Success Story

AquaFish CRSP: Sustainable Aquaculture and Fisheries for a Secure Future

No. SS-5 June 2011

Reduced Feeding Strategies Lower Production Costs

CRSP Research Helps Tilapia Farmers in the Philippines Increase Profits

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"We are developing technologies and building capacity to enhance the cost effectiveness of producing tilapia in the Philippines. The purpose is to improve the incomes and livelihoods of small-scale tilapia farmers in the Philippines who largely depend on fish as a primary source of dietary protein."

—Russell Borski, AquaFish CRSP researcher

Rapid growth of aquaculture in the Philippines is partly due to the availability of high-quality manufactured feeds. Photo by Jim Bowman

In the Central Luzon region of the Philippines, many smallholder family farms raise tilapia on a commercial scale in semi-intensive aquaculture systems. For this form of culture, the natural food in the ponds is not sufficient to support a large population of fish being grown for commercial markets. Farmers initially stock their ponds with fingerlings and add fertilizer on a regular schedule to promote growth of the plankton, algae, and bottom-dwelling invertebrates that nourish the tilapia. Farmers supplement this natural diet with manufactured feed designed to promote maximum growth. Depending on the farmer, supplemental feeding starts sometime in the period between 30–45 days after stocking. Since commercial fish feed represents 60–70% of production costs, it has a significant influence on the profitability of these small farm enterprises. To stay competitive, Filipino farmers are relying more heavily on commercial fish feed. With rising feed costs, declining profit margins threaten their livelihoods from aquaculture.

For a number of years, AquaFish CRSP researchers at Central Luzon State University (CLSU) have been working on reduced feeding technologies to control management costs without compromising marketable fish production. Their goal has been to develop a variety of options that allow farmers to select the cost-cutting strategy that best suits their individual farm situation and production approach.

According to Russell Borski of North Carolina State University, the Lead US PI for this AquaFish CRSP project, "We are developing technologies and building capacity to enhance the cost effectiveness of producing tilapia in the Philippines. The purpose is to improve the incomes and livelihoods of small-scale tilapia farmers in the Philippines who largely depend on fish as a primary source of dietary protein."

AquaFish CRSP investigators at CLSU have developed three categories of reduced feeding strategies for supplemental feed inputs: (1) delayed onset—lengthening the period before supplemental feeding is started, (2) subsatiation—feeding below the traditional recommended daily feeding level, and (3) alternate day—feeding fish on alternate days at 100% satiation levels. Using any one of these, farmers can reduce their overall supplemental feed costs without a net reduction in marketable fish yields. Local farmers have collaborated with the CRSP team to test reduced feed strategies in on-farm conditions. These trials have successfully shown that each strategy offers a viable cost-cutting approach by which to improve profit margins. The following cost and profit data are based on simple cost-return analyses of the on-farm trial results:

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- Delaying the onset of supplemental feeding to a period greater than 45 days, but no more than 75 days, reduces the overall amount of commercial feed over the shortened supplemental feeding period. A 75-day delay can lower total fish feed inputs by 37% for a $500/ha profit increase over that obtained when supplemental feeding is started at 45 days after stocking.

- Feeding at the 67% subsatiation level, farmers can lower production costs by $500/ha, increasing profits by $900.

- Reducing feed inputs to the 50% subsatiation level can raise profits to $1300/ha versus $14/ha at the 100% daily ration. Total supplemental feed inputs across the growout period can be cut by 56%.

- Feeding tilapia on alternate days at the recommended daily supplemental feed ration (100% satiation) can lower feed inputs by over 50%. A $556/ha profit is realized versus a $448/loss with daily feeding at a full ration.

Jason Isais, a CRSP graduate student at CLSU, measures out pelleted tilapia feed for a reduced feeding trial. Photo by Remedios Bolivar.

Large, market-sized tilapia can still be produced when farmers follow reduced-feeding strategies.

Interestingly, the CRSP team has found that using a combination of delayed onset supplemental feeding and reduced feed rationing (i.e., subsatiation or alternate day feeding) proves less cost-effective than following any one of these strategies individually.

Reduced feeding strategies also carry additional benefits. Under reduced feeding regimes, tilapia will convert a greater portion of feed to body weight without any adverse effect on their survival rates than they do under a 100% daily ration regime. The bottom line for farmers is a considerably lower production cost for fish yields comparable to those under standard feeding practices. The reduced feed inputs also lead to lower waste production and thus improved water quality, which brings with it an indirect cost benefit.

More recently, the CRSP researchers have shown that elimination of fishmeal, whose cost has risen considerably over the years, from manufactured diets can produce further costs savings for farmers, reducing feed costs by 8% over and above the > 50% savings obtained with the alternate-day feeding strategy.

To assist farmers in their decision making to select the best option for their farms, AquaFish CRSP has produced English-language podcasts with technical guidance on each of the reduced feeding strategies. There are also Tagalog versions available for the alternate-day feeding and 50% subsatiation feeding strategies. Download the podcasts from the website at: www.aquafishcrsp.oregonstate.edu/publications.php.

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This research was made possible by the United States Agency for International Development (USAID) through the Aquaculture & Fisheries Collaborative Research Support Program (AquaFish CRSP) under Cooperative Award No. EPP-A-00-06-00012-00 and by participating US and Host Country institutions.