The Market Potential for Farm-raised Aquaculture Products In the Delmarva Region: A Survey of Wholesale Distributors

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Introduction

Aquaculture products generally go from producers through established networks of fish brokers or wholesalers before getting to retailers and consumers (Helfrich et al., 1988). This makes aquaculture brokers and wholesalers the primary link between the aquaculture producer and the consumer. The role of "middleman" which wholesale distribution networks play is very important to fish producers and consumers. On one hand, they use their knowledge of market trends to determine products that are desired by their customers. Consequently, aquaculture products that meet their customers needs, both actual and perceived, are indirectly communicated to producers. On the other hand, many consumers are not very knowledgeable of aquaculture products, especially in cases where the products are not raised locally. In such cases, the middleman becomes the channel for introducing new products. By choosing whether or not to carry a specific product, the middleman controls consumers' access to the product and indirectly influences their choices and preferences.

This implies that seafood wholesalers must carefully examine consumers' preferences and attitudes toward fresh fish and seafood products, since consumer demand (or lack thereof) for seafood products is directly related to the success or failure of a wholesaler. Information received from these so-called middlemen can be very valuable to the fresh fish and seafood industry because of the feedback it provides producers, innovation of the marketing infrastructure, and input in public policy. Such information can help producers to determine consumer expectations or needs, help marketers respond to changes in consumer preferences, and help policy makers determine the kind and magnitude of assistance they can provide the industry.

Aquaculture is attracting considerable attention in the Delmarva region, both as a gourmet food and as a source of supplemental income for farmers (Harrell, 1987). Given the apparent success of some popular species such as trout, salmon, and catfish, prospective producers of new species such as crawfish would be interested in knowing the potential for success in the new venture. If aquaculture holds the promise of providing supplemental farm incomes, especially for small farmers, then addressing market potential is as important as developing new production techniques. Previous attempts to study trends in the aquaculture industry have generally focused on the production and consumption components of product lines. While research of production trends is generally credited for the reorientation of the production philosophy from a (product) production-oriented approach to a consumer--oriented approach, consumer studies have provided information about consumer tastes, demographic characteristics, attitudes, and opinions on aquaculture-related issues. Such information has helped producers to react to changes in fish consumption patterns and led to the development of products that are more acceptable to the changing needs of the aquaculture consumer.

As advocacy for expanding aquaculture in the Delmarva region continues to mount, this research effort focuses on wholesaler viewpoints about issues concerning market expansion. Since small, family-owned aquaculture operations do not have the resources and capabilities needed to conduct such comprehensive studies even at the regional level, this study is a cooperative effort between the Department of Food and Resource Economics, University of Delaware; the Delaware Department of Agriculture; and the U.S. Department of Agriculture.

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Objectives

The overall objective of this study is to determine wholesaler opinions on issues regarding the expansion of the aquaculture industry in the Delmarva region. Specifically, the study:

1. Discerns wholesaler attitudes about a generic advertising campaign for the seafood industry,

2. Determines wholesaler concerns with seafood safety issues, and

3. Analyzes trends in supply and demand for wild-harvest and farm-raised fresh fish and seafood.

Data and Procedures

In order to analyze the marketing infrastructure of commercial aquaculture in the Delmarva region, a series of mail back surveys were initiated in 1991. The first survey, undertaken in the summer of 1991, gathered detailed information from households on fresh fish and seafood purchasing practices, preferences, concerns or opinions concerning aquaculture products, and household demographic/socioeconomic characteristics (Delmarva Region Consumer Survey of Fresh Fish and Seafood Consumption, 1991). The second survey, conducted in the fall of 1992, elicited information from fresh fish and seafood wholesalers on overall industry trends, marketing constraints, government regulation, and the market potential of farm-raised aquaculture products grown in the Delmarva region.

Wholesaler Survey

The initial contact with wholesalers who participated in the survey was based on an exhaustive list of seafood wholesalers operating in the Mid-Atlantic region. A comprehensive mailing list of 338 seafood wholesalers comprising 35 participants from Delaware, 245 from Maryland, and 58 from the Fulton fish market in New York was compiled. There were 65 usable questionnaires returned for an overall response rate of 19.2 percent, not including refused, undeliverable, or unusable returns.

Location of Wholesalers

Of the 65 usable surveys returned, approximately three-quarters (72.3%) were from Maryland, followed by Delaware with 16.9 percent, and New York with 10.8 percent (Table 1). However, based on the ratio of respondents to the number of wholesale operations in each of the three areas, Delaware (11/35 or 31.4%) had a higher representation, followed by Maryland (47/245 or 19.2%), and New York (7/58 or 12.1%) in third place. Location-wise, the ratios (31.4, 19.2, and 12.1) indicate that the sample distribution is less skewed. Therefore, the three areas are reasonably represented and the results can be generalized for the Mid-Atlantic region.

Table 1
Location of Fresh Fish and Seafood Wholesale Distributors

State	Number	Percent
Delaware	11	16.9
Maryland	47	72.3
New York	7	10.8
TOTAL	65	100.0

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Sizes and Functions of Wholesalers

Total annual gross receipts from food sales in 1991 were fairly distributed over the three categories defined in Table 2, with fresh fish and seafood distribution chains which made \$1,000,000 and above (39.7%) dominating. The average amount made by fresh fish and seafood wholesale distribution chains operating in the region from food sales was \$500,000.

More than half of the wholesale operations surveyed (55.4%) indicated that fresh fish and seafood sales were responsible for over 95 percent of their food sales, with the average contribution to food sales computed to be 85.2 percent (Table 3). Only 13.8 percent of the respondents indicated that fresh fish and seafood was responsible for 50 percent or less of their total food sales. This suggests that a majority of the wholesalers responding to this survey are fresh fish and seafood distributors.

Table 2
Fresh Fish and Seafood Wholesaler's Total Food Sales in 1991, Delmarva

Food Sales	Number	Percent
Less than $250,000	16	27.6
$250,000 to $999,999	19	22.7
$1 Million and Above	23	39.7
TOTAL	58	100.0

Average Total Food Sales for 1991 = $500,000

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Table 3.
Percent of Firm's Total Food Sales From Fresh Fish and Seafood, Delmarva

Percent of Seafood Sales	Number	Percent
50 percent or less	9	13.8
51 to 80 percent	10	15.4
81 to 95 percent	10	15.4
Above 95 percent	36	55.4
TOTAL	65	100.0

Average Percent of Total Sales From Seafood = 85.2%

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Of the 65 wholesalers who responded to the survey, the top specialized functions undertaken were wholesaler/distributor functions (60.6%), followed by retail (45.5%), and processing (39.4%) (Table 4). While supplying seafood markets and shipping small orders are undertaken on a moderate basis, supplies to institutional feeders, packing under brand names, and supplies to chain stores were the least specialized functions. Although the functions of those who distribute fresh fish and seafood differ in many respects, the typical fresh fish and seafood middleman operating in the Mid-Atlantic region is a wholesaler/distributor. However, Table 4 also illustrates that these functions are not mutually exclusive.

Table 4
Specialized Functions Performed By Fresh Fish and Seafood Wholesalers Surveyed, Delmarva, 1992

Characteristics	Number	Percent
Wholesaler/Distributor	40	60.6
Retailer	30	45.5
Processor	26	39.4
Seafood Mkt Supplier	25	37.9
Ships Small Amount Orders	21	31.8
Chain Store Supplier	12	18.2
Pack Under Brand Name	11	16.7
Institutional Feeder	2	3.0
Other	2	3.0

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Discussion of Findings

The findings are based on frequency distribution tables from the fresh fish and seafood wholesaler survey. The descriptive analysis of the findings gives insight to wholesalers' opinions concerning three areas of interest regarding market expansion: 1) the effect of generic advertising on potential market growth, 2) seafood safety issues, and 3) interest in farm-raised fresh fish and seafood.

Generic Advertising

With respect to advertising support, sales support materials such as pamphlets, recipes, posters, and table displays have traditionally been used to attract attention and stimulate point of sale purchases. Since one form of commodity support that has been used by the dairy industry is generic advertising, respondents were asked if they thought generic advertising of fresh fish and seafood would increase sales. About two-thirds (63.6%) of the distributors responding to the survey believe that generic advertising would increase seafood consumption, another 25.8 percent are neutral, and only 10.6 percent believe that this type of promotion would not increase sales (Table 5). However, since distributors have very little incentive to incur promotional expenses, a majority of the respondents (34.8%) indicated that advertising costs ought to be shouldered at the producer level, 26.1 percent thought it should be shouldered at the retail and processor levels respectively, while only 13.0 percent thought wholesalers should provide such support.

Table 5
Use of Generic Advertising Campaigns to Increase Fresh Fish and Seafood Consumption: A Wholesaler's Perspective

Response	Number	Percent
Yes	42	63.6
No Opinion	17	25.8
No	7	10.6
TOTAL	66	100.0
If Yes, Who Should Pay Advertising Costs?		
At Producer Level	8	34.8
At Retail Level	6	26.1
At Processor Level	6	26.1
At Wholesaler Level	3	13.0
TOTAL	23	100.0

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Seafood Safety Issues

Over the past few years, extensive media publicity focusing on seafood safety has increased public concern and led to public discussions on mandatory inspection for both wild-harvest and farm-raised products (Jaroff, 1992). Although survey respondents expressed their opinions on government inspection of fresh fish and seafood products (see Table 6), recent calls from consumer groups asking that more be done to protect consumers through seafood inspection programs and the issuing of warning labels were worthy of verification. Seafood safety concerns should be very important to wholesalers, considering that tainted food could spell disaster for distributors since the source of their income is often based on consumer discretionary spending. The following discussion focuses on wholesaler attitudes about seafood inspection, wholesaler concerns in handling/marketing of fresh fish and seafood, and wholesaler opinion about nutritional labeling.

Inspection of Fresh Fish and Seafood

As expected, almost two-thirds (61.3%) of wholesalers favored some form of seafood inspection (Table 6). Over three-quarters (77.5%) of the respondents thought that the fish and seafood industry should conduct inspection rather than the federal government.

Even though wholesalers favor self-policing of the fish and seafood industry, respondents indicated a preference (31.7%) for the U.S. Department of Commerce (USDC) as the inspecting agency if inspection were to become mandated by the government. The USDC currently plays a role in the inspection of fresh fish and seafood in the form of random lot inspections. Less than one-quarter (23.3%) of the respondents wanted the U.S. Department of Agriculture (USDA) to be involved in fresh fish and seafood inspection. This contradicts the consumer study which found that fresh fish and seafood consumers favored the USDA as the inspecting agency (Delmarva Region Survey of Fresh Fish and Seafood Consumption, 1991). There was less support (18.3%) for the Food and Drug Administration (FDA) as a fresh fish and seafood inspection agency. Currently, both the USDA and FDA are being considered as the leading agencies to inspect fresh fish and seafood in two pieces of legislation before the U.S. Congress.

When asked how they thought mandatory inspection could best be implemented, about half of the respondents (51.7%) favored inspection of fresh fish and seafood in randomly selected lots, which is the current system practiced by the USDC (Table 7). This was followed by random inspection of fish from each lot (36.7%), with less than 10 percent (8.3%) favoring 100 percent inspection as is practiced in the poultry industry. Wholesalers' resistance to mandatory full-scale inspection may be due to the fact the additional costs may be difficult to pass on fresh fish and seafood consumers who have other alternatives such as poultry.

Table 6
Seafood Wholesalers' Attitudes Toward Inspection of Fresh Fish and Seafood Products, Delmarva, 1992

Issue	Number	Percent
Inspection		
Favors	39	61.3
No Opinion	12	19.0
Disfavors	12	19.0
TOTAL	63	100.0
Who Should Conduct Inspection?		
Government	9	22.5
Seafood Industry	31	77.5
Government Agency to Conduct Mandatory Inspection		
USDC	19	31.7
Public Health Dept.	17	28.3
State Dept. of Agric	16	26.7
USDA	14	23.3
FDA	11	18.3
CDC	3	5.0
EPA	2	3.3

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Table 7
Procedures For Implementing Mandatory Inspection Programs, Delmarva, 1992

Procedure	Number	Percent
Random Inspection/Lots	31	51.7
Random Fish Samples	22	36.7
100% Inspection Fish	5	8.3
Composite Samples	2	3.3
TOTAL	63	100.0

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Handling/Marketing Concerns

Handling and marketing concerns of wholesalers are important, since wholesalers' practices can directly influence the condition of the fish and seafood at the retail level. Factors of most concern are product freshness (86.9%), off-flavor (69.1%), price fluctuations (67.8%), and product varieties (62.3%) (Table 8). There is more concern over seasonality of demand (61.7%) than seasonality of supply (57.6%).

Interestingly, less than half (45%) of responding wholesalers are very concerned about federal seafood inspection, which is less than anticipated given the strong preference for industry-controlled inspection (see Table 6). Consumer desire for mandatory federal seafood inspection has not persuaded wholesalers to favor government inspection. This, along with wholesaler concern about product freshness and off-flavor, further supports the notion that wholesalers feel the industry is better suited to control seafood safety and quality than the government.

Table 8
Factors of Concern for Wholesalers When Handling/Marketing Fresh Fish and Seafood, Delmarva, 1992

	---- *Factor's Importance* ----		
Factor	Very Concerned	Less Concerned	Unconcerned
	---------- *(percent)* ----------		
Product Freshness	86.9	1.6	11.5
Off Flavor	69.1	25.5	5.4
Price Fluctuations	67.8	18.7	13.5
Selection	62.3	27.9	9.9
Seasonality of Demand	61.7	31.6	6.7
Seasonality of Supply	57.6	30.6	11.9
State Regulations	52.5	32.2	15.3
Packaging	50.0	38.4	11.7
Lot Size	46.6	41.4	12.1
Federal Seafood Inspection	45.0	40.0	15.0
Other Federal Regulation	40.7	42.3	17.0
Failure Fees	28.3	41.3	30.4
Slotting Fees	26.7	42.3	31.0

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Nutritional Labeling

Another issue related to seafood safety is mandatory nutritional labeling. This study asked respondents if they would favor mandatory nutritional labeling of seafood, and if so, the kind of information they wanted the labels to carry. The latter question is important because the public debate on nutritional labeling hinges on the content and accuracy of the information on the labels. As illustrated in Table 9, more wholesalers (43.1%) favor nutritional labeling, than do not (33.8%). Nearly one-fourth (23.1%) hold no opinion. The Delmarva consumer survey showed that nearly 59 percent of consumers favor nutritional labeling (cite it). Both consumer and wholesaler support of nutritional labeling may be hindered by the expected costs of a mandatory nutritional labeling program. The elasticity of demand will ultimately determine who shoulders the additional cost of nutritional labeling.

With respect to the information that the labels ought to carry if mandatory labeling became a reality, fat content, cholesterol level, and any ingredients added to the product (61.2%) were all of equal importance. These are factors that would tend to enhance the image of fresh fish and seafood products. These were closely followed by information concerning the origin of fresh fish and seafood products (57.1%), with labels indicating whether the products were domestic or imported. Although increases in nutritional awareness have brought about calls for nutritional labeling, the results in Table 9 illustrate that implied consumer concerns for healthful eating are as strong as their concerns for seafood safety. For instance, information on the fat content, cholesterol level, and any ingredients added to the product are reflective of concerns for healthful eating, while information about the origin of the product is a typical seafood safety concern. Overall, wide acceptance of nutritional labeling in the aquaculture industry may enhance consumer confidence in fresh fish and seafood products.

Interest in Local Farm-raised Aquaculture Products

The marketing opportunity created for commercial aquaculture in the Delmarva region depends in part on the ability of the industry to position farm-raised products not only as alternatives to poultry and meat, but also as an alternative to wild-harvests. Over half (51.0%) of the wholesalers surveyed would like labels to indicate whether a product is farm-raised (see Table 9). A set of questions was therefore asked to determine wholesaler attitudes toward locally-raised aquaculture products, especially crawfish, which have attracted considerable interest in the Delmarva region both as a gourmet food and a source of income for farmers.

Table 9
Seafood Wholesalers' Attitudes Toward Nutrition Labeling of Fresh Fish and Seafood Products, Delmarva, 1992

Issue	Number	Percent
Labeling		
Favors	28	43.1
No Opinion	15	23.1
Disfavors	22	33.8
TOTAL	65	100.0
What Information Should Labels Carry?		
Fat	30	61.2
Cholesterol	30	61.2
Added Ingredients	30	61.2
Origin Domestic/Imported	28	57.1
Calories	25	51.0
Farm-Raised	25	51.0
Sodium	24	49.0
Protein	24	49.0
Harvest Date	22	44.9
Quality Guarantee	21	42.0
Vitamins	18	36.7
Carbohydrates	15	30.6
Minerals	14	28.6
Certified Grade Level	11	22.9

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Farm-raised Products

First, respondents were asked if they were currently carrying locally-raised fresh fish, and half the respondents said yes (Table 10). For those distributors who said yes, hybrid striped bass (55.6%), clams (51.9%) and oysters (33.3%) were the most popular locally-raised fresh fish and seafood species stocked by wholesalers. Crawfish (7.4%) and mussels (7.4%) were identified among the least mentioned species stocked by wholesalers. This may be indicative of a lack of supply of locally-produced crawfish and mussels, and a greater supply of locally-produced hybrid striped bass, clams, and oysters.

Wild-Harvests versus Farm-raised Products

The wholesale distributors surveyed were asked to comment on perceived trends in the supply and demand of wild-harvests and farm-raised fresh fish and seafood products over the past five years. With respect to wild-harvests, about 38 percent of the respondents thought there had been growth in supply, 20 percent thought supply had stayed the same, and the remaining 38 percent thought supply had actually declined. Likewise, 38 percent of the respondents thought that demand for wild-harvests had grown, while only 23 percent thought that demand had actually declined (Table 11). Since any increases in the quantity of wild-harvests supplied was matched by increases in the quantity demanded, any price changes that may have occurred in the period under review cannot be attributed to market shortages or surpluses. In theory, price changes are attributed only to changes in quantity supplied, holding demand constant (i.e., movement along the supply curve); or changes in quantity demanded, holding supply constant, (i.e., movement along the demand curve).

Table 10
Wholesalers that Currently Carry Fresh Fish Farm-Raised in the Delmarva Region, 1992

Response	Number	Percent
Yes	29	49.2
No	30	50.8
TOTAL	59	100.0
If Yes, What Species?		
Hybrid Striped Bass	15	55.6
Crawfish	2	7.4
Catfish	4	14.8
Oyster	9	33.3
Trout	5	18.5
Clams	14	51.9
Tilapia	3	11.1
Mussels	2	7.4
Crabs	3	11.3
Shrimp	1	3.7

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Table 11
Trends in the Supply and Demand of Wild-Caught Fresh Fish and Seafood Products Over the Past Five Years, Delmarva, 1992

Trends	Number	Percent
Supply		
Fast Growth	10	18.2
Moderate Growth	11	20.0
Remain the Same	13	23.6
Decline	21	38.2
TOTAL	55	100.0
Demand		
Fast Growth	11	20.8
Moderate Growth	9	17.0
Remain the Same	21	39.6
Decline	12	22.6
TOTAL	55	100.0

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Unlike the trends in wild-harvests discussed above, respondents indicated that the quantity of farm-raised products supplied had increased by 75.0 percent while the quantity demanded had increased 62.9 percent. About 45 percent believed the growth in supply had actually been rapid, but only 23 percent felt growth in demand had been rapid during the same period (Table 12). If the quantity of farm-raised products supplied actually outstripped the quantity demanded, this would explain the relatively low prices by farmers in major production areas like Louisiana (Southern Regional Aquaculture Center, 1990).

However, the relatively higher growth rates in the supply and demand for farm-raised products compared to wild-caught products support the positive expectations that industry analysts continue to have for commercial aquaculture. More effective promotional campaigns could increase consumer awareness and eventually, the demand for aquaculture products. Furthermore, the growth in demand for farm-raised fresh fish and seafood reflects consumer desire for seafood they feel is safe.

Table 12
Trends in the Supply and Demand of Farm-Raised Fish and Seafood Products Over the Past Five Years, Delmarva, 1992.

Trends	Number	Percent
Supply		
Fast Growth	16	44.4
Moderate Growth	11	30.6
Remain the Same	8	22.2
Decline	1	2.8
TOTAL	36	100.0
Demand		
Fast Growth	8	22.9
Moderate Growth	14	40.0
Remain the Same	11	31.4
Decline	2	5.8
TOTAL	55	100.0

Source: Delmarva Region Seafood Wholesaler Survey, 1992.

Summary

This study analyzed wholesalers' evaluation of aquaculture in the Delmarva region and discerned wholesaler reaction to several means of market expansion, i.e. generic advertising, seafood inspection, and nutritional labeling. It was revealed that the average seafood wholesale business responding to the survey was a wholesale/distribution operation, with total food sales in 1991 averaging $500,000, with fresh fish and seafood sales accounting for about 85 percent of total food sales. Most fresh fish and seafood products carried were distributed through retail channels, with the best selling species being crabs, shrimp, and clams. About two-thirds of the survey respondents indicated that they favored inspection of aquaculture products, although there was less agreement on whether industry or government should oversee inspection. Product freshness and off-flavor problems were the biggest areas of wholesaler concern in handling and marketing fresh fish and seafood products. Less than half (43.1%) of the respondents favored nutritional labeling when faced with mandatory labeling. Fat content, cholesterol level, and any ingredients added to the products were the most important pieces of information desired on the labels.

Proportional growth of supply and demand for farm-raised products has outstripped the growth in supply and demand for wild-harvests over the past five years. About half the respondents said they carried Delmarva region farm-raised products, with hybrid striped bass, clams, and oysters being the most popular locally-raised products.

Implications

Commercial aquaculture is a relatively young enterprise in the Delmarva region, with product development somewhere between the introductory and growth stages. The findings of this study demonstrate that the market potential for aquaculture in the Delmarva region is quite promising. However, in order for aquaculture products to compete effectively with substitutes like poultry, efforts must be made to reduce consumer concerns with seafood safety. Some form of seafood inspection would reduce seafood safety concerns of consumers, and nutritional labeling would serve to promote local products, since one of the key pieces of information desired on the labels is the harvest location. This could pave the way for more aggressive promotional programs, such as a generic advertising campaign, which could be undertaken cooperatively by producers, wholesalers, and retailers. Other concerns which were expressed by wholesalers, such as freshness of the product and off-flavor problems, are not expected to impede market penetration efforts.

Regardless of how the market for Delmarva farm-raised fish and seafood expands, producers will always be faced with the issues of developing a product that is consistent in quality, and maintaining a dependable supply of product. Producers must work closely with wholesalers to determine the tastes and preferences of consumers. Since good marketing involves more than simply producing what the farmer wants to produce, the success of expanding the infant aquaculture industry in the Delmarva region critically hinges on how well wholesalers and producers market products desired by the consumer population.

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