



Activity Brief

AquaFish CRSP: Sustainable Aquaculture and Fisheries for a Secure Future

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CRSP Leads Kenya Toward a Sustainable Aquaculture and Fisheries Economy

Since 1997, the Aquaculture CRSP (ACRSP: 1997-2007) and Aquaculture & Fisheries CRSP (AquaFish: 2007 to present) have partnered with Kenyan institutions such as Moi University and the Kenya Department of Fisheries (DOF) to develop aquacultural systems that better serve the country's rural poor. This CRSP-government partnership is expected to further expand under Kenya's first *Oceans & Fisheries Policy*, announced in April 2009 by the Kenya Ministry of Fisheries Development. A newly established Aquaculture Directorate—one of four created in the Fisheries Department—has a promising 2009 budget of \$16 m, a first-time allocation for aquaculture. These monies are currently dedicated for a country-wide building enterprise of small-scale ponds as well as developing hatcheries, expanding technical training, and improving seed and feed production. With the ability to draw upon a well-established record of collaborative successes, CRSP and CRSP-trained Kenyans will be in a pivotal position to help implement these goals for growing the freshwater aquacultural subsector.

Capacity Building

CRSP activities in Kenya have engaged stakeholders at all levels—from farmers, fishers, and small entrepreneurs to extensionists, researchers, and government policymakers. Through targeted outreach and training programs for fishers, farmers and fisheries officers, CRSP has brought new technologies to rural communities and helped build the support structure for extension services. A doubling in the number of Kenyan fish farmers to over 4500 and substantial increases in farmed fish production—from less than 1 t in 1996 to 4 t by 2006 (DOF data)—verifies the robustness of the CRSP development model. Farmers adopting CRSP technologies and management practices designed for their local farm conditions have already begun to experience dramatic yield increases. In two different sets of on-farm trials in central and western Kenya, participating farmers saw yield increases of 330% (from 1 to 3.5 t ha⁻¹) in 2000 and of 420% in 2001.



A local Kenyan vendor, who has benefited from AquaFish CRSP market trainings, offers farmed tilapia at an open-air market in the western Kenyan town of Luanda. She can sell her tilapia for a higher price since it is dried, a value-added feature that helps generate additional income. (photo by Charles Ngugi)



CRSP-trained Kenyans Enos Mac'Were and Bethuel Omolo assist a Dominion Farms worker in inspecting tilapia cages at the company's site on Lake Kanyaboli. Mr. Mac'Were is currently in charge of aquaculture operations for Dominion Farms and also works as an aquaculture consultant in Kenya and Uganda. Mr. Omolo currently serves as the Head of Station at the Bungoma District Fisheries Office, Kenya. (photo by Jim Bowman)

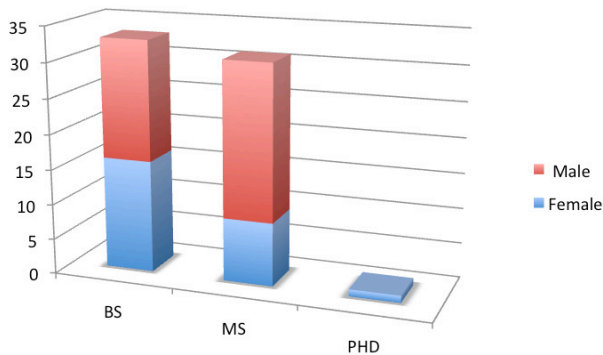


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AQUA FISH
COLLABORATIVE RESEARCH
SUPPORT PROGRAM

Graduate and undergraduate education has been another focus of CRSP training efforts in Kenya. Since 1999, 65 Kenyan students have graduated with degrees in aquaculture studies from six Kenyan institutions and two US Universities. The majority of these students—22 women and 31 men—attended Moi University, the principal Kenyan educational institution collaborating with the CRSP program. CRSP-trained graduates have



CRSP-trained Kenyan students have graduated from aquaculture programs with BS (33), MS (31), and PhD (1) degrees. Women graduates represent 40% of the overall student population. In addition to Moi University, students have attended Kenyatta University (1), Mombasa Polytechnic (1), Murang'a College of Technology (1), Nyanchwa University College of Science and Technology (1), University of Nairobi (5), Auburn University (1), and University of Georgia (2).

entered the aquacultural subsector at various levels. As government employees, some are forming a well-trained workforce of policy makers, fisheries officers, and extensionists whose expertise is essential for developing rural aquaculture. Others are proving instrumental in laying the groundwork for a robust business economy in their career roles as entrepreneurs, consultants, and employees of aquaculture companies.

Aquaculture Research

AquaFish CRSP is building on the earlier successes of the ACRSP as it broadens its development focus. Under ACRSP, the basics of small-farm production were at the forefront with emphasis on pond construction, pond fertilization, feed formulations and feeding regimes, improved “seed” production, and polyculture of Nile tilapia and African catfish. Much of this work is captured in the 2007 CRSP publication *A New Guide to Fish Farming in Kenya*, a primer on the basics of tilapia and catfish farming. Co-authored by Kenyans Charles Ngugi and Bethuel Omolo and US CRSP researcher James Bowman, it is recognized as a useful how-to training guide for tilapia farming in Africa.

Research activities in production technologies and watershed management have also formed an integral component of CRSP’s locally directed development work. Kenyan researchers, graduate students, and their US

Spotlight on CRSP Graduates

GOVERNMENT

Wilson Maina, Acting Director of Aquaculture in the Ministry of Fisheries Development, hands a copy of the Ocean & Fisheries Policy to CRSP researcher Jim Bowman. A CRSP-supported student at the University of Nairobi, Mr. Maina received his MS in 1999. He has since successfully advanced in his career, moving from his initial position of Fisheries Officer to Principal Fisheries Officer and recently to his current position at DOF.



ACADEMIA

Leah Cherop completed her CRSP-supported MS degree at Moi University in 2005. She decided on an academic position in aquaculture. After serving two years as a part-time lecturer at Moi, Ms. Cherop joined the faculty in the Department of Fisheries & Aquatic Sciences where she is now planning to pursue a PhD.



PRIVATE ENTERPRISE

James Mugo currently works as the Manager of the Mwea Fish Farm, a private business that focuses on production quality tilapia and catfish seed. Mr. Mugo started in aquaculture as a fish farm manager after completing his BS degree. When he started his MS in 2005 at Moi University, he took over management of the University’s fish farm. CRSP recently funded Mr. Mugo to train fish farmers in Mali and Tanzania on pond construction and catfish propagation techniques.





CRSP trainees attending a 2005 hatchery management course held at the Moi University Fish Farm prepare a “hapa” (a fine-mesh net-cage) for receiving catfish fry for nursing until they are old enough to be released into the open pond. (photo by Jim Bowman).

collaborators have been working to improve fingerling production techniques for African catfish, identify feeding regimes that will promote reproductive success of Nile tilapia brood fish, and determine stocking ratios for Nile tilapia-African catfish polyculture. With the completion of ecological and hydrological assessments of the Nzoia River Basin, they also have initiated the establishment of baseline data for sustainable management of this major watershed. Located in western Kenya, the Nzoia River flows into Lake Victoria and traverses a region populated by over 1.5 million people.

This record of CRSP work represents a significant scientific accomplishment both in its graduate student research training and its contributions to a growing Kenya-based research record. Through this multifaceted approach, CRSP is developing a strong local research expertise in aquaculture and freshwater fisheries which Kenyans can directly apply to their efforts to improve the lives of the rural poor.

ACRSP also spearheaded a collaborative effort that partnered two US institutions—Oregon State University and Auburn University—with Kenya’s Department of Fisheries and Moi University to develop the aquaculture facilities at Moi and Sagana Fish Culture Farm into regional research and training centers. CRSP funding helped Sagana to develop into one of Kenya’s top aquacultural research and training centers, a status reflected in its new name—Sagana Aquaculture Centre.

With a fundamental production structure now in place, AquaFish CRSP is turning its attention to strengthening the farm-to-market economic component to better serve the growing producer population. In this regard, CRSP has partnered with the USAID-KBDS (Kenyan Business Development Services program) to develop supply chain and group marketing systems for pond-raised African



US CRSP researcher Karen Veverica provided much-needed basic aquaculture training for officers of the Kenya Fisheries Department, beginning soon after CRSP initiated its Kenya project in 1997. Here participants in a 2000 short-course learn about post-harvest processing of cultured tilapia. CRSP funding helped the former Sagana Fish Culture Farm, where the training took place, to develop into one of Kenya’s top aquacultural research and training centers, a status reflected in its new name – Sagana Aquaculture Centre. (photo by Jim Bowman).



Fish farmers from western Kenya receive catfish fry for their ponds. This farmer group is one of several participating in a joint AquaFish CRSP and USAID-KBDS project that is creating a new market structure for farm-raised catfish fingerlings to reduce the threat to native stocks in Lake Victoria. The catfish fingerlings will be sold as bait to fishermen who earn their living on the lake, fishing for Nile perch (photo by Charles Ngugi).

catfish fingerlings to sell as baitfish to perch fishers on Lake Victoria. In developing both a new product and market, this project promises stable economic returns for farmers and vendors and a sustainable source of baitfish. On a larger scale, a viable market of farmed baitfish also represents a significant step towards protecting the lake’s catfish populations which are under threat from overfishing of fingerlings.

Success in establishing a new farmed baitfish industry models the AquaFish CRSP program goals of integrating income generation opportunities with market access. In 2008, the baitfish project started off with six clusters in Kenya’s Western Province, each with up to 10 members

and all close to the Lake Victoria market channels for catfish fingerlings. As of the end of 2009, 100 cluster farmers have attended CRSP trainings and production levels of fingerlings have reached 2,000 per day, supporting 20 traders along the lake shores. One cluster has grown to 25 members with nine women farmers among them, a significant accomplishment given the low number of female fish farmers in Kenya. Impressed with the CRSP baitfish clusters, the Women in Fishing Industry Project (WIFIP) has partnered with cluster farmers to train local women in fish pond construction and catfish breeding. Based at Lake Victoria, WIFIP is promoting aquaculture as a means of providing additional household income for women fish traders.



Kenyan researcher Charles Ngugi is one of the international CRSP experts collaborating on AquaFish CRSP's sustainable aquaculture and fisheries project in Mali. Here, during a February 2009 workshop, Dr. Ngugi (center) instructs Malian fish farmers, government fisheries officers, and extensionists in the basics of surveying techniques that they will use to lay out and construct fish ponds. (photo by Jim Bowman)

Regional and Local Focus

AquaFish CRSP is also helping to position Kenya as a major regional player in the development of Africa's aquaculture economy. Kenyan CRSP researcher Dr. Charles Ngugi of Moi University currently leads the CRSP's Regional Center of Excellence (RCE-Africa), whose charge is to offer technical expertise and foster collaborative partnerships across Africa and in particular with IEHA (Presidential Initiative to End Hunger in Africa) countries. Dr. Ngugi is actively developing ties with fellow African researchers and organizations such as SARNISSA (Sustainable Aquaculture Research Network in Sub-Saharan Africa), ANAF (Aquaculture Network for Africa), and NEPAD (New Partnership for

Africa's Development). He is recognized as a regional expert, having recently contributed to SARNISSA's 2009 aquaculture status and policy reviews for Cameroon, Côte D'Ivoire, Ghana, Kenya, Malawi, and Uganda. Working beyond Kenya's borders, Dr. Ngugi is also a collaborator on the AquaFish CRSP Associate Award in Mali (2007-2010). Along with other AquaFish CRSP international partners from China and Kenya, he is training Malians in technologies and practices that will lead to a more sustainable freshwater aquaculture subsector in that country.

Within Kenya, the CRSP's RCE-Africa has collaborated with the Department of Fisheries to provide startup funding to the Aquaculture Association of Kenya (AAK), a new organization that actively promotes private-sector aquaculture. AAK Vice-Chairman William Kiama is a CRSP farmer-trainee who is a success story in his own right. A model fish farmer, he serves as an enthusiastic "aquaculture ambassador" both in Kenya and regionally. In March 2009, Mr. Kiama, Dr. Ngugi, and seven other CRSP-trained Kenyans—among them researchers, extensionists, and Department of Fisheries officials—participated in the FAO National Aquaculture Stakeholders Workshop which was held to develop a National Aquaculture Development Strategy for implementing *Kenya's Ocean & Fisheries Policy*. As a member of the Board of Directors for the government's Kenya Marine & Fisheries Research Institute (KMFRI), Dr. Ngugi is also positioned to contribute his broad experience in guiding KMFRI's activities to foster growth of the aquaculture subsector under the new policy. The important national roles taken by these CRSP collaborators and trainees illustrates the successful ripple effect of CRSP's former and on-going contributions to aquaculture development in Kenya and Sub-Saharan Africa.



At a Nairobi fish market, vendors sell tilapia as whole fish or as higher-priced value-added fillets. Native to Kenya, tilapia is as popular here as it is elsewhere throughout the world where it has become a major farmed fish species.



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AquaFish CRSP • Oregon State University • 418 Snell Hall • Corvallis OR 97331-1643 USA
web: aquafishcrsp.oregonstate.edu email: aquafish@oregonstate.edu