Aquaculture Boot Camp (ABC): Enhancing success of new and beginning aquaculture farmers through integrated aquaculture production and business training

By Hanping Wang

1. Introduction and Goals

Operators of small farms play an important role in agricultural production in Ohio and adjacent states. One-third of US and Ohio farm sales originate from small farms (Mayerfeld, 2004). Many small farm owners and beginning farmers in traditional agriculture are seeking new enterprises and opportunities to increase revenues and maintain the family farm. Aquaculture presents a great opportunity for both rural and urban small and beginning farmers in Ohio. Aquaculture can have a significant impact on Ohio’s family farms, and can allow more farmers to maintain their current operations. It has diversified and supplemented farm income for many small farm operations. The growing aquaculture industry has also allowed for the conversion of small, unprofitable veal, swine, and poultry operations to profitable aquaculture operations.

In 2010, 40% of aquaculture producers in Ohio reported being in business less than five years, and another 39% reported less than ten years in operation. Therefore, 79% of all Ohio aquaculture farms (about 200) are considered new or beginning (Tiu, 2010). These new and small aquaculture operations are in urgent need of training in production techniques and business management strategies that will aid in their current operations and achieve their long-term goals of farming success. Unfortunately, there are very limited opportunities to access aquaculture classroom training and hands-on practice for those new and beginning farmers. We are proposing to address this need by developing and delivering an Aquaculture Boot Camp (ABC). The ABC will offer new and beginning farmers integrated training in aquaculture production and business management strategies with “3-I” levels: Intensive, an in-depth level involving immersion in a year-long hands-on training and mentoring program; Intermediate, a mid-level involving participation in a variety of learning activities; and Introductory, a general level where sharing of information is the goal. The ABC project will serve, and at least 30% of the program funds will be allocated to address the needs of, the following Target Audience:

- Beginning and new aquaculture farmers with less than 10 years of any farming experience.
- Other new farmers attempting to diversify their existing farming enterprise.
- Potential future aquaculture farmers: students and those without a family farming history.
- Educators and others who influence the farming decisions made by potential fish farmers.

The ultimate goal of this program is to utilize a multi-faceted approach, including classroom and hands-on training paired with industry mentoring, to improve the success rate of new and beginning aquaculture farmers in the State of Ohio and adjacent states. This will be accomplished through the establishment and delivery of an ABC in which new and beginning fish farmers gain both classroom and hands-on individual and group training in the skills required to successfully own and operate a fish farm. To achieve the long-term goal, the ABC 3-I training and partnership model will be utilized to pursue the following Specific Goals:

- Provide tools for new and beginning farmers to enhance their aquaculture production success by developing and delivering production curriculum and hands-on practices.
- Enhance the financial viability and business success of beginning aquaculture farmers by delivering business management and marketing strategies.
• Strengthen success of new and beginning aquaculture farmers through the ABC mentorship and partnership with the industry via the Ohio Aquaculture Association (OAA) and other partners.

2. Rationale and Significance

Aquaculture is one of the fastest growing segments in the agricultural sector in both the U.S. and the world, which provides great opportunities for new and small farms. According to the United Nations’ Food and Agriculture Organization (FAO), half of the world’s seafood demand will be met by aquaculture by 2020, as most wild capture fisheries are over-exploited and in decline (FAO, 2008). This suggests that any future increase in demand for seafood will need to be met by farm-based aquaculture production (Tiu, 2010).

The fish and shellfish trade deficit in the U.S. was $9.3 billion in 2010 (USDA-ERS, 2011), making it the largest contributor as an agricultural product to the U.S. trade deficit and the second among all deficit contributors. The increased attention on human health is expected to amplify the demand for seafood, which is considered a low-fat, healthy protein source. More than 80% of the seafood consumed in the U.S. is imported (USDA-ERS, 2010), most coming from developing countries. Increasing seafood safety concerns and the lack of jurisdiction over foreign production standards is also contributing to the demand for local, fresh, and healthy seafood products.

Ohio is a large and diversely populated state. Many new market opportunities exist for beginning fish farmers, including retail markets seeking high quality fish, local restaurants, social clubs, farmers’ markets, and non-profit organizations desiring to purchase locally grown products. Ohio has exceptional natural resources suitable for aquaculture operations. Land and water resources are plentiful in many parts of the state, and interstate highways connect the major cities of Ohio, as well as connecting Ohio to many regional metropolitan markets.

Strong market demand, exceptional natural resources and the nature of aquaculture create a great opportunity for new and beginning family farmers to develop aquaculture farms and for existing farmers to transition into aquaculture from traditional agriculture. In 1995, the Ohio legislature designated aquaculture as an agricultural activity and within a few years, the number of fish farms increased dramatically from 43 in 1992 to over 250 in 2009. In 2007, aquaculture had an estimated economic impact of $49.5 million in Ohio.

According to a recent study (Tiu, 2010), 79% of Ohio aquaculture producers have less than 10 years experience and 66% report annual profits of $10,000 or less. That means that most (about 200) of Ohio aquaculture farms are new, small, and inexperienced. Aquaculture Specialists at The Ohio State University South Centers have received hundreds of requests annually, via phone and email, for information on starting new aquaculture farms or diversifying existing farms. Farmers report the need for additional intensive, personalized, hands-on training; however, this type of training is also expensive (Tiu, 2010). In order to address the identified needs of new and beginning farmers for advanced information and intensive hands-on training on aquaculture production and business, federal funds are needed to support large-scale classroom and hands-on individual and group training on the skills required to successfully own and operate a fish farm.

Traditionally, many farming techniques and skills are passed down through generations. However, for those who desire to enter into fish farming, finding opportunities to apprentice with
experienced farmers can be difficult. Aquaculture is a relatively new industry in many states. In Ohio, fish farms are not clustered, but rather spread around the state, which makes it especially challenging to learn from those more experienced producers. The recent Ohio Aquaculture Industry Analysis and Strategic Plan (ODA, 2010), developed by the Ohio Department of Agriculture, the Ohio Aquaculture Association, The Ohio State University, and several other agencies and associations involved with aquaculture, identified assisting small aquaculture farms to raise and provide a consistent supply of high quality aquatic product as one of the top priorities of the aquaculture industry in Ohio. To accomplish this goal, this burgeoning industry and new farmers require federal investment to assist them in the implementation of best production practices, management strategies and business planning in the practice of aquaculture.

3. Applicant’s Experience and Resources

The OSU South Centers offers several distinct program areas and locations that make it well-suited to this project. Located in southern Ohio, The OSU South Centers includes seven centers related to agricultural research, extension, education and small business development, serving the entire state of Ohio for the past twenty years. The Ohio Center for Aquaculture Research and Development (OCARD) consists of three aquaculture research and extension specialists including two PhDs, four research/extension assistants and several graduate students. The OCARD has a satellite center located in northern Ohio, the Bowling Green Aquaculture Center (BGAC), which provides aquaculture outreach and extension services in northern Ohio.

The OCARD is the statewide aquaculture research and extension program leader in the Midwest, bringing outreach programming, training and technical information to Ohio fish farmers. OCARD personnel provide individualized technical aquaculture information, business consultations, one-on-one training, and tours of aquaculture research and demonstration facilities in Piketon and Bowling Green Ohio to more than 500 new and potential fish farmers annually. Program staff make over twenty-five aquaculture-related presentations annually to audiences around the state at venues such as the Small Farm Conference, Ohio Aquaculture Association Annual Meeting, and the Farm Science Review. OCARD’s efforts have contributed to the increase in registered new fish farms from 43 farms in 1992 to over 200 farms today, and a corresponding increase in aquaculture sales from $1.8 million to $6.6 million (NASS, 2007). Based on this experience and close working relationship with the Ohio aquaculture industry, OCARD is fully equipped and technically competent in providing enhanced assistance to new and beginning aquaculture farmers for this proposed project. The BFRDP investment will provide resources for OSU South Centers to add depth and breadth to the aquaculture program that will benefit the target audience.

For the past thirteen years, OCARD has successfully completed more than 60 aquaculture research, demonstration, and extension projects funded by USDA, the North Central Regional Aquaculture Center (NCRAC), Sea Grant, and the Ohio Agricultural Research and Development Center (OARDC). These grants have produced more than 70 journal articles, factsheets, and abstracts. The OCARD program is featured prominently in a variety of media outlets including television, radio, and newspaper.

The Business Development Network at the OSU South Centers has a proven track record with business assistance delivery. This Network includes the Endeavor Center for Business Incubation, Enterprise Center, OSU Learning Center South, Small Business Development Center, International Trade Assistance Center, TechGrowth Ohio (a technology commercialization assistance program), Manufacturing and Technology Small Business
Development Center, Growing! Farmers’ Markets and the Ohio Cooperative Development Center. The Network houses a team of twelve staff members, one PhD, two MBA’s and seven Certified Business Advisors© through the Ohio Small Business Development Center (SBDC). The mission of the Network is to increase entrepreneurial success through education and technical assistance. This commitment and vision will be transferred to the aquaculture industry for this project. The Endeavor Center has three large classrooms/auditoriums, two small conference rooms and one computer lab that can be used for class, group, and one-on-one training for the ABC. The OSU South Centers also has two IT specialists, who have been teaching basic information technology and computer classes for small farms and businesses, and will teach these classes to new and beginning farmers for this proposed project.

A select group of Ohio Direct Marketing team members will participate in developing and delivering marketing sessions for ABC. The statewide Ohio Direct Marketing Team includes more than 50 members, with representatives from OSU, the Ohio Department of Agriculture, Ohio Farm Bureau, Ohio Tourism Division, and other organizations. The team has a strong track record for developing new projects, such as the Market Ready™ curriculum, Ohio MarketMaker, and educational workshops on various direct marketing topics, including social media marketing.

The Ohio Aquaculture Association was founded in 1990 and is the leading aquaculture producer group in Ohio. The mission of the OAA is to provide scientific and educational advancement of aquaculture, encourage scientific research, develop public interest in the discipline, promote the marketing of aquaculture products and assist in the exchange of information and technology among members and other potential new farmers. OAA members are active collaborators and contributors to aquaculture workshops and tours in Ohio. The OAA serves as the industry voice in supplying input and direction to University research and Extension programs.

The combination of OCARD, the Business Development Network, the Ohio Direct Marketing Team, the aquaculture facilities and experimental farms in Piketon and Bowling Green, and the strong partnership with the Ohio Aquaculture Association, Aquaculture Program of Hocking College, and the Ohio Department of Agriculture places OSU in an exceptional position to develop and deliver this novel project to serve new and beginning aquaculture farmers in Ohio. Given our unique location and resources, we will also provide access to this distinctive training to new and beginning farmers in northeast Kentucky and northwest West Virginia, who live in areas with easy access to the OSU South Centers.

BFRDP funding will allow us to build on our established track record and synergize existing, but very limited resources to develop new hands-on, in-depth training and practice coupled with mentoring and internship opportunities. This project will focus on empowering new and beginning farmersto develop successful aquaculture businesses. In addition, this project will enable us to expand our reach to potential future farmers (students and those without a family farming history who are interested in fish farming), educators, and others who can influence the farming decisions made by the future farmers.

4. Other Similar Programs Available to New and Beginning Aquaculture Farmers

Aquaculture information and business development information is readily available on the Internet. However, to our knowledge, there is no other program that integrates the aquaculture production training, mentoring, and internship opportunities with the business development training for new and beginning farmers in the proposed geographical region. It is this integrated,
hands-on approach that makes this proposed project so unique and valuable in training and retaining new aquaculture farmers, and enabling them to flourish.

5. Approach

Goal 1 – Provide tools for new and beginning farmers to enhance their aquaculture production success by developing and delivering production curriculum modules and hands-on practice through ABC 3-I training (Intensive, Intermediate, and Introductory).

Objective 1-1: Develop 12 curriculum modules and an accompanying manual in aquaculture production and management strategies for ABC training programs needed by new and beginning farmers.

In 2011, a DACUM (Developing A Curriculum), a formal competency-based research/development process, was conducted with the aquaculture industry in Ohio to aid in the development of a quality training guide. Based on the results of the Aquaculture DACUM, twelve monthly informative educational modules and materials will be developed as part of the ABC, along with an accompanying manual in aquaculture production and business management strategies. Topics will include: 1) Whole Farm Planning (getting started in farming, acquiring land and choosing a crop or livestock enterprise), 2) Overview of Aquaculture, Systems and Species Selection, 3) Spawning and Basic Breeding, 4) Fry Production and Pond Fertilization, 5) Feeds/Live Feed and Feeding, 6) Fingerling Procurement, 7) Pond Management, 8) Stocking and Grow-out, 9) Water Quality and Aeration, 10) Biosecurity and Fish Health, 11) Harvesting, 12) Processing. Each monthly module will be designed so that the information builds on the previous module resulting in a comprehensive learning curve. Additionally, each module will be designed to coincide with seasonal activities on a typical aquaculture farm so that a participatory hands-on training event can simultaneously occur each month.

Objective 1-2: Deliver intensive classroom courses and on-farm practice to 50 new fish farmers through two one-year-long ABC Intensive programs.

ABC Intensive will provide 2 one-year-long intensive classroom courses and on-farm practice to 50 new fish farmers. We will target and recruit 25 new or beginning aquaculture farmers each year to participate in this intensive, hands-on aquaculture production training. Participants each term will join together at the OSU South Centers and BGAC one day per month for one year (January-December). Each month, an aquaculture production training module (from Objective 1-1) will be presented by qualified aquaculture researchers and Extension specialists and an Aquaculture Mentor. The Aquaculture Mentor, an experienced aquaculture producer provided by the Ohio Aquaculture Association, will be a co-teacher during each monthly training activity. This mentor will provide a unique perspective as one who is already successful in the industry.

Topics will be selected to coincide with hands-on practice to round out the class training. For example, the spawning module will be taught in March, when yellow perch (Ohio’s number one aquaculture species) spawning is actually occurring. Additionally, as a class, participants will design and conduct a pilot-scale aquaculture project in the commercial scale hatchery and production systems located at the OSU South Centers Aquaculture Center. Each year, there will be two main production practice groups: larvae and fingerling production, and food fish production. Species will include yellow perch, bluegill, and largemouth bass, which are the top three aquaculture species in Ohio and the Midwest. Participants will use the information provided to determine the species they wish to culture, the system they want to use, the
production strategy they wish to employ, and the marketing strategy to use to sell their product. Participants will be responsible for all aspects of producing their crop, from beginning (spawning) to end (marketable fish harvest) with ABC’s mentoring. Participants can visit ABC multiple times per month for their practice pilot project if needed. Each month, the class will have the opportunity to learn a new topic through lecture, participate in coordinated hands-on activities, and apply that knowledge to the class pilot project. Homework assignments to reinforce learning or to prepare for the coming month’s module will be assigned. Participants will also receive training and instruction in the business development modules and will be applying both the business and aquaculture production information and training to their own unique circumstances. At the end of the program, each participant will present their aquaculture production and business plan based on what they learned during the year. Monthly evaluations of each module and an end-of-program evaluation will be conducted. ABC Intensive will last for one year and then be repeated for a 2nd year after being revised based on participant feedback.

Objective 1-3: Provide extensive classroom courses and on-farm practice mentoring to an additional 300 new fish farmers through ABC Intermediate.

ABC Intermediate will provide training and mentoring for 300 additional new and beginning farmers through access to ABC Intensive modules, additional workshops, and bus tours of established fish farms. Not every new and beginning farmer can commit to a year-long ABC Intensive training activity; however, they may be in need of training and practice offered at a particular monthly session. For this audience, we offer ABC Intermediate. This less-intensive training allows participants to pick and choose among the 12 monthly modules for topics that have particular significance to them and register for individual training opportunities. The ABC Intermediate students will benefit from the training, interaction with the ABC Intensive students and the OAA Aquaculture Mentors, and the hands-on practices, but will not have the investment into the class pilot project. Participants can choose to practice on their own farms, and OAA Aquaculture Mentors will provide support through farm visits, phone or email. We expect to train 100 additional farmers through this extensive classroom and practice training.

ABC Intermediate will also include 9 workshops (three/year) targeted towards new and beginning farmers who may know the basics, but need professional development opportunities to enhance their skills, knowledge, and increase their business success. ABC Intermediate also includes three bus tours of existing aquaculture farms, coordinated with the Ohio Aquaculture Association, so that participants can network with other farmers and share ideas. We intend to train an additional 200 farmers through ABC workshops and bus tours.

Objective 1-4: Provide support and training to all the target audiences through ABC Introductory tools.

Digital recording portions of ABC Intensive training classes and practices will be conducted and edited in collaboration with the Ohio Aquaculture Association, and an ABC website will be developed to provide additional support to the target audience. The podcasts will be posted on the website. The website will have links to aquaculture information, podcasts, and updates of ABC activities. ABC Introductory will provide easy accessibility to aquaculture information on a 24/7 basis to the segment of the target audience that prefers to use the Internet to obtain information. The website will support ABC and the continuing education of workshop attendees by providing additional dynamic content and connecting farmer participants with each other, trainers, and mentors. Finally, the website will allow others tangentially connected to this project, for example, other aquaculture programs in the Midwest, to access information on the
To further disseminate ABC information and resources, links will be added to the new eXtension Freshwater Community of Practice (CoP) site. This CoP is devoted to providing research-based information on a variety of aquaculture topics to a variety of clientele, and uses multiple teaching formats in order to reach many audiences. This type of targeted information, available 24/7 is an efficient way to continually serve the information needs of our audiences, while guaranteeing the quality of the information. Additionally, ABC Introductory will also provide training and information through facility tours, individual and group counseling, a dedicated toll-free phone line and email. We expect to train and offer support to an additional 1000 farmers through use of ABC Introductory tools such as the website, eXtension, phone and email support.

Goal 2 - Enhance the financial viability and business success of beginning aquaculture farmers by delivering business management and marketing strategies through ABC 3-I training.

Objective 2-1: In conjunction with Objective 1-1, develop and deliver curriculum modules and accompanying manuals in aquaculture business and marketing strategies to the ABC Intensive and ABC Intermediate audiences.

Twelve monthly modules and one accompanying manual in aquaculture business and marketing strategies will be developed by the OSU South Centers Business and Marketing Specialists. ABC will incorporate these technical and business applications geared toward the aquaculture industry. Sessions will include: 1) Business Planning for Aquaculture – what is a business plan and how is one developed? 2) Marketing – conducting market research, exploring opportunities, and identifying your target market(s). 3) Determining the Business Legal Structure – the basics of legal forms of business. 4) Managing an Aquaculture Enterprise – how to manage the business for success and sustainability. 5) Cash Flow Management and Budget Development – what are the critical financial management aspects of an aquaculture enterprise? 6) Financing a new aquaculture enterprise – Available resources and what is required. 7) Recordkeeping for Small Business – An overview of recordkeeping and available tools. 8) Social Media Marketing – No-Cost or Low-Cost Tools to Establish Your Online Presence. 9) Growing for Your Customers – What Does Your Customer Require (packaging, delivery, insurance, certifications, etc.). 10) Bringing it all together – Crafting the Business and Marketing Plan for a New Aquaculture Enterprise. 11) Celebrate Your Success – Participants will give a brief presentation of their business plan to the group. 12) Make Up in case of inclement weather. Participants will simultaneously work on their farm business and marketing plan in conjunction with the aquaculture practices aspect of ABC

Objective 2-2: Deliver four additional annual complementary business and marketing workshop/trainings to ABC Intermediate.

Four additional annual complementary workshop/trainings will be delivered to the aquaculture industry in the areas of business and marketing strategies, focusing on the following areas that new farmers reported to need most:

Access to capital – Several identified areas will be addressed with access to capital business counseling: 1) Preparing investor packages, 2) Preparing loan packages, 3) Connecting state and federal resources and incentives, and 4) Locating cost avoidance opportunities through purchasing cooperatives and supply chain integrations.

Business planning - Provide assistance to small farms with preparing a business plan. This assistance will not only address the traditional elements of business planning, such as
money, marketing, and management, but will also include the unique technical elements to aquaculture operations/topics outlined in Objective 1-1.

**Commercialization** – The development of unique and innovative methods often occurs from trial and error methods in aquaculture production facilities. Assistance will be provided to the small farms to determine if potential exists for commercialization of innovative methods, alternative species, or equipment developed from this cluster. In addition, assistance will be provided to the small farms to identify current research and development occurring outside Ohio and determine if incorporation is beneficial, optimal, and feasible.

**Objective 2-3: Provide support and training in the areas of business and marketing strategies to the target audience through ABC Introductory.**

ABC counseling in the areas of business and marketing strategies will be provided to the target audience through the ABC website, and individual and group mentoring, phone, and email. Digital recording of training classes in business and marketing will be conducted, edited, and integrated into the ABC website. Professional consulting will combine the expertise of the aquaculture extension specialists and the small business counselors to provide both technical and business planning to meet the ongoing challenges of this emerging industry. In-depth business counseling will be provided to the complete aquaculture supply chain to assist with accelerating the industry. Counseling services will be provided at no cost to all businesses that are existing within the aquaculture new farmer cluster, as well as to beginning and prospective farmers to the supply chain. Areas of counseling will include all six aspects in business, and seven topics in marketing strategies described in Objective 2-1.

**Goal 3 -** Strengthen the success of new and beginning aquaculture farmers through the ABC mentorship and partnership with the industry via OAA and other partners.

**Objective 3-1: Establish an Aquaculture Internship Program through OAA to mentor new and beginning fish farmers in Ohio.**

Given the great value in farmer-to-farmer training, aquaculture internships will be an important aspect of ABC. The ABC and OAA will establish an internship program designed to provide eighteen (up to 6 per year) apprentice-type training opportunities for new and beginning aquaculture farmers and give established farmers a chance to mentor newcomers. To accomplish this, a grant program will be established offering OAA members the opportunity to cost-share an intern on their aquaculture operations. For example, if an existing aquaculture producer applies for the program, they will hire an intern that they intend to mentor on their aquaculture facilities. If the farmer pays the intern $10.00 an hour, the farmer could apply to the OAA Aquaculture Internship Program to reimburse half of the salary up to $1,000.00 per season. In this scenario, if the intern worked 200 hours during the season, the producer would pay the intern $2,000.00 and apply to be reimbursed $1000.00 from the OAA Internship Program. This would allow the intern to apprentice and learn important aquaculture production techniques as well as business operation skills and allow the aquaculture producer to mentor a new aquaculture farmer.

**Objective 3-2: Provide mentoring leadership and guidance for new aquaculture farmers through OAA and other partners.**

The OAA will provide mentoring leadership and guidance for new and small rural farmers that comprise the Association in Ohio, so that aquaculture remains an economical alternative for the limited resource farmers. OAA activities include: coordinating the ABC Mentoring and Internship programs, providing an annual bus tour of aquaculture farms, assistance in recruiting
new farmers for participation in ABC, facilitating cooperation among new farmers and existing farmers, compiling and distributing information on aquaculture for new and small rural farmers, creating and maintaining the OAA/ABC website, and developing a mentoring guide for new aquaculture farmers.

ABC Specialists will work together with OAA staff to enhance OAA’s website, newsletters and marketing strategies and opportunities. OAA and ABC will work together to digitally record segments of ABC Intensive training classes and place them on the OAA website to support the entire target audience. The website will be linked to the ABC website, with videos and updates from ABC activities and other aquaculture information. Additionally, the ABC and the OAA will collaborate to publish and distribute twelve issues (4/year) of an ABC-OAA Newsletter, and organize three conferences/workshops for new and beginning fish farmers.

During the project period, we will partner with Hocking College Aquaculture Program, Ohio Small Business Development Center, eXtension, and the Southern Ohio Agricultural and Community Development Foundation, to access additional audiences, broaden services to new and beginning fish farmers, and achieve ABC goals. We expect to establish the ABC Network with these partners in order to sustain long-term service to new and beginning fish farmers.

How and where will the activities be provided

ABC will be based at the OSU South Centers in Piketon, OH. The OSU South Centers is home to the Ohio Center for Aquaculture Research and Development and the Business Development Network. The South Centers has the facilities necessary to host this project including: conference rooms, computer labs, aquaculture lab facilities, fish hatchery and a semi-commercial scale aquaculture research and demonstration facility. The OSU South Centers also employs a variety of support personnel, including office, technical and farm, to support and carry out this project. Aquaculture and Business Specialists from the OSU South Centers will work together closely, with input from our project partners OAA and Hocking College Aquaculture Program, to develop the modules and materials and deliver the trainings. The OAA mentorship and leadership activities will occur on existing fish farms. In addition to the OSU South Centers facilities, workshops, trainings, and bus tours, will also occur at multiple facilities around the state, such as the Bowling Green Aquaculture Center, Hocking College, and established aquaculture farms throughout the state.

How will the beginning farmers and ranchers be recruited for this training?

OCARD receives hundreds of requests for aquaculture information, via phone, email and website, from new and potential aquaculture farmers each year. There is a somewhat predictive process that new farmers go through when learning about something new. First, they must do their research. They must spend time reading everything they can get their hands on pertaining to aquaculture. To fill this need, there are numerous fact sheets and white papers available, typically online. These are the clients we expect to reach with ABC Introductory. The second step is to actually speak with some current aquaculture producers and attend workshops. This step can be more challenging, as current producers do not have a lot of time to spend with prospective farmers, and workshops may not be targeted to what an individual needs at a certain time. These are the clients we hope to serve with ABC Intermediate. Finally, one must eventually put the proverbial toe in the water and build a pilot structure. It may be a tank system, a small pond, or a couple of cages, but a pilot system helps to determine if one is ready to raise fish. This is the type of participant that we hope to recruit to ABC Intensive. We envision having clients who have done some preliminary research on their own and are committed to
building or expanding their pilot operations. Given that hundreds of people contact OCARD every year in search of this type of support, and the large majority of aquaculture farmers in Ohio are new, we can recruit new and beginning aquaculture farmers from our current contacts and new contacts suggested by our partners. For example, OAA members are often approached by new fish farmers for information and support. With this project, the OAA will be able to steer these individuals to the ABC program. One of our partners, Hocking College, has a two-year Associate Degree in Aquaculture program where students are encouraged to become aquaculture entrepreneurs. Another partner, the Southern Ohio Agricultural and Community Development Foundation can also aid in recruitment and funding of participants through their scholarship and grant programs that are aimed at young farmers and innovative agricultural practices.

How will coordination with Standard BFRDP grantees take place

ACB is an integrated project requiring coordination of aquaculture and business activities. The PD and co-PD with the Ohio Center for Aquaculture Research and Development will coordinate the project. Business and Aquaculture specialists are all located on the same campus and can easily meet to develop training materials. Since the majority of the training will occur at the OSU South Centers, facilities and training calendars can be easily coordinated. The OSU South Centers has a long history of collaborating with the Ohio Aquaculture Association, with contact primarily by phone, Skype and email. Long-term professional relationships have been established between the lead grantees enabling an ease of coordination.

Innovative aspects of the proposed project

ABC is a unique, multi-faceted, and innovative approach to a problem evidenced in many new agricultural industries—the lack of hands-on practice and experience with a new farming technology or enterprise. With the reduction in the number of individuals engaged in farming for a living, it becomes difficult for new and beginning farmers to gain access to training and experience. In the case of aquaculture producers, they are relatively new and often geographically isolated, therefore making farmer-to-farmer mentoring more difficult. This was identified in a recent survey where Tiu (2010) reported that aquaculture producers selected other aquaculture producers as one of their top two preferred sources of information.

Another barrier to successful agricultural enterprises for new farmers can be attributed to lack of careful business planning, especially in start-up new farm operations. Many individuals base their business decisions on faulty assumptions, leading to long-term business problems. Learning and applying some basic business skills can enhance the success of any agricultural enterprise. Integrating production training and business training is the two-pronged approach that will lead to the greatest success.

Finally, incorporating farmers who are already successful in the industry as mentors will further enhance this effort. It’s important for new and beginning farmers to obtain research-based information from Universities, but it’s equally important for farmers to gain insight into real-world aquaculture issues. Having aquaculture mentors co-teach and open their operations to train and assist new farmers provides sustainability to this effort. The relationships built will yield long-term results, leading to the development of a stronger and more cohesive aquaculture industry composed of many new producers.

Pitfalls that may be encountered and limitations to proposed procedures

Aquaculture Boot Camp is a participatory learning experience. Participants must be fully engaged to be successful. A potential pitfall would be the challenge of attracting participants to commit to the year-long ABC Intensive program. However, given the hundreds of requests for
information received at OSU South Centers each year, and given this project has been discussed with several prospective Boot Camp participants, no problems are anticipated with attracting the target number of 25 qualified participants each year. Additionally, participants can participate in ABC at several different levels, appealing to those that have differing goals, time constraints, or learning styles.

A timeline of the proposed project
Start date: 1 October 2012; Completion date: 31 September 2015.

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<th>Year 1</th>
<th>Year 2</th>
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<td>Recruit participants</td>
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<td>Develop 12 module curricula &amp; accompanying manuals</td>
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<td>ABC Intensive (25 farmers) and Intermediate (50 farmers) production courses</td>
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<td>ABC Intensive and Intermediate: Practice 1) spawning to fingerling rearing; 2) food fish grow-out</td>
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<td>Presentations of Participants/Graduation; Develop modules and training materials for the 2nd round ABC</td>
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<td>ABC Intensive (25 farmers) and Intermediate (50 farmers) business and market strategy courses and training</td>
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<td>ABC Intensive (25 farmers) and Intermediate (50 farmers): 2nd round product course &amp; practice and business &amp; market training</td>
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<td>ABC Intermediate: 9 production workshop to 200 new and beginning farmers</td>
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<td>Four annual complementary workshop/trainings in the areas of business and marketing strategies</td>
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<td>Create ABC Website, and load video and other information</td>
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<td>ABC Introductory and ABC digital recording of production, business and marketing training</td>
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<td>ABC and OAA summer internship</td>
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6. Expected Outcomes:

Immediate outcomes

- 12 new curriculum modules and one accompanying manual in both aquaculture production and business and marketing strategies will be developed and delivered to the target audience.
- 50 new and beginning farmers (25/yr) will gain aquaculture production, business and marketing awareness and understanding, gain new perspectives, learn and practice skills, and aspire to be more successful after completing ABC Intensive.
- 100 new and beginning farmers will gain knowledge of aquaculture production, business and marketing strategies and learn new skills by participating ABC Intermediate classes.
- 200 new and beginning farmers (100/yr) will gain knowledge of aquaculture production and new technologies by participating in ABC Intermediate workshops and bus tours.
• 1,000 participants will gain new knowledge by accessing ABC Introductory and coordinating ABC website tools and information.
• 18 participants or potential new farmers (up to 6 per year) who are interested in aquaculture training experience will receive ABC and OAA internships and mentoring.
• An ABC website will be created to sustainably support the target audience.
• Podcasts of ABC Intensive training classes and practices will be developed, and posted on the ABC website permanently and distributed to new aquaculture farmers.
• A mentoring guide for new and existing aquaculture farmers will be developed.
• 12 new farmer newsletters will be published and delivered to new farmers.
• 3 annual conferences geared toward mostly new fish farmers will be organized.
• ABC network will be developed to broaden and sustain support services to new and beginning fish farmers.

Long-range outcomes and impacts
The overall goal of this project is to enhance the success of new and beginning fish farmers. By the completion of the project, we expect to 1) Increase the number of new aquaculture farmers in Ohio by 50; 2) With the additional new and beginning aquaculture farmers, total aquaculture sales for Ohio are projected to increase by 200%, and 3) Increase the economic efficiency of new aquaculture farmers by 10%.

Within a 10 year planning horizon, we expect to 1) Increase the number of new aquaculture farms in Ohio by 100; 2) Increase the value of aquaculture sales of beginning farmers by 200%; and 3) Increase the economic efficiency of aquaculture new farmers by 30% by improving farming and business skills and increasing availability of value-added products.

Upon completion, the ABC model can be adapted to other regions and communities in the Midwest and USA. Additionally, ABC materials will be available from the website and eXtension for continued dissemination of information.

How the Outcomes Will Be Analyzed, Assessed or Interpreted
Impact evaluations will document the degree of achievement of pre-determined targets and the extent to which program implementation influenced such achievement. Evaluation of the project will be built-in from the beginning. The outcome-based approach to the development of this grant is the first step in that process. Evaluation will take place throughout the process. Evaluation of each monthly module will provide for immediate feedback for the instructors. Additionally, a final evaluation of the ABC Intensive in year one will enable changes or enhancements to the ABC Intensive in year two. Finally, after careful assessment of the entire program at the conclusion of ABC Intensive, results will be published so the experience can be shared with others. Evaluations of ABC Intermediate and Introductory will occur at appropriate times during implementation and will contribute to the overall assessment of the program.

How will the project be sustained beyond the life of the grant?
The project will be well-documented and many of the activities and outcomes will be available permanently on the Internet through the OSU-ABC, OAA and eXtension websites. If this model proves to be a successful way to apprentice new fish farmers, it will lead to increased and expedited development of the aquaculture industry in Ohio, potentially impact on the aquaculture industry in West Virginia and Kentucky. To sustain the program, it would take a joint effort among the Universities, partners and the aquaculture industry. If the program is worthy, Universities will see it as a priority and therefore a program to support with added resources.
Industry will reap rewards as well, and will need to be relied on to monetarily support the project and in terms of supplying mentors. The strategy employed for this project, if successful, can be implemented in numerous circumstances. It can be repeated in other states or areas where aquaculture interest is growing. Additionally, the model for this program, the Boot Camp model, is applicable to other industries. Combining aquaculture education, production experience, mentoring and internships, along with business training gives participants an intensive and comprehensive set of tools to utilize in enhancing the success of their operations. This model could easily apply to other agricultural endeavors, for example Horticulture Boot Camp, where participants would choose a horticulture crop to learn about and conduct a pilot scale project.