



# FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

## DEVELOPMENT OF BIGHEAD CATFISH CULTURE FOR SUSTAINABLE AQUACULTURE IN CAMBODIA

### BACKGROUND

The goal of the Feed the Future Innovation Lab for Fish Bighead Catfish (*Clarias macrocephalus*) Culture activity is to develop and apply new aquaculture research technologies to support bighead catfish culture in Cambodia. The activity centered around two main investigations, namely the development and scaling of cost-effective feeds for sustainable culture of bighead catfish and strengthening the infrastructural and human research capacities of local institutions.

### FACILITY SET UP

This activity was a collaboration between WorldFish experts, the Center of Excellence on Sustainable Agricultural Intensification and Nutrition (CE SAIN), and the Faculty of Fisheries and Aquaculture at Royal University of Agriculture (RUA) and involved establishing three main aquaculture facilities. These included a wet lab with recirculating aquaculture system (or flow-through system) aquaria, a pond cage system using one-square-meter hapa nets, and a fish feed pelletizing machine to support feed production for research purposes as well as teaching opportunities.



Installed wetlab at the aquaculture facility at RUA, Cambodia. Photo by Sonoan Kry

### CAPACITY BUILDING

The activity involved three major training sessions. First, WorldFish trained a PhD student, interns, and the activity team on how to set up a wet lab, operate the recirculating aquaculture system, and maintain it for aquaculture nutrition research at RUA. The operation of the wet lab for scientific research was needed to start the first experiment of the activity at the RUA Aquaculture Farm. Second, two activity members from Cambodia joined a training at WorldFish in Penang, Malaysia, on formulating and producing fish feeds with a pelletizer, stocking samples and harvesting fish in the research facility, collecting and storing fish and feed samples, and managing a recirculating aquaculture system. The third capacity-building exercise was on the operation and maintenance of the fish pelletizing machine to produce floating feed. All the capacity built through these activities has equipped RUA personnel and students in their aquaculture nutrition research, which will benefit Cambodian aquaculture as whole as the industry grows.



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## ACTIVITY TEAM

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### U.S. PI

Manny Reyes, PhD  
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### WorldFish PI

Rodrigue Yossa, PhD  
WorldFish

### U.S. Co-PI

Delbert Gatlin, PhD  
Texas A&M University

## EXPERIMENTAL RESEARCH

The activity evaluated commercially available feeds with two protein levels for their suitability to support bighead catfish culture in Cambodia. The team examined two feed types from different companies with two levels of protein contents (30% and 35%). They stocked bighead catfish at a rate of 30 fish per aquaria for all treatments for 84 days. The results showed that feed types did not significantly affect fish growth, feed conversion ratio (FCR), or somatic index. However, the feed with a 35% protein level improved growth performance and FCR of bighead catfish.

The team conducted a second experiment in the pond net cages to verify the result of the first experiment. The team stocked each cage with 30 fish for all treatments and conducted weekly sampling for 14 weeks. This experiment aimed to evaluate the impact of commercially available aquafeed on growth performance of bighead catfish. The results indicated that feed types and protein levels significantly affected the final fish weight but not fish growth, FCR, feeding rate, or somatic index. The feed with a 35%

protein level promoted bighead catfish culture in a pond net-cage system.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the activity, the following recommendations are suggested:

- Technical support to a local institution like RUA Faculty of Fisheries and Aquaculture to set up and operate the wet lab facilities is a good initiative to increase aquaculture nutrition research capacity.
- Development of human resources—both short-term and long-term degree trainings—builds a good foundation for the continuation of research on bighead catfish.
- The diet containing 35% crude protein of locally available fish feed improved growth performance and FCR of bighead catfish providing insights for further studies on optimum feed management.

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## ABOUT THE FISH INNOVATION LAB

The Fish Innovation Lab supports the United States Agency for International Development's agricultural research and capacity building work under Feed the Future, the U.S. Government's global hunger and food security initiative. Mississippi State University is the program's management entity. The University of Rhode Island, Texas State University, Washington University in St. Louis, and RTI International serve as management partners.

[www.fishinnovationlab.msstate.edu](http://www.fishinnovationlab.msstate.edu)

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