





# JAFISH DEVELOPING HUMAN AND INSTITUTIONAL CAPACITY IN THE AQUACULTURE, FISHERIES, AND AQUATIC RESOURCES SECTORS

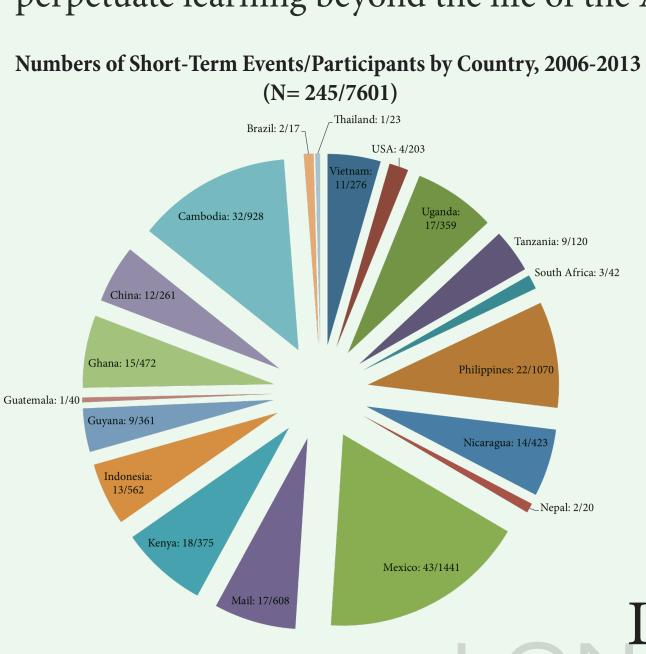
FEED THE FUTURE INNOVATION LAB FOR COLLABORATIVE RESEARCH ON AQUACULTURE & FISHERIES (AQUAFISH INNOVATION LAB)

To promote aquaculture sustainability, knowledge must be shared and disseminated amongst experts and beginners. AquaFish Innovation Lab has built upon two previous Collaborative Research Support Programs (Pond Dynamics/Aquaculture CRSP and Aquaculture CRSP) to develop a substantial network of trained international aquaculture professionals and stakeholders, creating opportunities for these exchanges to occur. Through innovative short-term trainings, such as on-farm training workshops, and long-term trainings, which focus on formal education in an academic setting, technology and information transfers have led to increased opportunities for enhancing livelihoods through sustainable aquaculture and fisheries worldwide.

#### SHORT-TERM TRAINING

From 1982, AquaFish sponsored projects have trained over 9500 people through short-term training events held in 26 different countries. Since 2006 alone, AquaFish has supported 245 short-term trainings reaching over 7600 stakeholders.

In the form of workshops, training, and on-site demonstrations, short-term trainings provide opportunities for those interested in aquaculture activities, including Host Country extension agents, fisheries officers, local fish farmers, government administrators, processors, and vendors, to learn from experts in the field with the goal of applying the newly learned techniques to individual circumstances. These trainings help fulfill extension and outreach objectives and create networks of in-country experts to perpetuate learning beyond the life of the AquaFish projects. Some short-term training topics include:



- Record keeping and fish farm business management
- Fish harvesting and processing Local feed substitutes
- Marketing fish products
- Recirculating systems • Value chain opportunities for
- women • Best management practices
- Rice-fish culture
- Business skills development



### LONG-TERM TRAINING

Long-term training is defined as academic training lasting six months or more, including degree programs at universities that culminate in a BS, MS, or PhD degree, as well as post-doctoral studies, and training for a high school diploma, a technical certificate, or Associates degree. AquaFish has supported students in earning approximately 1000 post-secondary degrees, in a variety of disciplines, including:

- Ecology Psychology
- Marine Resource Management Engineering

2006 - 2013 AQUAFISH-SUPPORTED LONG-TERM TRAINING

**INSTITUTIONS** 

- Graphic Design Law
- Business Management

• Asian Institute of Technology

• Auburn University

• Bangladesh Agricultural University

• Can Tho University

• Universidad Centroamericana

• Central Luzon State University

• Guyana School of Agriculture

• Hainan University

• Huazhong Agricultural University

• Inland Fisheries Research and Development

• Institute of Agriculture and Animal Science

• Institute Polytechnique Rural de Formation

et de Recherche Applique

• Kenyatta University

• Kwame Nkrumah University of Science and

Technology

• Louisiana State University

Moi University

• North Carolina State University

• Oregon State University

• Purdue University

• Royal University of Agriculture

• Shanghai Ocean University

• Sokoine University of Agriculture

Universidad Autonoma de Sinaloa-Culiacan

• Universidad Autonoma de Tamaulipas

• Universidad Juarez Autonoma de Tabasco

• University of Agriculture and Forestry

• University of Arizona

• University of Arkansas at Pine Bluff 1,2

• University of Georgia

• University of Guyana

• University of Hawaii at Hilo

• University of Michigan

• University of Nairobi

• Virginia Tech University

• West Visayas State University

• Wuhan University

- Fisheries Nursing
- Applied Economics Pharmacy
- Journalism • International Business

(USA)

(Bangladesh)

(Vietnam)

(Nicaragua)

(Philippines)

(Guyana)

(China)

(China)

(Cambodia)

(Nepal)

(Mali)

(Ghana)

(USA)

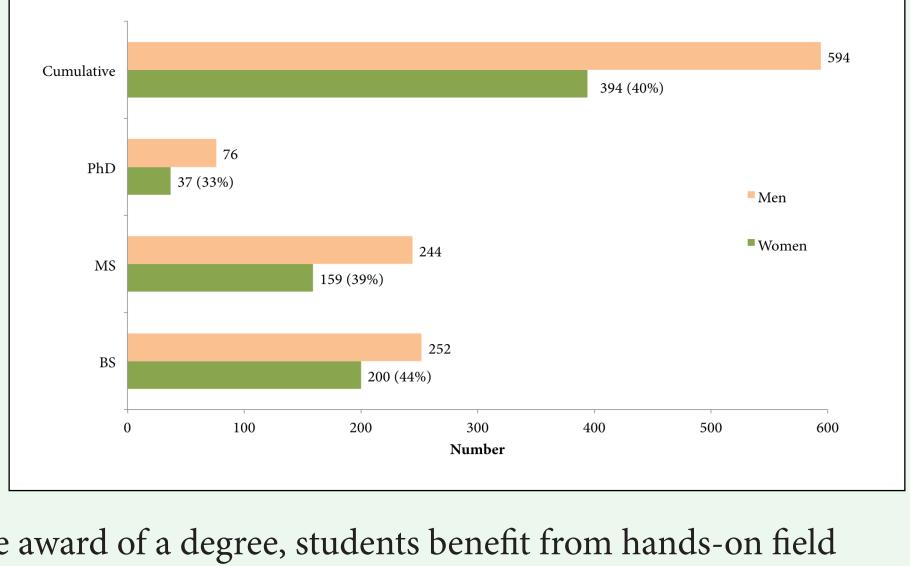
(USA)

(Cambodia)

(China)

(USA)

(USA)



Gender Distribution of Long-Term Degrees (N=988), 1982-2013

In addition to the award of a degree, students benefit from hands-on field activities and international network development, which can help propel them to be future researchers and managers in aquaculture, fisheries, and sciencerelated disciplines. The students build networks for future opportunities, the institutions are able to expand academic programs, and the Host Countries benefit from newly trained experts.

#### Institutional Capacity Building

Oregon State University (OSU) has housed the AquaFish Management Entity for over 30 years, providing support to approximately 130 OSU students in various disciplines. This experience has developed novel capacity at OSU for handling international grants and awards, which in turn has equipped AquaFish to fund collaborative research at over 100 institutions in the US and worldwide, with 50% of funding going to international partners.

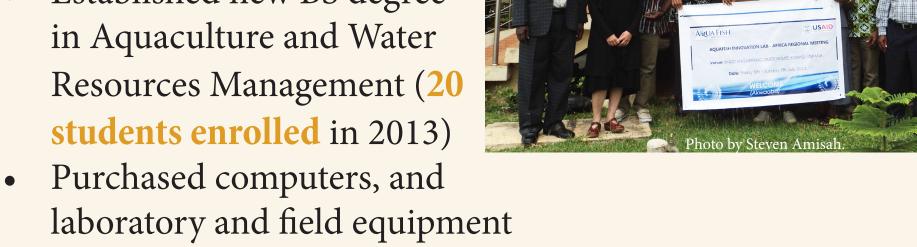
Here are examples of how AquaFish is helping to build institutional capacity at universities around the world.

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY (KNUST)



Developed 8 aquaculture

Established new BS degree in Aquaculture and Water Resources Management (20 students enrolled in 2013)



• Trained 1 PhD, 6 Master's, and 37 Bachelor's students

Universidad Juarez Autonoma de Tabasco (UJAT)



- Supported 8 key faculty members and more than 30 students (graduate and undergraduate) Developed undergraduate courses in Biology and
  - Aquaculture Engineering Created graduate courses in Experimental Design, Culture of Aquatic Organisms, Fish Nutrition, Tilapia Aquaculture, and Limnology
- Helped strengthen infrastructure of the Tropical Aquaculture Laboratory at the Biological Sciences Division, the Aquaculture Laboratory of the Agricultural Sciences Division, and the Marine Aquaculture Station



## GENDER INTEGRATION AND EQUALITY GENDER INTEGRATION AND EQUALITY

AquaFish is committed to improving women's lives and empowering them in the aquaculture and fisheries sectors. Development goals are hampered by the marginalization of women because they are often not offered the same positions as men. As aquaculture expands throughout the world, it is essential to create equal opportunities for both women and men.

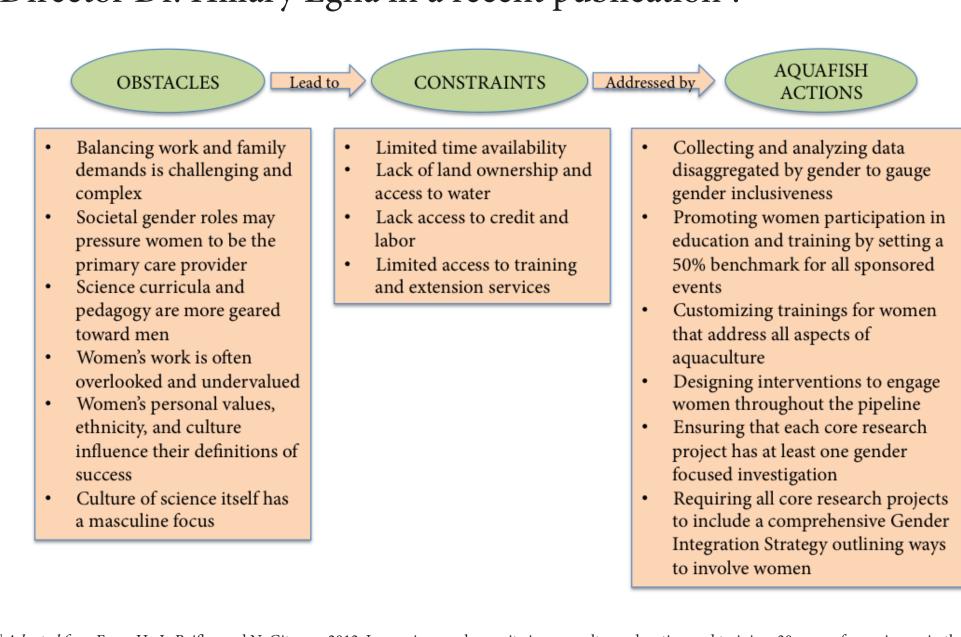
With the help of AquaFish and participating US and Host Country universities and institutions, a growing number of women are pursuing post-secondary degrees in aquatic sciences. From 1982 to present, women earned 40% of the AquaFish supported degrees. Through short-term training activities from 2006 to 2013, over 2500 women learned about all aspects of aquaculture technology, from pond stocking and management to harvesting and marketing.



#### Improving Gender Equity in Aquaculture Training and Education

Women have long been under-represented in science, engineering, and technology careers and academic employment. Although women's representation has improved in recent years, collective quantitative data on women in science sectors still show that women do not remain in science at the same rate as men. The increase in women graduates has not been accompanied by a similar increase in the proportion of women in academic science, engineering, and technology careers. It is essential to design interventions to engage women throughout the pipeline, from research in universities, high level management in organizations, to private operators in lending, fish marketing, and farming.

These issues and the obstacles for women in aquaculture, along with AquaFish actions, are addressed by AquaFish Director Dr. Hillary Egna in a recent publication<sup>1</sup>.



<sup>1</sup>Adapted from Egna, H., L. Reifke, and N. Gitonga. 2012. Improving gender equity in aquaculture education and training: 30 years of experiences in the Pond Dynamics/Aquaculture, Aquaculture, and AquaFish Collaborative Research Support Programs. Asian Fisheries Science Special Issue. Vol. 25S: 119-128.



#### WHERE ARE THEY NOW?

AquaFish seeks to build sustainable human capacity in aquaculture and fisheries by not only supporting the education of promising students, but also collaborating with these individuals at all stages of their careers. This helps to ensure that the benefits of education are far reaching and establish a legacy of trained professionals and collaborative research. Sunila Rai and Wilfrido Contreras-Sanchez are exemplary students, trained through CRSP efforts, who are now contributing to AquaFish and aquaculture research in significant ways.

Dr. Sunila Rai

Sunila Rai is a Nepalese fisheries scientist whose graduate education was supported by the AquaFish CRSP/ACRSP, earning a Master's (1997) and a Doctorate (2007) at Thailand's Asian Institute of Technology (AIT). Sunila's doctoral advisor was Dr. Yang Yi, who himself completed a PhD in Aquaculture Sciences at AIT supported by AquaFish. Sunila was motivated to pursue her education in fisheries and aquaculture science in part because of the need to address the significant gender gap in the aquaculture sector in Nepal. Through her formal long-term training and experience working on AquaFish-funded projects, Sunila was well positioned for continuing into a promising career in aquaculture and fisheries.

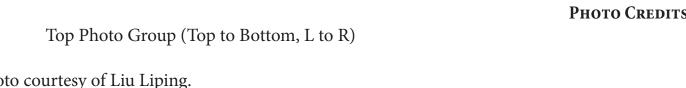
After completing her graduate education, Sunila worked as the Head of the Aquaculture Department at the Institute for Agriculture and Animal Sciences (IAAS) at Agriculture and Forestry University (AFU, formerly Tribhuvan) in Chitwan, where she conducted research for enhancing carp production in polyculture ponds. In

2013, she was appointed the Associate Dean of Academics of the Faculty of Animal Science at the AFU, and continues to work with AquaFish projects as a Host Country Investigator. Sunila is a pioneer for women in the field of aquaculture science, and she sets a strong example to encourage women to not only pursue higher education, but to become leaders in the aquaculture sector. Wilfrido Contreras-Sanchez pursued a Master's and a Doctorate in Fisheries Science supported

by funding provided by the ACRSP at Oregon State University (OSU). He completed his doctoral dissertation at OSU in 2000, which focused on finding safe and reliable masculinization techniques for sex reversal in Nile tilapia.

After completing his PhD, Wilfrido was a research professor at Universidad Juarez Autonoma de Tabasco (UJAT) and immediately started work on building capacity for aquaculture production and research in Mexico. Continuing his collaboration with AquaFish, Wilfrido has served as a Principal Investigator on research projects and continues to promote aquaculture for conservation and food security. In 2011, Wilfrido was awarded the Medal of Merit for Environmental Defense from the Congress of Tabasco, Mexico. He recently assumed the position of Vice-President of Research at UJAT and continues his efforts in aquaculture and fisheries research.





- Short-term training in Mali. Photo courtesy of Liu Liping. Women in Cambodia weaving fish onto skewers for smoking. Photo by Peg Herring. Woman with binder in Mali. Photo courtesy of Jim Bowman. Snook for sale at market in Villahermosa, Mexico. Photo by Tiffany Woods.
- Man with handmade fishnets in a pond in Mali. Photo courtesy of Jim Bowman. Family-scale aquaculture at floating houses on the Mekong River, Vietnam. Photo by Peg Herring. Preparing nets at a launch site in Tri An Resevoir, Vietnam. Photo by Tran Van Man.

Bottom Photo Group (Top to Bottom, L to R) A relief in Angkor Wat tells the 1,000 year history of fishing on the Tonle Sap. Photo by Peg Herring. Woman selling dried tilapia. Photo by Victor Motari. A man carries baskets of native fish caught in Tri An Resevoir, Vietnam. Photo by Peg Herring. Lake Yojoa is a tourist destination in Honduras, and a place where tilapia is farmed. Photo by Tiffany Woods. Man throwing a fishnet in Mali. Photo courtesy of Jim Bowman. Tilapia served at a restaurant in Honduras. Photo by Tiffany Woods.

