

ECONOMIC CONCERNS FOR TILAPIA ENTERPRISES

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Aquaculture Overview

According to the United States Department of Agriculture¹, the average per capita consumption of fish and seafood in the U.S. has remained relatively flat in recent years at around 15 pounds. During recent years, the source of seafood products has been trending away from wild harvest and toward organized aquacultural production. In 1997, U.S. production of processed catfish products was close to 1 pound per capita, imports of farm-raised shrimp were likely over 1 pound per capita, and the combination of farm-raised salmon, trout, tilapia, crawfish and other aquaculture products probably added another pound. With about 20 percent of U.S. fish and seafood consumption now being farm-raised, aquaculture has become a recognized segment of the livestock complex; larger than veal, mutton and lamb combined.

A number of market factors are expected to affect the domestic aquaculture industry in the near future. First,

large supplies of competing meats, especially pork and chicken, are expected. This may lead to a decrease in the price of these meats. Second, prices for catfish, the largest segment of the domestic aquaculture industry, are expected to increase as available supplies tighten. Third, with the devaluation of foreign currencies relative to the dollar, the United States market should become more attractive to Asian seafood imports.

At the beginning of 1998, domestic grower inventories of stocker class fish (those between 0.06 and .75 pounds) were down approximately 19 percent from a year earlier and fingerling inventories (fish below 0.06 pounds) were up 18 percent. Indications are that processors are experiencing the effects of lower inventories as their monthly ending inventories have begun to slip as a percent of total monthly processing volume. This "decreased inventory" situation will likely lead to higher retail prices for consumers. It is also anticipated that fingerling prices will experience an increase prior to or shortly following increases in retail prices.

1 USDA, Agricultural Outlook - - March 5, 1998

Specifically Tilapia

U.S. tilapia imports have been forecast to expand in 1998 and into 1999. The strength of the dollar versus Asian currencies will also encourage more imports from countries such as Thailand and Indonesia. Domestic production is also expected to increase, but the increase will be limited to the live market growth, the biggest outlet for domestic producers. The American Tilapia Association (ATA)² has reported that domestic production of tilapia increased by nearly 17 million pounds in 1998. Tilapia sales have also benefitted recently from the growing Asian population in the United States. Live fish and frozen whole fish go mostly to Asian markets and Asian restaurants where many dishes call for whole fish. Tilapia is a commonly grown species in many Asian countries and Asian consumers are more familiar with it. While more grocery chains and seafood stores are carrying tilapia products, restaurants are still the primary sales outlet. The changes in tilapia imports over the last several years would seem to indicate a highly elastic import demand. This implies that imports could increase strongly in 1998 with currency devaluations occurring for some of the major Asian suppliers. However, tilapia is a relatively new species in many parts of the United States and the overall demand may be increasing as consumer awareness of tilapia increases. Total consumption of tilapia in the United States increased 26 percent in 1997 to nearly 100 million pounds.

According to the USDA³, tilapia imports in the first 6 months of 1998 were 20 percent higher than the previous year. Frozen whole tilapia accounted for approximately 77 percent of the 29.9 million first 6 months imports while fresh and frozen fillets accounted for the remaining 13 percent and 10 percent, respectively. The value of tilapia imports during the first half of 1998 increased only 3 percent

to \$25.4 million. The average price fell in all three major market categories. In fact, tilapia prices have fallen sharply in the last two years. In the first half of 1996, tilapia imports averaged \$1.09 per pound but by 1998, prices fell to only \$0.85 per pound and was reflected by lower retail prices. The falling average prices are due primarily to a large increase in the quantity available and the declining prices for frozen whole fish. Tilapia imports are expected to remain strong and prices are expected to remain close to their present lows. Tilapia production in the U.S. has increased about 300 percent in the past five years. The ATA projects domestic production to increase significantly in 1999 and new markets will have to be developed to support such large supplies.

Domestically produced tilapia must compete on the international market with imports. From April 1997 to July 1998, live tilapia prices in the northeast U.S. market have decreased approximately 21 percent from \$2.15 per pound to \$1.70 per pound. The total value of tilapia imports were up 15 percent in 1997 to \$49 million compared to a 26 percent increase in 1996. Total imports of tilapia in 1997 were 53.9 million pounds, up 28 percent, with 33.7 million pounds imported as frozen whole fish and the remainder as either fresh or frozen fillets.

U. S. Tilapia Market

The U.S. market for tilapia is significant and growing annually. In 1995 and 1996, retail tilapia sales in the U.S. exceeded the retail sales of trout. In 1994, it was thought that in order for domestic tilapia production to grow, U.S. producers had to be competitive with processed imported tilapia. However, time has proven this hypothesis to be wrong. According to Idaho Aquaculture News' *Aquaculture Outlook*,⁴ the vast majority of U.S. tilapia production is for the live fish market. It is estimated that 85% of U.S. tilapia production is sold in the live fish market with the

2 The American Tilapia Association, 1997 Tilapia Situation and Outlook Report, Arlington, Virginia, 1998.

3 USDA, Agricultural Outlook - - October 2, 1998

5 University of Idaho Aquaculture Research Institute's *Idaho Aquaculture News* Fall 1998.

remaining 15% being sold for processed fish.

Considering Domestic Production

While tilapia is currently grown around the world, production is dominant in the tropics where labor wage rates are low and the natural environment parameters, particularly water temperature, are more suitable for tilapia production. According to studies at the Thad Cochran National Warmwater Aquaculture Center in Mississippi, it is not possible for domestic producers to compete with imports on the fillet market. Only local and niche markets in major metropolitan areas of the east and west coasts, upper Midwest and Canada offer potential. Markets for live tilapia have not been fully developed in the Southeast (Nashville, Memphis, New Orleans).

As the domestic tilapia industry continues to grow, gleanings from more developed aquaculture enterprises, such as catfish, will be helpful. Experiences in the catfish industry indicate that in ideal areas (level land, adequate ground water, and a growing season of approximately 210 days) a well-trained producer-operator who performs all of the labor functions tends to generate annual net cash returns around \$6,264.21 from a single crop of fish on 80 acres of land. Therefore, most successful catfish farmers are usually involved in several agricultural enterprises or are committed to catfish production on a year-round basis. While some individuals realize over 50 percent returns on their initial catfish investments, less than 10 percent of the U.S. catfish farmers have been reported as making a sustained annual profit from the enterprise. "The supply of low-cost foreign fish products has had a severe impact on the commercial catfish farmer. Processed, packaged and frozen channel catfish shipped from South America often cost less in New Orleans than the break-even price for pond-raised Louisiana channel catfish sold live at the pond bank."⁵

6 Planning for Commercial Aquaculture, Helfrich, L.A. and D.L. Garling, Virginia Cooperative Extension Service, Publication No. 420-012, May 1997.

Tilapia Production

Tilapia are native to Africa but have been successfully introduced in many countries world wide. Tilapia are a prolific fish in that they are disease resistant, reproduce easily, eat a variety of foods (in the wild, plankton is the tilapia's main food source) and tolerate poorer water quality with lower dissolved oxygen levels than most other fish. Given their hardiness, tilapia require warm water ranging between 76 and 84 degrees Fahrenheit. Tilapia can be grown in a variety of environments such as rice fields, open ponds, cages and in both indoor and outdoor environments. Tilapia are very adaptable and even though they are considered a fresh water fish, they can thrive in either brackish water or full-strength sea water.

Tilapia propagate easily and as a result, the problem of overcrowding arises. The fish will become stunted if they are too crowded and the food source is limited. Even where adequate food is provided, a significant portion (75%+) of the fish may be stunted (weigh less than 100 grams or 3.53 ounces) simply because of excessive reproduction. This is a serious problem in the U.S. market because of the demand for larger fish, 150+ grams or 5.3 ounces. As a result, special knowledge and skills are needed to successfully raise tilapia for the U.S. market.⁶ Researchers are investigating several ways to develop monosex cultures in order to avoid excessive reproduction. However, the Food & Drug Administration has not yet approved chemicals which may be used to affect sex change in fish.

For the most part, the tilapia industry in the U.S. is still in the experimental stage. There is not an abundance of information or data supporting the viability of large-scale, domestic tilapia operations. Part of the concern is the lack of markets outside of major metropolitan areas. With the majority of U.S. tilapia production going to the live market, U.S. producers will need to

7 Water Harvesting and Aquaculture for Rural Development: Introduction to Tilapia Culture, International Center for Aquaculture and Aquatic Environments. Auburn University

find a viable market close to a major city. The following are additional factors that should be investigated in the consideration of domestic tilapia production ⁷:

1. Appropriate water quality and availability
2. Financial backing
3. Consistent production inspection

Cost Estimates & Break-Even Projections

According to cost and production budget estimates from Louisiana State University (LSU), Cooperative Extension Service, approximately \$1.05 per pound is needed just to break-even on cash costs in a 100,000 pound (annual production) recirculating tilapia operation ⁸. A break-even price of \$1.19 is needed to cover total (all economic) costs including depreciation. Similarly, budget estimates from the North Dakota Extension Service estimate a break-even of \$1.07 per pound for a 80,000 pound operation on total costs.

Annual fixed cost estimates range from \$15,000 to \$85,000. These costs include such items as land, facilities, heating and ventilation, water, tanks, electrical set-up, filters and pumps, aerators, blowers, generators, equipment and tools, storage, depreciation and management. Initial building and equipment estimates range from \$140,000 to \$175,000. Annual variable expenses include fingerlings (approx. \$0.16 per finished pound), feed (approx \$0.31 per finished pound), electricity (approx. \$0.18 per finished pound) and hired labor (approx. \$0.25 per finished pound).

Average domestic prices around \$1.70 for live tilapia **appear** to offer some profit potential. However, a live price in the northeast of \$1.70 and a farm price in

8 Sell, Randy, *Tilapia*, University of North Dakota Extension Service's Alternative Agriculture Series, Number 2. January 1993.

9 Greenhouse Tilapia Production in Louisiana, C. Greg Lutz, Associate Specialists - Aquaculture, Louisiana State University Agriculture Center, Publication 2705, June 1998.

Tennessee are not the same. Transportation costs to the market must be considered. A local grower would need to provide transportation to the market or sell the fish to a live hauler at the farm for a price less than the live price at the market. Reports in 1997 indicated that live haulers were paying \$1.50 per pound in Tennessee. Since then, however, prices at northeast markets have fallen by 21 percent. A 21 percent reduction in the \$1.50 per pound live hauler estimate would reveal a \$1.18 per pound price. Compared with the LSU break-even price needed to cover total costs of \$1.19 per pound⁹, each pound of tilapia sold would lose one penny.

Conclusion

A robust import market for tilapia may be sending a false "surplus demand" signal to some potential producers. As tilapia imports continue to increase, making it the third largest imported aquaculture product entering the U.S. behind farm-raised shrimp and Atlantic salmon, prices continue to fall. Average tilapia import prices of \$0.85 per pound is approximately 28 cents **less than** an estimated break-even price for domestic production. While live markets in the northeast have also slipped during the recent years, they continue to offer delivered prices above break-even estimates. However, transportation to these markets, sales to brokers and haulers, increasing supplies and signals from the import market all contribute to a risky scenario for domestic production considerations. In addition, price trends of imported tilapia cannot be overlooked from a competition standpoint. The average import price of tilapia in the first half of 1998 was \$0.85 while the 1997 average was approximately \$0.91, down significantly from the 1996 average of \$1.03 per pound.

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10 Because no research evidence provides cost of production data specifically for Tennessee systems, a comparison with the LSU data is made here.