Local, Regional, National, and International Benefits of Stakeholder Involvement in Aquafish Innovation Lab Research

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Introduction

Developing sustainable aquaculture and fisheries systems that increase productivity and enhance local capacity is essential to addressing food security in developing countries. AquaFish Innovation Lab (AquaFish) collaborates with many stakeholders and partners to investigate and implement aquaculture technologies that address site-specific challenges facing farmers and communities. Since 2006, AquaFish has partnered with institutions and organizations from 33 countries in Asia, Africa, and Latin America to broadly investigate, disseminate, and integrate sustainable aquaculture solutions across all scales to generate positive impacts at local, regional, national, and international levels.

Integrating Solutions Locally

AquaFish transfers the benefits of aquaculture at the local level by training a variety of stakeholders, such as small- to medium-enterprise farmers, mothers and heads of households, and community groups. In Nepal, AquaFish is addressing food security and household nutrition through extension **programs at schools and farms** that train students (grades 8 to 10), teachers, women's groups, and farmers in sustainable aquaculture production. The project confirmed schools can serve as a foundation to empower youth, women, and nearby farmers with aquaculture knowledge and skills.

Broader Impacts:

- The project **trained 121 students (64 girls and 57 boys), eight teachers,** and **44 women** through women's groups.
- Knowledge transfer was measured using pre- and post-tests. Only 4% of students scored 60% or better on the pre-test, but **after participating in the curriculum** and hands on training, **85% of students scored higher than 60%.**
- After the first year of the program, **pond ownership among student households increased by 4%** and the number of times per year student households consumed fish increased by 47%.
- School pond installation piqued interest among the surrounding communities. Local **farmers established ponds of their own** within a few months of attending AquaFish trainings.

Regional Partnerships Inform National Policy

Integration and coordination across local, regional, and national levels can add value to activities and often increases the likelihood of change at national scales. For example, **AquaFish research played a substantial role in lifting decade-long snakehead farming ban in Cambodia in 2016** by creating and informing options for a sustainable snakehead aquaculture program. A key tipping point in lifting the ban was the generation of processed fish feeds, which AquaFish researchers in Cambodia, Vietnam, and the US helped to develop. New feed formulations using soy and vitamin C decrease reliance on small-sized fish and lessens the environmental impact of snakehead aquaculture, while the lifting of the ban augments income opportunities for farmers.

Broader Impacts:

- **Cambodia's Fisheries Administration (FiA) sought information from AquaFish** regarding our work on snakehead domestication, breeding, weaning, and grow-out to inform the design and implementation of a sustainable snakehead aquaculture program.
- Lifting the snakehead ban **enhanced trade and investment for global fishery markets**, opening the door for improved economic opportunities and increased food security for Cambodians.
- AquaFish **weaned the first Cambodian snakehead strain onto a soy-based feed** developed by AquaFish, a critical first step in generating a fully domesticated strain of snakehead in Cambodia.

Value of International Collaboration

AquaFish research and dissemination efforts connect international stakeholders. The AquaFish Collaborative Research Support Program (CRSP) Mali Project, for instance, used a novel (at the time) **South-South approach** – a framework designed to tackle food security challenges by **facilitating collaboration between Southern countries** – to bring together in Mali AquaFish researchers from Kenya, China, and Thailand. The project's efforts set the stage for further development of aquaculture and fisheries sectors in Mali by introducing best management practices, transferring technologies among stakeholders, and increasing economic opportunities.

Broader Impacts:

- **20 workshops reached 358 participants in Mali**, covering a variety of aquaculture topics, including: pond site selection, establishment, and management; up-to-date techniques for rice-fish culture; catfish breeding, propagation, and care; tilapia pond water quality; and best management practices.
- Field testing and demonstrations were also conducted to complement workshop activities, providing guided, **hands-on experience to farmers**.
- Technical staff of the Direction Nationale de la Pêche **acquired skills needed to conduct frame surveys** to assess fishing capacity of a water body and improve co-management for the fishery.
- The project **brought together 21 collaborators from 11 institutions and government agencies** across Mali, Kenya, China, Thailand, and the United States and **supported three students** in post-secondary degrees.

Mali Project Success Stories

Rokia Coulibaly, a 2009 trainee who travelled from Mali to Kenya, installed a catfish hatchery on her property in June 2010. By 2011, she produced 15,000 fingerlings for sale.

Mamadou Samaké, a rice producer in Mali's Baguineda irrigation area, participated in the project's demonstration of rice-fish culture techniques. By the end of the demonstration period in 2009, he harvested more rice than previously (3,640 kg) plus 115 kg of fish, generating approximately CFA 60,720 ($121) in fish sales. As a result, at least 22 new Baguineda-area rice farmers chose to adapt their rice fields for fish production in June 2010.

Seydou Toé is a farmer who previously tried fish farming but experienced problems due to insufficient technical information. Following participation in AquaFish pond culture training events, he improved his own fish farming efforts by renovating old ponds, building new ponds, and producing catfish fingerlings for sale.

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