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**Factors to Consider in Establishing
a Successful Aquaculture Business
in the North Central Region**

by
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The Ohio State University
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in cooperation with USDA

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Introduction

Aquaculture Extension workers are often asked by potential fish farmers, "How do I get started in fish farming?" As a response, they are referred to general fish farming publications that discuss getting started in aquaculture, such as those found in the list of additional readings at the end of this work. Many such publications provide a checklist of questions as a way to begin learning about aquaculture. Here I outline and discuss critical factors that should be considered before starting a fish farming business.

Let us consider four steps to profitable aquaculture: learning, evaluating, planning, and testing.

- **Learn** all you can about aquaculture. The local County Extension office is a good place to start. Within the North Central Region some county Extension agents have been trained to respond to requests for aquaculture information from prospective fish farmers. County Extension agents can direct you to people within your state who are responsible for Aquaculture Extension. Aquaculture Extension specialists will help you find specific information. Visit working fish farms, both private and public. Talk with experienced fish farmers. Join your state aquaculture association. Subscribe to aquaculture periodicals. Read all you can about aquaculture. View videos about aquaculture. Attend aquaculture workshops, seminars, and conferences.

- **Evaluate** your resources—human and natural. Do you have the time, energy and financial resources to develop a fish farm? Do you have both land and water that can be used for fish farming? What equipment will you need to raise fish? Are there local markets for fish that you can supply?

- **Plan** your aquacultural enterprise. Develop a business plan. Such a plan will help you to think through the operation. Look for potential pitfalls. What permits do you need to raise fish for sale? A

business plan is essential if you hope to obtain outside financing for your enterprise.

- **Test** your plan on a scale that you can afford. Are you able to grow fish on a small scale? What works? What doesn't work? Build your business after you have worked out the problems in your plan and as you gain knowledge and skill as a fish farmer. Make sure you can grow and sell the fish before you invest large amounts of time and money on production.

Requisites

Land, water, capital, a market, and management skills are essential to successful fish farming. Knowledge of these requirements will help you to plan and develop your enterprise.

Land

One or two acres of water will not generate sufficient income for a full time operation. A small trout raceway operation capable of producing up to 100,000 pounds of fish may require 16 pairs of tanks that are each 35 feet long by 6 feet wide. To generate \$10,000 in income from a bait minnow farm one would need a minimum of 20 acres of ponds, each acre producing \$500 net income. Land for a fish farm must usually be improved before it can produce fish. Construction of ponds, wells, work and storage buildings, and hatchery facilities, is usually necessary. Make sure that the land you want to develop does not have detrimental use restrictions. Wetlands designation or zoning and deed restrictions can make land difficult if not impossible to develop. Pesticides or other chemical residues on the land may make it unusable for aquaculture. To hold water, clay soils are necessary for pond development. Soil tests will help tell you if your land is suitable for pond construction. Your county Soil Conservation Service (SCS) office can help you with information on pond construction.

Water

Water quality and quantity are critical. The water should be void of any chemicals harmful to fish. The environmental requirements for fish are discussed in detail in the book, *Water Quality in Ponds for Aquaculture* by Dr. Claude E. Boyd. To a large extent, water temperature will determine what species of fish can be grown successfully. For example, the shorter growing season in the North Central Region makes it difficult for catfish farmers to compete successfully with catfish farmers in Mississippi.

The amount of water available will limit the size of the fish farm. At a minimum you want enough water to drain and fill a fish production pond at least once a year, as well as the capability of replacing any water lost through leakage or evaporation. For a 20 acre pond averaging 4 feet deep that loses one foot of water per year you need 100 acre feet of water per year. To produce 100,000 pounds of trout in a raceway culture system without recirculating the water requires a flow of 500 gallons per minute.

Capital

Aquaculture is capital intensive. Financing is generally needed to construct ponds, raceways, wells, buildings, and other specialized fish production equipment. Capital investment for a 100 acre baitfish farm in the South is estimated to be \$171,000. Establishment costs for a small trout hatchery capable of producing 36,000 pounds of fish per year is estimated to be \$26,400. Feed and labor costs are major variable expenditures in the production of trout, catfish, and other aquatic species. Aquaculture is a type of farming and agricultural lending institutions are more likely to finance aquaculture than commercial banks. To obtain financing for fish production, a business plan is normally required. More than 60 percent of all new non-farm businesses fail within the first five years. Is there any reason commercial aquaculture should be different? Aquaculture is a business! It requires good business planning!

Markets

To be successful, fish farmers must be proactive in the marketing of their products. Research in the North Central Region demonstrates that there is a perception that farm-raised fish is fresher, healthier, and of higher quality than wild-caught species. Emphasis on careful handling, cleaning, processing, packaging, transport, and retail sales is important in order to develop your market. Research funded by North Central Regional Aquaculture Center (NCRAC) indicates that North Central Region fish farmers can market their farm-raised fish as a high-quality high-valued product. These farmers must look to develop niche markets where they can sell limited quantities of high-valued products. This will take time and determined efforts.

Develop answers to the following questions:

- Who specifically is going to buy my fish?
- Is there a market for fish that I can supply?
- At what price can I sell my fish?
- What is my market risk?
- How do I plan to sell what I produce?
- Why produce something if I cannot sell it?

Management

A fish farm requires continuous proactive management. "Who would have thought?" is a question asked often after a fish kill. The ability to anticipate and prevent problems is essential to sound management. Aquaculture involves risk of crop loss due to oxygen depletion, winter kill, parasites, disease, predators, flooding, vandalism and more. A sound business plan and proactive management will help avoid problems.

In a recent survey, Extension agents who work with fish farmers mentioned several things that were essential for success in aquaculture. Perhaps the most critical factor identified was the human resource potential of the individual fish farmers as exemplified in the following quotes:

"The personal commitment to aquaculture and [the] human resource factor is critical to a successful aquaculture enterprise. Hard work and a drive to succeed are needed. Knowing 'how to' and a willingness to learn more 'how to' is necessary for success. How to react to problems and being prepared for problems...is essential." (Gary Jensen, National Program Leader, Aquaculture, USDA Extension Service).

"What does it take to succeed? [They] must be able to visualize the [business] environment they are working in and have the vision, drive to succeed, and flexibility to work out the items needed to reach their goal." (Greg Paschwitz, Leader Small Business, Ohio Cooperative Extension Service).

What kind of fish?

What kind of fish to produce? Beginning fish farmers should consider the difficulties involved in the rearing of each fish species. If you are just learning the business why start with the most difficult fish to raise?

We asked fourteen aquaculture researchers and Extension specialists within the North Central Region for their opinion on the suitability of various fish species for commercial aquaculture. Eleven completed the survey. We asked them to rank the difficulty of rearing 16 fish species or hybrids for commercial aquaculture.

In general, bait minnows, rainbow trout, hybrid sunfish, bluegill and baitfish are easy to raise. Largemouth bass, hybrid striped bass, crappie, chinook salmon, brown trout and yellow perch were ranked in the middle range of difficulty. Brook trout, smallmouth bass, northern pike and walleye were considered the most difficult to raise.

Fish farmer survey

We mailed a survey to 73 licensed Ohio fish producers in January 1991 in an attempt to learn what fish farmers think it takes to be successful. The responses may provide some insight to those

considering aquaculture. A total of 53 fish farmers provided useful information. The responding Ohio fish farmers had worked in aquaculture for an average of 13 years.

Most respondents had more than just monetary reasons for getting involved in fish farming. Almost 17 percent of respondents said that aquaculture was a primary source of income, while 55 percent said it was a secondary source of income. Almost 60 percent said that they liked the work. Another 15 percent indicated that it gave them a chance to live on a farm. More than 39 percent gave other reasons for their involvement in fish farming. The respondents said that they earned from 0 to 100 percent of their total income from their fish farming operations. The average percent of total income earned from aquaculture was just over 20 percent.

Factors for success

Fish farmers ranked ten items they believed contribute to the start-up of a successful fish farming business. The ten items listed by 53 responding fish farmers are in the order of importance:

1. Aquaculture requires hard work and commitment for success.
2. Recognize that fish are live animals and need to be treated as such.
3. Human resources, management skill, and a drive to succeed are essential.
4. Start small to reduce risk of loss while you are learning about aquaculture.
5. Grow a high-value high-quality product and provide good service.
6. Business experience and knowledge are needed.
7. Marketing your fish is where the money is made.
8. Aquaculture is a high risk business.
9. It takes a long time to make a profit in aquaculture.
10. Work only with a proven fish production technology.

Serious concerns

We asked fish farmers to rank 25 aquaculture issues. The top ten most serious concerns are listed in order beginning with the most serious problem:

1. Issues concerning control of predatory birds.
2. Availability of government support for aquaculture.
3. Issues concerning regulatory authority of state agencies.
4. High feed and production costs.
5. High fish farming equipment costs.
6. Poaching and/or vandalism.
7. Availability of aquaculture information and research.
8. Availability of suitable financing for aquaculture development.
9. Issues concerning aquaculture and water quality.
10. High fish transportation costs.

The responding fish farmers ranked learning how to grow various fish species as the most useful information for them in developing their fish farming operations. Learning how to market fish, how to get financing, and how to manage a small business were considered less useful by the respondents.

North Central Regional Aquaculture Center (NCRAC)

The North Central Regional Aquaculture Center serves the 12 states of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota and Wisconsin. NCRAC-supported research has shown that the expansion of aquaculture in the North Central Region is dependent upon the regulatory environment as well as biological and economic feasibility. Informal discussions with fish farmers concerning their operations always includes reference to regulatory problems encountered. The success of an individual enterprise will ultimately depend upon the drive to succeed and the skills of the individual fish farmer. However, the 12 state

governments of the North Central Region have a large influence on the aquaculture industry because of their regulatory power and capacity to fund aquaculture research and Extension.

If it is to grow as an industry in the North Central Region, aquaculture in the region must deal effectively with the issues of production, economics, and regulation. The aquaculture industry today faces constraints that traditional agriculture did not face. Aquaculture is developing in the United States at a time of increasing governmental regulation. Significant policy issues will influence aquaculture development in the North Central Region in the 1990's.

Major issues include:

- regulatory jurisdictions for aquaculture,
- predator control,
- water quality and effluent control,
- regulation of game and non-native species, and
- product quality and safety.

Potential

The potential for aquaculture to expand in the North Central Region is good. Demand for fish is high. The individual states in this region, through research and Extension, can aid the development of aquaculture. Potential fish farmers must learn about the industry and the technology needed to produce a product. They need to understand the regulatory issues, biological needs, and economics of aquaculture. Learning, planning, testing, and evaluating are steps in the process of developing a successful fish farm. Successful aquaculture requires adequate land, water, capital, and marketing and management resources. Existing fish farmers, the various state Aquaculture Associations, the North Central Regional Aquaculture Center, the Great Lakes Sea Grant programs, and the state Cooperative Extension Services are sources of knowledge and experience for potential fish farmers. New research and technology holds the promise of having positive impacts upon the

aquaculture industry in the North Central Region. It is up to the individual to seek out information, consider the key factors for success, and decide if aquaculture holds a potential for profit for them.

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Regional Aquaculture Center Publications should first be requested from your state extension specialists, some of whom are listed on pages 7 and 8 of this publication. Other publications, e.g., books or state extension publications, may be requested from addresses in parenthesis listed after individual citations.

Additional reading

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Aquaculture Extension contacts within the North Central Region

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Michigan	Donald L. Garling (517) 353-1989 FAX (517) 336-1699	Fish Culture Specialist Department of Fisheries & Wildlife 9A Natural Resources Building Michigan State University East Lansing, MI 48824
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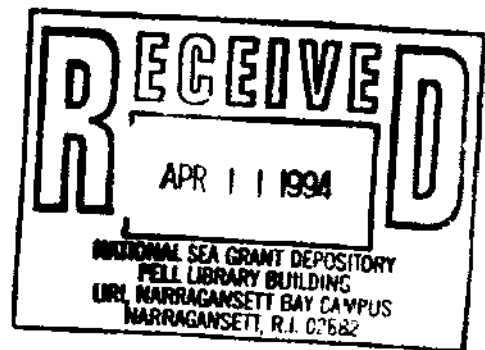
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