

COVER PAGE

Farmer to Farmer - Aquaculture in Kenya and Mexico

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The Aquaculture in Kenya and Mexico Niche Project will be a collaboration between the University of Arizona (UA) and Aquaculture without Frontiers (AwF). We propose a project that will provide training and support to small holder farmers who have requested education and advice on sustainable aquaculture practices. We propose to build upon our experiences in a prior Farmer to Farmer and AwF collaboration. We will further improve capacity in the Mexican state of Tabasco and we will develop a new effort in Kenya. The Kenyan government has recently begun a project to construct 18,000 small farm ponds across the country to benefit small farmers and produce “low-cost” tilapia and catfish and provide irrigation water for the rural poor. However, the government has not provided the needed extension or technical support that will be required for this project to have any chance for success. We propose to utilize Farmer to Farmer – AwF volunteers to work with the Kenyan government, Moi University, and other NGO’s who would like for this to succeed, but lack technical expertise. We would provide training for other local trainers as well as direct training and advice to small and medium scale farmers. UA will serve as the implementing organization while AwF will provide an initial technical review of requests for technical assistance. We have already received some requests from other NGO’s for Kenya and Mexico. AwF will also provide an extensive list of qualified volunteers, many of whom are US based fish farmers. AwF has an existing list of qualified applicant organizations and requests for assistance. AwF also has a database of volunteers that would allow the Kenya aspect to start as soon as funds were approved. We expect that we could support at least twenty volunteer assignments, fourteen to Kenya and six to Mexico. There is a strong potential for matching funds that would allow us to support additional missions or extend or expand the listed missions. The Principal Investigator recently led the Farmer to Farmer - AwF Aquaculture niche program that met or exceeded all of the contracted goals. We believe we can build upon that success to again meet or exceed our obligations. AwF and UA have long been involved with the development of and dissemination of sustainable aquaculture training. Fish farmers themselves are requesting assistance and training to meet the goals of NGO’s and seafood buyers who are now demanding that seafood be produced using sustainable methods. Integrating aquaculture with vegetable production has become a secondary goal of many farmers and AwF volunteers will also assist to train farmers in these efforts.

Total Request: \$ **89,514** for one year. July 1, 2012 – June 30, 2013

Farmer to Farmer Aquaculture in Kenya and Mexico Project Proposal

1. Objectives – Our objectives are to utilize an established and successful **collaboration between the University of Arizona (UA) and Aquaculture without Frontiers (AwF)** to support Farmer to Farmer volunteers to provide **on-site information and training in small and medium -scale sustainable aquaculture** techniques in Kenya and Mexico. Our focus will be training of farmers, extension personnel, and staff from local NGO's in **Best Aquaculture Management Practices (BMP's)**, a generally accepted set of guidelines that are quickly being adopted by governments, World Wildlife Fund, NaturLand, Global GAP, Aquaculture Stewardship Council and other NGO's, farming organizations and major seafood buyers (Red Lobster, Whole Foods, WalMart, Sysco). In Tabasco and Oaxaca, Mexico, we will also provide an evaluation of progress from a previous Farmer to Farmer Aquaculture niche project along with the continuing effort. In Kenya, we will build upon a currently supported AwF fish farming project in the Kisumu and Eldoret areas. Some of the **specific training for all three locations will include manufacture of simple on-farm compounded diets from local ingredients, selection of high quality fingerlings for stocking, use of simple feeding trays to better evaluate and manage feed applications, improved harvest and handling techniques to improve shelf life, food safety and traceability, and practical methods for use of fish farm effluents on vegetable crops.**

2. Description of problem – **Aquaculture is the fastest growing sector of agriculture on a global basis and is critical to replacing overfished freshwater and marine resources.** Much of the developing world depends on seafood (fish, various invertebrates, aquatic plants and seaweeds) as a major source of protein and income. **However, many aquaculture projects have been developed using non-sustainable techniques that harm the environment, utilize excessive amounts of fishmeal, introduce exotic species, parasites, and pathogens, and provide inadequate safeguards for workers.** The global charity Aquaculture without Frontiers was organized and acts to support sustainable aquaculture practices to benefit the rural poor in developing countries. AwF is a completely voluntary organization, www.aquaculturewithoutfrontiers.org, that has no administrative staff, but has a strong record of achievement supporting (funds and/or technical advice) sustainable aquaculture development. Some aquaculture practices and industry sectors have been responsible for environmental damages and social displacements. Reducing or eliminating these impacts has been a focal point of research and action for many aquaculture farmers, researchers, and extension professionals. AwF has been in the forefront of teaching and supporting more sustainable aquaculture practices and sharing these with disadvantaged poor, especially women, landless workers, and others in extreme poverty. **AwF and their partner NGO's believe that aquaculture practiced in a sustainable manner is one of the most efficient methods to improve household nutrition, income and overall social welfare.** By teaching and training farmers to use native species of fish, to incorporate locally available feed ingredients, to develop and follow bio-security protocols, and to re-use fish effluents to irrigate row crops, vegetables, and tree crops, fish farmers can develop truly sustainable farming methods. These practices are especially useful for women in rural areas as the ancillary farming practice is often a method for women to earn additional household income, improve household nutrition and develop some entrepreneurial skills. Following more sustainable aquaculture practices may increase operating costs in the short term, but over an extended period the more sustainable practices will prove to be cost-effective and will be required by many buyers and consumers, both domestic and international. AwF volunteers have directed or advised projects in

over thirty-five countries in the Americas, Africa and Asia. We are proposing to provide a concerted effort to support an ambitious program by the Department of Fisheries in Kenya and to expand upon earlier Farmer to Farmer Aquaculture Niche efforts in Mexico. We will also prepare a detailed evaluation of the progress achieved in Tabasco, Mexico since the start of the prior Farmer to Farmer Aquaculture Niche through this proposed effort.

The UA collaborates with federal and international agencies, NGO's and the private sector to conduct agricultural research, education, and extension work on a global basis. The UA Director of International Agriculture Programs, Kevin Fitzsimmons, has served as a volunteer with AwF, and various Farmer to Farmer programs, and as Past President of the World Aquaculture Society. We propose that the **UA serve as the implementing organization** to provide the requisite administrative and reporting duties while AwF would provide its list of approved proposals and extensive list of US volunteers. We believe that this would be a most **cost-effective opportunity to leverage an existing list of volunteer requests and willing professional expertise** to improve the operations of aquaculture farms. We already have several requests from other NGO's and farmer cooperatives for support of fish farming projects in Kenya and desire to improve sustainability. They have requested competent technical and practical advice but do not have funds to bring in professional consultants.

3. Proposed Activities:

a. Key Partners - Our basic plan is that **AwF would forward requests from Kenya as well as Mexico which the AwF technical advisory group has vetted, to the UA for further evaluation and then implementation making use of the existing AwF volunteer data base.** Dr. Fitzsimmons and the UA staff would make a final review of the proposals and then contact the host country partner NGO and individual(s) who would host a volunteer. UA will consider the number of farmers to be assisted, the number of other beneficiaries (fish consumers, farm employees-family members, etc.) The ability of the NGO partner to provide local support and follow-up support and reporting after the volunteer's visit will also be an important factor in final selection of a particular request. UA would then **develop a Scope of Work (SOW)**, based on the request and the experience and information gathered by AwF volunteers and the staff at the UA. Local contributions (expenses and in-kind) from the partner/host would be identified and documented. The SOW would describe the specific tasks for the volunteer and the skills and experience that would be needed for an assignment. The most common aspects where fish farmers require additional training and assistance include how to improve water quality management, how to develop on farm manufactured feed or how to identify purchased feeds that improve growth rates while reducing waste generation and eutrophication of water, how to operate and manage a fish farm without the use of antibiotics or chemicals, how to install and maintain bird netting, where to purchase certified pathogen free stocks, and how to prepare or purchase feeds with minimal amounts of fishmeal. We will also advise on practical methods to integrate fish farms with simple irrigation and fertilization of vegetable and row crops utilizing fish pond effluents. These topics are also the core of the Best Management Practices that have been adopted by World Wildlife Fund, the Aquaculture Certification Council, WalMart, Global GAP, Aquaculture Stewardship Council, Whole Foods and others sourcing sustainably grown seafood. AwF volunteers, as experts and practitioners of sustainable aquaculture are familiar with these issues and practice them on their own farms.

In addition to these and other applications that have been submitted through the AwF, the **UA could also consider direct applications from farmers and farmer groups in Kenya or in the states of**

Tabasco and Oaxaca, Mexico or from Western or Central Kenya. Again, the ability and willingness of a host and NGO to work with UA to document the results will be one of the primary criteria in project selection.

After the UA develops the SOW and selects the volunteer, the **UA will prepare the assignment contract with the volunteer, arrange visa and other travel documents and purchase insurance.** The office staff members at the UA have experience with these procedures and would prepare a separate spreadsheet-based **management information system to track the Aquaculture Farmer to Farmer project.** We will also provide instructions and training to the volunteer on both the particular aquaculture aspects of Statement of Work and the cultural aspects of their host country and region. Volunteers will also receive instructions relating to the particular guidelines provided by US AID. Particular attention will be provided to mutual desires to avoid introductions or use of invasive species, GMO's, pesticides, or non-sustainable practices. Volunteers will be advised of the reporting requirements and data needs. The project will also **post reports to the existing Aquaculture Farmer to Farmer website** linked to the AwF and University of Arizona Aquaculture <http://ag.arizona.edu/azaqua> websites. The website describes the overall program, links to the AwF application page, and has a results section that includes reports, monitoring and impacts.

In Table 1, are some of the Kenyan target hosts currently requesting Farmer to Farmer-type assistance through AwF. These projects have been reviewed by the technical advisory group and have been visited by an AwF volunteer and are indicative of the types of projects that would be considered.

Table 1. Current requests for sustainable aquaculture training in Kenya.

Location	Farm project	NGO Partner	On ground reviewer / Date of review	Number of farmers	Gender
Eldoret, Rift Valley Province, Kenya	Tilapia and catfish ponds and farmers in region	Moi University	Dr. Julius Manyala / Feb 2012	200	Male
Kisumu, Western Province, Kenya	Tilapia hatchery and rice farming	Dominion Farms	Enos McWere / Nov. 2011	30	Male and female
Kisumu, Western Province, Kenya	Fingerling-poultry and horticulture	Kenya Gatsby Trust	Enos McWere / Jan. 2012	45	Male and female
Multiple across Kenya	Tilapia farmers and gardens	Department of Fisheries	Charles Ngugi/ multiple	5,000 to 18,000	Male and female
Central Province Kenya	Tilapia farmers cooperative	Co-op group of women with no formal name yet.	Charles Ngugi / Dec 2011	60	Female

Table 2. Current requests for sustainable aquaculture training in Mexico.

Location	Farm project	NGO Partner	On ground reviewer / Date of review	Number of farmers	Gender
Caridad Guerrero, Tabasco, Mexico	Tilapia and habanero peppers	Fundacion Vigas and Ejido Caridad Guerrero	Wilfrido Contreras/ Dec 2011	15	Male and female
Oaxaca, Mexico	Snook	Fundacion Vigas and Universidad Autonoma de Tabasco	Fitzsimmons and Contreras August 2011	45	Male and female

b. Target Hosts - **AwF will be the primary partner, but Kenya Gatsby Trust, Dominion Farms, and Moi University in Kenya, along with the Kenya Department of Fisheries** are expected to serve as local host/partners. **A farmers cooperative (ejido), a university in Tabasco, a fishing cooperative, and a Mexico City based foundation** are expected to participate and provide valuable contributions of time and resources as local host/partners. Specifically, the hosts will be expected to provide all local transportation, take the lead to arrange workshop times and locations, invite local farmers and contribute to the training efforts to improve sustainability for aquafarmers in Kenya and Mexico.

c. Numbers and types of volunteer assignments - We expect that each of the **partner NGO's and individuals listed in Tables 1 and 2, along with past partners** would **serve as hosts**. Our plan is to have **20 Farmer volunteer assignments** during the grant, each averaging 7 to 10 days. In the first six months we plan to arrange ten Farmer visits. **Seven visits to three locations in Kenya and three to Tabasco, Mexico.** Our plan is to develop the Statements of Work in conjunction with the host partners that have been vetted and approved by the AwF technical advisory group, an AwF volunteer who has been to the site, and finally by the UA. The SOW will have a heavy focus on provision of training in best aquaculture management practices. Farmer volunteers will be selected in great part on their ability to provide practical training in BMP's from their own experiences. We will place special emphasis on the areas most requested by our hosts, improved seed stocks, on farm compounded feeds, better feeding practices, better harvest and handling practices, and use of effluents for small scale farming. In Mexico we worked with the Vigas Foundation, the Universidad Autonoma Juarez de Tabasco, and two ejidos. In each case we have worked with the host, or a host representative, to provide practical training and support and then to document the results of the volunteer work, determine the changes in operations and improvements in farm capacity, and reduction or elimination of environmental damages. Some of the specific training for all three locations will include manufacture of simple on-farm compounded diets from local ingredients, selection of high quality fingerlings for stocking, use of simple feeding trays to better evaluate and manage feed applications, improved harvest and handling techniques to improve shelf life, food safety and traceability, and practical methods for use of fish farm effluents on vegetable crops.

4. Sources of US volunteers:

a. The AwF volunteers, and others that UA might recruit, will all have practical experience with Best Aquaculture Management Practices. Specifically, we will be recruiting from our volunteers who have experiences with fry and fingerling selection for stocking, on farm feed preparation, monitoring pond water quality, harvest and handling techniques and post –harvest evaluation of value chains and marketing. United States markets have been some of the first to demand that farmers follow more sustainable practices and US NGO's and academics have collaborated with industry to develop these BMP's. Now international producers are under heavy pressure to implement BMP's in order to sell to US markets. US Farmers who have practical experience implementing these BMP's will be some of the best instructors. AwF has a volunteer list of several hundred famers and academics with desired experiences. A few of these volunteers may be repeats from the prior Aquaculture Niche project, but as the primary focus country is new, we expect to have a majority of new volunteers. The number of female volunteers in our data base has increased considerably in recent years and we hope to recruit several to participate in this project.

b. Recruits - A potential volunteer list will be developed incorporating AwF volunteers, including some with prior Farmer to Farmer experience and others new to the program. We will prepare the list in conjunction with Dr. Dave Conley, the executive director and new volunteer coordinator for AwF, and Fitzsimmons' extensive contact list. Several **aquaculture employment/volunteer opportunity list serves and websites will also be used to publicize the opportunities** to expand the potential pool of Farmer to Farmer volunteers. These include the World Aquaculture Society jobs website, the AquaFish CRSP Ed/Op website, www.aquaculturejobs.com, and the AwF Facebook group. **Only volunteers meeting US-AID criteria (US citizens and permanent residents) would be reviewed** to serve on the proposed projects. Many of the AwF volunteers are known to Drs. Fitzsimmons and Conley and they have already answered a questionnaire detailing experience, locations of volunteer interest, language skills, and time frame for volunteering. Many of the fish farmers in the Western United States have also worked with the USDA – Western Regional Aquaculture Center, where Fitzsimmons serves on the Extension committee and the Board of Directors. These farmers are an additional pool of expertise who may not currently be AwF volunteers. **As many of the farmers in developing countries are women, we will put specially emphasis on recruiting female volunteers from our lists. This is especially important in the Muslin dominated areas of Kenya.**

We plan to provide a final analysis of the requests for assistance listed in Table 1 and then recruit and identify volunteers within a few weeks should Arizona and AwF be selected. Volunteers we determine to be qualified, will be contacted through the e-mail list maintained by the AwF and the associated AwF group on Facebook. Aquaculture farmers and extension specialists from across the US who indicated they have the requisite skills for a particular mission will be contacted to determine their availability and interest in a selected project. If an additional pool of volunteers is needed, we will solicit volunteers through the industry specific channels listed above. We will also begin preparation of the SOW based on the original request and our follow-up discussions with the host NGO. The SOW's would be prepared within two months and the first **ten volunteers in host countries in months 3-6. We plan to support ten project missions during the first six (6) months and ten more in the second half year.**

b. Placement – The UA office has extensive experience providing international travel and documentation needed for University projects. The office also administers the **TraiNet and Visa Compliance System** at

the UA, acting as Originators and Verifiers for several US-AID supported projects. The UA will be responsible to coordinate with the hosts and the Farmer volunteer to arrange travel and complete all the tasks in the SOW. Typically the **host NGO will provide local transportation, several meals, interpretation, if necessary, transportation for local farmers, and a venue for training or workshops.**

b. Support – Before departure the Farmer volunteer will be provided with specific details and schedule with contact persons and numbers, in addition to the goals and activities in the SOW. The volunteer will also be provided instructions and funds to purchase a SIM card to be used in personal cell phone to enable easy communications in country. We have found this to be critical for efficient use of limited time and travel resources. Most important, the volunteer will be supplied with an Aquaculture Water Quality test kit, a pH test pen, extra reagents, and for the Kenya project, an oxygen meter. These are all critical tools for monitoring effluents and farm water conditions. Just as important, the volunteer will be provided with expendable lab supplies and text books which are very difficult to obtain in most developing countries. Finally, AwF has, in the past, been able to procure foundation funds in support of specific projects. If additional monies or support were provided as matching or in-kind, the Farmer to Farmer program would benefit and be able to expand the number or the duration of individual missions.

5. Target beneficiaries

a. **Our primary beneficiaries will be the farmers who receive training and technical support and their immediate families.** The secondary beneficiaries will include neighbors and colleagues who learn from the host farmers and the cooperatives and NGO's who are supporting the fish farmers. **Improving the capacity of the NGO's and Universities to provide additional BMP training themselves** is a critical goal. Another benefit is that family members and local community will have higher quality seafood, more vegetable produce, and a cleaner environment. Finally, consumers in the local and international markets benefit when fish are grown using the most sustainable practices. **The projects identified in Table 1 would directly benefit at least a thousand people in Kenya, with the potential to impact many more.** The Aquaculture Farmer to Farmer project would allow these producers to utilize practices that will minimize environmental impacts while at the same time improving the market value of the products.

b. **Impacts and Benefits - Volunteers and their hosts would jointly be responsible for collecting information on the farming practices generally in use before the volunteer actions and after.** Each project report will use summary tables described in the RFP (Annex D) as well as a more detailed text report. The table will be for a quick check of project objectives. The more detailed text report will document the anticipated changes in behavior and practices that will be the long term contributions of the project. Although the document will not normally go into an economic analysis of the impacts, simple enterprise budgets describing the costs and benefits of the changes might be included to better describe the improvements that are resulting from the Farmer to Farmer visits. We also intend to provide some basic instruction to the volunteers for collection of value chain information. This has become a critical aspect of documenting the improvements in livelihood and social welfare. This will be especially important in Kenya as the scope of the government's pond building program is vast, but the impacts on the people seems to be an after-thought.

6. Knowledge generation and sharing

a. **Recommendations and training and demonstrations** that are developed to assist farmers to operate

within the BMP's will be prepared into **Power Point presentations, small demonstrations, and/or printed materials and made available to other volunteers.** Some of these BMP's presentations have already been prepared for the earlier Aquaculture niche project. We plan to expand this with additional translations to Spanish and Swahili.

b. Technologies – In addition to Power Points, workshops, demonstrations, and brochures, many of the materials and resulting reports and findings will be posted on websites (AwF, WAS, UA, host NGO's).

c. Future beneficiaries - The BMP training materials and demonstration projects will be made available to each of the host NGO's and universities for further use and dissemination. They will also be posted on multiple websites.

d. Final documentation and reporting - **UA would be tasked with providing the assignment documentation and monthly, quarterly and annual reports to the sponsor.** The results would also be posted at the Aquaculture Farmer to Farmer Program and AwF websites and reported at the annual World Aquaculture Society. A final report will be prepared to describe the overall program successes, lessons learned, and aspects that might be improved. This final document will be written by several of the volunteers and the project PI. It will be submitted to the sponsor for the record and also submitted to Reviews in Fisheries Science, a professional journal that specializes in publishing peer-reviewed studies such as this. It is anticipated that the results will be of broad interest to the aquaculture development community and possibly to a larger audience of agriculture and fisheries experts.

Table 3. Time line

	Months 1 and 2	Months 3 and 4	Months 5 and 6	Months 7 and 8	Months 9 and 10	Months 11 and 12
Review existing project applications, solicit new apps	Assignment 1,2,3,4, 5	Assignment 6, 7,8,9,10	Assignment 11, 12, 13 14	Assignment 15,16, 17	Assignment 18,19, 20	Assignment
Contact and confirm NGO partner and host(s)	1,2,3,4, 5	6,7,8,9, 10	11, 12, 13	14, 15, 16 17	18,19,20	
Develop volunteer lists per project	1,2,3,4, 5	6,7,8, 9 10	11,12, 13	14,15, 16, 17	18,19,20	
Write SOW's and send to Weidemann	1,2, 3, 4,5	6,7, 8, 9	10,11, 12,	13,14, 15, 16	17,18,19, 20	
Review SOW and procedures with volunteers	1,2, 3, 4, 5	6,7, 8,9	10, 11, 12, 13, 14, 15	16, 17, 18, 19, 20		
Mission in field	1,2, 3	4, 5, 6, 7	8,9,10, 11, 12	13, 14, 15, 16, 17	18, 19, 20	
Implementation work plan	X					
Assignment reports submitted	1	2, 3, 4, 5	6,7,8,9, 10	11, 12, 13, 14,15	16, 17,18	19,20
First Milestone report			X			
Final Milestone Report and Paper submission						X