INTRODUCTION

The high cost and variable quality of fish feed remains a barrier to profitability of small-scale aquaculture operations, and is exacerbated by the common practice of overfeeding. While high quality fish feeds are critical to growth and production, feed ingredients such as fishmeal, soy, corn, and wheat are globally traded commodities vulnerable to price fluctuations that can negatively impact farmers. Feed accounts for the greatest production cost for farmers, comprising about 80% of total costs in grow-out systems.

The AquaFish Innovation Lab has been researching feed formulations, ingredients, and feed strategies on semi-intensive fish farms in Africa and Asia in order to reduce production costs and maximize profit for small-scale farmers. Strategies under development include:

- Improved low-cost, alternative feeds that incorporate the use of locally produced, high quality protein sources.
- Polyvalent techniques such as multipurpose species cultivation with cage culture.
- Alternative input practices, such as reduced feeding regimes.

These techniques increase access to quality feed ingredients, improve feed efficiency, increase profits for farmers, and increase the sustainability of small-scale aquaculture.

PROVEN FEED REDUCTION TECHNIQUES:

Early AquaFish research helped pioneer the development and use of feed reduction regimes while maintaining normal production levels. Two successful strategies that remain incorporated (brought AquaFish’s current research and capacity-building portfolio include the greenhouse technology and alternate feeding. These approaches are not only more cost-effective than traditional practices, but they also reduce environmental impacts by lowering the amount of non-renewable energy entering the surrounding environment that can result from excess feed.

GREENWATER TECHNOLOGY

- When carefully handled, an aquaponic pond will naturally produce fish food for fish, directly reducing the need for supplemental feeding. This approach to optimizing pond production is referred to as “greenwater technology” because of the reduced need for inputs and reliance on natural productivity.
- AquaFish researchers found that farmers using greenwater technology in suitable locations can produce up to 300 kilograms of fish per hectare per year (kg/ha/yr) with optimal nutrient inputs. A culture operation that uses greenwater feeds in addition to greenwater technology can surpass farms that spend more time using feed inputs alone.

ALTERNATE FEEDING STRATEGIES:

- AquaFish research on alternate-day feeding with Nile tilapia (Oreochromis niloticus) in the Philippines achieved 7.5% closer to and reduced feed costs by 40% while still producing marketable fish.
- Building off of this early success, AquaFish researchers turned their attention to tilapia in China; a nearly-bankable greenhouse in Zhejiang.Alternate feeding trials produced fish of similar size while achieving an FCR of 2.75 and saving 10% on feed, compared to the control feed regime.
- This simple technology is easy to implement and requires very little training, making it an ideal option for small-scale farmers.