Fishery based food security field schools: Bondo district, Lake Victoria, Kenya

Devin M. Bartley
Inland Water Resources and Aquaculture Service
FAO Fisheries Department, Rome
devin.bartley@fao.org

Beatrice Nyandat
Kenya Fisheries Department, Nairobi
samaki@saamnet.com

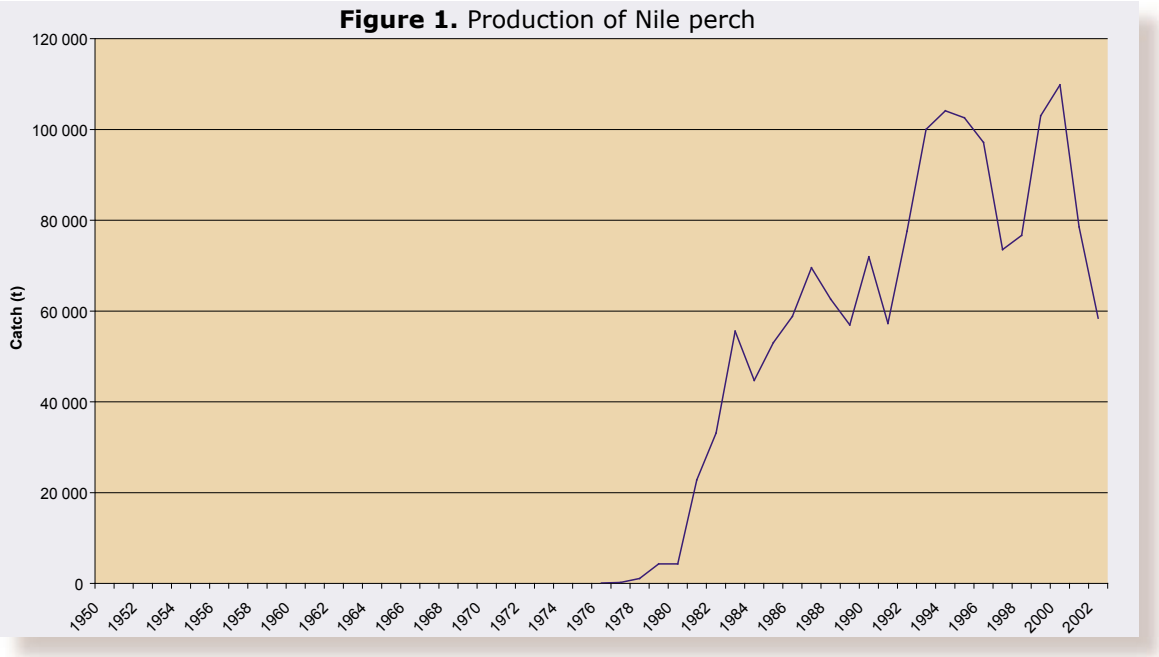
Deborah Duveskog
FAO, Kenya, Nairobi
DDuveskog@faonairobi.or.ke

Introduction

FAO, Kenyan fisheries and agriculture officers, and farmers and fishers of the Lake Victoria Basin are undertaking a project[1] on discovery-based learning methods in order to generate income, learn new activities and conserve valuable fishery resources. To understand better how this project is working, we undertook a mission to Bondo District¸ an agriculture and fishing area with approximately 12 000 fishers and more than 3 500 small sail and paddle boats. Approximately 73 landing sites and beach management units (BMU) have been established here to administer the fishery and provide for community development.

Nile perch (*Lates niloticus*) tilapia (*Oreochromis niloticus*), and dagaa or omena (*Rastrineobola argentea*) comprise most of the catch; additional species include other tilapias (*O. esculentus, O. variabilis, Tilapia rendalli,* and *T. zilli*), catfish (*Clarias gariepinus and C. mossambicus),* and small haplochromids. Catches have declined since 2000 (Figure 1) and it is widely rumoured that the Nile perch fishery has collapsed or will soon collapse. Overcapacity, use of illegal gear, e.g. monofilament net and small mesh-size, and fishing in breeding grounds appear to be the main reasons for the decline. Many species, especially haplochromid cichlids, suffered as a

Figure 1. Production of Nile perch



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Fish breeding grounds are being protected by local fishers and catches are increasing

result of the introduction of Nile perch in the late 1950s; pollution and sedimentation from land-based activities also have played a role in decreasing the fish stocks.

Fish provide substantial economic opportunity and over 50 percent of the animal protein for people in the district. Therefore, urgent action is needed to prevent additional hunger and hardship on the population and to save the fishery resources of the Lake. Fisheries is one sector that the Government of Kenya has targeted in its current poverty reduction strategy[2].

FSFS approach

Food security field schools (FSFS) build on the successful farmer field school (FFS) model introduced in Kenya in 1996. The FFSs were developed in SE Asia during the 1980s to help small-scale rice farmers investigate and learn for themselves the benefits of integrated pest management (IPM) in their rice fields. The FSFS are conceived to induce self-reliant approaches in the community by addressing multidisciplinary issues necessary to improve livelihoods and raise food security (see Box 1).

Bondo District presents numerous challenges to agriculture and fishery development. Numerous projects involving fisheries and fish farming have been implemented in the Lake Basin. However, unfamiliarity with fish farming, inappropriate extension and lack of understanding of the complicated cultural, economic and social system in the area have often worked together to reduce the effectiveness of these past activities. Along Lake Victoria, fishers, processors and traders are often migrants or short-term residents that do not invest or have interest in long-term local development. Additionally, much of the population has limited business experience or competence; money is made and spent quickly with no concern for investments or savings. The motto appears to be that "there will always be fish, so spend the money today and simply get more fish tomorrow". It is now apparent that there may not be fish tomorrow.

The FSFS approach has proven to be an effective mechanism to address many of the above problems by adopting a more participatory bottom-up approach to learning about the entire production and social system by incorporating a broad range of development topics. In Bondo District the approach was designed to be multidisciplinary and broad in scope (see Box 1).

The unique aspect in Bondo District is that, for the first time, the FSFS approach has been applied to BMUs and groups of people involved in capture fisheries.

What is a Farmer Field School?

A Farmer Field School can be described as a community-based practically-oriented field study programme, involving a group of farmers, facilitated by extension staff or – increasingly – by other farmers. The Farmer Field School provides an opportunity for farmers to learn together and test and adapt farming practices, using practical, hands-on methods of discovery learning that emphasise observation, discussion, analysis, and collective decision-making. Discussion and analysis are important ways to combine local indigenous knowledge with new concepts and bring both into decision-making. The process builds self-confidence (particularly for women), encourages group control of the process, and improves group and community skills. Facilitators are used rather than instructors, in order to help stimulate discussion and learning by discovery.

What is a Food Security Field School?

Food Security Field Schools were designed to broaden existing Farmer Field School methodologies. Through Food Security Field School, farmers would move a step further from an agricultural model into a community study and support group that addresses the multi-faceted aspects of food security, including measures to raise production, reduce risks, mitigate the effects of HIV/AIDS and put in place safety nets. The Food Security Field School also provided the main forum to build the capacity of technical staff at various levels, as well as of community members to become skilled facilitators of multisectoral approaches to improving food security.

Capture fisheries and FSFS

Two BMUs, Kogonga and Akoka, have undertaken fishery-based food security field schools (FBFSFS), while a third BMU, Luanda Disi, is making preparations to start the process. Kogonga is a temporary community of approximately 200 people (>50 percent women) from many different areas around the Lake Basin. Local fishing grounds had become unproductive through overfishing and use of illegal fishing gears. A beach management unit was started in 2000 under the direction of Kenyan Fisheries Department (KFD). In 2003, 35 members of the community formed a FSFS to try to protect the valuable fishery habitat in the area and to develop additional land-based activities for income generation and overall improvement in standard of living.

The Akoka FBFSFS is composed of local residents from three beaches, Aram Beach, Kokech Beach, and Kadede Beach. Fishing is similar to Kogonga, and also in a similar manner, fish catches had decreased in the area due to over-fishing and use of illegal fishing gear. On 3 May 2003, ten people within the BMU began mobilizing the community to help protect critical spawning habitat in the area. By 30 July, 2003 the group had 30 members, each paying 100Ksh to join. The group had learned of the experience from Kogonga FBFSFS and contacted KFD to establish a FBFSFS with similar objectives.

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Tilapia are sorted and sold according to size – habitat protection has lead to larger and more tilapia and Nile perch

The "trials" in both areas involved the protection of fish breeding grounds for Nile tilapia and perhaps Nile perch along the coastline through the establishment of a protected area where fishing was restricted and illegal fishing gear was banned. The idea was that fish from the protected area would move from the protected area into areas where fishing was allowed in order to increase production in the surrounding areas. Prior to

Box 1. Key elements of Food Security Field Schools	
Participatory/ Interactive/ Bottom-up	Group members decide what is important for the school. Discussion among members and facilitators are important
Facilitators not teachers	Facilitators encourage discussion and exchange of ideas; provide additional information that the group may need to make decisions; help group decide what to do rather than lecture group or simply transfer technology
Learn from common experiences	Practical experiences are shared among resource users
Agro-ecosystem analysis	The entire production system and how its parts are linked is extremely important
Multi-disciplinary	Since most people undertake a variety of tasks in their daily lives, the approach should address many components of the production and social system
Experimentation/trials	Learning by doing is most effective
Analysis/adoption	Participants assess the results of their trials and then adopt appropriate techniques to their own production/social system

Table 1. Tilapia production from Kogonga Fishery Based Farmer Field School

a) Indicative tilapia catch of a 3 man crew fishing 4 hours with 5.5" gill net

Size category (approximate weight)	Number of fish	Value/category (ksh)	Value subtotal (ksh)
1 (0.91 - 1.00kg)	2	70	140
2 (0.81 - 0.90kg)	2	60	120
3 (0.71- 0.80kg)	3	50	150
4 (0.61 - 0.70kg)	4	40	160
5 (0.50 - 0.60g)	3	30	90
		TOTAL VALUE	**660**

establishment of the protected area, there were practically no tilapia caught in the area and no Nile perch greater than 1 kg. Additionally, each FBFSFS started raising tomatoes as a means to generate additional income.

Results of establishing the protected area were dramatic. In Kogonga tilapia started reappearing after 3 months of intensive protection of habitat. As of 3 January 2004, 40 weeks after initiation of the programme, catches of tilapia increased from approximately 50 kg/d to between 400 – 500 kg/d; now tilapia of about 1 kg are part of the catches in the surrounding protected area (Table 1). Traders like the larger fish as they are easier to transport and spoil less quickly.

Tilapia of a range of sizes are now regular components of the fish harvest. Tilapia prices are based on size and

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Women learning to raise tilapia in ponds

no record is kept of the weight of the catch, nor of the time spent fishing (Table 1). A general rule is that a fish crew of three people spend six to eight hours/day fishing. Only Nile perch are weighed and sold for approximately 75Ksh/ kg at the time of this report.

In Akoka catches of tilapia increased to approximately 50 kg/beach/day. Nile perch also started appearing in the catch with a maximum size of 5 kg.

However, in both areas the increase in catch brought increased fishing pressure from fishers from other areas into the protected area. These "pirates" usually had motorized boats, did not respect the closed area, often used illegal gear, cut floats away, and physically attacked group members trying to patrol the area.

The FSFS approach in the project is multi-disciplinary. Therefore the fishers also attempted to raise tomatoes as an income generating activity. However, members were not farmers and needed help in producing the crops. Many fishers' families or ancestors had been involved with farming in the past, however. The FSFS brought in facilitators on a variety of agriculture related topics, such as seed variety, plant diseases, health, and HIV/AIDS, and new plots have been planted with tomatoes. Savings accounts and loan schemes have been established and small grants received from the project were used in part to develop horticulture, i.e. fishers chose to spend money on horticulture rather than on fishing gear. At the time of the mission, no fishers had quit fishing to take up farming full-time.

Another BMU at Luanda Disi, one of the first BMU's to protect habitat and regulate fishing gear, has also received funding from the project. This money was used for horticulture development, and the group wants to establish a FBFSFS to study further the benefits of responsible fishing and improve crop production.

Fish farming and FSFS

There is tremendous interest in developing fish farms in the Lake Basin. This was expressed by many of the groups interviewed and also by fishery officers in KDF. Aquaculture development here has not had a very successful track record due to lack of experience, lack of appropriate extension, economic competition from wild fisheries, lack of understanding the social/cultural context of the Basin, shortage of water and other inputs, and shortage of human resources and capacity[3]. None-the-less, this interest combined with precarious state of wild fish stocks presents an opportunity for FSFS to learn from past mistakes and determine how and when fish farming may be appropriate.

One FBFSFS in Odundo was organized around tilapia farming and horticulture. The FBFSFS in Odundo sought to teach women alternative activities in order to increase income and food security. Participants were primarily women and senior citizens who did not know anything about fish farming. They chose to examine the differences between tilapia ponds stocked with only male tilapia (all-male treatment) and those stocked with male and female fish (mixed-sex treatment). The group also undertook horticulture of kale and some traditional vegetables using different levels of fertilizer as treatments.

Although production appears to have been low for both tilapia and vegetables, the participants learned basic fundamentals of tilapia farming and were extremely enthusiastic about continuing with fish farming. The group now wants to dig bigger ponds to stock with catfish fingerlings to sell as bait to the Nile perch long-line fishery. However, simple economic analyses of the potential for tilapia and catfish fingerling culture have not been done. These analyses are necessary and should be part of the curriculum of the FBFSFS. For example, 3 fishers working 4 hours captured about 660 Ksh worth of tilapia – can tilapia farmers compete with this source of wild caught fish? Furthermore, long-line fishers currently harvest small haplochromids for bait. This practice is actually illegal as the nets used have mesh size smaller than the legal minimum size. These fish are essentially free costing only labor; each fisher uses about 1200 fish per long-line. Would the fishers be willing to pay for bait that previously was free? How much would farmers need to sell the catfish fingerlings for to be profitable? Would the KFD enforce the ban on small mesh nets, thus forcing fishers to purchase farm-raised bait? What input and transportation costs would be involved?

Opportunities for FBFSFS

The precarious status of the Lake's fish stocks, most of which have declined substantially in recent years, may have created a situation where fishers are motivated to learn about responsible fishing and investing in land-based activities, such as fish farming and horticulture. These new activities will reduce reliance and

pressure on wild fish stocks. Most of landing areas have an established administrative structure, i.e. the BMU, that provide a ready-made entry point for FSFS. Additionally, the excellent results achieved by the Akoka, Kogonga, and Luanda Disi BMU's have shown group members that their aquatic environment is a valuable asset that should be protected. The success of the protected areas has been noticed by other BMU's and fishers in the Lake, thus facilitating establishment of additional field schools.

Although the BMU's were a critical first step in community mobilization, the FBFSFS introduced agriculture to a primarily fishing group of people. One of the problems identified with long-term reduction in poverty and hunger in Bondo District was that many fishers have little business capacity, are transient and do not invest in land or local development. Now fishers are at least considering such investments, and some have created savings accounts and a system of credit.

However, changing established customs and practices will not be quick or easy. It is said that "a man from the sea leaves the sea only when he dies". This should be borne in mind when trying to wean fishers into agriculture. However, it should be stressed that it is still early in the process, there appears to be a viable crop of tomatoes awaiting future harvest, and signs are that there is interest in agriculture development by fishing community.

Lessons learnt

The food security field school approach can and should be extended to the fishery sector (Box 2). The current project has demonstrated that there is interest from group members, good facilitators available on a variety of topics, and although the schools have only been in operation a short time, initial results are encouraging from the BMUs. The development of fish farming in the area will require further economic study, and the FSFS approach in a multi-disicplinary setting would be appropriate in helping farmers decide on where and what kind of fish farming to undertake.

The FBFSFS provide an excellent contact point for interaction with Kenya Fisheries Department, FAO and other potential partners. The Kogonga and Akoka FBFSFS's working with Kenya Fisheries Department were able to achieve results that neither group could achieve individually. KFD fishery officers have come to understand that many BMUs are serious in their attempts to fish responsibly, whereas many fishers understand better the governments rationale behind fishing regulations. Signs of increased cooperation between resource managers and users are that the District Fishery Officer has agreed to assist with patrolling the protected areas around Kogonga and Akoka BMUs, KDF provided a small foot-pump has been provided to help with irrigation of crops, and local fishers have been diligent at reducing illegal fishing gear and patrolling their fishing area.

Some development projects have been criticized for not reaching the truly vulnerable sectors of society. Strengthening the BMU's through FSFS may help reach some of the vulnerable in Bondo District. Many of the BMU's had set up cooperatives and membership fees in order to support widows and orphans and to provide schools. The holistic approach adopted by FSFS and the increased confidence members have in government resource officers and facilitators may help disseminate information on HIV/AIDS and promote necessary change in social attitudes and practices. Several of the BMU's visited had awareness posters and were trying to inform members on how to prevent the disease.

It will be important to build quickly on the current success and enthusiasm generated by the project. The approach to conserving fishery habitat should be promoted throughout Kenya's shores of Lake Victoria immediately

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BMU's and FSFS provide a forum for discussion on related issues such as HIV AIDS

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The Lake contains valuable fishery resources, but rural communities are still poor

to protect fisheries, to reduce motivation for poaching, and to improve the effectiveness of the Kenya Fisheries Department. A necessary change in attitude around the Lake Basin may be underway. Sparked by the declining stocks of Nile perch, people are looking for alternative activities to provide food and economic growth. This may involve investment in land based activities, interest in developing long-term residence around farms or productive fishery habitat, and reduced migration out of fishing communities. Accompanying improvements in infra-structure such as roads and processing, as well as improvements in savings and availability of credit, may also be expected.

Bondo District of Lake Victoria has abundant natural resources, but the inhabitants still remain poor for a variety of reasons, some of which are well known, while others are less clear. A multi-disciplinary FSFS approach that incorporates fishery issues and facilitates interventions by government and donor organizations, provides excellent possibilities to address underlying causes of poverty and food insecurity, and help the people improve their lives through better understanding of their environment.

[1] TCP/KEN/2901 Horn of Africa (Kenya): Reducing Chronic Hunger in Bondo District: Evaluation of Fisheries-Based Food Security Field Schools; [2] Samaki News, page 33. Vol II (No.1), July 2003. [3] Harris, E. 1993. Fish Farming in the Lake Basin, Kenya. University of Sussex, Brighton, UK.

Box 2. Advantages and challenges of the Fishery Based Food Security Field Schools in Bondo District

Advantages	Challenges
BMUs provide entry point for FSFS	Aquaculture lacks comparable structure
Competent Fisheries Department and User Group	New activities and user skills may be required.
Necessary change in attitude underway facilitated by FBFSFS	Changing attitude difficult
Government support for sector	Infra-structure needed
Mechanism to build trust	New activities should not put users at risk
Trust allows additional topics to be discussed, e.g. HIV/AIDS, education, general health, environment	Other political interests may feel challenged and resist change
Multi-disciplinary approach helps to decide what activities are appropriate	Some activities desired by group may not be appropriate; requires numerous well trained facilitators
FSFS provide contact point for government and donors	
Good user communication helps spread the word	