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Potential for Supermarket Outlets for Tilapia in Nicaragua

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Abstract

Development of a domestic market for farm-raised tilapia in Nicaragua could provide an economic incentive for development of a farm-raised tilapia industry in Nicaragua. The goal of this project was to assess the domestic market as an alternative market outlet to the export market. While the overall study includes analyses of supermarket, fish market, and restaurant market outlets, this document will focus on the supermarket segment. A census of the supermarkets listed in telephone books in the major urban areas and small towns in the country resulted in 35 completed supermarket questionnaires. Information was collected on both tilapia and other types of fish and seafood sold, prices, most frequently sold fish products, marketing channels, supplier information, attitudes towards tilapia, and store characteristics. Survey results showed that only one-fourth of supermarkets in the country sold tilapia in spite of the substantial fishery for tilapia in Lake Nicaragua. Tilapia were not sold due to off-flavor (tastes like earth), lack of supply, and fears of selling contaminated fish from Lake Nicaragua. Nevertheless, those supermarkets that sold tilapia indicated that their sales in 2000 were higher than they had been in 1999. A high percentage of supermarkets indicated that they were very likely to begin selling tilapia in the coming year. Inconsistent supplies and insufficient quantities were the greatest supply problems. Fresh fillets were preferred but quality and availability needed to be improved. For a domestic market for farm-raised tilapia to develop in Nicaragua, the issue of consumer fears of contamination must be addressed. Broad-based consumer education, third-party certification, and labeling programs may be needed to assist consumers to differentiate between farm-raised and wild-caught tilapia. Tilapia farms and processors in Nicaragua will need to guarantee and ensure a consistent supply of good-flavor, high-quality, and safe tilapia products.

Introduction

Tilapia have been raised in Nicaragua for many years on a small scale. They were first introduced in 1969. Yet a commercial industry has not developed on the scale that it has in other Central American countries. Domestic markets could provide a lower-cost market outlet that reduces the market risk associated with export markets.

A wild fishery for tilapia has developed over time. A reservoir-stocking program resulted in established tilapia populations in a number of reservoirs across the country. Flooding episodes resulted in the unintended introduction of tilapias into Lake Nicaragua. The fishery that developed from these introductions has generated a supply of tilapia for local markets.

Nevertheless, no marketing studies have been done on the potential to sell farm-raised tilapia in local markets. Development of a domestic market could enable a tilapia industry to develop as has happened in other Central American countries. This could provide broader economic benefits, such as new sources of employment.

Three surveys were conducted in Nicaragua in 2000. Restaurants, supermarkets, and fish market vendors were surveyed to assess the potential to develop a domestic market for farm-raised tilapia. The overall goal of this project was to evaluate the potential to develop a domestic market for farm-raised tilapia in Nicaragua. This report will summarize results of the supermarket survey and will highlight findings related to the potential to increase sales of farm-raised tilapia in Nicaragua.

Table 1. Location of supermarkets interviewed in Nicaragua. Supermarket survey, Nicaragua, 2000.
[a] This row indicates the number of respondents who answered this question and the percent these represent of the total number of respondents.

Category	Region of Country					
	South-Central		*Northwest*		*Total*	
	N	%	N	%	N	%
Managua	11	46	0	0	11	31
Jinotega	0	0	5	46	5	14
Matagalpa	0	0	4	36	4	11
Rivas	4	17	0	0	4	11
Estelí	3	12	0	0	3	9
Boaco	2	8	0	0	2	6
Carazo	2	8	0	0	2	6
Chinandega	0	0	2	18	2	6
Masaya	1	4	0	0	1	3
Granada	1	4	0	0	1	3
Total Respondents [a]	24	69	11	31	35	100

Figure 1. Principal urban centers and small towns in Nicaragua.

Methodology

A comprehensive study was conducted of the supermarkets in Nicaragua. The supermarket survey instrument designed in Honduras by Engle et al. (2001) was used as a basis for these studies. Interviews were conducted throughout the populated region of Nicaragua in August and September 2000. The Atlantic Coast was not considered due to its low population density and dense rain forest with difficult access.

A complete census of supermarkets was conducted in the major urban and rural population centers. Managers of all the supermarkets published in the telephone listings were interviewed. There were approximately eleven supermarkets in Managua (of which three were chains), two in Carazo, one in Masaya, one in Granada, two in Boaco, five in Jinotega, four in Matagalpa, three in Estelí, two in Chinandega, and four in Rivas (Table 1). Chain restaurants provided information only through a regional manager. Thus, there was only one observation per chain even in cases where the chain had more than ten stores. The regional managers did not give permission to conduct additional interviews at the store level.

Thus, 35 supermarket managers were interviewed in Nicaragua. Of these, 69% were located in the South-Central region and 31% in the Northwest region (Figure 1). The higher concentration of supermarkets in the South-Central region is based on the higher population density and higher standards of living compared to the Northwest region.

Supermarkets represented in the survey excluded convenience (Start Mart) stores. The survey's 167 questions were addressed to the supermarket manager or seafood section employee who had control over the selection of seafood products. The duration of the interview was approximately 40 minutes. This survey included questions on tilapia and other types of fish and seafood sold, prices, most frequently sold fish products, marketing channels, and suppliers. The survey instrument was designed to also obtain information about specialized fish sections in supermarkets. Awareness and availability of tilapia were addressed through questions related to the owner's familiarity with tilapia as well as questions related to the supply of tilapia. Information on supermarket managers' attitudes towards attributes such as flavor, odor, supply, quality, ease of preparation, size, and price was elicited by asking respondents to assign a value from 1 to 10 in re-

Table 2. Store area of supermarkets, by region. Supermarket survey, Nicaragua, 2000.
[a] This row indicates the number of respondents who answered this question and the percent these represent of the total number of respondents.

Store Area (m^2)	Region of Country					
	South-Central		*Northwest*		*Total*	
	N	%	N	%	N	%
20–50	7	18	2	14	9	17
51–100	6	15	6	43	12	22
101–400	5	12	1	7	6	11
401–1,200	4	10	1	7	5	9
1,201–2,000	4	10	1	7	5	9
No Answer	14	35	3	21	17	31
Total Respondents [a]	40	74	14	26	54	100

Table 3. Number and percent of independent or chain supermarkets, by region. Supermarket survey, Nicaragua, 2000.
[a] This row indicates the number of respondents who answered this question and the percent these represent of the total number of respondents.

Supermarket Type	Region of Country					
	South-Central		*Northwest*		*Total*	
	N	%	N	%	N	%
INDEPENDENT	20	83	11	100	31	89
CHAIN						
Two	1	4	0	0	1	3
Four	1	4	0	0	1	3
Five	1	4	0	0	1	3
Thirteen	1	4	0	0	1	3
TOTAL RESPONDENTS [a]	24	69	11	31	35	100

sponse to statements concerning each attribute. A score of 1 represented complete disagreement with the statement, and a score of 10 represented complete agreement.

Characteristics of supermarkets were necessary to interpret responses to the survey. Questions were asked about the size of the store, type of ownership, location, and years in business.

The response rate was very high (95%). This is likely due to the novelty of supermarket surveys in Nicaragua. People were surprised to be asked to participate but were extremely cooperative.

All data were entered into a computer using Survey Pro® software. The data were cross-tabulated by two regions. The South-Central region comprised the capital, Managua, and the main cities of Rivas, Granada, Masaya, Boaco, Estelí, and Carazo; and the Northwest region comprised Matagalpa, Jinotega, León, and Chinandega. Data were cross-tabulated by locales that sold and did not sell tilapia and by the regional origin of the fish.

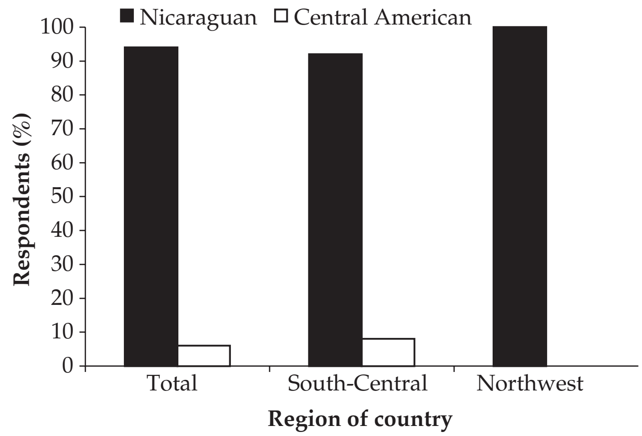

Figure 2. Origin of investors in supermarket businesses, by region. Supermarket survey, Nicaragua, 2000.

Results

Characteristics of Nicaraguan Supermarkets

The largest percentage of supermarkets had a store area between 51 and 100 m^2 (Table 2). However, there was a wide range of store sizes, from 20 to 2,000 m^2. Supermarkets in the Northwest region tended to be smaller than those in the South-Central region. The South-Central region had many more supermarkets in different size ranges than did the Northwest region.

Eighty-nine percent of the supermarkets in Nicaragua were independent supermarkets (Table 3). Chains included 2 to 13 stores per chain. All the chains were located in the South-Central region of Nicaragua.

A high percentage of the investors in supermarket businesses in Nicaragua were Nicaraguan (Figure 2). Only a few other Central American investors were involved in supermarkets in Nicaragua.

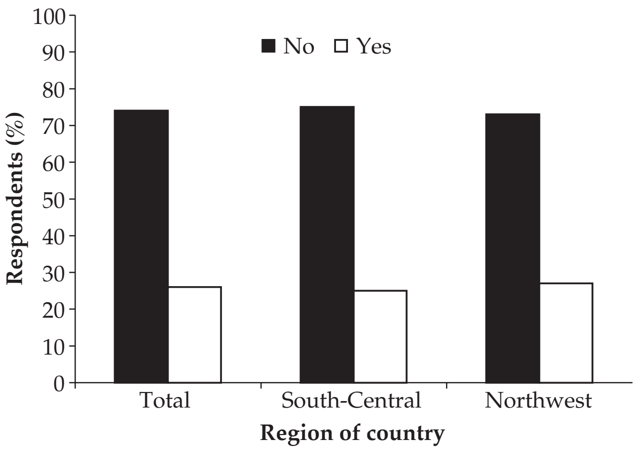

Figure 3. Availability of specialized fish sections in supermarkets, by region. Supermarket survey, Nicaragua, 2000.

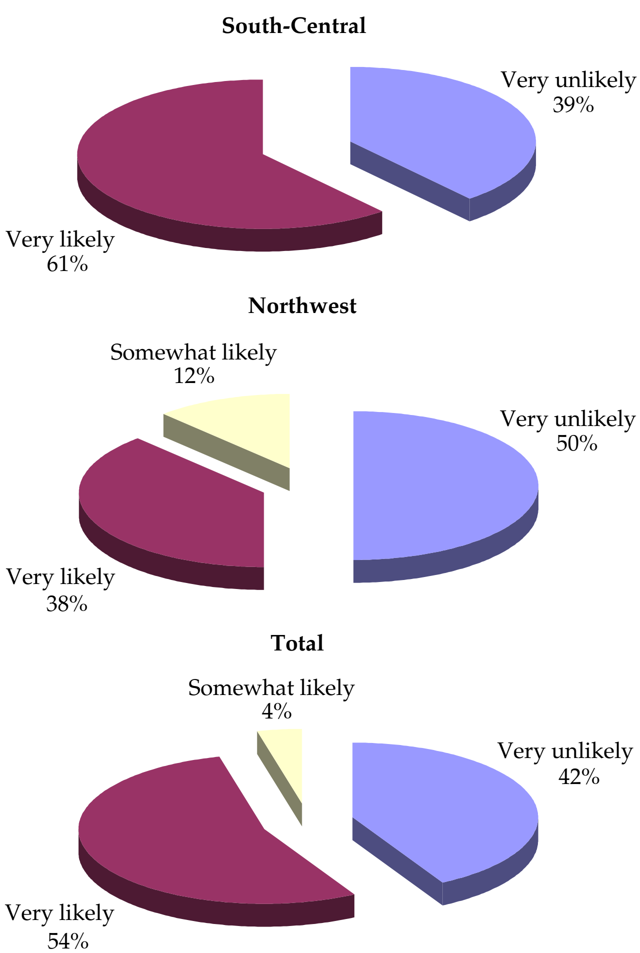

Figure 4. Percent of supermarkets, by likelihood to add a specialized fish section and by region. Supermarket survey, Nicaragua, 2000.

The majority of supermarkets in Nicaragua did not include a specialized fish market section (Figure 3). Less than 30% in both regions had a specialized fish market section. Of those without a specialized fish market section, half of the supermarkets in the Northwest region indicated that they were very unlikely to add one. In contrast, 61% of the supermarkets in the South-Central region were very likely to add a fish market section (Figure 4). Overall, 54% were very likely and another 4% were somewhat likely to add a specialized fish market section. In Honduras, the existence of a specialized seafood section was an important indicator of tilapia sales. This high percentage of supermarket managers who indicated a likelihood of adding a specialized seafood section may be important for future tilapia sales.

Table 4. Frequent clientele groups of supermarkets, by region. Supermarket survey, Nicaragua, 2000.
[a] This row indicates the number of respondents who answered this question and the percent these represent of the total number of respondents.

Income of Clientele Group	Region of Country					
	South-Central		*Northwest*		*Total*	
	N	%	N	%	N	%
Low	3	12	0	0	3	9
Lower-Middle	3	12	4	36	7	20
Middle	13	54	6	55	19	54
Upper-Middle	5	21	1	9	6	17
Total Respondents [a]	24	69	11	31	35	100

Over half of the respondents indicated that their most frequent clientele group was middle-income customers (Table 4). Another 20% said that their customers were lower-middle-income customers, and another 17% said upper-middle-income customers. None of the respondents in the Northwest region said that they had low-income customers, whereas 12% of the respondents in the South-Central region said that they did.

The top seafood product in terms of sales by region was drum (Table 5). This was followed by tilapia, red snapper, shrimp, fresh fillets, and shark. Other seafood products mentioned as a top product were black mussels, mackerel, mahi-mahi, guapote,

Table 5. Ranking of top seafood products in terms of sales, by region. Supermarket survey, Nicaragua, 2000. (A score of 4 means the most important; 1 represents the fourth most important.)

Seafood Item	Region of Country		
	South-Central	*Northwest*	*Total*
Drum	2.6	1.7	2.6
Tilapia	1.4	1.6	1.8
Red Snapper	0.8	1.6	1.8
Shrimp	1.3	0.5	1.7
Fresh Fillet	0.8	0.3	1.0
Shark	0.3	1.3	1.0
Black Mussels	0.3	0.0	0.5
Mackerel	0.0	0.5	0.5
Mahi-Mahi	0.7	0.0	0.5
Guapote	0.3	0.8	0.5
Grouper	0.5	0.0	0.4
Snook	0.0	0.5	0.2
Eel	0.0	0.5	0.2
Clams	0.2	0.0	0.1
Lobster	0.0	0.3	0.1

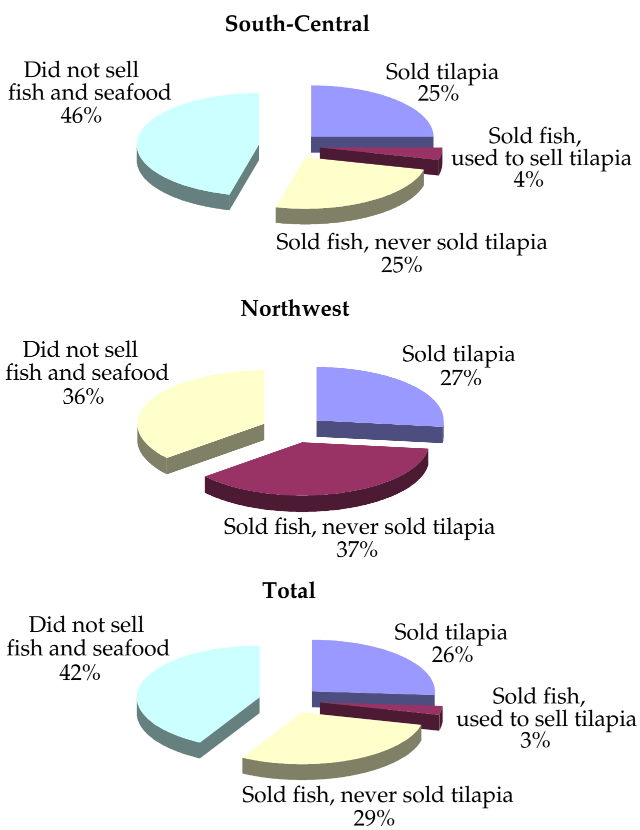

Figure 5. Percentage of supermarkets that sold, used to sell, never sold tilapia, and did not sell fish, by region. Supermarket survey, Nicaragua, 2000.

Table 6. Ranking of seafood with fastest sales growth, by region. Supermarket survey, Nicaragua, 2000. (A score of 3 represents the product with the fastest sales growth; 1 represents the third fastest sales growth.)

Seafood Item	Region of Country		
	South-Central	*Northwest*	*Total*
Drum	1.9	1.0	1.9
Tilapia	0.8	1.3	1.1
Shrimp	0.7	0.5	1.0
Red Snapper	0.5	0.8	0.6
Shark	0.0	1.2	0.5
Fresh Fillet	0.4	0.0	0.4
Guapote	0.2	0.3	0.4
Eel	0.2	0.3	0.4
Grouper	0.5	0.0	0.3
Clams	0.0	0.0	0.2
Snook	0.0	0.3	0.1

grouper, snook, eel, clams, and lobster.

Products with the fastest sales growth followed the pattern of the products that were considered the top products (Table 6). Drum was listed first, followed by tilapia, shrimp, red snapper, shark, fresh fillets, guapote, eel, grouper, clams, and snook.

Tilapia Sales

Overall, 26% of the supermarkets sold tilapia (Figure 5). Another 29% sold fish but never sold tilapia. Three percent sold fish and used to sell tilapia. The largest percentage, 42%, did not sell either fish or seafood. The percentages of supermarkets that sold tilapia were similar between the South-Central and Northwest regions. However, a higher percentage of supermarkets in the Northwest region sold fish but had never sold tilapia.

Overall, most of the supermarkets had been in business only two to five years (Table 7). This was followed by those in business for six to ten years. The highest percentage of stores that sold tilapia were in stores having been in business for two to ten years. However, there were higher percentages of the newer stores (two to five years in business) that had never sold tilapia.

The number of years that tilapia had been sold increased with the years the supermarket had been in business (Table 8). However, there was one super-

Table 7. Number and percent of supermarkets that sold, used to sell, and never sold tilapia, by years in business and by region. Supermarket survey, Nicaragua, 2000.

Region of Country	Years in Business											
	New		*2–5*		*6–10*		*11–20*		*> 20*		*Total*	
	N	%	N	%	N	%	N	%	N	%	N	%
SOUTH-CENTRAL												
Sold Tilapia	0	0	2	33	2	33	1	17	1	17	6	25
Used to Sell Tilapia	0	0	0	0	0	0	1	100	0	0	1	4
Never Sold Tilapia	0	0	3	50	1	17	1	17	1	17	6	25
Did Not Sell Fish	1	9	6	54	2	18	2	18	0	0	11	46
Subtotal	1	4	11	46	5	21	5	21	2	8	24	69
NORTHWEST												
Sold Tilapia	0	0	1	33	1	33	0	0	1	33	3	27
Never Sold Tilapia	0	0	1	25	2	50	1	25	0	0	4	36
Did Not Sell Fish	0	0	2	50	2	50	0	0	0	0	4	36
Subtotal	0	0	4	36	5	46	1	9	1	9	11	31
TOTAL	1	3	15	43	10	29	6	17	3	9	35	100

Table 8. Number of years tilapia has been sold, by years in business. Supermarket survey, Nicaragua, 2000.

Years in Business	Number of Years Tilapia Has Been Sold							
	1–2		*3–4*		*6*		*Total*	
	N	%	N	%	N	%	N	%
2–5	2	67	1	33	0	0	3	33
6–10	0	0	3	100	0	0	3	33
11–15	0	0	1	100	0	0	1	11
> 15	1	50	0	0	1	50	2	22
Total	3	33	5	56	1	11	9	100

market that had been in business for more than 15 years that had only been selling tilapia for one to two years.

The larger stores (401 to 2,000 m^2) were those that tended to sell tilapia in the South-Central region (Table 9). This was not the case in the Northwest region. There, those that sold tilapia tended to be the smaller supermarkets.

The greatest number of supermarkets had weekly sales volumes in the range of US$110,000 to $500,000 overall (original amounts were converted from Nicaraguan córdobas to US dollars at the prevailing

Table 9. Number and percent of supermarkets, by sales area (m^2) and by region. Supermarket survey, Nicaragua, 2000.

Region of Country	Store Area (m^2)													
	20–50		*51–100*		*101–400*		*401–1,200*		*1,201–2,000*		*No Answer*		*Total*	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
SOUTH-CENTRAL														
Sold Tilapia	1	8	2	17	1	8	3	25	2	17	3	25	12	30
Used to Sell Tilapia	0	0	0	0	1	100	0	0	0	0	0	0	1	2
Never Sold Tilapia	1	17	2	33	2	33	0	0	1	17	0	0	6	15
Did Not Sell Fish	5	24	2	10	1	5	1	5	1	5	11	52	21	52
Subtotal	7	18	6	15	5	12	4	10	4	10	14	35	40	74
NORTHWEST														
Sold Tilapia	1	25	2	50	0	0	0	0	0	0	1	25	4	29
Never Sold Tilapia	0	0	2	50	0	0	1	25	1	25	0	0	4	29
Did Not Sell Fish	1	17	2	33	1	17	0	0	0	0	2	33	6	43
Subtotal	2	14	6	43	1	7	1	7	1	7	3	21	14	26
TOTAL	9	17	12	22	6	11	5	9	5	9	17	31	54	100

Table 10. Number and percent of supermarkets, by overall weekly sales (US$) and by region. Supermarket survey, Nicaragua, 2000.

Region of Country	Overall Weekly Sales (US$ in thousands)													
	0.15–1.00		*1.5–10.0*		*11–100*		*110–500*		*> 500*		*No Answer*		*Total*	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
South-Central														
Sold Tilapia	0	0	3	25	1	8	6	50	2	17	0	0	12	30
Used to Sell Tilapia	0	0	0	0	1	100	0	0	0	0	0	0	1	2
Never Sold Tilapia	1	17	1	17	3	50	0	0	0	0	1	17	6	15
Did Not Sell Fish	4	19	4	19	1	5	11	52	1	5	0	0	21	52
Subtotal	5	12	8	20	6	15	17	42	3	8	1	2	40	74
Northwest														
Sold Tilapia	1	25	2	50	1	25	0	0	0	0	0	0	4	29
Never Sold Tilapia	1	25	2	50	1	25	0	0	0	0	0	0	4	29
Did Not Sell Fish	1	17	3	50	0	0	2	33	0	0	0	0	6	43
Subtotal	3	21	7	50	2	14	2	14	0	0	0	0	14	26
Total	8	15	15	28	8	15	19	35	3	6	1	2	54	100

Table 11. Number and percent of supermarkets, by percentage of total sales from fish and seafood and by region. Supermarket survey, Nicaragua, 2000.

Region of Country	Percentage of Total Sales from Fish and Seafood (%)									
	0.5–5.0		*5.1–10.0*		*10.1–15.0*		*Variety*		*Total*	
	N	%	N	%	N	%	N	%	N	%
South-Central										
Sold Tilapia	8	67	3	25	1	8	0	0	12	63
Used to Sell Tilapia	1	100	0	0	0	0	0	0	1	5
Never Sold Tilapia	2	33	1	17	0	0	3	50	6	32
Subtotal	11	58	4	21	1	5	3	16	19	70
Northwest										
Sold Tilapia	2	50	0	0	2	50	0	0	4	50
Never Sold Tilapia	1	25	1	25	1	25	1	25	4	50
Subtotal	2	38	1	12	3	38	1	12	8	30
Total	14	52	5	18	4	15	4	15	27	100

rate of 12.65 córdobas = US$1) (Table 10). However, more supermarkets in the Northwest region had lower overall weekly sales. Tilapia sales followed this same trend. In the South-Central region, most of the stores that sold tilapia were in this same category of weekly sales. In the Northwest region, those that sold tilapia were the smaller stores.

Fish and seafood sales made up a low percentage (0.5 to 5%) of total store sales (Table 11). This was true in both regions. Tilapia sales followed these same trends. However, there were more stores that had never sold tilapia with higher percentages of sales from fish and seafood in the Northwest region than there were in the South-Central region.

Stores that sold tilapia in the South-Central region were exclusively those that indicated middle-income to upper-middle-income customers (Table 12). In the Northwest region, stores that sold tilapia indicated customers from lower-middle through upper-middle income brackets. Stores that never sold tilapia reported exclusively the higher-income customer groups also.

Of the stores that sold fish but had never sold tilapia, a high percentage was very likely to add a

Table 12. Number and percent of supermarkets surveyed, by frequent clientele groups and by region. Supermarket survey, Nicaragua, 2000.

Region of Country	Income of Clientele Group									
	Low		*Lower-Middle*		*Middle*		*Upper-Middle*		*Total*	
	N	%	N	%	N	%	N	%	N	%
SOUTH-CENTRAL										
Sold Tilapia	0	0	0	0	5	83	1	17	6	25
Used to Sell Tilapia	1	100	0	0	0	0	0	0	1	4
Never Sold Tilapia	0	0	0	0	4	67	2	33	6	25
Did Not Sell Fish	2	18	3	27	4	36	2	18	11	46
Subtotal	3	12	3	12	13	54	5	21	24	69
NORTHWEST										
Sold Tilapia	0	0	1	33	1	33	1	33	3	27
Never Sold Tilapia	0	0	0	0	4	100	0	0	4	36
Did Not Sell Fish	0	0	3	75	1	25	0	0	4	36
Subtotal	0	0	4	36	6	55	1	9	11	31
Total	3	9	7	20	19	54	6	17	35	100

Table 13. Number and percent of supermarkets, by likelihood of adding a specialized fish section and by region. Supermarket survey, Nicaragua, 2000.

Region of Country	Likelihood of Adding Specialized Fish Section							
	Very Likely		*Somewhat Likely*		*Very Unlikely*		*Total*	
	N	%	N	%	N	%	N	%
SOUTH-CENTRAL								
Sold Tilapia	0	0	0	0	2	100	2	11
Never Sold Tilapia	3	60	0	0	2	40	5	28
Did Not Sell Fish	8	73	0	0	3	27	11	61
Subtotal	11	61	0	0	7	39	18	69
NORTHWEST								
Sold Tilapia	1	100	0	0	0	0	1	12
Never Sold Tilapia	1	33	1	33	1	33	3	38
Did Not Sell Fish	1	25	0	0	3	75	4	50
Subtotal	3	38	1	12	4	50	8	31
TOTAL	14	54	1	4	11	42	26	100

specialized seafood counter (Table 13). Overall, the majority of stores were very likely to add a specialized seafood counter. However, unlike results in the Honduran supermarket survey, the few stores in the South-Central region that sold tilapia also said that they were very unlikely to add a specialized seafood counter.

The primary reasons given for not selling tilapia were that it tasted like earth and that there was no supply (Table 14). Other reasons given were contamination of the lake, hadn't heard of it, negative consumer attitudes, and storage problems.

Overall, supermarket respondents indicated that sales of tilapia in 2000 were higher than those in the previous year (Figure 6). This was more evident in the Northwest region. In the South-Central region, there were equal percentages of respondents who said that they were selling more and the same amount of tilapia as in the previous year.

Overall, fresh fillets were indicated to be the preferred tilapia product form by 60% of respondents (Figure 7). This was followed by frozen fillets. This was true in both regions, but there was a higher percentage of respondents in the South-Central

Table 14. Reasons why supermarket managers stopped selling or never sold tilapia, by region. Supermarket survey, Nicaragua, 2000.
[a] Responses represent individual answers, not respondents. Multiple answers (responses) can result in totals over 100%.

Reasons for Not Selling Tilapia	**Region of Country**									
	South-Central						*Northwest*		*Total*	
	Used to Sell		Never Sold		Subtotal		Never Sold			
	N	% [a]	N	%	N	%	N	%	N	%
Tastes Like Earth	1	100	1	17	2	29	2	50	4	36
Lack of Supply	0	0	4	67	4	57	0	0	4	36
Contamination of Lake	0	0	0	0	0	0	3	75	3	27
Have Not Heard of It	0	0	1	17	1	14	1	25	2	18
Negative Consumer Attitudes	0	0	0	0	0	0	1	25	1	9
Storage Problems	0	0	1	17	1	14	0	0	1	9

Table 15. Volume sold (lb wk^{-1}) of tilapia, by product form. Supermarket survey, Nicaragua, 2000.
[a] Responses represent individual answers, not respondents. Multiple answers (responses) can result in totals over 100%.

Volume of Tilapia Sold (lb wk^{-1})	**Product Form**					
	Fresh Whole-dressed		*Fresh Fillets*		*Frozen Fillets*	
	N [a]	%	N	%	N	%
1–20	0	0	2	15	0	0
21–40	1	100	2	15	1	12
81–100	0	0	3	23	1	12
101–200	0	0	0	0	4	50
201–400	0	0	3	23	2	25
1,001–2,200	0	0	3	23	0	0
Weighted Average	30		396		134	

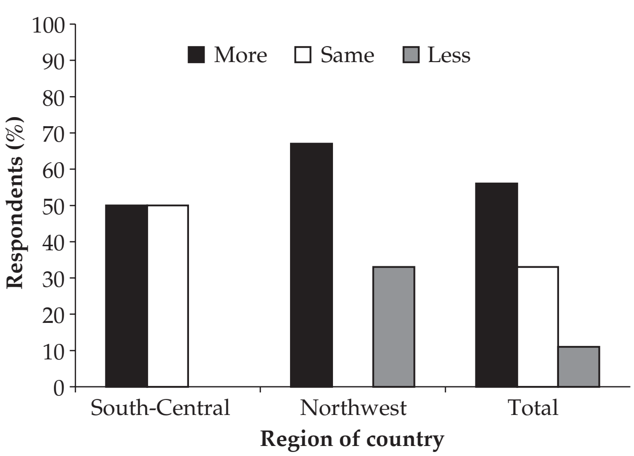

Figure 6. Current sales of tilapia compared to the previous year. Supermarket survey, Nicaragua, 2000.

region who preferred fresh fillets. Equal percentages of respondents in the Northwest region said that they preferred fresh and frozen fillets. Only a small percentage said they preferred fresh whole-dressed fish.

Overall, supermarkets sold more fresh fillets than any other product form (Table 15). On a weekly basis, supermarkets sold an average of 396 lb wk^{-1}. This quantity was followed by frozen fillets with an average weekly sales volume of 134 lb wk^{-1}. The weekly volume sold of fresh whole-dressed fish averaged 30 lb wk^{-1}.

The average size of fresh fillets sold was 0.60 lb (Table 16). The average size of frozen fillets was 0.37 lb, and the average size of fresh whole-dressed

Table 16. Size (lb) of tilapia sold, by product form. Supermarket survey, Nicaragua, 2000.
[a] Responses represent individual answers, not respondents. Multiple answers (responses) can result in totals over 100%.

Size of Tilapia Sold (lb)	**Product Form**					
	Fresh Whole-dressed		*Fresh Fillets*		*Frozen Fillets*	
	N[a]	%	N	%	N	%
0.15–0.20	0	0	0	0	1	12
0.21–0.60	0	0	4	31	7	88
0.61–1.00	0	0	4	31	0	0
2.01–3.00	1	100	0	0	0	0
Variety	0	0	5	38	0	0
Weighted Average	2.50		0.60		0.37	

Table 17. Wholesale price (US$ lb^{-1}) of tilapia, by product form. Supermarket survey, Nicaragua, 2000.
[a] Responses represent individual answers, not respondents. Multiple answers (responses) can result in totals over 100%.

Wholesale Price (US$ lb^{-1})	**Product Form**					
	Fresh Whole-dressed		*Fresh Fillets*		*Frozen Fillets*	
	N[a]	%	N	%	N	%
0.47–0.80	1	100	0	0	0	0
0.81–1.20	0	0	1	8	0	0
1.21–1.40	0	0	8	61	3	38
1.41–1.60	0	0	4	31	5	62
Weighted Average	0.64		1.34		1.43	

Table 18. Retail price (US$ lb^{-1}) of tilapia, by product form. Supermarket survey, Nicaragua, 2000.
[a] Responses represent individual answers, not respondents. Multiple answers (responses) can result in totals over 100%.

Retail Price (US$ lb^{-1})	**Product Form**					
	Fresh Whole-dressed		*Fresh Fillets*		*Frozen Fillets*	
	N[a]	%	N	%	N	%
0.81–1.20	0	0	1	8	0	0
1.41–1.60	0	0	2	15	3	38
1.61–2.00	0	0	1	8	0	0
2.01–2.40	0	0	9	69	5	62
No Answer	1	100	0	0	0	0
Weighted Average	-		1.97		1.94	

fish was 2.5 lb. Only one respondent sold fresh whole-dressed tilapia.

Wholesale prices of fresh tilapia fillets averaged $1.34 lb^{-1} (Table 17). Wholesale prices of frozen fillets averaged $1.43 lb^{-1}, while wholesale prices of fresh whole-dressed tilapia averaged $0.64 lb^{-1}. No estimates of the costs of producing tilapia were found in Nicaragua. However, Green and Engle (2000) estimated production costs of $2.44 lb^{-1} for export fillets. Whether Nicaraguan costs of production will be

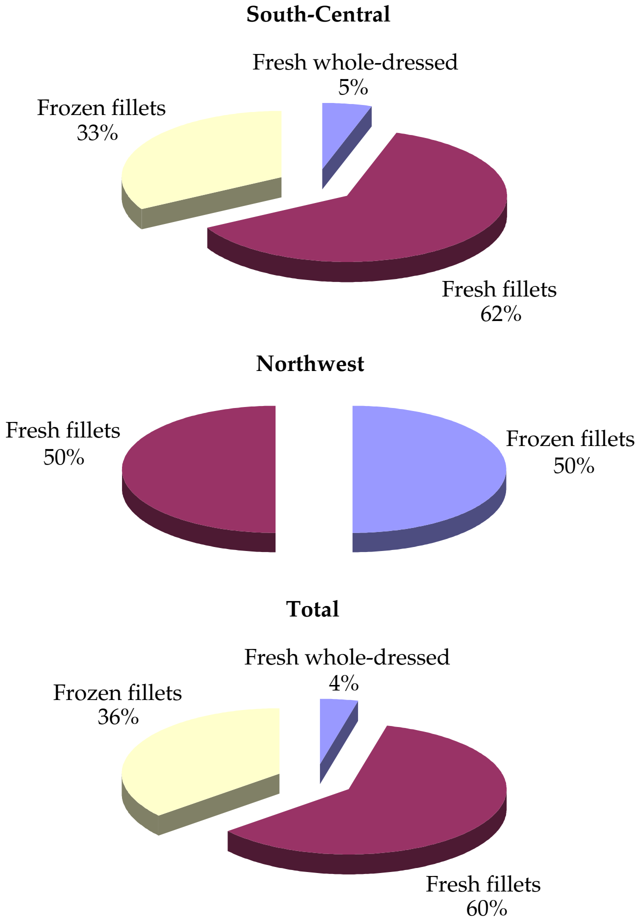

Figure 7. Preferred tilapia product forms, by region. Supermarket survey, Nicaragua, 2000.

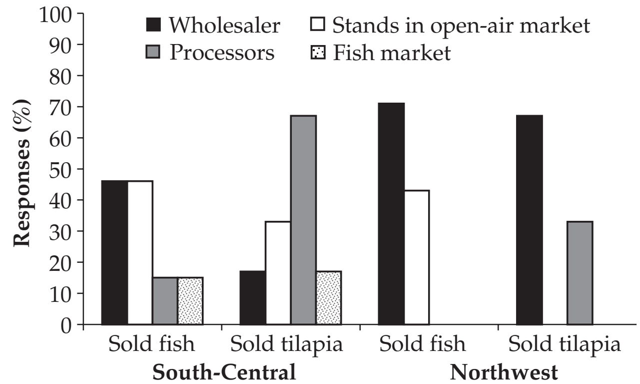

Figure 8. Type of fish and seafood suppliers, by region. Supermarket survey, Nicaragua, 2000.

higher or lower is unknown at this time.

Retail prices of fresh fillets averaged $1.97 lb^{-1}, and retail prices of frozen fillets averaged $1.94 lb^{-1} (Table 18). In spite of these average prices, there appeared to be a bimodal price distribution for the fillet products, with a number of stores charging retail prices over $2 lb^{-1} and a number of other stores charging from $1.41 to 1.60 lb^{-1}. This apparent bimodal distribution of prices could be related to product size.

Table 19 relates average prices to product form and product size. The average price of fresh whole-dressed tilapia of 2.5 lb was $0.63 lb^{-1} with a range of $0.47 to $0.80 lb^{-1}. For fresh fillets of 0.40 lb, the average price was $1.22 lb^{-1} with a range of $0.81 to $1.40. For larger fresh fillets of 0.80 lb, the average price was $1.50 lb^{-1} with a range of $1.41 to $1.60. For frozen fillets of 0.18 lb, the average price was $1.30 lb^{-1} with a range of $1.21 to $1.40 lb^{-1}. For the larger frozen fillet size of 0.40 lb, the average price was $1.44 lb^{-1} and ranged from $1.61 to $2.00 lb^{-1}.

Supply of Tilapia and Marketing Channels

Most supermarkets purchased their fish supplies either from wholesalers or from fish vendors in the open-air markets (Figure 8). In the Northwest, the majority purchased primarily from wholesalers, while in the South-Central region, equal percentages of supermarket managers purchased from wholesalers and from fish vendors in open-air markets. Tilapia were also acquired by supermarkets in the Northwest primarily from wholesalers. However, in the South-Central region, most tilapia supplies were acquired from fish processors.

The greatest number of suppliers (45%) of fish and seafood originated in Managua (Table 20). Other

Table 19. Tilapia prices (US$ lb^{-1}), by product form and size. Supermarket survey, Nicaragua, 2000.

Product Form and Average Size of Tilapia	**Price** (US$ lb^{-1})	
	Average	*Range*
FRESH WHOLE-DRESSED		
2.50 lb	0.63	0.47–0.80
FRESH FILLETS		
0.40 lb	1.22	0.81–1.40
0.80 lb	1.50	1.41–1.60
Variety	1.30	1.21–1.40
FROZEN FILLETS		
0.18 lb	1.30	1.21–1.40
0.40 lb	1.44	1.61–2.00

Table 20. City of origin of fish and seafood suppliers, by region. Supermarket survey, Nicaragua, 2000.
[a] Responses represent individual answers, not respondents. Supermarkets utilize a variety of different suppliers. Multiple answers (responses) can result in totals over 100%.

Origin of Suppliers	**Region of Country**					
	South-Central		*Northwest*		*Total*	
	N	% [a]	N	%	N	%
Managua	6	46	3	43	9	45
San Juan del Sur	3	23	0	0	3	15
Casares	1	7	1	14	2	10
Corinto	0	0	2	29	2	10
Masaya	1	7	0	0	1	5
Chinandega	1	7	0	0	1	5
León	0	0	1	14	1	5
Granada	1	7	0	0	1	5
Momotombo	1	7	0	0	1	5
Atlántico	1	7	0	0	1	5
Lago de Nicaragua	1	7	0	0	1	5
Do Not Know	2	15	1	14	3	15

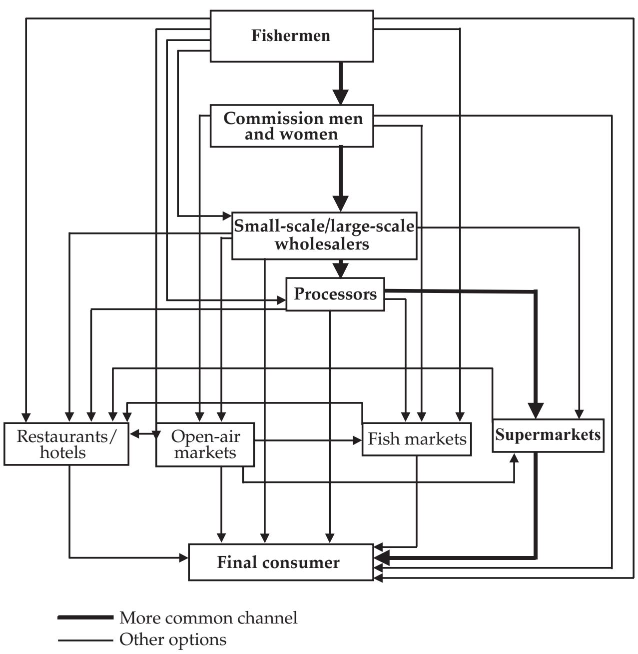

Figure 9. Market channels for wild-caught tilapia in Nicaragua.

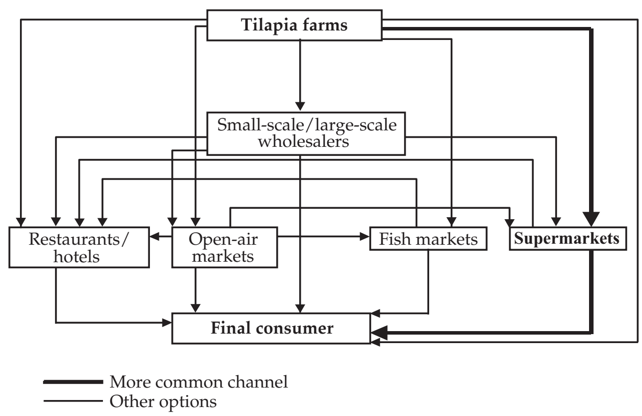

Figure 10. Market channels for farm-raised tilapia in Nicaragua.

supplies were purchased from San Juan del Sur, Casares, and Corinto. A few respondents also mentioned purchasing fish and seafood supplies from Masaya, Chinandega, León, Granada, Momotombo, Atlántico, and the Lago de Nicaragua.

Wild-caught tilapia are sold by fishermen to commission men and women who sell their fish for a commission (Figure 9). Small-scale and large-scale wholesalers purchase fish from the commission men and women and then resell them to processors. The processors sell to supermarkets that sell to the final consumer. Farm-raised tilapia are sold by tilapia farms to supermarkets and then to the final consumer (Figure 10). This is a more direct marketing route than that used for wild-caught tilapia.

Overall, the majority of respondents indicated that their supply of tilapia was not consistent (Figure 11). However, more respondents in the Northwest indicated a consistent supply; in the South-Central region, the majority responded that their supply was not consistent.

Table 21. Problems indicated with the supply of tilapia, by region. Supermarket survey, Nicaragua, 2000.
[a] Responses represent individual answers, not respondents. Multiple answers (responses) can result in totals over 100%.

Supply Problems	Region of Country					
	South-Central		*Northwest*		*Total*	
	N	% [a]	N	%	N	%
Insufficient Quantity	3	75	0	0	3	60
Unavailable at Certain Times of the Year	1	25	1	100	2	40
Competition with Honduran Exporters	1	25	0	0	1	20

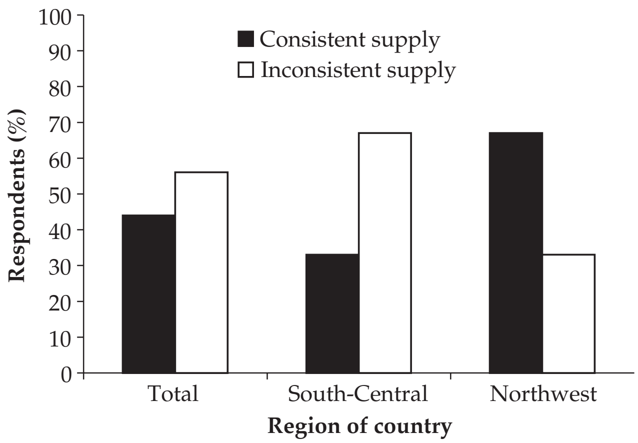

Figure 11. Consistency of tilapia supply, by region. Supermarket survey, Nicaragua, 2000.

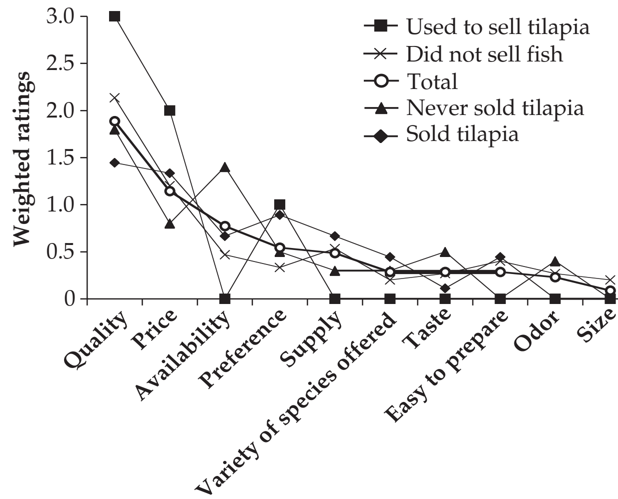

Figure 12. The most important characteristics that influenced choice of fish products for super markets that sold, used to sell, never sold tilapia, and did not sell fish. Supermarket survey, Nicaragua, 2000.

The most frequently mentioned supply problem was an insufficient quantity of tilapia (Table 21). This was followed by the lack of availability of tilapia at certain times of the year and by competition with Honduran exporters.

Quality was the most important characteristic that influenced the choice of fish products for supermarkets that sold tilapia, used to sell tilapia, never sold tilapia, and did not sell fish of any kind (Figure 12). Those who used to sell tilapia rated quality much higher than the other supermarkets. The second most important characteristic was price for all categories of sales with the exception of those that never sold tilapia. For this group of supermarkets, availability was the second most important characteristic. Availability was the third most important characteristic for most of the categories of supermarkets. For supermarkets that used to sell tilapia and those that sold tilapia, the third most important characteristic was consumer preferences.

Overall, supermarkets rated tilapia highest on ease of preparation, nice fresh flavor, patrons like variety, high-quality fish, and little fishy odor (Table 22). However, respondents also rated high the statement that marine fish is better. Low ratings on the statements that price was too high and the fish were too small indicated that respondents found the prices and sizes of fish acceptable.

Supermarkets that never sold tilapia rated it lower on reliable supply and on the attribute "consumers like to eat" (Table 22). Those who did not sell fish also rated tilapia low on reliable supply. Other responses were similar.

A very high percentage of respondents indicated that they were very likely to begin selling tilapia the next year (Figure 13). This was true for supermarkets

Table 22. Weighted mean ratings of various attributes of tilapia, by region. Supermarket survey, Nicaragua, 2000. Note: There were no supermarkets in the Northwest that used to sell tilapia.
[a] N = number of respondents.

Attributes	Sold Tilapia					Never Sold Tilapia					Did Not Sell Fish					Total
	South-Central		*Northwest*		*Total*	*South-Central*		*Northwest*		*Total*	*South-Central*		*Northwest*		*Total*	
	Mean	N [a]	Mean	N	Mean	Mean	N	Mean	N	Mean	Mean	N	Mean	N	Mean	Mean
Reliable Supply	6.00	6	7.33	3	6.44	2.00	2	5.50	2	3.75	4.50	4	1.00	1	3.80	5.37
Available	6.17	6	7.67	3	6.67	5.33	3	7.00	3	6.17	5.00	4	5.50	2	5.17	6.27
Consumers Like to Eat	6.67	6	7.33	3	6.89	4.50	2	2.33	3	3.20	8.00	1	6.00	2	6.67	5.50
High Quality Fish	6.83	6	7.00	3	6.89	7.40	5	5.50	2	6.86	8.33	6	3.00	1	8.00	7.21
Little Fishy Odor	7.00	6	4.50	2	6.38	5.50	2	8.00	2	6.75	6.75	4	8.33	3	7.43	7.00
Tastes Like Earth	5.00	6	6.67	3	5.56	3.50	4	9.50	2	5.50	3.60	5	3.67	3	3.62	5.08
Nice Fresh Flavor	6.83	6	8.00	3	7.22	6.50	4	9.00	2	7.33	8.80	5	7.75	4	8.33	7.60
Easy to Prepare	9.17	6	7.67	3	8.67	9.83	6	9.00	3	9.56	9.25	8	7.25	4	8.58	8.94
Price Is Too High	3.17	6	1.00	2	2.62	2.83	6	1.25	4	2.20	2.20	5	6.50	2	3.43	2.85
Tilapia Similar to Guapote	2.60	5	6.67	3	4.12	4.60	5	5.00	4	4.78	7.43	7	4.00	3	6.40	5.29
Marine Fish Is Better	8.17	6	8.00	2	8.12	8.83	6	3.75	4	6.80	7.36	11	3.33	3	6.50	7.09
Size Is Too Small	4.33	6	4.00	3	4.22	3.33	6	2.50	4	3.00	4.17	6	4.00	4	4.10	3.70
Patrons Like Variety	7.50	6	9.00	3	8.00	7.67	3	7.00	4	7.29	5.88	8	7.50	2	6.20	7.22

Table 23. Number and percent of supermarkets that sold guapote and tilapia, by region. Supermarket survey, Nicaragua, 2000.

Category on Menu	Region of Country					
	South-Central		*Northwest*		*Total*	
	N	%	N	%	N	%
Sold Only Tilapia	4	31	1	14	5	25
Sold Guapote and Tilapia	2	15	2	29	4	20
Sold Only Guapote	0	0	1	15	1	5
Sold neither Guapote nor Tilapia	7	54	3	43	10	50

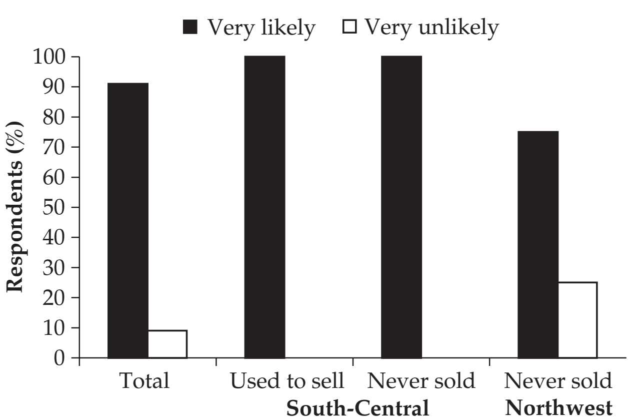

Figure 13. Likelihood of supermarkets to begin selling tilapia the next year, by region. Supermarket survey, Nicaragua, 2000.

that used to sell tilapia and those that never sold tilapia both in the South-Central and the Northwest.

Nicaraguan restaurants serve a traditional dish prepared from a freshwater fish known as guapote (*Cichlasoma managuense*). As cichlids, tilapia and guapote share certain characteristics that make them similar types of consumer products. Twenty percent of supermarkets sold both guapote and tilapia (Table 23). Another 25% sold only tilapia and an additional 5% sold only guapote. Half of all supermarkets sold neither guapote nor tilapia.

The major reason given for not selling guapote was the contamination of the lake (Table 24). Other reasons given were lack of supply, storage problems, only work with fillets, negative consumer attitudes, tastes like earth, lack of demand, and customer preference.

Table 24. Reasons why supermarket managers did not sell guapote, by region. Supermarket survey, Nicaragua, 2000.
[a] Responses represent individual answers, not respondents. Multiple answers (responses) can result in totals over 100%.

Reasons for Not Selling Guapote	Region of Country					
	South-Central		*Northwest*		*Total*	
	N	% [a]	N	%	N	%
Contamination of Lake	3	27	3	75	6	40
Lack of Supply	3	27	1	25	4	27
Storage Problems	3	27	0	0	3	20
Only Work with Fillets	3	27	0	0	3	20
Negative Consumer Attitudes	0	0	1	25	1	7
Tastes Like Earth	0	0	1	25	1	7
Lack of Demand	1	9	0	0	1	7
Customer Preference	1	9	0	0	1	7

Table 25. Number and percent of supermarkets that sold drum and tilapia, by region. Supermarket survey, Nicaragua, 2000.

Category on Menu	Region of Country					
	South-Central		*Northwest*		*Total*	
	N	%	N	%	N	%
Sold Only Tilapia	4	31	1	14	5	25
Sold Drum and Tilapia	2	15	2	29	4	20
Sold Only Drum	6	46	1	14	7	35
Sold neither Drum nor Tilapia	1	8	3	43	4	20

Table 26. Number and percent of supermarkets that sold red snapper and tilapia, by region. Supermarket survey, Nicaragua, 2000.

Category on Menu	Region of Country					
	South-Central		*Northwest*		*Total*	
	N	%	N	%	N	%
Sold Only Tilapia	4	31	2	29	6	30
Sold Red Snapper and Tilapia	2	15	1	14	3	15
Sold Only Red Snapper	1	8	2	29	3	15
Sold neither Red Snapper nor Tilapia	6	46	2	29	8	40

Twenty percent of the supermarkets sold both drum and tilapia (Table 25). An additional 25% sold tilapia only, 35% more sold drum only, and 20% sold neither drum nor tilapia.

When compared with red snapper, 30% of the supermarkets sold only tilapia (Table 26). Another 15% sold red snapper and tilapia, 15% sold only red snapper, and 40% sold neither red snapper nor tilapia.

Weighted mean ratings of various attributes of tilapia were compared across supermarkets that sold tilapia and drum, tilapia and red snapper, and tilapia and guapote (Table 27). For the comparisons of tilapia and drum and tilapia and red snapper, ratings were similar. However, the supermarkets that sold guapote only rated tilapia much lower on reliable

Table 27. Weighted mean ratings of various attributes of tilapia by supermarkets that sold tilapia only, drum only, guapote only, red snapper only, drum and tilapia, guapote and tilapia, or red snapper and tilapia. Supermarket survey, Nicaragua, 2000.

Attributes	Tilapia and Drum			Tilapia and Red Snapper			Tilapia and Guapote		
	Only Tilapia	*Tilapia and Drum*	*Only Drum*	*Only Tilapia*	*Tilapia and Red Snapper*	*Only Red Snapper*	*Only Tilapia*	*Tilapia and Guapote*	*Only Guapote*
Reliable Supply	6.40	6.50	5.50	5.83	7.67	6.50	6.20	6.75	3.00
Available	6.00	7.50	7.00	6.33	7.33	7.33	5.60	8.00	4.00
Consumers Like to Eat	7.20	6.50	3.00	6.67	7.33	2.00	5.80	8.25	4.00
High Quality Fish	7.80	5.75	7.50	6.83	7.00	6.50	5.80	8.25	3.00
Little Fishy Odor	6.80	5.67	7.00	6.00	7.50	9.50	6.75	6.00	9.00
Tastes Like Earth	3.00	8.75	6.60	5.00	6.67	9.50	6.00	5.00	9.00
Nice Fresh Flavor	7.60	6.75	6.40	6.67	8.33	7.00	6.20	8.50	8.00
Easy to Prepare	7.80	9.75	9.43	8.17	9.67	10.00	9.00	8.25	0.00
Price Is Too High	3.75	1.50	3.57	3.20	1.67	3.00	2.40	3.00	1.00
Tilapia Is Similar to Guapote	4.25	4.00	5.71	3.80	4.67	3.33	4.75	3.50	1.00
Marine Fish Is Better	7.00	10.00	8.14	7.67	9.50	5.33	8.50	7.75	5.00
Size Is Too Small	4.00	4.50	3.71	5.17	2.33	1.33	4.00	4.50	1.00
Patrons Like Variety	7.80	8.25	7.75	7.50	9.00	7.00	7.20	9.00	10.00

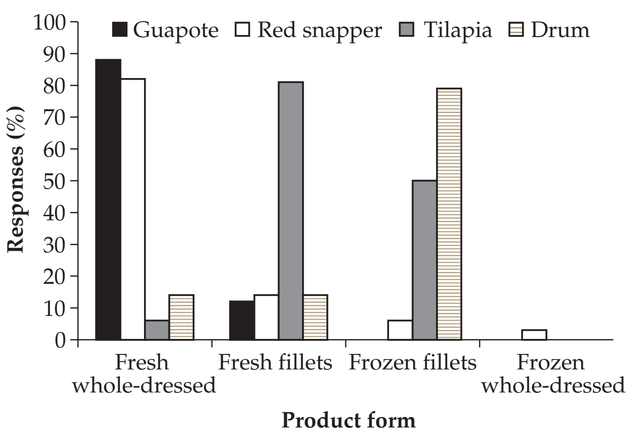

Figure 14. Product forms purchased, by most popular fish. Supermarket survey, Nicaragua, 2000.

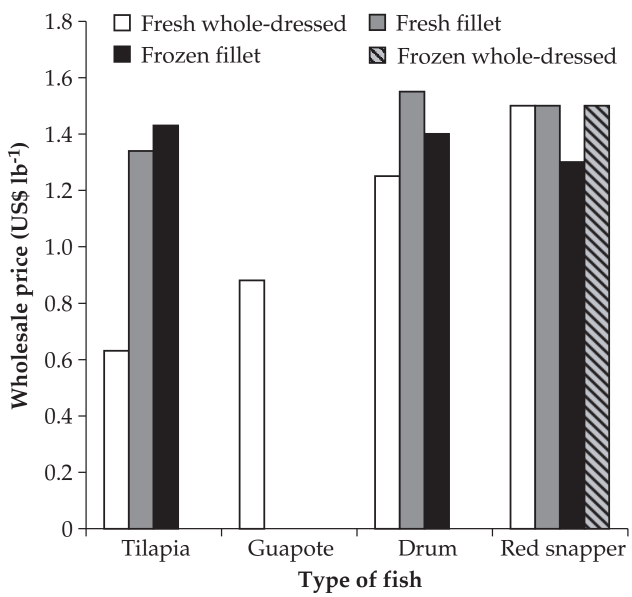

Figure 15. Weighted average of wholesale price, by most popular product form. Supermarket survey, Nicaragua, 2000.

supply and availability, consumers like to eat, and high-quality fish.

Guapote and red snapper were sold primarily as fresh whole-dressed product (Figure 14). On the other hand, drum were primarily sold as frozen fillets, and tilapia were sold primarily as fresh fillets and frozen fillets.

Wholesale prices of fresh whole-dressed tilapia were lower than fresh whole-dressed guapote, drum, and red snapper (Figure 15). Likewise, tilapia fresh fillet prices were lower than fresh fillet prices of either drum and red snapper. On the other hand, prices of tilapia frozen fillets were higher than frozen fillet prices of drum and red snapper.

Retail prices followed the same general trends (Figure 16). Fresh tilapia fillet prices were somewhat lower than fresh fillet prices of drum and red snapper. On the other hand, retail prices of tilapia frozen fillets were similar to or higher than frozen fillet

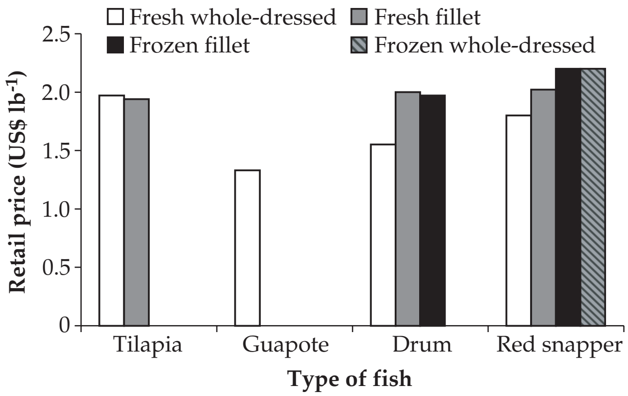

Figure 16. Weighted average of retail price of fish, by most popular product form. Supermarket survey, Nicaragua, 2000.

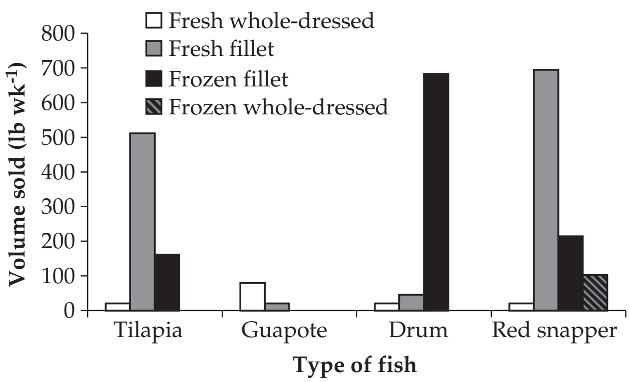

Figure 17. Weighted average of volume sold (lb wk^{-1}), by most popular fish form in Nicaragua. Super market survey, Nicaragua, 2000.

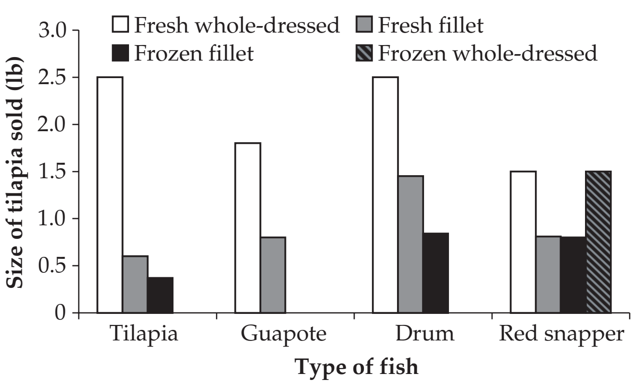

Figure 18. Weighted average of size of tilapia sold, by most popular product form. Supermarket survey, Nicaragua, 2000.

prices of drum or red snapper.

Weekly volumes sold of fresh whole-dressed tilapia were similar to volumes of fresh whole-dressed drum and red snapper, but they were less than fresh whole-dressed guapote (Figure 17). The volumes sold of fresh tilapia fillets were greater than those of guapote and drum but less than those of red snapper. Frozen tilapia fillet volumes were less than volumes sold of frozen drum and red snapper fillets.

The size of fresh whole-dressed tilapia sold was similar to the size of fresh whole-dressed drum sold but was larger than the size of fresh whole-dressed guapote and red snapper (Figure 18). The fresh tilapia fillets were sold at a size smaller than the fresh fillet size of guapote, much smaller than that of drum, and smaller than that of red snapper. Likewise, the average size of frozen tilapia fillets was smaller than those of frozen drum fillets and of frozen red snapper fillets.

Conclusions

There were few supermarkets that sold tilapia in Nicaragua. An overall 26% of the supermarkets sold tilapia. There were another 29% who sold fish but not tilapia. Fish and seafood overall made up a low percentage of the total store sales (0.5 to 5%). Many of the supermarkets in Nicaragua were new stores that had been in business for only a few years. In contrast to Honduras, few of the stores had specialized seafood counters. The larger supermarkets were those that tended to sell tilapia. In particular, those supermarkets with clientele groups described as middle to upper-middle income.

Tilapia were not sold due to off-flavor (tastes like earth), lack of supply, and fears of selling contaminated fish from Lake Nicaragua. Guapote, for which tilapia might be considered a close competitor, was likewise not sold by a number of supermarkets due to fears of contamination.

Nevertheless, those supermarkets that sold tilapia indicated that their sales in 2000 were higher than they had been in 1999. A high percentage of supermarkets indicated that they were very likely to begin selling tilapia in the coming year. Inconsistent supplies and insufficient quantities were indicated to be the greatest supply problems. Fresh fillets were preferred, with the most common size sold being 0.6 lb. The most important attributes of tilapia and other fish products were quality, price, and availability. Price of tilapia was acceptable, but quality and availability were considered questionable.

For a farm-raised tilapia industry to develop a domestic market for tilapia in Nicaragua, the issue of consumer fears of contamination must be addressed. Broad-based consumer education, third-party certification, and labeling programs may be needed to assist consumers in differentiating between farm-raised and wild-caught tilapia. Tilapia farms and processors in Nicaragua will need to guarantee and ensure the flavor, quality, and safety of their product and promote these attributes. A consistent supply of high-quality tilapia will be essential.

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