector in Uganda (Owani-Olok, National Consultant)

The participants were informed of the situation and status of aquaculture development in Uganda. The review pointed out that tremendous strides and achievements had been made in the aquaculture sector over the last 10 to 15 years, with a move away from government driven to private sector led growth. The aquaculture sector has grown from under 1 percent to nearly 20 percent of total national fisheries production. However, it was noted that further stimulation of market led and profit oriented aquaculture was needed to make the sector sustainable.

Key points of the presentation were:

1. Aquaculture production in Uganda has developed very fast (over 300 percent per annum) over the last 12 years rising from a paltry 285 tonnes in 1999 to over 90,000 tonnes by 2010.
2. The key to this superb growth rate was deliberate government intervention that included the procurement of material from farmers to stock and re-stock public and communal water reservoirs that account for nearly 70 percent of reported aquaculture production.
3. More and more farmers have taken on aquaculture as a business but there are still a number of challenges including the lack of skills and hands-on experience. Farmers doing aquaculture as a business have mainly focused on the volume of fish production hence turning to high-density fish culture systems such as cages and tanks.
4. Currently there are about 2,000 farmers considered to be emerging commercial aquaculture entrepreneurs and 3,000 progressive small-scale fish farmers. Another 21,000 farmers have remained predominantly subsistence producers.
5. The country has policies and a regulatory framework in place to promote aquaculture as a business including: the Fish Act (2000); the Fish Rules (Aquaculture), 2003; provisions for aquaculture investment under the MAAIF Development Strategy and Investment Plan (DSIP); Fisheries Sector and Strategy Plan (FSSP); the Aquaculture Parks Investment Plan and Policy; and a draft Aquaculture Strategy.

2.3.6 Uganda's experience in commercial aquaculture (Napuru Abudala, SON Fish Farm)

Mr Abudala Napuru, the Manager of SON Fish Farm based at Jinja, presented the experience of the private sector in doing aquaculture as a business: he highlighted that previously, aquaculture development relied heavily on public support for aquaculture through centralized public extension and inputs. Mr Napuru stated that 20 years ago production was characterized by:

- a culture of mixed sex Tilapia;
- inbreeding;
- use of poor fish feed quality;
- peasantry approach;
- a lack of expertise.

Mr Napuru explained that over the past five years, aquaculture development has been characterized by private sector led growth with increased use of expert staff, adoption of mono-sex Tilapia culture, use of selective breeding programmes, use of good quality fish feed as well as diversification of production systems from ponds to hapas and cage-based fish culture. He also explained that this positive turn around in aquaculture was a result of a decrease in natural catches, commitment by the Ugandan government, increased awareness of fish farming as an alternative, the establishment of feed production plants, better and increased availability of quality Tilapia and Catfish seeds, training, the adoption of new methods of farming and use of appropriate technologies.

Photo 2: Nile Tilapia broodstock holding pond of a commercial aquaculture farm (SON Fish) in Jinja



However, Mr Napuru also specified that whilst the future of aquaculture as a business was bright, there were still several constraints including:

- Seeds: a managed broodstock and selective breeding programme;
- Feed of high quality;
- Training: HR, technical assistance and access to reliable information and advice;
- Lack of capital: initial and additional investment and working capital;
- Poor access to specific aquaculture equipment, need to import and increased production costs;
- Access to stable and quality electricity;
- Property rights;
- Poor roads in potential fish farming areas;
- Marketing: farmed product versus wild catch, price and familiarity.

Photo 3: Delivery of fish seed by a commercial aquaculture farm (SON Fish) in Jinja



2.3.7 Conducting aquaculture as a business: policy-makers and farmers' perspectives; expectations from the workshop (DFR, MAAIF)

Participants were asked about the information, knowledge, and skills they would like to gain from the workshop; the participants provided the following:

- How to design a small business plan and enterprise budgets for fish farmers;
- How much would have to be spent on commercial feed to produce one kilogram of fish, i.e. for Tilapia and Catfish;
- Management of production and marketing costs;
- Farm management;
- Market information systems;
- Dynamics of the aquaculture industry;
- Comparison of other farms (compare notes and experiences);
- Networking and sharing of ideas;
- Control and prevention of diseases;
- Cost-benefit analysis of commercial aquaculture (grow out or breed).

The Manager of SON Fish Farm concluded that aquaculture in Africa is still in the early stages of development. Uganda has:

- A favorable environment to promote aquaculture and encourage private investment;
- Technical support;
- Financial support from international organizations: donors and development organizations.

Farmers were also asked why Chinese imported Tilapia was cheaper than locally produced Tilapia. The following responses were given:

- The Chinese must have good quality Tilapia seeds which grow faster than those in Uganda and their fish feeds must be affordable and of good quality. Raising Tilapia in China must be much cheaper than in Uganda.
- Farmers in China practise large-scale fish farming and therefore have a very high output compared to the farmers in Uganda who have very small ponds and hence very low returns. The Chinese can therefore afford a smaller profit margin since they have a higher output.
- Some farmers pointed out that in fact Chinese Tilapia was not cheaper than locally produced Tilapia.
- Other farmers wondered if Tilapia was in fact imported from China.

The public managers were asked what they perceived to be the key constraints to aquaculture development in their respective areas. The DFO's answers were as follows:

- Land fragmentation/small land holdings;
- Poor quality fish seeds (fingerlings or fry);
- Lack of supplementary feeds;
- High costs of aquaculture inputs such as harvesting nets, water testing kits, etc.;
- Lack of stockists (traders) for aquaculture inputs such as feeds, nets, etc.;
- Security of fish ponds;
- Lack of initial capital to open ponds;
- Poor farm management;
- Lack of technical know-how;
- Indigenous knowledge not available; lack of any tradition of fish farming;
- Everyone is being asked to become fish farmers (approach);
- Competing profitable enterprises (livestock);

- Lack of model farms and farmers;
- Dependency on hand-outs from the government and donors;
- Effects of climate change (water more scarce).

The public managers were also asked about their knowledge of existing or potential government policies, plans and laws. The DFO's answers were as follows:

- Aquaculture Parks Policy;
- Aquaculture Policy;
- Private Sector Investment Policy;
- Support under local government management service delivery funds;
- Support under production and marketing grants;
- Support under the National Agricultural Advisory Services (NAADS);
- Water policies;
- Wetlands policies;
- Land policies.

2.3.8 Conducting aquaculture as a business: reconciliation between perspectives and workshop objectives (Hishamunda, FAO)

At the end of the first day participants were given the opportunity to review their perspectives and workshop objectives, and discussed at length individual experiences in aquaculture that later fed into the group work and hands-on training with the profitability and feasibility of commercial aquaculture assessment tool.

2.3.9 Basic elements of conducting aquaculture as a business (planning) (Cai/Hishamunda, FAO)

Participants were taken through the basic elements of business planning and what conducting a business means. The following aspects were covered:

- a) Definitions and practical meanings of business terms:
 - Meaning of profit (or earnings) = Revenue – Costs
 - Profit > 0 → business is making money
 - Profit < 0 → business is losing money
 - What is revenue?
 - Is cash received from selling a pond revenue for the farmer?
 - What is considered as a cost?
 - Is depreciation of equipment a cost?

- Is family labour a cost?
- b) Contents of a business plan
- c) Meaning and key elements of a business plan
 - Information on the business
 - market and competition;
 - production and technology;
 - management.
 - Information on profitability
 - Income statement (or enterprise budget)
 - Information on financial situation
 - Balance sheet
 - Information on liquidity
 - Cash flow statement
 - Equity (Net Worth) = Asset – Liability
 - Cash flow statement
 - Difference between net cash flow and profit
- d) Record-keeping as a foundation of business planning and management

2.3.10 Assessment of the economic profitability and financial feasibility of small- and medium-scale aquaculture farms: case studies (Cai, FAO)

Participants were introduced and trained in the aspects and means of assessing the economic profitability and financial feasibility of small- and medium-scale aquaculture enterprises using case studies from Uganda. The case studies were reviewed together in the plenary session, and later the investment tool designed to assess the economic feasibility and profitability of small aquaculture production enterprises was presented.

Investment tool for assessing economic profitability and financial feasibility of aquaculture farms: demonstration (Hishamunda, FAO)

Participants were given hands-on training in using the design tool with their own farm data. Participants, who had been divided randomly into groups, worked with the tool for two days using their respective farms as examples. They were able to highlight the shortcomings of their respective data sets and the need to upgrade the tool.

3. Conclusions

Participants appreciated the training and found that the aquaculture production record in Uganda is still very poor and questionable, which complicates the assessment of the economic and financial viability of any aquaculture venture in the country. It appears that most Ugandan farmers have not embraced the importance of record keeping or they simply lack the knowledge of how to design a record keeping tool and manage it or both. As a result, aquaculture production records obtained by local government staff (DFOs) for onward transmission to the central government (DFR) are also very poor, scanty and unreliable, making aquaculture planning and management at the government level a real challenge. This problem is further compounded by limited funding for aquaculture both at local and central government levels. Although the user-friendly tool used in the training provides for some 'default values' for use in the assessment exercise, these default values are only approximations of reality and do not guarantee accurate results. Therefore there is a definite need for a concerted effort and support for the establishment of reliable baseline data in the country.

The workshop further identified that current national fisheries and aquaculture policies are not user friendly. To promote a sustainable aquaculture production as a business, there is a strong need to have enabling aquaculture policies in place.

Having understood the importance of access to good quality production inputs at low cost, and the need for a good, reliable market to do aquaculture as a business, participants were concerned that the marketing of aquaculture products and purchasing aquaculture production inputs still present big challenges to most of Ugandan fish farmers. This is because the majority of farmers working independently and usually in isolation. As a result, market information about aquaculture products and inputs are not well circulated, meaning that middle men are able to exploit the farmers who end up losing money by paying too much for inputs and selling their products for less than they should. Strengthening and/or forming farmers associations or cooperatives will go a long way to solve these problems.

Participants also mentioned that extension and service delivery in the aquaculture subsector is disorganized and uncontrolled; currently, there are government extension agents (DFOs) and private extension agents (service providers). The problem is that the technical information given to farmers by these different workers varies significantly. As a result, farmers end up in total confusion when it comes to decision-making. They were relieved to learn that the user-friendly tool they worked with during the training could alleviate this problem.

After practising and understanding the use of the planning tools, the participants discovered that the tool was designed to only handle monoculture systems and not polyculture aquaculture or mixed farming systems. Many farmers are currently practising these different farming systems and may not be willing to change to a different system unless the tool finds it is not profitable.

Thus, the participants expressed the desire for changes to be made to the tool to allow them to assess the economic and financial feasibility of their current systems.

Photo 4: Tending to Tilapia fry and SON Fish Farm, Jinja, Uganda.



4. Recommendations

Participants found the training in aquaculture as a business to be very appropriate and they recommended that the training be extended to other aquaculture practitioners, extension workers and managers.

Participants also recommended that the farmers' capacity to develop business acumen in aquaculture be strengthened; proper planning should be given priority when conducting aquaculture operations (to produce more and maximize profits); and farmers should have access loans if necessary (to initiate and/or operate farms, and be able to implement their business plans). It is important that the tool to assess economic feasibility and aquaculture profitability be adopted and popularized nationally.

The workshop recognized that there is a lack of data on national aquaculture and recommends that a baseline for aquaculture information be established. Fish farmers should be given templates for record keeping ensuring the quality of aquaculture data nationally and providing the type of data necessary for assessment of aquaculture enterprises.

Participants recommended that technical and financial support be extended to farmers for the creation of a national fish farmers' federation with a technical secretariat that will serve to organize farmers and existing farmers associations with improved guidance, support and marketing of aquaculture products.

4.1 The way forward

The following points were made as a way forward:

- Efforts will be made to modify the investment tool to include integrated and poly-culture systems;
- A draft of the model for the tool to assess the economic feasibility and profitability for Tilapia and Catfish hatcheries exists; it just needs to be completed;
- Modification of the tool will include an intermediate step to create a profitable enterprise in itself : an ideal initial sizes of Tilapia and Catfish for grow out will be used;
- Efforts will be made to finish the most urgent parts of the tool and make it available to participants and some key banks; hopefully by the end of the year;
- Efforts will be made to help some farmers establish cooperatives. For existing cooperatives, their capacity building requirements will be identified and efforts to support them will be put in place (hopefully before the end of the year);
- At the government's request, FAO could provide assistance to ensure that current aquaculture policies are business friendly;

FAO is also in the process of assisting Uganda and other EAC member countries to draft a common policy and strategy for aquaculture development in the region.

Annex 1. List of participants and resource persons

Name	Organisation	E-mail	Position
Namwabira Edinance	Salama Integrated Fish Farm	nedina@yahoo.com	Hatchery Operator
Abudala Napuru	SON Fish farm	Abudala.napuru@gmail.com	Manager
Kiddu Ben	Gomba District/WAFICOS	Benamu7@yahoo.com	DFO/Coordinator WAFICOS
Okunzi Peter Obiayi	Adjumani District	pokunzi@yahoo.com	DFO
Enima Christopher	Arua District	ehrisenima@yahoo.com	DFO
Musoloza Ben	Ssisa Integrated Fish Farm Ltd.	sittff@gmail.com	Director
Achibu Ekwilu JP	Serere District	achabuecea@gmail.com	DFO
Daniel Gonza	OMAL Aquaculture	danielgonzagod@yahoo.com	Service Provider
Sebinyasi Paul	Mpigi Fish Farm/WAFICOS	paulssebinyasi@yahoo.com	Director
Alfred Obedmoth	Eco-mungusi Fish Farm	alfredbedmoth@yahoo.com	Fish Farmer
Nkwanga Patrick	Tororo District	nkwangap@yahoo.com	DFO
Mwesigwa James	Hoima District	mwesigwajames@yahoo.com	DFO
Apsanya Fluge	Integrated Aquaculture		Farm Manager
Ayorekire Fredric	Isingiro District	frdric1000@gmail.com	DFO
Obbo Apollo	Nasenyi Fish Farm		Farm Manager
Nabayunga Stella	Local Government	snwalug@gmail.com	Fisheries Officer
Kibengo Peter	Mpigi Fish Farm	kibengo@kab.co.yr	Fish Farmer
Bamwite Rogers	Kamuli District	rogersbamwite@yahoo.com	DFO
Butuwa Moses	Majore Fish Farm		Farm Manager
Komakech Simon Peter	Pukure Orphan Care Integrated Farmers	komakechsimonp@yahoo.com	Service Provider/ Farm Manager
Trainers/Resource persons			
Dr. Nathanael Hishamunda	FAO (Rome)	nathanael.hishamunda@fao.org	Senior Aquaculture Officer
Dr. Junning Cai	FAO (Rome)	Junning.Cai@fao.org	Aquaculture Economics Officer
Mr. Simon Owani Olok	Aquaculture Services U Ltd	simoolok@yahoo.com	Local Aquaculture Consultant
Mr. Andrew Alio	DFR/MAAIF	andrewalio@gmail.com	Principle Fisheries Officer – Aquaculture

Mr. Andrew Alio	DFR/MAAIF	andrewalio@gmail.com	Principle Fisheries Officer – Aquaculture
Mr. Martin Ameu	FAO (Uganda)	martin.ameu@fao.org	Programme Assistant
Ms Flavia Kiyimba	FAO (Uganda)	flavia.kiyimba@fao.org	Programme Clerk

Annex 2. Workshop programme

Day 1	
08:30 - 09:00	Registration of participants
09:00 - 09:15	Welcome remarks by FAO Representative in Uganda
09:15 - 09:30	Workshop opening remarks by Honourable Minister of MAAIF
09:30 - 09:45	Self-introduction of participants
09:45 - 10:15	Overview, objectives and contents of the workshop (Hishamunda, FAO)
10:15 - 10:45	Group photo and coffee break
10:45 - 11:15	Overview of aquaculture development worldwide, in sub-Saharan Africa and Uganda (Cai, FAO).
11:15 - 11:45	Overview of the aquaculture sector in Uganda (Owani-Olok, National Consultant)
11:45 - 12:15	Uganda's experience in commercial aquaculture (Napuru, Son Fish)
12:15 - 12:30	Discussions
12:30 - 14:00	Lunch
14:00 - 15:30	Conducting aquaculture as a business: policy-makers and farmers' perspectives; workshop expectations (DFR, MAAIF)
15:30 - 15:45	Coffee break
15:45 - 16:30	Conducting aquaculture as a business: comparison between perspectives and workshop objectives (Hishamunda, FAO)
16:30 - 17:30	Discussion of the basic elements of conducting aquaculture as a business (planning) (Cai/Hishamunda, FAO)

Day 2	
08:30 - 09:30	Assessment of the economic profitability and financial feasibility of small- and medium-scale aquaculture farms: case studies (Cai, FAO)
09:30 - 10:30	Investment tool to assess economic profitability and financial feasibility of aquaculture farms: demonstration (Hishamunda, FAO)
10:30 - 10:50	Coffee break
10:50 - 12.20	Investment tool to assess economic profitability and financial feasibility of aquaculture farms: demonstration (continued)
12:20 - 12:30	Group formation
12:30 - 14:00	Lunch
14:00 - 15:30	Investment tool to assess economic profitability and financial feasibility of aquaculture farms: group exercises (Hishamunda/Cai/Owani-Olok)
15:30 - 15:50	Coffee break
15:50 - 17:30	Investment tool to assess economic profitability and financial feasibility of aquaculture farms: group exercises (continued)

Day 3	
08:30 - 09:30	Feedback from groups (DFR, MAAIF)
09:30 - 10:30	Investment tool to assess economic profitability and financial feasibility of aquaculture farms: group exercises (continued) (Hishamunda/Cai/Owani-Olok)
10:30 - 10:50	Coffee break
10:50 - 12:30	Investment tool to assess economic profitability and financial feasibility of aquaculture farms: group exercises (continued)
12:30 - 14:00	Lunch
14:00 - 15:30	Investment tool to assess economic profitability and financial feasibility of aquaculture farms: group exercises (continued)
15:30 - 15:50	Coffee break
15:50 - 17:30	Investment tool to assess economic profitability and financial feasibility of aquaculture farms: group exercises (end)

Day 4	
08:30 - 10:30	Group presentation and discussions (DFR, MAAIF)
10:30 - 10:50	Coffee break
10:50 - 12:30	Group presentation and discussions (continued)
12:30 - 14:00	Lunch
14:00 - 15:30	Group presentation and discussions (continued)
15:30 - 15:50	Coffee break
15:50 - 17:30	Group presentation and discussions (end)

Day 5	
08:30 - 10:15	Field visit to Manjore Fish Farm (overview of a typical Ugandan fish farm); improvement of farm efficiency; sharing experiences (cost control, obtaining funding, marketing for better prices, networking, etc.) (Owani-Olok/Napuru, farm discussions)
10:15 - 11:00	Workshop evaluation survey (Owani-Olok/Cai/Hishamunda)
11:00 - 11:20	Coffee break
11:25 - 12:30	Closing of workshop, results of workshop evaluation (Owani-Olok/Cai/Hishamunda, summary and way forward)
12:30 - 14:00	Lunch
14:00 - 15:00	Interaction and exchange of contact details (Owani-Olok)
15:00 - 15:40	Closing ceremony (DFR/MAAIF Andrew Alio)

Annex 3. Opening speech

OPENING REMARKS BY HON. RUTH NANKABIRWA, MINISTER OF STATE FOR FISHERIES AT THE TRAINING WORKSHOP ON CAPACITY BUILDING IN CONDUCTING AQUACULTURE AS A BUSINESS

Ridar Hotel Seeta, Mukono, 30 July to 3 August 2012

FAO Country Representative,
International consultants,
Commissioner for Fisheries,
District Fisheries Officers,
Private service providers,
Fish farmers,
All participants present,
Ladies and gentlemen,

You are all welcome to this training workshop here at Ridar Hotel Seeta, Mukono.

Dear Participants, the importance and benefits of the fisheries subsector cannot be overemphasized. Currently, the fisheries subsector contributes 12 percent of the agricultural GDP to our national economy and employs 1.2 million people directly, supports another 1.4 million livelihoods and provides food security.

In 2009, the value of aquaculture production reported in FAO statistics by Uganda was 76,654 tonnes. Aquaculture production is estimated to have increased from 285 tonnes in 1999 to about 50,000 tonnes in 2007 and 100,000 tonnes in 2011.

Aquaculture has the potential to fill the growing gap in capture fisheries as wild fish catches decline and the demand for fish increases. Uganda has a very high potential for aquaculture production; extensive lakes, rivers and wetlands, suitable native species for aquaculture such as the Nile Tilapia, the African Catfish and others, availability of local ingredients for feed production, a suitable climate, and extensive local, regional and international fish markets.

The demand for fish as a healthy food has increased and the price of fish has increased. Declining catches from capture fisheries requires aquaculture development as stocks of capture fisheries decline; aquaculture can therefore contribute to household income and economic growth.

Therefore, the government would like to tap into this potential by transforming aquaculture from subsistence to commercial ventures so that it can contribute to economic growth. This will be achieved through the MAAIF DSIP to increase fish production by 26 percent from 420,000 to 530,000 tonnes over five years. This increment will be achieved from increases in both capture fisheries and aquaculture production.

Despite all the above potentials and government efforts in creating an environment conducive to aquaculture production, there are challenges amongst which is the lack of management skills and knowledge of good aquaculture practices. Poor, or lack of, record keeping by farmers, results in inadequate information for aquaculture planning. Without proper record keeping of activities and associated costs, a farmer will not be able to know whether he/she is making a profit or not. Currently, there is limited data upon which to make investment and management decisions and to guide investors in aquaculture.

The objective of the training you participants are undertaking today is therefore to impart knowledge and the necessary management skills for proper record keeping. These skills and tools should be used to make decisions on whether a farmer is making a profit or loss in their aquaculture enterprise. I am pleased that today we are here discussing better management and the development of aquaculture as a business.

Practical field findings have shown that aquaculture can be a very profitable venture but only if the enterprise is well managed especially as far as feeding is concerned, this constitutes about 60 percent of the total cost of aquaculture production. Even though feed costs are still very high due to monopolies, the need for a proper feed management plan to avoid damage to feed and losses through wastage is of paramount importance to ensure a profit.

I appeal to the participants to take this training very seriously and to actively participate in the workshop.

The government has been working with other partners and supports the provision of an environment that is conducive for aquaculture development.

The FAO, as one of our development partners, has continued to work and support our overall efforts in agriculture development. My ministry, in collaboration with the Food and Agriculture Organization of the United Nations, has developed and submitted a draft aquaculture strategy and development plan for aquaculture in Uganda. Today, our farmers and extension staff are being trained in aquaculture as a business.

I would like to thank FAO for this support and collaboration and at the same time I would like to call for more support of this type of training so that more fish farmers and extension staff can acquire this knowledge.

I would also like to inform you MAAIF prioritized fish as one of the 15 priority commodities for investment and development in the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) Development Strategy and Investment Plan (DSIP) for the period 2010/2011 to 2015/2016. The DSIP has also identified many challenges in the fisheries sector and we need to provide an enabling environment through the development of appropriate policies.

I urge you participants to demonstrate a keen interest and put the knowledge and skills you will acquire into practice to make money.

I pledge my total support and that of my government to all initiatives geared towards improving the management and development of the aquaculture industry in Uganda.

Last but not least, ladies and gentlemen, I once again, thank the FAO for organizing this important training workshop and for inviting me to give the opening speech. I would like to thank you participants for coming and request that you remain committed to this cause and make aquaculture profitable for everyone.

I therefore declare this training workshop open.

Thanks very much,

For God and my Country

Annex 4. Workshop evaluation

A. Participants' evaluation of workshop

1. How would you rate the usefulness of the training?

Class – 100 percent

- Farmers – 100 percent
- Private sector – 100 percent
- Public sector – 100 percent

2. How much was learnt from the workshop?

Farmers:

- Very much – 44 percent
- Much – 56 percent

Private sector:

- Very much – 100 percent
- Much – -

Public sector:

- Very much – 38 percent
- Much – 62 percent

3. Rating of the overall training

Farmers:

- Very satisfied – 44 percent
- Satisfied – 56 percent
- Somewhat satisfied – -

Private sector:

- Very satisfied – 50 percent
- Satisfied – 50 percent
- Somewhat satisfied – -

Public sector:

- Very satisfied – 38 percent
- Satisfied – 50 percent
- Somewhat satisfied – 12 percent

4. Would you recommend this training to others

Farmers:

- Yes – 100 percent
- No – -

Private sector:

- Yes – 100 percent
- No – -

Public sector:

- | | | |
|-------|---|-------------|
| • Yes | – | 100 percent |
| • No | – | - |

5. Suggestions for improving the training

a) Farmers:

- Provide participants with some notes/hand outs for reference;
- Involve more practising farmers and have them share their experiences;
- Ensure the tool is ready to use for the practice sessions;
- Include a mechanism to ensure all trainees actively participate, especially in the group exercise;
- Input real data from a commercial farm;
- This training would have been more rewarding if there had been more farmers instead of the DFOs, some of whom do not own farms. Farmers are already in place and they need guidance;
- Share the assessment tool to enable farmers to assess their financial status;
- Allow more days for the training.

b) Private sector:

- Participants should be categorized: farmers trained separately from DFOs and private service providers;
- The tool should be complete, ready to use and available for the farmers; this would be very beneficial.

c) Public Fisheries Managers:

- Provide documented scenarios of how some farmers are performing in different parts in Uganda compared to farmers in other countries.
- Training should cover all components of record keeping for the farmers, as accurate data by farmers is the key to their success.
- Provide participants with notes/hand outs of the training materials for reference.
- Ensure the tool is ready to use for the practise sessions.
- Provide participants with the tool for testing in the field so that better results may be communicated to FAO for improvements/adjustments of the tool. Different districts have different opportunities and challenges; testing the tool in different situations will allow for better adjustments.
- Provide more time for field trips to share more knowledge and practical experiences.
- Provide a softcopy of training material for continued practice.
- Include real data on farms for training.

B. Participants' evaluation of the aquaculture business evaluation tool

1. Rating of the usefulness of the tool

Farmers:

- Very useful – 100 percent
- Useful – -

Private sector:

- Very useful – 100 percent
- Useful – -

Public sector:

- Very useful – 88 percent
- Useful – 12 percent

2. Ease of use of tool with regards to data entry and navigation within the tool

Farmers:

- Very easy – 33 percent
- Easy – 56 percent
- Somewhat easy – 13 percent

Private sector:

- Very easy – -
- Easy – 100 percent
- Somewhat easy – -

Public sector:

- Very easy – 33 percent
- Easy – 50 percent
- Somewhat easy – 17 percent

3. Ease of understanding of the results (conclusions of the tool analyses)

Farmers:

- Very easy – 56 percent
- Easy – 33 percent
- Somewhat easy – 13 percent

Private sector:

- Very easy – 100 percent
- Easy – -
- Somewhat easy – -

Public sector:

- Very easy – 25 percent
- Easy – 50 percent
- Somewhat easy – 25 percent

4. Recommending the tool to others

Farmers:

- Yes – 100 percent
- No – -

Private sector:

- Yes – 100 percent
- No – -

Public sector:

- Yes – 100 percent
- No – -

5. In which ONE area do you think that FAO and the government's assistance can be applied to help improve the performance and competitiveness of your farm or the aquaculture sector?

a) Farmers:

- Stocking; area of ponds; sales;
- Study tour to China, Egypt or Israel;
- Introduction and training of the tool for financial institutions to enable farmers access to loans;
- Review cheaper/quality feeds options;
- Organization of farmer cooperatives and capacity building for cooperative management;
- Traceability;
- Identification of farms that could act as models or demonstration sites; encourage farmers to share information;
- The tool should work with Tilapia, Catfish, other species and the hatchery sector.

b) Private sector:

- Baseline survey to improve aquaculture production data for planning purposes;
- Train feed producers on quality standards; provide standard operating procedures.

c) Public sector:

- Formulate feeds and improve managerial capacity;
- Improve communication with the relevant stakeholders;
- The tool has shown that borrowing from the bank does not improve the farmer's profit; therefore, grants/incentives should be given to farmers;
- Empower government officials and farmer groups to carry out extension services efficiently;

- Update fish production management technologies;
- Quality assurance of farmed fish; issues of traceability for lucrative markets;
- Provision of hire schemes for farm equipment and some tools; access to quality extension/technical services; certification of service providers, feeds and seed; access to agriculture loans;
- Compatible policies on commercial aquaculture or the establishment of aquaculture units (machinery) at the regional/district level.

6. List of components of the tool which you would like to be improved

a) Farmers:

- Integrated aquaculture; model for hatchery management (Tilapia and Catfish);
- Feed area; price of fish; survival rates; technical staff;
- Include minimum husbandry components;
- Tool should include farmers with poly-culture systems of farming;
- Tool should address all sectors to help farmers understand where they can get more profit without too much outlay;
- Make the tool easy to understand/follow for lay farmers;
- Advice and results should be more explicit about whether to encourage the continuation of the business or not;

b) Private sector:

- Poly-culture practices;
- Appropriate harvest times to maximize profit rather than growing for long periods;
- Feeding schedules to better manage feeds;
- Include integrated (poly-culture) systems;
- A few grammatical errors need to be corrected;
- Translation of the tool into local languages.

c) Public sector:

- Poly-culture systems;
- Incorporate integrated and other related enterprises;
- Review of the FCR as captured in records/formula used in the tool may not be real;
- It would be better if the tool could fit on the screen so that navigation can be done vertically rather than horizontally;

- Appreciation/depreciation of land value in Uganda;
- Formulas in the tool should be included and made visible with better explanations of some of the terminology (e.g. average pond area = total area of ponds/number of ponds). FCR = total weight of feed given (weight gained by the fish);
- The tool should be able to identify areas for adjustment in case of loss or insufficient profit;
- Identification of problem areas will make adjustments easier for farmers;
- Assessment of economic profitability; accessing loans; reorganizing the farm for better profitability.

SmartFish is a regional fisheries programme managed by the Indian Ocean Commission, funded by the European Union and co-implemented by the Food and Agriculture Organization of the United Nations. SmartFish, which operates in 20 countries throughout the East and Southern Africa - Indian Ocean region, focuses on fisheries governance, management, monitoring, control and surveillance, trade, and food security.

The present report highlights the results of the workshop "Conducting Aquaculture as a Business" that responds to African countries' desire and contributes to their efforts to transform aquaculture from a non-viable subsistence and public sector driven activity to an economically vibrant, private sector led, sustainable business.

The workshop recognized that there is a lack of data on national aquaculture and recommends that a baseline for aquaculture information be established. Finally, the workshop further identified that current national fisheries and aquaculture policies are not user friendly. To promote a sustainable aquaculture production as a business, there is a strong need to have enabling aquaculture policies in place.



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