

**THE FIFTH PAN COMMONWEALTH FORUM ON OPEN LEARNING**

**ENTREPRENEURIAL FINGERLING PRODUCTION FOR LAKE VICTORIA  
FISHERIES – MOVING TOWARDS DISTANCE LEARNING**

**Presented by**

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## **Introduction and Background Information**

Many fishers on Lake Victoria depend on long line fishing using fingerling sized clarias, the traditional supply of which is wild-caught from the lake. This supply is however, intermittent and depends on the extent of the floating and drifting of the notorious water hyacinth masses near the shores with clarias being numerous under the growth.

Bait fishers suffer long hours of standing in unhealthy water but also use seine nets which are destructive to the spawning habitats of the native cichlids and is illegal, making bait fishers in constant conflict with the Fisheries Department. Consequently the three million daily requirement of bait fish is never met hence immense loss of livelihoods.

The Fingerling Production Project was initiated as a stop gap measure to the shortage of bait fish and wanton destruction of the spawns and their habitat. The project aims to build the capacities of fish farmers within organized clusters to produce fingerlings for bait as a farm enterprise, thus expand rural economic opportunities through increasing food, linkages between farmers, researchers and extensionists.

Moi University, Department of Fisheries & Aquatic Sciences being the technical arm, Fisheries Department the extension arm and WIFIP the community mobilization and organization arm have joined hands to carry out training through face to face approaches, print media – specifically posters and mobile phones for continuous communication, consultation and monitoring.

Early emerging challenges include; low survival rates of fingerlings, market linkages and pricing and high cost of maintaining mobile phones especially reloading and recharging. An unexpected outcome has been the high demand of fingerlings by fish farmers to produce fish for food rather than for bait. Though not the main aim of the project, the returns are good and farmers prefer it. The project is already showing great potential of improving rural livelihoods. The aspect of environmental conservation will be addressed as the intervention progresses.

## **Broad Objectives**

- i) Provide a steady and environmentally sustainable supply of Nile Perch baits to long line fishers whose daily demand runs into several millions of catfish fingerlings a day.
- ii) To help, prohibit the capture of juvenile fish and destruction of breeding grounds.
- iii) Provide an alternative source of income to the fishing communities along the lakeshores through commercial pond production of Nile Perch baits.
- iv) To train and equip selected riparian communities on simple and flexible methods of propagating catfish.

## **Specific Objectives**

Our specific objectives are to develop techniques that will assist in scaling up catfish production activities to commercial level in the Lake Victoria region and hopefully spread it out to the rest of the country.

This project therefore seeks to address specific objectives that include:

- i) The production of baitfish for Lake Victoria fisheries,
- ii) Production of food fish (tilapia and catfish) for the community and for sale to consumers and

- iii) Development of training activities that emphasize pond operation and management that farmers will be use to prepare enterprise budgets and business plans for catfish/tilapia production systems.
- iv) Linking catfish farmers with end markets.

### **The Target Group**

The target pilot group consists of 40 Fish Farmers all with varied levels of schooling ranging from zero to 14 years. The same applies to their age range which runs between 17 and 80 years. All the farmers are rural based with very basic infrastructure for transport and communication. Income among the farmers at the beginning of the programme ranged between \$50 to a maximum \$120.

The farmers all belong to community based self-help groups formed on the basis of a common interest in fish farming and for the purpose of alleviating poverty among themselves and among members of the other community. Once trained, the forty members of the pilot group have a responsibility of rolling out the programme to other farmers by conducting training to them.

### **Training Model**

Fingerling Production is no mean a task and is in most cases considered an academic venture. Transfer and management of knowledge and skills required to execute the production process has been preserve for professionals and academicians in that field. Training ordinary farmers on this technology would therefore seem very difficult to achieve. Using distance learning mode for the same in a rural set up which predominantly has under developed communication infrastructure, costs of communication equipment and technology that are far above the means of the people and all the challenges that come with them could be even more daunting.

Due Educational, social and economic backgrounds, training is primarily face to face using a mixture of local, national and official languages. The national and official languages in Kenya are Kiswahili and English respectively. Training was initially organized in groups of approximately ten members each and conducted at either a government fish farming demonstration site or a selected farmer's site by staff from Moi University, Ministry of Fisheries and WIFIP depending on what content was being covered. Moi and Fisheries personnel addressed technical aspects while WIFIP which is a non-governmental organization handled the social and entrepreneurial aspects, specifically group dynamics, leadership and business skills. The pilot group now use the same model to expand training to other potential farmers.

The training model is thus designed to accommodate the scenario described above, also including background factors of the people. An integrated approach including face to face, posters and the mobile were used at one time or another during and after the training. It is designed to create an environment and opportunities for non formal groups in the fishing industry to learn how do to things differently, to make them informed, knowledgeable and skillful so as to be able to face and cope with the rural environment in which they operate. The intervention model is based on the blended principles of non-formal (NFE) and distance education (DE). This provides considerable flexibility and allows the learners to choose appropriate time for learning which fit in their tight schedules resulting from their multiple roles.

## **Face to Face**

Face to Face is inevitable for fingerling production and forms the basis for the subsequent use of Posters. After preliminaries of introduction to Fish Farming which is more theoretical, every other step of both pond construction and fingerling production are intricately practical involving more demonstration than theory. Site identification which is basically the first step is done through set criteria that is discussed and practically done by making a transect work in the most probable areas for establishing fish ponds. This is followed by excavation which is labour intensive and has to be done and shaped in a very particular manner and would probably be very difficult to achieve if not through face to face. Pond construction specifically includes site selection, marking, pegging, excavation and construction and takes approximately five days.

Propagation then follows starting with practical selection of brood stock. What follows are very technical procedures which learners must watch keenly as well as handle in order to learn more effectively. The procedures include; preparation of pituitary extract, administration of the pituitary extract. The gametes are then harvested by getting the testes extracts and harvesting the milt. This step ends with harvesting the eggs, their fertilization and incubation. The fingerling fry are then put in the nursery.

The other benefit of the face to face approach used in the training is the multiplicity of the languages used. This helped a lot in communicating with the pilot group which was mixed in terms of their level of schooling background and consequently, their ability to speak and even understand the three different languages except for the local language varied. Their trainers on the other hand were non local language speakers and had to communicate either in English or Kiswahili as the official and national languages respectively. Practical demonstrations coupled with interpretation of languages across the learners and the trainers made communication effective and efficient, particularly in cases where technical terminologies had to be explained to be understood. This process is being replicated by the pilot group who are now training other fish farmers on the same technology. There is also the aspect of visiting fish farmer sites on day six of the training period.

## **Using the Poster**

Apart from face to face, a step by step illustrative full colour Poster was designed, produced and used during and after training to reinforce and help in recall of information. Poster is defined by Wikipedia (20<sup>th</sup> March 2008) as "Any large piece of printed paper designed to be attached to a wall or vertical surface. Typically, Posters include both textual and graphic" Posters are of different type depending on intended use. Educational Poster is used for learning purposes. It covers a specific subject and even subject area. The relative low cost of production makes it ideal for mass production, distribution and utilization.

Each farmer in this programme is equipped with two full colour posters, one illustrating the stages of pond construction and the other of fingerling production. Each Poster is well labelled with each step having a caption to explain what activity is being illustrated. Pond Construction is Poster 1 illustrating step by step the following;

### **Poster on Pond Construction – The Steps**

1. Pond site selection: Use other ponds as reference (Chagua mahali utakapo jenga kidimbwi chak)
2. Peg the area set out for the construction (Pima kasha uweke vikingi)
3. Dig the core trench all round the core area (Chimba mtaro utakao zunguka kidimbwi)
4. Manual excavation is done (Chimba ukitumia vifaa kama jembe)
5. Level the surface using a string (Tandaza ukitumia kamba)
6. Dyke compacting should be done every 15cm (Unapojenga kuta za kidimbwi, sindilia udongo kila baada ya 15cm)
7. Floor levelling. The walls should slope inwards (Tandaza sakafu la kidimbwi. Kuta za kidimbwi)
8. Peg the outlet channel (Pima mtaro wa kutoa maji kwa kuweka vikingi)
9. Connect the outlet Pipe (Uganisha mfereji wa kutoa maji)

### **Poster on Catfish Propagation**

#### **a, Semi Artificial Propagation**

1. Select suitable males and females from brood-stock pond(s). Males and females can be differentiated by observation
2. Collect pituitary preferably from males so that their testis can be used. Pituitary is a pinkish-white globule-like organ, suited on the ventral side of the brain
3. Crush the pituitary in a mortar using pestle and dissolve it in 1 ml of saline solution
4. Draw the suspension in a syringe and inject it into the female catfish, it is then put together with a male in a "Hapa"

#### **b, Artificial Propagation**

1. The female is injected with the pituitary suspension and left for between 11 to 12 hours
2. The Male is dissected on belly region to remove testis entirely without squeezing them
3. Dry the testis with a piece of filter/tissue paper
4. Strip female (with eggs running out from genital papillae by holding each spawn with wet towels and pressing out gently till blood appears [ovary empty]).
5. Make small incisions using a pair of scissors in cream coloured lobed ends and squeeze out milt using a dry finger
6. A feather can also be used to mix the eggs and sperm. Add immediately little clean water and mix with the eggs by gently moving bowl to remove excess milt.
7. Pour the eggs in a single layer into the incubating tray or use sisal fibres or kakabans as substrate for eggs. Within 3 days the yolk sac will be absorbed and the swim-up fry will start to search for food

## **Flyer Information – Activity Schedule and Content**

### **Day 1 to Day 5**

Refer to Poster on Pond Construction

### **Day 2**

Refer to Poster on Catfish Propagation - a. Semi Artificial Propagation

### **Day 4 - 9**

Refer to Poster on Catfish Propagation – b. Artificial Propagation

### **Pond Management**

- Impact of tadpoles
- Nursing catfish larvae in earthen ponds
- Stock density
- Size and form of nursing
- Duration of rearing period and cannibalism among the catfish fingerlings
- Pond monitoring and predation control

### **Day 10**

- Construction of pond 2 continues
- Monitoring the incubated eggs
- Transporting of catfish fry

### **Day 11**

- Monitoring eggs for hatchlings
- Fish feeding regimes

### **Day 12**

- Transferring of hatchlings to nursery ponds
- Fish farming records keeping

### **Day 13**

- Monitoring of the fry

### **The Mobile Phone**

The mobile phone is an amazing gadget both for the mighty and the meek. It closes the geographical distances between the people and consequently enhances communication between the trainers and the learners and among the learners themselves after the face to face training. It is being used in the programme to pass on new information, ask questions and clarify issues, and most importantly, track market forces and trends in-order to maximise on sales' profit. Most crucial is its function of enabling extension services to be provided at a distance. It has not only created rapport between the farmers and extension workers but also reduced the cost of travelling for the extensionist and the pain of not knowing what to do when the farmer needs support and the extensionist cannot reach the farmer.

However, ownership among the farmers is very low as only six farmers out of forty owned the mobile. Costs of purchasing and maintaining the mobile is prohibitive for the small scale farmer and most of the time for those who have it, there is either no credit or it has no power. This means that a farmer may not be able to make contacts with technical and extension support all

the time and this may include even times when times when they are in crisis and most in need to communicate.

Though it has its own disadvantages, it has made monitoring at a distance very possible. Consultation between all the groups involved in the programmes despite being hundreds of kilometres apart. Farmers also use the mobile for checking out on prices as well as checking out for orders by their market collaborators. Group meetings are communicated through the same technology and only one person with it among several acts as the focal person and passes on information as and when necessary.

### **What have we achieved**

Within a period of only one year, approximately 350 new fish farmers have joined fish farming as a result of determination and commitment of the first lot. More ponds have been constructed and better fish yields realized in terms of quality and quantity and consequently increased income as well as food on the table.

An unexpected outcome has been from neighbouring districts who have been inspired this venture. One of the first trained groups have won jobs from a Non-governmental organization to guide construction and stocking of up to 300 fish ponds at a fee.

### **Constraints and Challenges**

The greatest constraint has not been realized from the choice of communication technology and transfer of knowledge, but from an inherent problem known in fish propagation, that is survival rate of the fingerlings fry. At the beginning death was 90% for some farmers. However, this has improved over the time with every other propagation done.

There has been a shift in purpose of propagation from propagating for bait fish to raising seed for other farmers to farm the fish for food. This has been due to fluctuating baitfish prices as well as the long distances to market causing fear for loss in business through transport expenses.

The issue of the mobile phone being expensive to maintain in terms of airtime and power to recharge the batteries has been a concern but has nevertheless been overcome by using public mobile phone vendors whose services are relatively cheaper particularly if they are within reach of the farmers' area of operation.

### **What have we Learned**

The outcomes of the programme clearly demonstrate:

- Great opportunities for empowering communities living in difficult situations through open and flexible learning and promoting learning from among peers which constitute horizontal and self directed learning from learner to learner.
- Collaboration between institutions of higher learning, line ministries and civil society organizations should be encouraged to authenticate non-formal education programmes which otherwise contribute to bridging the gap that exist in providing education for all. Vertical interactions is a satisfying experience to the learner because of their belief that qualified personnel, certification, and accreditation is a symbol of advancement and a way of boosting self esteem. These are very critical for the success of their undertaking.

- Out of school learning opportunities create forums for learning what would otherwise be left for the four walls of the classroom and formal systems.
- New technology such as the mobile phone expands avenues for learning at a distance and is desirable that their operational costs be reduced for more persons to have it.
- Well and simply designed posters could go a long way in reinforcing learning if they are properly integrated with face to face approaches for even what may be considered too advanced for particular target groups in the communities.

### **Where do we go?**

Expansion of this innovation is inevitable. The most probable path to follow is for Moi University to explore further the opportunities it has in offering this training through more advanced distance learning systems to the thousands of students who attain University entrance qualifications every year, but fail to join the institution due to lack of physical space.

It may also use its research mandate to carry out further research in the best way of reaching out to more less educated rural based communities who are in dire need of improving their capacities in entrepreneurial investments. With their engagement backgrounds, distance education options would be most appropriate so that they could improve their knowledge and skills but also continue with their family and community responsibilities. Collaborative ventures are the way to go to exploit each others potentials through value addition to all the processes.

The potential ICT for open and flexible learning is unquestionable. As the world gravitates towards modern and advanced technology, let us all remember that there is an invisible lot who need education not for academic purposes but for livelihood improvement that will enable them make informed choices, and lead better lives. They have a great potential to contribute towards world economic growth in whatever small way. We must commit to giving them the opportunity to do so through Community Resource Centres including telecentre activities and go beyond Posters.



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