

In response to the severe impact that poverty has on livelihoods, health, and ecosystems, the AquaFish Innovation Lab is investing strong, evidence-based efforts that help increase agricultural productivity, expand markets and trade, and increase economic resilience in vulnerable communities. With aquaculture growing throughout the world, sustainability is essential in order for the poor to truly benefit.

Developing and implementing best management practices (BMPs) can enhance the economic benefits and lessen the environmental footprint of small-scale aquaculture operations in developing countries. Through the USAID Strategic Investment in Rapid Technology Dissemination (SIRTD) Program, activities were carried out in Ghana, Kenya, and Tanzania that focused on production options, considering profitability and environmental impacts.



EFFLUENT MANAGEMENT PRACTICES

Improved effluent management practices include:

- Guidelines on pond operation
- Management of settling ponds and vegetation ditches
- Draining to wetlands
- Top-releases for partial drainage
- Water re-use (by holding or re-circulating to other ponds)

Of these practices, emphasis is being placed on water re-use to provide the most environmental benefit. Intentional drainage, which accounts for most effluent output, can be avoided altogether for longer periods of time than has been traditionally practiced.

Some benefits to farmers of reusing water include retaining nutrients from previous production that can be incorporated into the biomass of the new crop.



TARGET TECHNOLOGIES

NUTRIENT MANAGEMENT PRACTICES

Better nutrient management practices include fertilizing and feeding regimes that reduce waste and prevent water quality deterioration that threatens fish health.

A better practice is to regulate pond water fertility by applying fertilizers to ponds in slow-release sacs that can be removed from the pond when the desired plankton concentration is reached.

Avoiding excessive feeding saves on input costs and translates directly into farm profitability. Feed that is not eaten often functions like an expensive fertilizer and can lead to highly eutrophic water conditions that both reduce yields and escalate the cost of operations.



Feeding is best regulated by observing how much feed the fish are consuming and adjusting the amount offered accordingly. This is more easily done when extruded (floating) feeds are used as opposed to pelleted (sinking) feeds. The use of pelleted feeds often results in high waste loads and lower feed conversion ratios (FCR = weight of feed fed/fish weight gain). Experienced farmers, however, are often able to manage well with sinking feeds.

PROFITABILITY ANALYSIS

Appropriate stocking and feeding regimes can reduce the cost of production through:

- Reduced aeration
- Better water quality
- Higher survival
- Reduced use of medication and chemicals
- Improved feed conversions

Initial profitability analyses shows that integrating economic, social, and environmental objectives into aquaculture production by including BMPs can result in increased profits for farmers.



A financial decision support tool has been developed to assist existing and prospective fish farmers in considering the adoption of BMPs. The tool assesses and selects production scenarios and profitability relationships for their fish farms.

The tool consists of financial spreadsheet templates that fish farmers can populate with data to develop their own financial profiles. It also helps to set benchmarks that serve as bases for investment decisions, comparisons, and/or improvements to the farm enterprise.



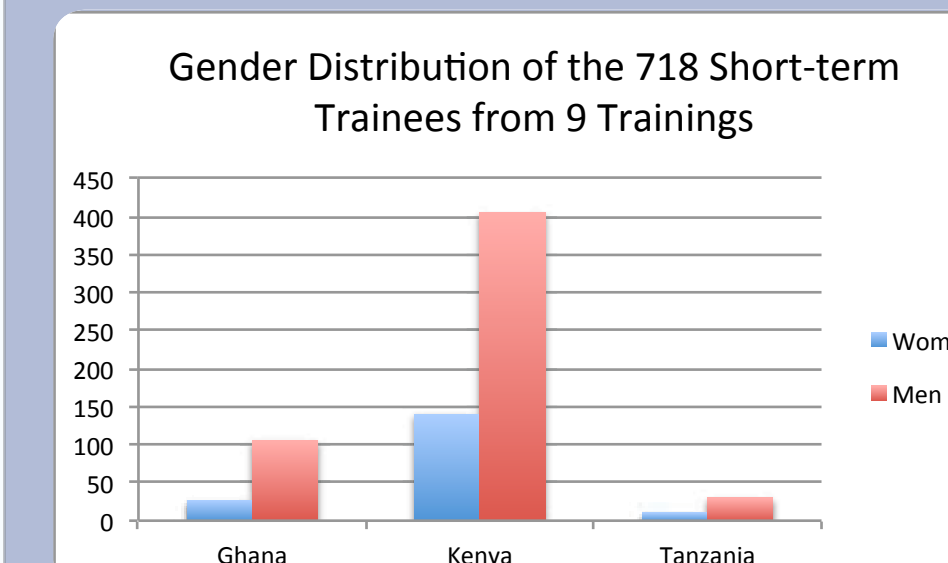
AQUAFISH TRAINING SUCCESSES

- Trained extension officers to work with farmers implementing BMPs
- United a core group of farmers who are expected to continue to spread BMPs to other farmers
- Communicated to regulators that the aquaculture industry has an active program of examining its environmental practices

SHORT-TERM TRAINING

The SIRTD Associate Award project's dedicated effort to increase women participation has led to an increase in the number of women participating in AquaFish trainings from 16% in 2011 to 37% in 2013.

The under representation of women in aquaculture poses a potential challenge to involvement in trainings; however, AquaFish continues to work towards the goal of involving equal numbers of men and women.

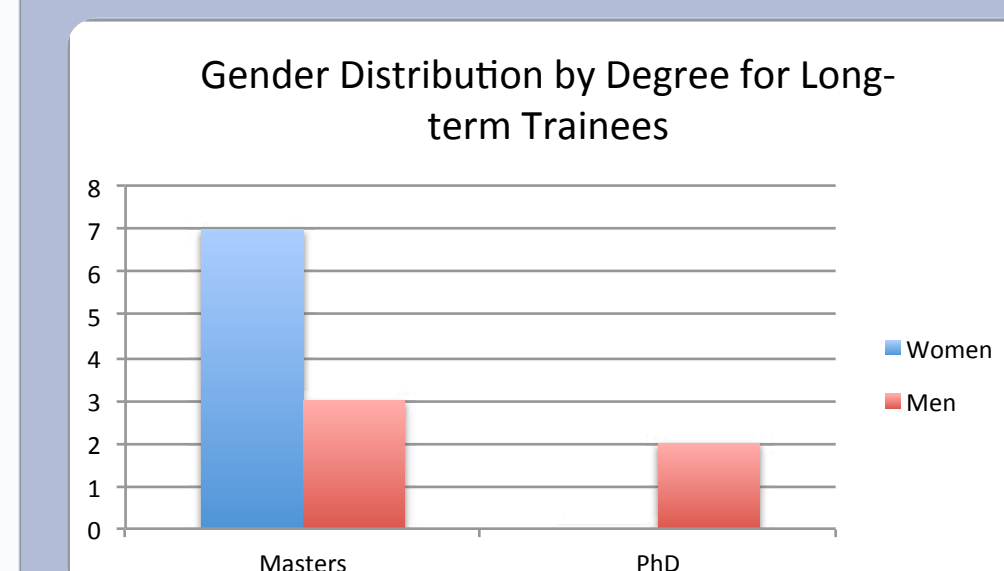


LONG-TERM TRAINING

Long-term trainings include programs resulting in the award of an academic degree.

Twelve students were supported under the SIRTD project in FY13, including seven women (58%) and five men (42%).

Among the seven Ghanaians, two are pursuing PhDs, and five are pursuing Master's degrees. In Kenya, all five of the students are working on MS degrees.



OUTREACH AND DISSEMINATION

CENTRAL MEDIA

AquaFish sponsored a series of workshops at national and regional levels to expand first exposure to BMPs. During FY13, the project organized and held three workshops—two in Ghana involving 252 participants and one in Tanzania that involved 41 participants. These workshops included:

- Train-the-trainer efforts - educating regional extension officers to liaise between BMP adopters and researchers to provide reliable advice and sustain adoption of BMPs.
- Developing communications media in local languages to provide materials directly to fish farmers.

BMP DEMONSTRATIONS

On-farm BMP demonstrations are crucial for showing farmers the benefits that can be achieved with BMPs.

AquaFish researchers built relationships with cooperative farmers to host demonstration sites. This allowed for the highest potential for the diffusion of new ideas to other farmers. Accurate data are being collected from these demonstrations, including stocking densities, fertilization rates, feeding rates, monthly water quality, yields, and FCRs.

Demonstration ponds are managed by AquaFish-supported graduate students and fisheries extension officers with the cooperation of the farmers. Ponds are visited during workshops to show farmers the benefits of BMPs and encourage adoption.

LATERAL DIFFUSION

One of the most effective methods of transferring knowledge involves farmer-to-farmer extension of BMPs.

Through regional workshops and demonstrations, participants are establishing a business enterprise network in each country.

Under the innovation diffusion model, farmers trained in workshops constitute nodes in a social network.

These farmers spread information to other farmers and become nodes, propagating their own networks, thereby laterally transmitting knowledge without the direct involvement of extension personnel.

ACKNOWLEDGEMENTS

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