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Western Regional Aquaculture Center

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Aquaculture Investment: Lowering the Risks

INTRODUCTION

Aquaculture in the western United States is a viable industry with large-scale production in both finfish and shellfish. It includes a wide array of animals produced for both food and recreation. Major food species include rainbow trout, channel catfish, sturgeon, hybrid striped bass, oysters, abalone, clams and mussels. Species such as trout and catfish also have a high value as recreational fishing species along with black bass, crappie, bluegill and red-ear sunfish. Another category of aquaculture products are the ornamentals such as Koi and tropical fish, and their support species such as feeder-goldfish and the brine shrimp. In addition to these relatively well-established ventures, aquaculturists continue to examine the potential for opportunities through an expanding research and development (R&D) sector that is investigating new species for culture and new production system designs.

The success of aquaculture has attracted investors seeking business profits and potential profits from R&D companies. Potential developers and investors interested in aquaculture need information that allows them to assess an existing or potential business. They need information that allows an intelligent assessment of the level of risk associated with establishment or investment in a viable business or in an R&D venture. Aquaculture is like any other business; there are inherent business risks, and success depends upon business judgment and the financial depth of the operation. Because much R&D aquaculture includes unproven technology, the investment risks are inherently greater.

DEFINING R&D AQUACULTURE

R&D aquaculture may involve the development of the biological technology to culture a new species, the development of a new type of culture system, or a combination of both. If it is required to develop both, the magnitude of risk is increased significantly. As progress and success in both research and development are made, the company goes through a transition from the R&D status to economic viability. Here, successful transition is defined as establishment of a production system capable of deriving a profit from the plant or animal product produced.

It is useful for potential investors to separate aquaculture species and production systems into categories that are ultimately defined by their level of risk. To define and separate businesses by categories can lead to over-simplification, as most successful businesses have a well-balanced mix of solid production and R&D development. This is how a business maintains economic

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viability and remains on the cutting edge for expansion and/or improvement. The categories used in this publication are defined in a way that provides separation, transition, and flexibility when describing a business.

Three Categories of Development: Three categories of aquaculture development are R&D aquaculture, transitional R&D aquaculture, and economically viable aquaculture. The potential investor should understand the three levels of development and have some understanding of the risk and potential return on investment for each. Our objective is to use definitions and information to help determine the status of a business, technology, or species-system within the context of the three categories. The following definitions provide the reader with a system by which they might evaluate an investment opportunity based on production and basic financial structure, and defines each in terms of risk, time associated with return on investment and/or successful transition to a viable business. The interpretation of the categories should be used with flexibility and only to provide a general guideline. It is to the advantage of the owner or developer to position the description of a business as close to economic viability as possible. It is essential tothe investor to be as correct as possible in the assessment of the potential venture.

R&D Aquaculture Business: In an R&D aquaculture business, income for salaries and operational expenses is derived primarily from venture capital investment. Additional revenues may include consultant services and/or government grants and the sale of turn-key systems in which only the seller has evidence of success. Less than about 30 percent of the total gross revenues are derived from the sale of a species produced or a product resulting from a species produced. The level of risk is greatest in this category. The commitment is long-term, and the return on investment, if realized, may take many years. R&D is the necessary cutting edge for future aquaculture development and is essential to economic development. Examples of R&D aquaculture include production of marine halibut and sea bass.

Transitional R&D Aquaculture Business: An R&D aquaculture business in transition to economic maturity is one in which the primary gross revenues are still derived from sources such as investors, government grants, and consultant fees; however, about 30 to 70 percent of the gross income is from the sale of a cultured product. Turn-key systems sales promotions without a public track record of success are nonexistent. There is an established marketing and sales program for species cultured on site and an established program for transition of primary income from investments, grants, and consultant fees to sales of on-site cultured aquatic species. There is also an established track record based on a thorough business plan that gives evidence that the transition is being made toward a viable aquaculture production business. Two species and production systems that have recently evolved from transitional R&D to viable aquaculture production are the recycle systems used for the production of tilapia and on-shore tank production systems used to prodce abalone.

Viable Aquaculture Production Business: A viable aquaculture production business is one in which income is primarily based on sales of the species produced, and one in which the company has an established financial track record. Investors are usually shareholders investing in the company's expansion using established technologies, or new technologies to be incorporated into the established business. R&D and consulting, if present, are but one segment of the larger business and, if present, both make up less than about 30 percent of the gross income. There are many examples of viable aquaculture, including production of rainbow trout, channel catfish, oysters, mussels, baitfish, Koi, clams, and feeder fish for the aquarium industry.

INTERPRETING THE STATUS OF AN AQUACULTURE BUSINESS

The interpretation of information used to determine the status of an aquaculture business is not a simple exercise. It requires a knowledge of the

status of species and systems and access to the company's business plan and financial background. Access to a company's financial background and business plan is usually available only to prospective investors. To achieve the most accurate background concerning an R&D company, the potential investor must work with the company to review its financial perspective but is also encouraged to use all resources available to determine the true status of the biological and/or production system being proposed. Interpretation of the status of a species or method of production is also based on how and where a species is being cultured. A few examples are useful to understand how interpretation of species and system status with respect to aquaculture development are determined.

Tank Culture of Finfish: The culture of channel catfish as food fish in ponds is a well-established aquaculture industry. However, growing channel catfish in intensive tank systems using flow-through designs with supplementary oxygen is R&D because the economic value of the catfish balanced against production cost is not cost-effective. Companies using intensive tank systems to culture fish use species such as hybrid striped bass because of the higher market price, or tilapia because the market price is good and the species does extremely well in tank culture. Many tank farms have made the change from transitional R&D to viable aquaculture businesses, but not all. Each potential business should be examined in terms of system design, species cultured, company infrastructure, and both present and future markets. Long-term survival of tank cultured finfish in the U.S. will depend on the cost of production and the ability to compete in the market when compared to the same product originating from other domestic and foreign sourcesusing pond culture methods.

Closed Systems: Closed systems are engineered to use mechanical and biological systems to remove feed and animal byproducts from the water. The best examples are well-managed aquarium systems in which the mechanical and biological substrate filter cleans the water. Even an aquarium filter will fail if the animal density and food placed in the tank exceeds the filter's capacity to function effectively.

Closed systems are also used to successfully culture some ornamental species at high densities. Economic success is based on the biomass of fish produced and the value of the product balanced against capitol and operational expenses. Some ornamental fish bring 10 to 25 times the value of a food fish when compared as value per biomass produced and are economically viable enterprises. However, food fish production in closed systems is still in the R&D stage because the relatively low return on the product has not off-set the capitol investment and operational costs.

Recycle System: Recycle systems are often confused with closed systems. Recycle systems, like closed systems, are engineered to use mechanical and biological systems to remove feed and animal byproducts from the water but require about 10 to 20 percent fresh water exchange every 24 hours to maintain water quality. Removing the cost associated with engineering the system to recover water quality in the last 10 to 20 percent has moved some of these systems from transitional R&D to economic viability in the production of food fish. The most familiar examples are recycle systems for the production of tilapia.

Recycle system technology has advanced significantly in the 1990s. Many recycle aquaculture production systems are economically viable based on factors such as system design, economics of targeted markets, and integration of the system with other money generating activities such as methane generation and the sale of waste heat to energy companies. Some discharge water may be used in other applications such as low-grade fertilizer in agriculture or landscape maintenance. Not all recycle system designs can support a food fish economy and a great number of these systems are still considered in transitional R&D.

Location of Technology: The status of aquaculture business development may also be based on the location of the species to be cultured or even the market exposure of the product. One of the most successful aquaculture farming industries is the Louisiana "crawfish" aquaculture industry based on pond culture of the crayfish and polyculture of the crustacean. Attempts to duplicate the industry in the West are considered R&D. For now, this is based on undetermined factors such as the impact of regional climates, including nighttime cooling, seasonality of crops, unexplored market analysis for large-scale production, and the impact of foreign imports. No matter how successful a technology is employed in other areas, until these questions are resolved, crayfish culture is R&D in the West. At best, the final decision as to the risk involved in a potential investment in any stage of aquaculture is the decision of the buyer.

Integration of Aquaculture Segments to Lower R&D Risks

Many aquaculture companies reduce R&D risk by integrating their total operation to include a strong, viable commodity along with the R&D segments. An example is the combination of channel catfish pond culture with tank culture of another species such as carp or sturgeon. The on-site resources, such as the water and hatchery facility, support all three species with reasonable overlap seasonally. Channel catfish occupy a strong established market, carp aquaculture is being developed and sold to metropolitan Asian-American markets, and sturgeon are grown for the meat market and the developing caviar markets. Neither carp nor sturgeon can support the farm alone, but by combining the R&D segments with an established species such as channel catfish using shared resources, the combined sales result in total profitability.

Integrating species production is a recommended approach for any company. It diversifies market outlets and provides a net if problems develop for one of the market lines. It is also a highly recommended strategy for lowering R&D risk associated with a new aquaculture species or system.

References & Selected Readings

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