# AQUANEWS

*Sustainable Aquaculture and Fisheries for a Secure Future*

Feed the Future Innovation Lab for Collaborative Research on Aquaculture & Fisheries

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*Dried fish at market in Tanzania (photo courtesy of the AquaFish Innovation Lab).*

## Growing the Global Aquaculture Network One WAS Chapter at a Time

*By Morgan Chow, AquaFish Innovation Lab*


*AquaFish Host Country Co-Principal Investigator Dr. Charles Ngugi with colleagues at the Mwea AquaFish Farm in Kenya (photo courtesy of Auburn University).*

Professional networks connect people, often bringing together scientists and practitioners, and can contribute to the growth and sustainability of a sector. In the aquaculture world, possibly the most prominent network is the World Aquaculture Society (WAS), which has more than 3,000 members in approximately 100 countries.

One of the long-standing assets of the AquaFish Innovation Lab is the creation of a close-knit network of researchers, professionals, students, and government representatives that have been involved with the program in a number of ways. To continue this effort, the AquaFish Regional Centers of Excellence (RCE) in Africa, Asia, and Latin America and the Caribbean (LAC) work to develop new connections and foster existing ones. AquaFish RCE coordinators also continue to play critical roles in the development of WAS chapters, first in the LAC region in the early 2000s and now in the Africa region.

Creating the LAC WAS Chapter was no walk in the park. AquaFish RCE coordinators and longtime partners Drs.

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Wilfrido Contreras-Sanchez and María Celia Portella said that one of the main challenges associated with developing a WAS chapter is holding meetings that equally include all interested parties, without bias toward a particular country.

Drs. Contreras-Sanchez and Portella recalled that the key is to make people feel that a chapter benefits everyone, which can be difficult if a few countries are always leading the effort. They credited the Internet for making communication easier across chapter members and balancing the power dynamics between participating countries.

"Another big issue is increasing and retaining membership," Drs. Contreras-Sanchez and Portella wrote in a joint email to AquaFish.

Although people join WAS when attending a meeting or conference, many do not renew their annual membership because it is costly. "Money is always an issue since membership is not affordable [for] many scientists and institutions," Drs. Contreras-Sanchez and Portella wrote.

Despite these challenges, the LAC WAS Chapter was created and has been successful in retaining membership.

"The Chapter brings a lot of people together with common ideas," wrote Drs. Contreras-Sanchez and Portella. They said they both have witnessed exchanges of knowledge and information as well as collaboration across institutions as a result of the chapter.

AquaFish Host Country Co-PI Dr. Charles Ngugi and AquaFish HC Lead Project PI Dr. Steve Amisah are the current AquaFish RCE coordinators for the Africa Region and are helping with efforts to create a WAS Africa chapter to address the needs of scientists regionally and to connect to the global aquaculture network.

According to Dr. Amisah, "the sustained growing numbers of fisheries and aquaculture

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## Goings-On In the Pond...

Typhoon Koppu (Lando) battered the island of Luzon, Philippines, in October 2015. AquaFish colleagues and friends at Central Luzon State University (CLSU) reported that they are safe and their homes are okay, but many buildings on the CLSU campus were significantly damaged and without power for multiple days. The AquaFish Innovation Lab sends its most sincere sympathies to those affected by the storm.

AquaFish US Lead Project PI Dr. Jim Diana presented "*Development of more efficient tilapia systems in southeast Asia*" at a workshop on aquaculture development in Kazakhstan on 17 August 2015. Dr. Diana also conducted an evaluation of the feasibility of stocking zander and tilapia in Kazakhstan, with positive results. Dr. Diana and researchers agreed to train personnel on walleye culture techniques.

The AquaFish 9th Annual Report was recently completed and released to the general public on the AquaFish website with updated information on projects and country involvement. The report can be found at aquafishcrsp.oregonstate.edu/Documents/Uploads/FileManager/9AR_AquaFish_FY15.pdf

AquaFish US Co-PI Dr. Kevin Fitzsimmons was quoted in Time magazine's June issue in an article titled, "*Should I eat tilapia?*" Dr. Fitzsimmons said that tilapia is the second-most popular farmed fish on the planet and can be used in virtually any fish recipe.

Jenna Borberg represented the AquaFish Management Team at the annual World Food Prize Meeting in Des Moines, Iowa, in October 2015. The prize recognizes individuals who have advanced human development by improving the quality, quantity, or availability of food in the world including: food agriculture science and technology, manufacturing, marketing, nutrition, economics, poverty alleviation, political leadership, and the social sciences. This year's winner is Sir Fazle Hasan Abed of Bangladesh.

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*Africa and Latin America AquaFish RCE coordinators (from left to right): Dr. Steve Amisah, Dr. Charles Ngugi, Dr. María Portella, and Dr. Wilfrido Contreras-Sanchez (photos courtesy of AquaFish Innovation Lab).*

scientists, researchers, students, and practitioners, coupled with their continuous exposure to various global conferences," has generated awareness of the importance of professional networks.

For Dr. Ngugi, a WAS chapter will provide the much-needed forum to address Africa's diversity in aquaculture. For Dr. Amisah, having a WAS chapter in Africa will increase exposure of aquaculture activities across the continent, as well as provide more opportunities for stronger interactions between professionals and researchers for collaboration.

"The primary objective would be linked to the global objectives of WAS but tailored to meet the needs of African scientists, researchers, and practitioners," said Dr. Amisah.

Drs. Contreras-Sanchez, Portella, Amisah, and Ngugi agreed that being an AquaFish RCE coordinator allows them to connect people through their networks and to contribute their knowledge of international meetings and key aquaculture issues from past activities with AquaFish. This unique perspective provides RCE coordinators with the capacity to enrich an aquaculture network by organizing expert panels to stimulate discussion and new research while also encouraging participation across their networks.

Drs. Ngugi and Amisah echo convictions of similar challenges experienced during the formation of the LAC chapter. The initial creation of a chapter poses the biggest challenge, according to Dr. Amisah.

Dr. Ngugi said he shared the concerns faced by the LAC WAS Chapter regarding the lack of funds to support member travel, and Dr. Amisah stressed the importance of careful planning when creating guidelines for the roles and functions of WAS leaders to avoid future conflicts within the chapter.

Drs. Ngugi and Amisah are optimistic that the proposed WAS Africa chapter will gain the required 100 members, as there are already several active countries in Africa with WAS members. The goal is to have all of the required members by April for Asian-Pacific Aquaculture 2016 in Surabaya, Indonesia.

Drs. Ngugi and Amisah hope to tap into resources from other WAS chapters and learn from their experiences with overcoming the challenges associated with developing and sustaining a chapter.

"The Africa chapter of WAS would indirectly, but ultimately through its activities, facilitate the creation of employment, improve nutrition, and enrich livelihoods to serve the rural poor," said Dr. Steve Amisah.

"We need help especially from Asia and Latin America on how to make it a success," said Dr. Ngugi. Being a part of the AquaFish community connects the RCE coordinators from each region.

Dr. Ngugi, Dr. Amisah, and others involved — including AquaFish HC Co-PI Dr. Sebastian Chenyambuga, Senior Lecturer at Stellenbosch University Dr. Khalid Salie, and other longtime, regional partners in the Collaborative Research Support Program (CRSP) family — strive to facilitate a growing community of aquaculturists through the formation of a WAS Africa chapter.

# Zanzibar Workshop Attendees Share Aquaculture Experiences

*By Susannah L. Bodman*
*AquaFish Innovation Lab*

Bivalve shellfish farming can help increase food security and family income — not only directly but also indirectly, through the growth of cottage industries in which value-added products such as jewelry and soap are developed and sold. Such industries and products were discussed as dozens of women and men joined AquaFish Innovation Lab project partners to share their ideas and experiences in aquaculture at the Coastal Women's Shellfish Aquaculture Development Workshop, held 29-30 July 2015 in Zanzibar, Tanzania.

Participants included:

- 37 trainees from Zanzibar coastal communities (17 of whom were women);
- AquaFish HC Co-PI Dr. Narriman Jiddawi of the Institute of Marine Sciences (IMS), University of Dar es Salaam, Tanzania, and AquaFish US Co-PI Dr. Maria Haws of the University of Hawaii at Hilo, US;
- AquaFish Director Dr. Hillary Egna and Research and Communications Manager Jenna Borberg;
- AquaFish Activity Manager Dr. Shivaun Leonard from the US Agency for International Development (USAID); and
- Researchers and students from Sokoine University of Agriculture (SUA), Morogoro, Tanzania.

Among the workshop participants were no-take zone monitors; seaweed, bivalve and sponge farmers; jewelry makers; and members of the Chaza Cooperative Society, a shellcrafting and oyster management co-op.

Workshop sessions touched on community-based aquaculture research at SUA, mariculture activities that empower women, experiences from local communities, sustainable bivalve farming, and marketing. Attendees also took part in a demonstration of pearl oyster seeding.

In an introduction about the USAID Feed the Future (FTF) program, Dr. Leonard talked about FTF and AquaFish's goals of getting more food into households and helping aquaculturalists build income. In order to reach those goals, "we want to get fish farmers to think like businessmen," she said.

The entrepreneurial spirit already has a foothold in the Zanzibar community, as demonstrated by the experiences shared

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*Workshop participants in Zanzibar, Tanzania (photo courtesy of AquaFish Innovation Lab).*

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by community members. For example, local trainees talked about the various aquaculture and business ventures they're involved in and their income, challenges, and successes. Many described diversified business practices that incorporate activities such as jewelry making, farming bivalves, making seaweed soap, building a shop, hosting students, and keeping beehives.

Trainees described the challenges they face in their ventures, with marketing being cited often. One woman described how she's overcome marketing obstacles and boosted her business by becoming friendlier in interactions with tourists, including learning to use "ciao" with Italian visitors.

However, one notable marketing obstacle that emerged in the discussion was that of getting locally made jewelry and other goods into area hotels. So far, many hotels refuse to sell the products, and there's a lack of cooperation with bigger businesses.

Beyond marketing, other challenges and concerns raised by attendees included infrastructure, such as jewelry makers having to cope with unreliable power grids and related surges that can destroy power tools used to grind and polish shells.

*AquaFish Director Dr. Hillary Egna and AquaFish HC Co-PI Dr. Narriman Jiddawi of the IMS, University of Dar es Salaam, in Zanzibar (photo courtesy of AquaFish Innovation Lab).*

*AquaFish Director Dr. Hillary Egna and students at an AquaFish-supported aquaculture research facility in Tanzania discuss methods for growing fingerlings (photo by Jenna Borberg).*

Meanwhile, concerns about sustainability and biodiversity of marine resources continue to be addressed in the region through the use and monitoring of no-take zones. The zones give habitats time to recover, help boost resource abundance in adjacent areas, conserve biodiversity, and empower adjacent communities, Dr. Jiddawi said.

Monitoring the zones is currently done exclusively by women, with the support of community members. However, the women remain unpaid for their efforts. In response, Dr. Egna asked whether the government could pay the women to encourage continued monitoring.

Moving forward, attendees expressed needs and interests in several areas, including polyculture of oysters and sponges, obtaining machines and other equipment, and training in processing and other techniques.

Overall, the workshop was successful in pulling together local community members and AquaFish project partners to discuss successes, challenges, and future needs for work in Zanzibar.

## AquaFish Student Corner

# Graduate Student Profile: Shamim Naigaga

*By Susannah L. Bodman*
*AquaFish Innovation Lab*

Shamim Naigaga, an AquaFish-funded graduate student working on a Master's degree at Auburn University, hopes her research with the AquaFish Innovation Lab will help farmers to use more affordable and efficient water-quality-monitoring tools.

Naigaga is working with AquaFish Investigator Dr. Claude Boyd to compare standard methods and water-quality test kits used in measuring the presence and concentration of physical and chemical pollutants in Ugandan water bodies.

"Water quality is of concern as it is one of the main factors controlling aquaculture production. However, the extent of water quality testing of fish farms in Uganda has not been well-documented," Naigaga said. "Ugandan farmers know little about water-quality testing, and extension workers, fisheries organizations, and farmers' organizations have relatively little information on management practices used by Ugandan fish farmers."

Most fish farmers in Uganda do not have the means to measure key water-quality variables, Naigaga said, adding that they often face hurdles in terms of the cost of chemicals used in the kits and complications in shipping because some of the chemicals are deemed hazardous. Additionally some items such as test strips are hard to come by because "most test strip vendors do not ship to Uganda," she said. Consequently, if farmers can conduct tests, they often end up using expired chemicals that yield inaccurate results.

Naigaga hopes the results of her study can be helpful for training farmers in water-quality testing and interpretation and in fostering collaboration between farmers, extension workers, researchers, and fisheries organizations.

*Shamim Naigaga, an AquaFish-supported graduate student at Auburn University (photo courtesy of Shamim Naigaga).*

Originally from Kampala, Uganda, Naigaga said aquaculture first captured her interest after she realized the contributions it could make to her country and "how it had not been an explored field." She earned an undergraduate degree in fisheries and aquaculture from Makerere University in 2014.

For Ugandan aquaculture, Naigaga sees challenges that include the lack of a market for cultured fish, a lack of knowledge among farmers about aquaculture science, and poorly bred fingerlings and low quality fish feeds.

"The best intervention will be creating awareness among the farmers, extension workers, and other concerned parties," she said.

Meanwhile, cross breeding and the use of high quality diets during breeding can help improve fingerling quality, Naigaga said.

"The problem of poor quality feeds can be tackled from the source, the raw materials used to make the feeds," she said. "[Raw] protein materials like soya beans and mukene (fish) should be increased in the diet."

*Graduate continued on page 7...*

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## AquaFish Student Corner

*Naigaga examines samples (photo courtesy of Shamim Naigaga).*

Naigaga hopes to participate in aquaculture and fisheries consultation in her country, to contribute to science, and to educate young people.

But first, there is the Master's research to complete.

Naigaga has collected and analyzed data for her thesis, titled "*Assessing the Reliability of Water Test Kits for Use in Small-Scale Aquaculture*." Her expected graduation date is in December 2015.

"I am grateful to AquaFish for funding my Master's and giving me this opportunity to build my career," said Naigaga, who has been supported by AquaFish for the duration of her degree.

Her most enjoyable experience during that time has been "learning and having hands-on experiences on aquaculture techniques and the different fish species in Auburn University and being able to attend aquaculture conferences." These opportunities have contributed to an expanded aquaculture network for Naigaga.

In the future, she hopes to continue pursuing interests in aquaculture, including a PhD.

## PONDerings...

Asia Pacific leaders formally adopted the Iloilo Plan of Action in fall 2015, with the aim of promoting climate resiliency and inclusive growth in fisheries throughout Asia. The plan includes three implementation pillars:

1) Blue economy approach toward sustainable food supply chains for food security;

2) Fish loss reduction for increased fish production; and

3) Agribusiness development for food security and inclusive growth.

The plan was part of the conversations on global fisheries in the Philippines in October 2015.

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# Notices of Publication

Notices of Publication announce recently published peer-reviewed work carried out with AquaFish support. To receive a full copy of a publication, please contact the author(s) directly. All past and present Notices of Publication can be found on the AquaFish website at: aquafish.oregonstate.edu/nop.php

**Price transmission and threshold behavior in the African catfish supply chain in Uganda (15-348).**

James Bukenya[1] and Maurice Ssebisubi[2].

1. Alabama A&M University, Huntsville, Alabama, USA;
2. Aquaculture Management Consultant Ltd, Kampala, Uganda

The issue of price linkage in the catfish supply chain in Uganda is important because catfish has become an important traded species with exports to regional markets rising even faster than production, yet limited research has been undertaken to understand the linkages and the non-linearity in the price transmission mechanism. This paper explores the issue using monthly price data from January 2006 to August 2013, and applies threshold autoregressive approaches to test for the existence of a long-run relationship and price asymmetry. The results show that prices in the catfish value chain are tied together by a long-run relationship. It is also revealed that ex-vessel and wholesale price adjustments to retail price changes are symmetric while ex-vessel price adjustments to wholesale price changes are shown to be asymmetric. The direction of causal relationships was observed from the retail to the wholesale and ex-vessel markets, indicating that retailers are the price leaders in the Uganda catfish supply chain.

This abstract was excerpted from the original paper, which was published in the Journal of African Business (2015), 16(1-2): 180-197.

**Threatening "white gold": Impacts of climate change on shrimp farming in coastal Bangladesh (15-349).**

Nesar Ahmed and James S. Diana.

School of Natural Resources and Environment, University of Michigan, Ann Arbor, MI 48109, USA

In Bangladesh, tiger shrimp (*Penaeus monodon*) is commercially known as "white gold", because of its export value. However, the production of "white gold" under shrimp alternate rice and shrimp-only farming systems in coastal Bangladesh has been accompanied by recent concerns over climate change. Field survey reveals that different climatic variables including coastal flooding, cyclone, sea-level rise, salinity, drought, rainfall, and sea surface temperature have had adverse effects on shrimp culture as well as socioeconomic conditions of farming households. There is also overwhelming evidence that changes in climatic variables has detrimental effects on the ecosystem of shrimp farms, and thus, severe effects on survival, growth, and production of shrimp. Considering extreme vulnerability to the effects of climate change on shrimp farming, we propose that community based adaptation strategies and integrated coastal zone management are needed to cope with the challenges.

This abstract was excerpted from the original paper, which was published in Ocean & Coastal Management (2015), 114: 42-52.

**The social and economic impacts of semi-intensive aquaculture on biodiversity (15-350).**

Robert Pomeroy[1], Madan M. Dey[2], and Nataliya Plesha[3].

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2. Aquaculture/Fisheries Center, University of Arkansas at Pine Bluff, Pine Bluff, Arkansas, USA
3. Department of Agricultural and Resource Economics, University of Connecticut-Storrs, Storrs, Connecticut, USA

As a result of the concern and debate about the impacts of intensive aquaculture development on biodiversity, semi-intensive aquaculture is being considered as an alternative. Although the biophysical impacts of aquaculture on biodiversity have been examined, there is only limited understanding of the social

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and economic impacts of aquaculture on biodiversity, and especially the impacts of the shift from intensive to semi-intensive systems. The purposes of this article are twofold: (1) to identify and discuss the social and economic impacts of aquaculture on biodiversity, and (2) to examine the impacts while moving from intensive to semi-intensive systems. After discussing the findings of our study, we provide some recommendations as to how to minimize social and economic impacts of aquaculture on biodiversity by moving to a lower intensity aquaculture system. The integrated agriculture aquaculture farming systems, stakeholder involvement in management, and well defined basic rights are aquaculture systems that contribute to conservation of biodiversity.

This abstract was excerpted from the original paper, which was published in Aquaculture Economics and Management (2015), 18: 303-324.

## AquaFish at Oregon State University Day 2015

The AquaFish Management Team shared current work and general information about aquaculture and development at Oregon State University's annual University Day on 21 September 2015 at the CH2M HILL Alumni Center. The annual event was attended by hundreds of faculty and administrators as a kick-off event for the new school year. Among other organizations on campus, AquaFish welcomed new and old members of the OSU community.

*AquaFish Research and Communication Coordinator Caleb Price shares some fun facts about aquaculture with new faculty at OSU's annual University Day (photo by Kat Goetting).*

# Upcoming Meetings and Events...

**Aquaculture 2016**
22-26 February 2016
Las Vegas, Nevada, US
www.was.org/meetings/default.aspx?code=AQ2016

**International Symposium on Tilapia in Aquaculture**
26-29 April 2016
Surabaya, Indonesia
ag.arizona.edu/azaqua/ista/ISTA11/ISTA11.htm

**Asian-Pacific Aquaculture 2016**
26-29 April 2016
Surabaya, Indonesia
www.marevent.com/APA2016_INDONESIA/APA16%20Reg%20Bro%206-22.pdf

**International Institute of Fisheries, Economics, and Trade Conference 2016**
12-15 July 2016
Aberdeen, Scotland
www.iifet-2016.org/

**11th Asian Fisheries and Aquaculture Forum, Asian Fisheries Society**
3-7 August 2016
Bangkok, Thailand
www.asianfisheriessociety.org/events.php

**6th Global Symposium on Gender in Aquaculture and Fisheries**
3-7 August 2016
Bangkok, Thailand
genderaquafish.org/

For more meeting and employment opportunities visit our Education & Employment Opportunities network database online, EdOpNet, at aquafishcrsp.oregonstate.edu/edop.php

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Your comments, stories, student profiles, and photos are always welcome! Send information to aquafish@oregonstate.edu (please include "AquaNews" in the subject line).

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