



AQUACULTURE CRSP 22ND ANNUAL TECHNICAL REPORT

DEVELOPMENT AND ASSESSMENT OF A SIMPLE MARKET FEASIBILITY ASSESSMENT METHODOLOGY

*Tenth Work Plan, Marketing and Economic Analysis Research 2 (10MEAR2)
Final Report*

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ABSTRACT

Market surveys require extensive time and funding on the part of skilled researchers to develop useful answers on the market feasibility of aquaculture species. Comprehensive surveys were done in Peru and in Mexico to test a simplified market feasibility assessment methodology. A followup of the methodology was conducted in Kenya. Three interview guides have been developed based on the most important variables from the previous surveys conducted in Honduras and Nicaragua and the surveys in Peru and Mexico conducted as part of this project. The interview guides solicit information on competing, preferred products, such as freshwater versus marine species and the preferred product forms, sizes, current supply quantities, and prices of the four most preferred species. Availability of the proposed aquaculture species product is assessed at each market level. Attitudes are evaluated through simple scaled questions on the consistency of supply, consumer preferences, quality, flavor, price, and size. The interview guides end with sociodemographic and store size characteristics. Interview guides were developed for restaurants, supermarkets, and wholesalers. Open-air markets were not included because, in many areas, prices paid by vendors in open-air markets are too low to cover costs of producing farm-raised aquaculture products. These interview guides can be used to rapidly assess market potential for new aquaculture products.

INTRODUCTION

Comprehensive marketing studies are very expensive and resource intensive. They require a great deal of manpower, funding, and expertise. Yet, all too often, efforts to develop aquaculture industries fail due to market conditions, not lack of production technology expertise. There is a significant need to attempt to develop some simplified and rapid market assessment techniques that are applicable to the Latin American context.

Polling firms in the U.S. have identified indicator questions and variables that can be used as predictors of behavior (Burns and Bush 1998). These are based on analysis of comprehensive survey data and statistical analyses that develop relationships among different variables and parameters. For new industries like aquaculture in developing nations without the plethora of databases, surveys, and census information that some other countries have available, these types of convenient shortcuts are not possible. The surveys conducted in the Ninth

Work Plan, however, provide a wealth of information related to fish and seafood markets in Central America. If a reliable subset of key parameters can be developed, it may be possible to develop a simplified and relatively rapid market assessment tool.

Rapid assessment tools have been developed for other types of development initiatives. For aquaculture ICLARM is actively using a spreadsheet-based resource allocation interactive tool to assist with community and farm development (Prein et al. 1996). This tool has successfully been used to identify sustainable approaches to resource use and economic development. Hatch and Falck (2001) developed a spreadsheet program that allowed for distribution of costs, yields, and prices, to be entered to assess the effects of economic risk in production.

There is little literature on the development of such a rapid assessment methodology for addressing marketing feasibility. Baker and Neto (1988) developed a

description of a generalized Rapid Market Assessment methodology for products for which an existing market exists. The Baker and Neto methodology was based on identifying markets where the product is currently sold and then interviewing individuals from several levels of that market channel. However, many aquaculture products, particularly in the Western Hemisphere, enter the market as new products. Moreover, the Baker and Neto work did not include any guidance or templates for the interview guide. Careful attention to wording and question placement can affect the success of an interview instrument. Most individuals who are trained in aquaculture have little experience or training in development of such an interview guide.

The specific objectives of this project were to develop a methodology for rapid assessment of market feasibility for aquaculture species and to evaluate the methodology developed for rapid assessment of market feasibility for aquaculture species.

METHODS AND MATERIALS

Results of the surveys conducted in Honduras and Nicaragua under previous work plans (Fúnez et al. 2003a, b; Monestime et al. 2003; Engle and Neira 2003 a, b) and quantitative analyses of these data (Neira and Engle, 2003) were used to identify the most important variables related to market characteristics for farm-raised tilapia in those countries. Short (2-page) questionnaires were developed for restaurants, supermarkets, and fish wholesalers to capture the most important information identified in the previous studies.

Comprehensive market surveys of restaurants, supermarkets, and open-air markets were conducted in both Peru and Mexico. Both tilapia and native cichlid species are sold in Mexico City, the principal market area and population center in Mexico. In Peru, surveys were conducted in the capital city Lima where large marine species predominate, in Iquitos, where tilapia are banned and large freshwater species are, and in Tarapoto where tilapia are cultivated and marketed.

The restaurant and supermarket survey instruments designed in Honduras by Engle et al. (2000) was used as a basis for these studies. Interviews were conducted in Lima, Iquitos, and Tarapoto in November and December 2002 (Figure 3). For the restaurant surveys, the sampling universe consisted of full-service restaurants registered in the 2002 telephone directory. Fast-food eating establishments, roast chicken specialty stores, catering shops, and pizza stores were excluded from the sampling universe for the survey. Random numbers were used to select specific restaurants for inclusion in the survey sample. Sample size for the restaurant survey was estimated based on similar studies in Central America. The interviews were conducted in 23 districts

of Lima with 105 completed questionnaires (75% of sample), two districts in Tarapoto with 19 completed questionnaires (14% of sample), and 10 completed restaurant questionnaires (8% of sample) in Iquitos for a total of 134 completed restaurant questionnaires.

A complete census of supermarkets was conducted in the three sites. Managers of all supermarkets published in telephone listings were interviewed. There were only two supermarket chains listed in telephone books in Lima, two in Tarapoto, and five in Iquitos. Chain supermarkets provided information only through the main store managers who would not give permission to conduct additional interviews at the store level. Thus, there was only one observation per chain. Convenience stores (Start Mart) were excluded from the survey.

The survey instruments were designed to obtain descriptive information about fish sold. There were 109 potential questions on the restaurant survey and 178 on the supermarket survey. Interviews lasted approximately 30 minutes. The surveys included questions on both tilapia and other types of fish and seafood sold, prices, most frequently sold fish products, marketing channels and information on suppliers. Awareness and availability of tilapia were addressed through questions related to the owner's familiarity with tilapia as well as questions related to its supply. Information on restaurant managers' attitudes towards attributes such as flavor, odor, supply, quality, ease of preparation, size, and price were elicited by asking respondents to assign a value of 1 to 10 in response to statements concerning each attribute. A score of 1 represented complete disagreement with the statement, and a score of 10 represented complete agreement.

Response rates were high in all three locations for both surveys, ranging from 90% to 100%. This is likely due to the novelty of seafood market surveys in Peru. Questions were asked about years in business, customer income, type of ownership, size, location, and yield. 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.

All data were entered into a computer using Survey Pro[®] software (Apian Software, Inc., Seattle, Washington). The data were cross-tabulated by location. Data were cross-tabulated by locales that sold and did not sell tilapia, and by place of origin of the fish purchased.

RESULTS

Complete detailed results of the surveys conducted in Peru are available from the 2004 Pond Dynamics/Aquaculture Technical Reports. The descriptive analysis of the Peruvian data allowed for extraction of the most

critical parameters in terms of evaluating market potential. These parameters were compared with the short questionnaires developed with the Honduran and Nicaraguan data and the short questionnaires were modified accordingly.

Appendix A lists the finalized interview guides for restaurant, supermarket, and wholesaler interviews that can be used for Rapid Market Assessment for new aquaculture products. Consumer preferences are related strongly to traditional consumption of products. One of the first questions that needs to be asked is whether the buyer handles primarily freshwater or marine fish products. Questions eliciting the most preferred species, product forms, sizes, quantities purchased, and both wholesale and retail prices is critical. Identification of a new market niche will depend upon competing species in the market and these other, preferred species possess characteristics desired by the clientele. Understanding the volumes, prices, and characteristics of these species in the market will provide key information on potential market niches.

The interview guides include questions on attitudes towards important information such as the consistency of supply, clientele preferences towards the new aquaculture product, quality, flavor, price, and size of the product. In the surveys conducted to date, quality, price, and size were the most important characteristics. Identification of supply problems with existing products will point towards possible market opportunities.

Additional information on store size and type, principal clientele groups served, and year in business will provide some guidance as to which types of outlets have the most positive attitudes towards the types of products being offered.

Appendix B includes summaries of the data collected from the questions on the Rapid Market Assessment interview guides. Data from both Peru and Mexico are included for comparison purposes.

ANTICIPATED BENEFITS

Direct beneficiaries of this project were aquaculture growers in Peru and Mexico where the methodology

was developed. The development efforts have provided valuable market information on markets for tilapia and for other important native species. This methodology has potential to be a valuable tool for many areas where aquaculture is a new technology, or where a new species or product is to be introduced.

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Table 1. Characteristics of supermarkets by site.

| Characteristics | | Peru | Mexico |
|------------------------|-------------------|--------|---------|
| Mean store area | (m ²) | 2,036 | 5,913 |
| Mean weekly sales | (\$/week) | 16,375 | 350,000 |
| Mean years in business | (yr.) | 5 | 15 |
| Income clientele group | | | |
| Low-income | | 0 | 7 |
| Middle low-income | (%) | 11 | 41 |
| Middle income | (%) | 78 | 22 |
| Middle high-income | (%) | 11 | 17 |
| High-income | (%) | 0 | 13 |

Table 2. Number and percent of supermarkets that sold fish and seafood.

| Category | Peru | | Mexico | |
|-----------------------|------|----|--------|----|
| | No. | % | No. | % |
| Sold fish and seafood | 7 | 78 | 33 | 72 |
| Did not sell fish | 2 | 22 | 13 | 28 |

Table 3. Number and percent of supermarkets that sold, used to sell, and never sold tilapia by site.

| | Peru | | Mexico | |
|----------------------|------|----|--------|----|
| | No. | % | No. | % |
| Sold tilapia | 3 | 33 | 32 | 70 |
| Used to sell tilapia | 1 | 11 | 0 | 0 |
| Never sold tilapia | 5 | 56 | 14 | 30 |

Table 4. Reasons why supermarkets managers did not sell tilapia by site.

| Reasons for not selling tilapia | Peru | | Mexico | |
|---------------------------------|------|----------------|--------|----------------|
| | No. | % ^a | No. | % ^a |
| Haven't heard of it | 3 | 50 | 0 | 0 |
| Customer preference | 2 | 33 | 1 | 7 |
| Lack of supply | 2 | 33 | 0 | 0 |
| No specialized seafood section | 0 | 0 | 13 | 93 |

^aResponses represent individual answers, not respondents. Multiple answers (responses) can result in percentage totals over 100%.

Table 5. Likelihood of supermarkets beginning to sell tilapia the next year by site.

| Likelihood to sell tilapia | Peru | | Mexico | |
|----------------------------|------|----|--------|----|
| | No. | % | No. | % |
| Very likely | 4 | 44 | 31 | 67 |
| Somewhat likely | 2 | 22 | 0 | 0 |
| Very unlikely | 2 | 22 | 1 | 2 |
| Somewhat unlikely | 0 | 0 | 0 | 0 |
| Don't know / No answer | 1 | 11 | 14 | 30 |

Table 6. Weighted mean ratings of various attributes of supermarkets by site.

| Attributes | Peru | Mexico |
|-----------------------|------|--------|
| Consistent supply | 5.5 | 7.9 |
| Consumers like to eat | 8.0 | 8.0 |
| High quality fish | 8.8 | 7.7 |
| Nice fresh flavor | 8.5 | 7.6 |
| Price is too high | 5.8 | 5.0 |
| Size too small | 6.3 | 3.9 |

Table 7. The most important factors that affect purchase decision for fish and seafood.

| Most important factors | Peru | Mexico |
|------------------------|------|--------|
| Freshness | 1.6 | 0.6 |
| Quality | 1.0 | 3.0 |
| Price | 0.8 | 1.0 |
| Size | 0.6 | 0.0 |
| Presentation | 0.6 | 0.0 |
| White flesh | 0.3 | 0.0 |
| Clean | 0.3 | 0.0 |
| Supplier kindness | 0.2 | 1.2 |
| Color | 0.2 | 0.0 |
| Weight | 0.2 | 0.0 |
| Available always | 0.1 | 0.1 |
| Customer preference | 0.1 | 0.0 |

Table 8. Weighted average of volume sold (kg/week), size (kg) of tilapia Purchased by supermarkets, wholesale price of tilapia, and retailer price of tilapia (\$/kg) by product form.

| Product form | Unit | Fresh whole-dressed | | Fresh fillets | | Frozen fillets |
|-----------------|---------|---------------------|--------|---------------|--------|----------------|
| | | Peru | Mexico | Peru | Mexico | Mexico |
| Volume | kg/week | 125 | 92 | 500 | 53 | 34 |
| Size | kg | 0.72 | 0.27 | 0.09 | 0.16 | 0.15 |
| Wholesale price | \$/kg | 1.2 | 1.9 | 3.7 | 7.2 | 6.7 |
| Retail price | \$/kg | 2.3 | 3.2 | 5.3 | 9.9 | 9.8 |

Table 9. Number and percent of restaurants by type of cuisine and by site.

| Type of cuisine | Peru | | Mexico | |
|---------------------|------|----|--------|----|
| | No. | % | No. | % |
| Variety | 38 | 28 | 15 | 13 |
| Typical | 30 | 22 | 18 | 15 |
| Seafood | 28 | 21 | 34 | 28 |
| International | 11 | 8 | 18 | 15 |
| Specialized cuisine | 28 | 21 | 35 | 29 |

Table 10. Number and percent of restaurants surveyed by income clientele group and by site.

| Income clientele group | Peru | | Mexico | |
|------------------------|------|----|--------|----|
| | No. | % | No. | % |
| Low | 1 | 1 | 1 | 1 |
| Middle | 117 | 87 | 95 | 79 |
| High | 15 | 11 | 17 | 14 |
| International | 1 | 1 | 7 | 6 |

Table 11. Number and percent of restaurants by seating capacity and by site.

| Seating capacity | Peru | | Mexico | |
|------------------|------|----|--------|----|
| | No. | % | No. | % |
| 1-50 | 29 | 22 | 14 | 12 |
| 51-100 | 58 | 43 | 45 | 38 |
| 101-300 | 42 | 31 | 49 | 41 |
| 301-500 | 4 | 3 | 11 | 9 |
| 501-2500 | 1 | 1 | 1 | 1 |
| Weighted average | 124 | | 162 | |

Table 12. Number and percent of restaurants that sold fish and seafood.

| Category | Peru | | Mexico | |
|-----------------------|------|----|--------|----|
| | No. | % | No. | % |
| Sold fish and seafood | 124 | 92 | 103 | 86 |
| Did not sell fish | 10 | 8 | 17 | 14 |

Table 13. Number and percent of restaurants by percentage of total sales from fish and seafood and by site.

| Percentage of total sales | Peru | | Mexico | |
|---------------------------|------|----|--------|----|
| | No. | % | No. | % |
| <30% | 25 | 20 | 25 | 24 |
| 30-60% | 49 | 40 | 37 | 36 |
| >60% | 50 | 40 | 41 | 40 |

Table 14. Peak demand season for fish and seafood by site.

| Season | Peru | | Mexico | |
|-----------------------|------|----|--------|----|
| | No. | % | No. | % |
| Jan.-April. (Easter) | 79 | 64 | 53 | 51 |
| No special time | 27 | 22 | 31 | 30 |
| May-August | 9 | 7 | 2 | 2 |
| Set-Dec. (Christmas) | 6 | 5 | 15 | 15 |
| Don't know/ No answer | 3 | 2 | 2 | 2 |

Table 15. Number and percent of restaurants that sold tilapia and did not sell it.

| Category | Peru | | Mexico | |
|------------------------|------|----|--------|----|
| | No. | % | No. | % |
| Sold tilapia | 9 | 7 | 31 | 30 |
| Did not sell it | 115 | 93 | 61 | 59 |
| Don't know / No answer | 0 | 0 | 11 | 11 |

Table 16. Reasons why restaurant managers did not sell tilapia by site.

| Reason for not selling tilapia | Peru | | Mexico | |
|--------------------------------|------|----|--------|----|
| | No. | % | No. | % |
| Haven't heard of it | 48 | 42 | 1 | 2 |
| There is no demand | 28 | 24 | 33 | 54 |
| There is no supply | 16 | 14 | 0 | 0 |
| Fish too small | 8 | 7 | 1 | 2 |
| Negative consumer attitudes | 12 | 11 | 21 | 34 |
| Only work with fillets | 2 | 2 | 1 | 2 |
| New restaurant | 0 | 0 | 1 | 2 |
| Don't know / No answer | 1 | 1 | 3 | 5 |

Table 17. Likelihood of restaurants beginning to sell tilapia the next year by site.

| Likelihood to sell tilapia | Peru | | Mexico | |
|----------------------------|------|----|--------|----|
| | No. | % | No. | % |
| Very likely | 32 | 24 | 13 | 11 |
| Somewhat likely | 53 | 40 | 22 | 18 |
| Very unlikely | 24 | 18 | 46 | 38 |
| Somewhat unlikely | 7 | 5 | 12 | 10 |
| Don't know / No answer | 10 | 8 | 10 | 8 |

Table 18. Weighted mean ratings of various attributes of restaurants by site.

| Attributes towards tilapia | Peru | Mexico |
|----------------------------|------|--------|
| Consistent supply | 4.5 | 6.7 |
| Consumers like to eat | 6.9 | 5.6 |
| High quality fish | 7.9 | 6.8 |
| Nice fresh flavor | 8.1 | 7.5 |
| Price is too high | 4.2 | 4.0 |
| Size too small | 6.7 | 4.7 |

Table 19. The most important factors that affect purchase decision for fish and seafood.

| Most important factors | Mexico | Peru |
|------------------------|--------|------|
| Freshness | 2.0 | 2.0 |
| Price | 1.1 | 1.0 |
| Quality | 1.2 | 0.9 |
| Size | 0.5 | 0.4 |
| Texture | 0.1 | 0.3 |
| Customer preference | 0.1 | 0.2 |
| Available always | 0.0 | 0.2 |
| Supplier kindness | 0.1 | 0.2 |
| Odor | 0.3 | 0.1 |
| Clean | 0.0 | 0.1 |

Table 20. Weighted average of volume sold (kg/week), size (kg) of tilapia Purchased by restaurant, and supplier price of tilapia (\$/kg) by product form.

| Product form | Unit | Live | Fresh whole-dressed | Fresh fillets | Frozen fillets | |
|-----------------|---------|------|---------------------|---------------|----------------|------|
| | | Peru | Mexico | Peru | Peru | Peru |
| Volume | kg/week | 6 | 21 | 6 | 26 | 3 |
| Size | kg | 0.16 | 0.50 | 0.33 | 0.13 | 0.26 |
| Wholesale price | \$/kg | 1.7 | 3.5 | 1.4 | 3.3 | 3.7 |

Figure 1. Product forms purchased by most popular fish in Peru.

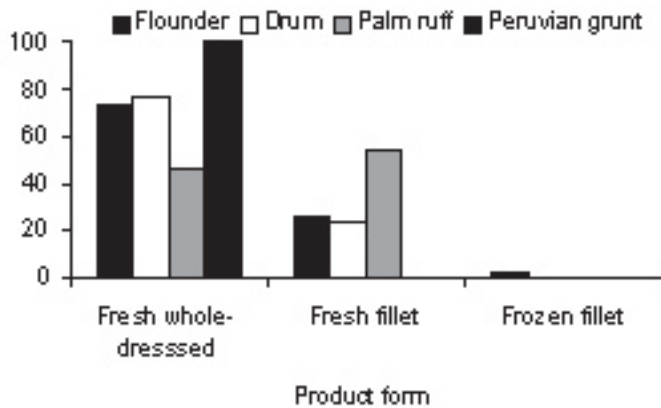


Figure 2. Product forms purchased by most popular fish in Mexico.

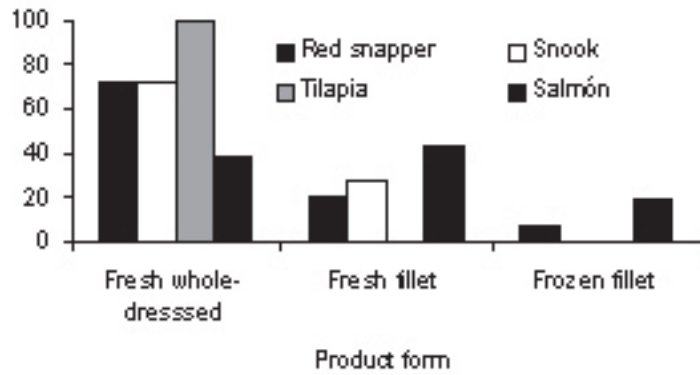


Figure 3. Product size (kg) of fish by most popular type of fish in Peru.

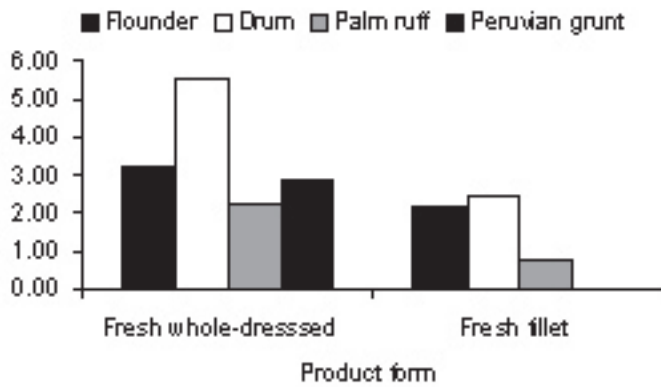


Figure 4. Product size (kg) of fish by most popular type of fish in Mexico.

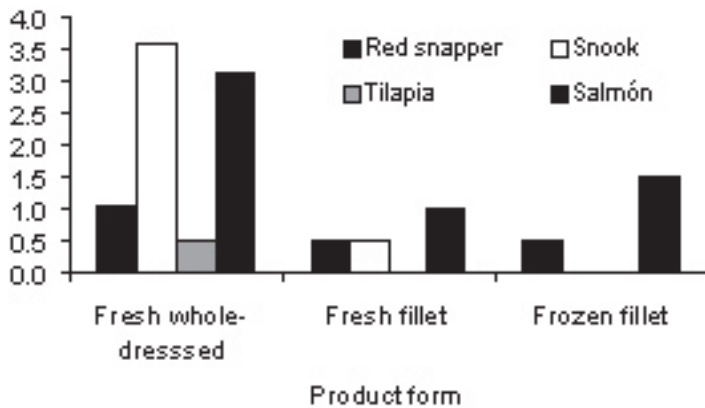


Figure 5. Volume sold (kg/ week) by most popular fish form in Peru.

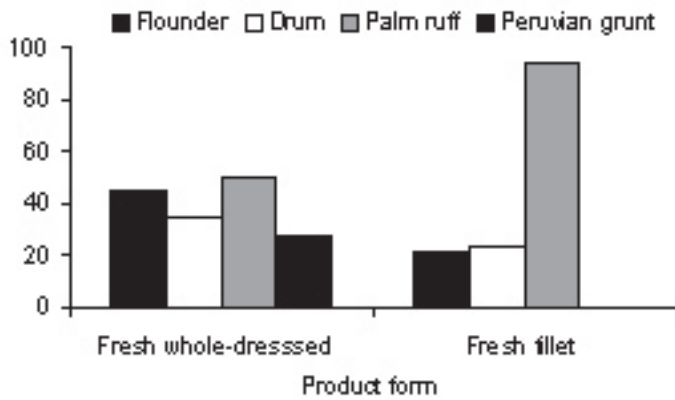


Figure 6. Volume sold (kg/ week) by most popular fish form in Mexico.

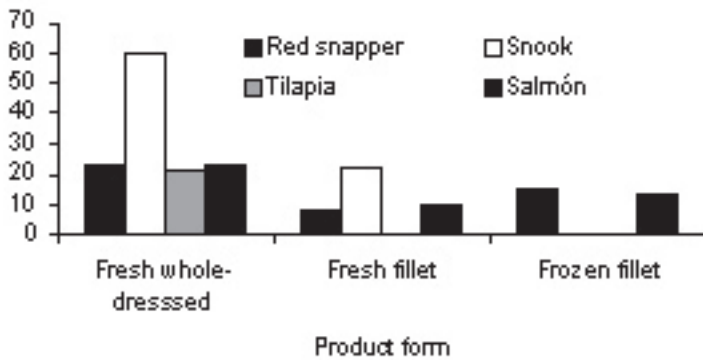


Figure 7. Supplier price of fish by most popular product form in Peru.

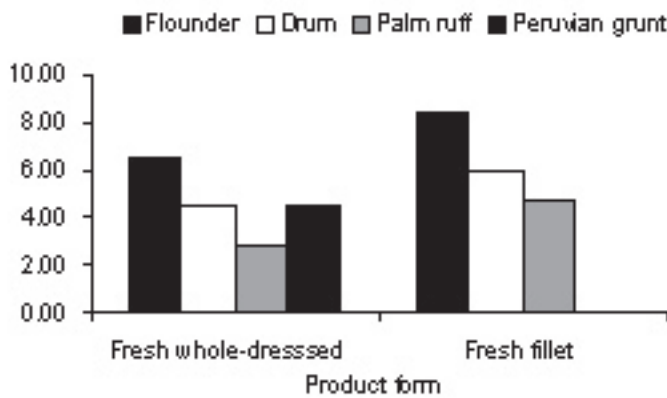


Figure 8. Supplier price of fish by most popular product form in Mexico.

