ANALYSIS OF THE AQUACULTURE MARKET IN THE COSTA RICAN METROPOLITAN AREA

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December 14, 2010

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This report is the product of an educational program and is intended to serve as partial documentation for evaluation of academic achievement. The report should not be construed as a working document by the reader.

Abstract

Our team aimed to assess and analyze the urban market for aquaculture products since these products were not well-commercialized in the metropolitan area of Costa Rica. We accomplished this by conducting surveys of aquaculture producers, wholesalers, market managers and consumers of fish products. Our main deliverables included data describing the volumes and prices of fish sold, demand for fish species, locations of purchase, consumer demographics and current advertisement techniques as well as recommendations for developing the commercialization of aquaculture products.

Authorship Page

All research conducted for this study and all writing completed in this report were done in equal measures by Brandon Boucher, Hannah Duscha, Smita Kurrumchand and Franco Oshiro. This final product is a collaboration by all members of the group and each member accepts full responsibility for the contents of this paper.

From left to right: Franco Oshiro, Brandon Boucher, Hannah Duscha, and Smita Kurrumchand.

Acknowledgements

We would like to extend our sincerest gratitude to all of the individuals without whom this research project would not have been possible.

First, we would like to give our most heartfelt thanks to our project liaisons, Sr. Álvaro Otárola Fallas and Dr. Rolando Ramírez Villalobos, for the resources they provided us with to aid our work and also for the countless hours they devoted to helping us conduct numerous interviews and surveys.

We would also like to sincerely thank our on-site project advisors, Professor Jennifer Rudolph and Professor Stanley Selkow, for guiding and supporting us through the research process and for offering their advice and counseling when we needed it most.

We were lucky to have the opportunity to work with several individuals from INCOPESCA and we would like to thank them for taking the time to escort and aid us during our data collection process. To Sr. Carlos Luis Barrantes, Sr. Edgar Chacon Palma, Sra. Dixe Jones Grainger and Sr. Marco Miranda Alvarez: we couldn't have done this without you.

We truly appreciated speaking with Sr. Marco Freer from the Wal-Mart Corporation; the information we received during our interview with him was invaluable, as was the time he donated to our research process.

We extend our thanks to Mr. Ken Dirst and all of the producers of trout, tilapia and shrimp who took the time to speak with us about aquaculture production and marketing.

We also would like to thank the countless market managers, wholesalers and consumers who were willing to participate in our interviews and surveys.

We recognize that organizing a project site takes a lot of time, effort and cooperation from a number of people and so we would like to thank Professor Susan Vernon-Gerstenfeld, Sr. Jimmy Music and Sra. Marcela Music for "putting a foot in the door" for us.

Thank you also to Professor Ingrid Shockey for guiding us through the preliminary stages of our project; without her we would not have obtained all the proper skills for conducting this research.

Finally, we would like to express our gratitude to Sr. Gelman Suarez and Sra. Olga Beatriz Rodríguez and all of their wonderful staff at Los Apartamentos Tairona for providing us with a comfortable and friendly living and working environment for the duration of our stay in Costa Rica.

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Executive Summary

Aquaculture production has been an important cornerstone for the economy of developing Latin American countries. The practice was first introduced to Latin America in the 1940s as a means of fulfilling domestic consumption demands. Since the 1960s, the Latin American aquaculture industry has been growing steadily in order to compete with other countries on a global scale. According to the Food and Agricultural Organization of the United Nations' website (2010), the Costa Rican aquaculture industry has undergone rapid development in the past 10 years. Although Costa Rica has established an important overseas market for aquaculture products (such as the export of tilapia to the United States), the same aquaculture products have not been competitive at a local level.

In 1994, the Costa Rican government created the agency entitled Instituto Costarricense de Pesca y Acuicultura (INCOPESCA). Beginning that year, INCOPESCA assumed the responsibility for the aquaculture and fishing industry in Costa Rica and their mission to work towards the sustainable development of the country's aquaculture industry has remained ever since. According to the INCOPESCA website, one of the responsibilities of the agency is to "promote the development of fishing and aquaculture by regulating, protecting, and managing marine resources and aquaculture products" (INCOPESCA, 2010). Prior to our studies INCOPESCA had focused mostly on establishing proper farming practices for the cultivation of trout, tilapia and shrimp. However, they did not focus much on promoting local aquaculture products on the national market. Due to this lack of assessment, we worked in conjunction with INCOPESCA to determine the state of development of the national market for local aquaculture products in the metropolitan area of San José and how we could improve it.

INCOPESCA identified two major long-term goals for this project: to assess the current market for aquaculture products in the metropolitan areas of Alajuela, Cartago, Heredia and San José and to develop suggestions for a marketing strategy that will increase aquaculture products' competitiveness. In order to address these goals we accomplished the following objectives:

1) Identified distribution routes for the accessibility of tilapia, trout, shrimp and other aquaculture products in order to determine the elasticity of demand
2) Determined if the quality of local aquaculture products influenced the sales of these products

3) Determined the level of competition between imported and local aquaculture products in the market, and analyzed the impact of the imported products.
4) Measured the level of acceptance of the different types of products available
5) Determined current advertisement methods for Costa Rican aquaculture products

To achieve each of these objectives, we began by conducting background research. We first investigated the development of aquaculture in Costa Rica and discovered that trout, tilapia and shrimp were the most prominent aquaculture species. Next, we researched previous studies done by INCOPESCA and discovered that the studies have primarily looked at the "standard practices" used for aquaculture farming rather than the marketing aspect of the products. Furthermore, we investigated a brief overview of the large scale imports and exports done in Costa Rica, which helped us understand the impact of foreign goods on the local aquaculture market. As a final preparation, we investigated three different case studies. The first involved a catfish advertisement study that researchers conducted in the United States during the early 1990's in order to increase the sales of cultivated catfish. The next two case studies were done in Nicaragua and Honduras in the early 2000's in order to promote sales of aquaculture products in metropolitan markets. These studies elucidated the procedure we should use for assessing the market in Costa Rica since these countries share common traits with Costa Rica.

To continue with our investigation, we conducted a series of 167 interviews and surveys that targeted producers, wholesalers, markets and consumers. We interviewed a total of 32 producers of trout, tilapia and shrimp at their farms which were located in various regions of Costa Rica. The trout farms were established in San Gerardo de Dota and the areas surrounding Cartago. The tilapia farms were found in Venecia, Aguas Zarcas and La Fortuna in the region of San Carlos. The shrimp farms were situated near Colorado next to the Gulf of Nicoya. We also interviewed 10 wholesalers located at Cenada, a wholesaler distribution center in the city of Heredia. The market populations were broken down further into hypermarkets, supermarkets, municipal markets and farmers' markets. These markets were found at various locations in the cities of Alajuela, Heredia and San José (due to time constraints we were unable to visit markets in Cartago). Overall, 1 hypermarket, 3 supermarkets, 17 municipal markets and 9 farmers' markets were included in our interviews. Additionally, we surveyed a total of 95 consumers at these markets. We conducted this study in a one-month round of data collection which incorporated the interviews and surveys of all four populations simultaneously. In general, we designed the interview and survey questions to provide

us with the relative volumes of aquaculture products sold, the prices of these products, where the products were sold, public opinions on the quality of these products and reasons for buying and consuming these products. In addition to our official interviews and surveys, we also gathered information through personal communications with Carlos Luis Barrantes from INCOPESCA; Marco Freer from the Wal-Mart corporation; and our liaisons from INCOPESCA, Sr. Álvaro Otarola Fallas and Dr. Rolando Ramírez Villalobos.

After we gathered the data we proceeded with a detailed analysis. We documented the information from interviews in Appendix E. We also used Microsoft Excel in order to document numerical values and show relationships through graphical representations.

In our analysis, we first discovered that none of the producers were satisfied with the price at which they purchase fish feed. Producers reported that imported feed was good quality but also very costly and this prevented them from earning a high profit margin. Most of the producers we interviewed owned restaurants at their farms and focused mainly on running their business rather than concentrating on commercializing their product in the cities. When we inquired about their reasons for not selling their products in the cities, the producers explained that they would have to invest in both equipment for processing the fish and means for transporting the fish; many of the producers expressed that they did not have the monetary means to accomplish this. The producers also talked about bad road conditions which deterred them from transporting their fish to the cities.

We also made a series of findings that were specific to each type of producer. For the trout producers, some who were situated at lower elevations spoke of an eye disease which the fish contracted when the water temperature in the "tanks" increased too much. Another issue that trout producers mentioned was the high level of competition between producers due to their close proximity to one another. For the tilapia producers, their main concern was competition from large producers that produce tilapia and also competition from other small- and medium-scale tilapia producers. For the shrimp producers, their biggest issue was competition from Nicaragua. Products from Nicaragua were typically cheap, which forced shrimp producers to lower their prices when they sold their products to intermediaries. This loss of revenue resulted in a lower profit margin since there were already so many costs involved with cultivating and harvesting the shrimp. Additionally, the shrimp producers reported that they only sold their products to intermediaries; the price of the

product consequently increased before reaching the final consumer due to the use of the intermediaries.

All of the wholesalers reported selling marine products to the local population. Also, 4 out of the 10 wholesalers sold cultivated products in addition to marine products. The highest-selling product at the wholesalers' market was sea bass, with an average volume of 1414 kilograms sold per month. By comparison an average volume of 375 kilograms of panga and mahi mahi (the least sold fish) were sold per month. Furthermore, the average price of imported cultivated salmon (7000 c/kg) was the highest out of all the different prices for fish sold at the wholesalers' market.

For the market manager section of our findings, we analyzed a total of 30 interviews conducted in the greater San José area. Seventy percent of the interviewees were either market owners or managers while the other 30% were people who worked closely with fish. Many of the markets exhibited similarities in the way that they presented the fish for sale. Nearly 100% of the markets sold their fish fresh (preserved on ice). Almost all of the markets felt that local products (marine and aquaculture) earned more profits than imported goods.

We also discovered that different fish were in higher demand depending on which market was selling the fish. Certain fish were sold in different types of markets; for instance, municipal markets sold the most sea bass and porgy out of any other market type in the study. Overall, super- and hypermarkets mostly sold aquaculture products while municipal markets mostly sold marine products. Additionally we found in all venues that almost 50% of the aquaculture products were imported aquaculture products. We also found that the market was price-driven. Cheaper fish sold more readily than more expensive fish. We additionally found that as the demand for a certain species increased, so did its availability at that venue.

We performed a series of correlations and found that advertisement methods varied from market to market. For example, hyper- and supermarkets employed advertising techniques and were willing to advertise more readily than the other types of markets. Also, markets that advertised felt that the advertisements were very effective.

Our consumer results showed that consumers thought prices were reasonable, but leaned towards expensive. Additionally the general opinion of quality throughout was that it was of a high caliber. The whole population had some awareness that fish had nutritional value. The main reasons

for consuming fish were due to the fact that fish is nutritious and tasty. The population liked to buy their fish fresh. Finally, the majority of the consumers we interviewed talked about the lack of advertisements in the marketplace and reported that they usually inquired about the products available and their prices at the venue. Along with these general findings, we further examined other factors.

The first factor we examined was location of purchase. If we ignore demographics, the whole population mainly shops at hypermarkets, supermarkets, and municipal markets. We found that the majority of consumers purchased fish at the same place we interviewed them. We also saw that younger consumers tend to shop at hyper- and supermarkets, while older consumers shop at municipal markets. Likewise, employed consumers tend to shop at hyper- and supermarkets, while unemployed and pensioned consumers shop at municipal markets. For this section we also discovered that consumers with a higher level of education tend to shop at hypermarkets and supermarkets, while consumers with a lower level of education shop at municipal markets.

The next factor we compared was the species that consumers ate. The species that consumers ate most commonly consumed were sea bass, shrimp, and tilapia. When comparing species consumed to interview locations, most species stayed close to the average consumption percentage. However, panga was mostly consumed by customers in supermarkets, porgy by customers in farmers' markets, and tilapia by customers in hypermarkets. We also found that employed consumers ate the widest variety of species and that a large percentage of employed consumers ate tilapia. Lastly, we found it significant that consumers with a lower level of education consumed shark, consumers with a higher level of education consumed tilapia, and a high percentage of consumers with a university education consumed shrimp and sea bass.

Next we compared desired species and their accessibility in terms of price. In general, shrimp and sea bass were the most desired species. Notably, a high percentage of consumers interviewed at farmers' markets desired shrimp; those at hypermarkets desired sea bass and porgy; and those at supermarkets desired sea bass, panga, and mahi mahi. When compared to age, key findings included: younger consumers wanted more accessible salmon and shark; consumers between 36 and 65 wanted accessible shrimp; and consumers above the age of 51 wanted accessible porgy. With the next demographic, marital status, we found that married consumers or consumers in a free union desired more shrimp, sea bass, and tilapia compared to single consumers. In addition

we found that employed consumers wanted accessible salmon, unemployed wanted accessible porgy, and pensioned wanted accessible tilapia compared to the other groups. Finally we found that as a consumer's education level increased, their desire for shrimp, sea bass, and salmon also increased, and additionally consumers with a technical and university education wanted more accessible trout compared to the other categories.

The last three factors that we compared were the volume of fish consumed, the frequency of fish consumption, and fish product expenses. In general, consumers ate 1.34 kg of fish per week. More specifically, in each of the demographic groups we saw that consumers above the age of 66 and consumers with a low level of education consumed the least amount of fish while employed consumers ate the most. Furthermore, consumers ate fish an average of 5.11 times per month. To be more specific, within each of the demographic groups we saw that consumers above the age of 66, single consumers, consumers with a low level of education, and pensioned consumers ate fish less frequently. Lastly, consumers spent an average of 5413 colones ($10.80) per week on fish.

Our team formulated several conclusions and recommendations for INCOPESCA based on our findings. Overall, our results indicated that producers were not satisfied with the price at which they buy feed and were reluctant to commercialize their product nationally. They also spoke about the competition they faced from larger corporations in the national market. We recommended that INCOPESCA (and other organizations that focus on the betterment of local producers) work towards providing imported feed at a lower cost, and provide facilities for producers to get their fish ready for sale to ease the commercialization process. With regards to the problem of competition, we recommended that INCOPESCA work in conjunction with other organizations (such as Coonaprosal, a cooperative that aids shrimp producers to commercialize their products) to devise methods to help producers improve their marketing skills. We also recommend (based on consumer demand) that producers focus on the cultivation of salmon on a large scale.

From our analysis of the wholesalers' market we found that most wholesalers sold marine products while only a few sold imported products. These wholesalers commercialized their product to nearby supermarkets and other fish markets; however our analysis showed that wholesalers in Cenada supplied a lower volume of fish in high consumer demand. With regards to this issue, we recommended that wholesalers provide a higher volume of these species to maximize their sales and satisfy the consumer at the same time.

We finally made recommendations based on the results from our surveys of market managers and consumers. Based on the information we gathered about certain products, we recommend that markets adjust their prices according to current consumer demand. For the future, we recommend that each of the different venues emulate each other in the variety of products they sell and their presentation in order to expand the variety of fish sold. Furthermore, we recommend that markets start an advertisement campaign. For the short term, the markets should focus on the already existing consumer demographic (average age of 51.5, mostly female, living with a spouse or partner, gaining income, and educated). For the long term, the markets should consider expanding this demographic. Overall, these advertisements should promote the fish's freshness, quality, and nutritional value. Hyper- and supermarkets should try to promote their products' freshness similar to municipal and farmers' markets while municipal and farmers' markets should attempt to achieve the cleanliness standards of a hyper- or supermarket. Also, we found that the San José fish market is price-driven; therefore markets should promote their products accordingly. Finally, we recommend that markets make shrimp, sea bass, salmon and tilapia more economically accessible based on consumer demand. This will benefit the consumers and generate more profits for different markets.

In conclusion, our group accomplished the objectives we described above. The data we collected from trout, tilapia and shrimp farms helped us identify the distribution routes for the accessibility of these aquaculture products and we created a flowchart that depicts these typical channels of distribution, including channels which are extended by intermediaries. Additionally, we surveyed 95 consumers to determine whether quality was an important factor influencing the sales of fish products. In general, consumers admitted that their choices when buying fish were more price-driven than quality-driven but they also said that they trusted their preferred venue to offer products of high caliber. Additionally, we saw that almost 50% of the aquaculture products in the market are imported. Although local aquaculture (tilapia and trout) is sold more than imported (panga and salmon), the imported aquaculture products are cheaper than the local. In order to assess the level of acceptance for different types of products, we questioned market managers about the demand for different products. Our analysis showed that prices and the venue consumers shopped at influenced the acceptance level of certain fish products. We fulfilled our final objective by interviewing market managers and surveying consumers about current advertisement techniques. We found that hyper- and supermarkets used different forms of advertisements while municipal and farmers' markets relied on word-of-mouth.

We hope that the information in this project, which includes a detailed analysis of our findings, conclusions and recommendations from our study of the Costa Rican metropolitan area, will help INCOPESCA to develop an effective marketing strategy for the sale of aquaculture products. Due to the time constraints placed on our work, we were only able to focus our study on the cities of Alajuela, Heredia and San José as a representation of the entire metropolitan area. We believe that our project provides a very basic foundation for the development of a marketing strategy, and therefore we recommend that INCOPESCA conducts further studies of each of these market populations to obtain more detailed results. We propose that additional studies focus on only one or two populations (particularly the markets or the consumers), focus on one type of product, or be conducted over a longer time period.

Chapter 1: Introduction

Aquaculture production has been an important cornerstone for the economy of developing Latin American countries. The practice was first introduced to Latin America in the 1940s; by the 1960s, the aquaculture industry had been focused on fulfilling the consumption demands at a domestic level. Since the 1960s, the Latin American aquaculture industry has been growing steadily in order to compete with other countries on a global scale. In Costa Rica, the aquaculture industry is of the utmost importance to the country's economy. According to the Food and Agricultural Organization of the United Nations' website (2010), the Costa Rican aquaculture industry has undergone rapid development over the past 10 years. Although Costa Rica had established an important overseas market for aquaculture products (such as the export of tilapia to the United States), the same aquaculture products have not been competitive at a local level.

In 1994, the Costa Rican government created the agency entitled Instituto Costarricense de Pesca y Acuicultura (INCOPESCA). Beginning that year, the responsibility for the aquaculture and fishing industry in Costa Rica was placed on the shoulders of this organization, and it has remained their mission to work towards the sustainable development of the country's aquaculture industry ever since. According to the INCOPESCA website, one of the responsibilities of the agency is to "promote the development of fishing and aquaculture by regulating, protecting, and managing marine resources and aquaculture products" (INCOPESCA, 2010). Prior to our studies INCOPESCA, in conjunction with WPI student researchers, had focused mostly on establishing proper farming practices for the cultivation of a variety of aquaculture products. The introduction of shrimp and tilapia (two major aquaculture products) in Costa Rica began during the 1960's, and these arenas of fish farming have evolved to become major pillars of the aquaculture and fishing industry. The cultivation of trout gained popularity shortly after the introduction of shrimp and tilapia. Despite these advances in production, INCOPESCA did not focus on promoting local aquaculture products on the national market. Due to this lack of assessment, INCOPESCA turned to us to determine the state of development of the national market for local aquaculture products in the metropolitan area of San José and how they could improve it.

For the purpose of this project, INCOPESCA identified two major long-term goals for us to work on: to establish what the current market for aquaculture products was in the metropolitan areas of Alajuela, Cartago, Heredia and San José and to develop suggestions for a marketing strategy that will increase aquaculture products' competitiveness. A fish farming economy in which local

aquaculture products are more competitive has the potential to garner more profits for local producers. In order to make this project a reality we addressed the following objectives:

1) Identified distribution routes for the accessibility of tilapia, trout, shrimp and other aquaculture products in order to determine the elasticity of demand
2) Determined if the quality of local aquaculture products influenced the sales of these products
3) Determined the level of competition between imported and local aquaculture products in the market, and analyzed the impact of the imported products.
4) Measured the level of acceptance of the different types of products available
5) Determined current advertisement methods for aquaculture products

To achieve each of these objectives, we began by interviewing producers of aquaculture products to determine the quality and variety of aquaculture products and where these products are being sold. In addition we assessed the level of competition between imported and local aquaculture products along with the investigation of other factors affecting the sales of local fish through interviews of local suppliers and wholesalers. Furthermore, we interviewed sellers about the current advertisement methods for aquaculture products and their willingness to practice more effective marketing strategies. Simultaneously, we determined product options that appeal to local tastes and preferences for what people would like to purchase through surveys of consumers at different venues.

These data helped us in our search to establish the current market trends. Additionally we made recommendations to INCOPESCA based on the information we gathered about the how local aquaculture products could be made more competitive. The accomplishment of these objectives addresses the goal we share with INCOPESCA: to aid their community to create a more lucrative and thriving aquaculture business.

Chapter 2: Background

Aquaculture, which refers to the artificial breeding and cultivation of aquatic life, has become a necessary practice in many countries around the world where consumers of fish products have depleted the naturally occurring resources (Kutty & Pillay, 2005, p. 3). Regions in Asia, Europe, North America and Latin America practice aquaculture specifically to meet the demand for fish since these areas have experienced depletion of marine resources. Costa Rica is no different from these countries; aquaculture was established in Costa Rica to supply the demand for fish, boost the local economy and create occupations for residents. Additionally, aquaculture products have become a cash crop for small family farms operating in the Costa Rican countryside. While aquaculture has proven to be successful in some ways for the Costa Rican people, it is not without faults. In the last decade, the Instituto Costarricense de Pesca y Acuicultura (INCOPESCA) has labored to support, expand and improve aquaculture in Costa Rica, both through their own endeavors and through collaborations with other researchers.

In recent months, INCOPESCA representatives have questioned whether or not local aquaculture products can feasibly compete with foreign products of the same or similar variety, with special attention given to aquaculture sales in the metropolitan areas of San José, Alajuela, Heredia and Cartago. To provide a basis for this project, our team examined results from past studies done with INCOPESCA and information about imports and exports of Costa Rican fish products in order to establish how much focus has been given to marketing local aquaculture products. Additionally, we completed research devoted to methods of effective advertisement to better understand how to market goods. Furthermore, we examined market studies carried out in neighboring Latin American countries to understand successful and unsuccessful marketing strategies in nations similar to Costa Rica. All of the above information helped us understand how we could develop an effective marketing strategy to improve the competitive quality of local aquaculture products against foreign goods.

2.1 Brief Overview of the Aquaculture Industry in Costa Rica

According to the Food and Agriculture Organization of the United Nations' (FAO) website, aquaculture experienced major global expansion from the 1700s through the 1900s due to advancements made in seed production and involvement of new technologies of communication. Furthermore, the aquaculture industry has undergone a substantial amount of growth over the course of the last 50 years. FAO statistics have reported an increase of about 50 million tons of fish

produced in world aquaculture from 1950 to 2006. Aquaculture has become essential to satisfying our needs for fish ever since over-harvesting of marine fish has negatively impacted the aquatic life in the different seas and oceans. As recently as 2006, "43 per cent of fish consumed by people" were products of the global aquaculture industry; this shows a large increase from the 9 per cent in the 1980s (People and the planet, 2006). Figure 1 represents a graphical analysis of the change in the world aquaculture production from 1970 to 2006 for different parts of the world such as Europe, Asia, and Latin America, to name a few (FAO, 2010).

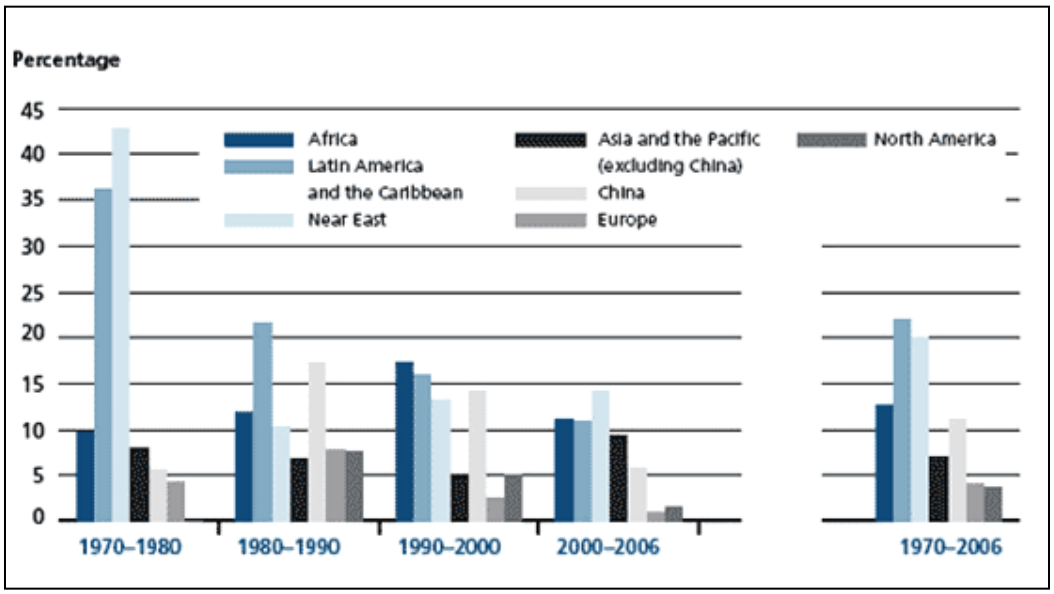


Figure 1 - World aquaculture production: change in growth by region since 1970 (FAO, 2010)

Aquaculture was introduced to Latin America between the 1960s and 1970s mostly for purposes of domestic consumption and "diversification of rural activities related to agriculture" (Hernández-Rodríguez, Alceste-Oliviero, Sanchez, Jory, Vidal & Constain-Franco, 2000). It later developed to become a major component of the economy in certain Latin American countries, such as Ecuador and Chile. It not only provided food for the local population but also foreign revenue and employment. A 2001 FAO report listed salmonids (from Chile), shrimp (from Ecuador, Mexico, Honduras, Colombia, Peru, Panama and Belize), tilapia (from Colombia, Brazil, Mexico, Cuba, Costa Rica and Jamaica) and carp (from Mexico, Cuba and Brazil) as the major types of fish exported from different Latin American countries.

Marco Freer, a Wal-Mart Corporation representative, explained that the trends in Costa Rican aquaculture production were similar to the trends experienced by other Latin American

countries; on average, the aquaculture production levels in Costa Rica and Latin America have been greater within the last few decades than those of all other parts of the world. Figure 1 is also a representation of the growth trends described by Marco Freer. Costa Rica is looking to expand its aquaculture market through sustainable development and promoting environmental friendly practices (Freer, Personal Communication, November 11, 2010).

Aquaculture started to gain popularity in Costa Rica in 1963 with the introduction of the Tilapia species by the Ministry of Agriculture and Husbandry. By 1974, the Costa Rican Department of Aquaculture was created to encourage the growth of aquaculture production and facilitate the development of aquaculture stations around Costa Rica (FAO, 2010). From there, aquaculture production slowly increased until the 1990s as seen in Figure 2**.** Over time, new products (such as trout and shrimp) became popular and their cultivation practices became standardized.

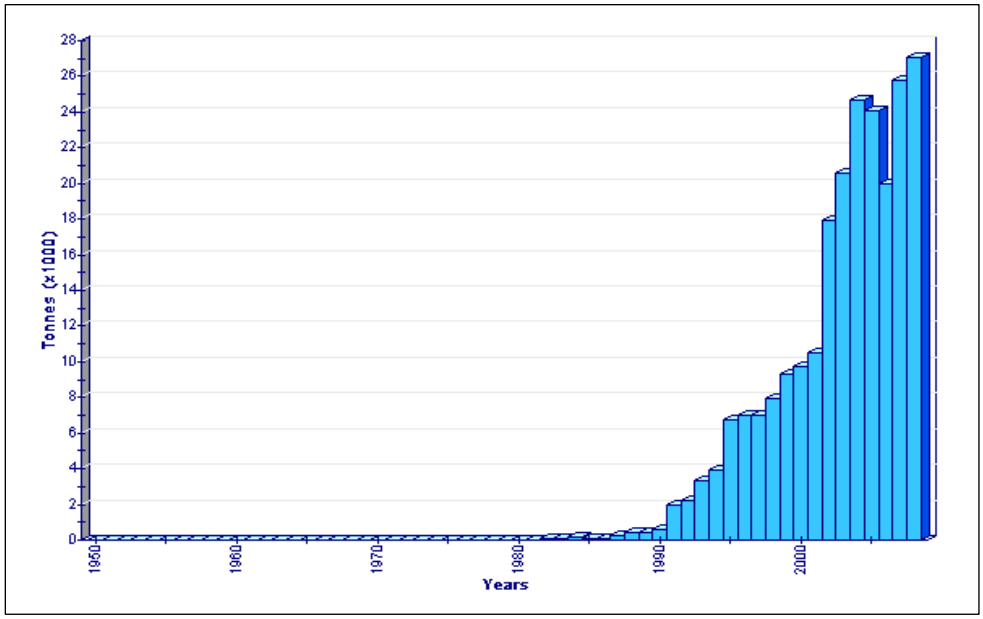
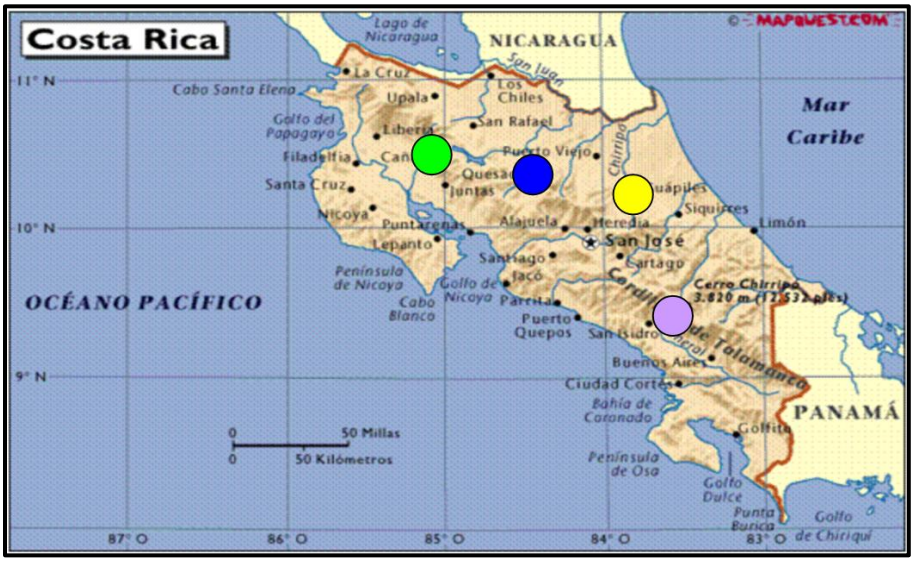


Figure 2 - Aquaculture Production, Costa Rica, 1950-2008 (FAO, 2010)

Aquaculture became more popular during the early 1990's; this was possibly due to improvements in technology including better feed quality (Luis, Personal Communication, November 17, 2010). A new institution had to be established in order to organize the expanding practices. To address this need, the Instituto Costarricense de Pesca y Acuicultura (INCOPESCA) was established by the Costa Rican government in 1994. Their mission statement, which has been translated from the original Spanish, is: "to promote the development of fishing and aquaculture by regulating, protecting, and managing marine resources and aquaculture products. This regulation

protects and manages marine and aquatic resources by encouraging sustainable practices as a contribution for national economic development" (INCOPESCA 2010). The establishment of this institution could explain the sudden boom in the mid 1990s.

INCOPESCA has established stations around Costa Rica in order to aid and educate aquaculture farmers; the educational programs are meant to help support existing and start-up operations. The 4 major stations can be seen in the following map.



Aquaculture Station Enrique Jiménez Núñez, in Cañas Guanacaste.
Aquaculture Station Los Diamantes, in Guápiles, Limón.
Aquaculture Station Cuestillas*, in San Carlos, Alajuela.
Aquaculture Station Truchas, in Ojo de Agua de Dota
* Cuestillas closed in 2005 and is no longer operational

Figure 3 - Map of Stations around Costa Rica (INCOPESCA, 2010)

These stations have 4 major functions. The first function of each station is to cultivate and distribute fish fry to aquaculture producers. The second function involves investigating the nutritional value of aquaculture products. The third function includes providing procedural demonstrations and information about farming procedures, water quality, topography, contamination and other related topics. The final function of each station is to conduct educational classes on good cultivation practices (Ramirez and Otarola, Personal communication, November 8, 2010). Through the research of INCOPESCA and their associates, aquaculture production has greatly expanded in the last decade.

Overall, between 2002 and 2009 the production of aquaculture products has increased. Table 1 shows the volume by weight of the three major aquaculture products (tilapia, trout, and shrimp) for the past eight years:

Species	2002	2003	2004	2005	2006	2007	2008	2009 (estimate)
Tilapia	13,190	14,679	18,987	17,328	13,000	19,489	21,000	20,639
Trout	500	513	515	522	524	532	531	530
Shrimp	4,097	5,051	5,076	5,714	5,726	5,274	5,265	3,544
Total	17,787	20,243	24,578	23,564	19,250	25,295	26,796	24,713

Table 1 - Aquaculture Production in Metric Tons by Species for 2008-2009 (INCOPESCA, 2010)

As seen in Table 1, there have been setbacks. A major obstacle in 2006 was when contamination and disease greatly decreased Tilapia production. A similar situation involving contamination and disease occurred with shrimp in 2008, which caused the estimated decrease in production for 2009. Furthermore, this disease, among other factors, increased the cost of shrimp production after 2008, which decreased the estimated shrimp production even more (Ramirez and Otarola, Personal communication, November 8, 2010). Although there are currently some minor obstacles in the production of aquaculture products, the industry is still growing and seeks to expand.

2.2 Previous Research Collaborations with INCOPESCA

Over the last decade, INCOPESCA has nurtured and developed its standing partnership with Worcester Polytechnic Institute (WPI) through student research projects to improve the aquaculture market of Costa Rica. In 2005, WPI students considered ways to regulate the production of tilapia around the country (Broders, Douville & Slonski, 2005). In 2006, Bryand, Kadilak and Pani conducted a project entitled "Good Management Practices for Shrimp Farming in Costa Rica" for similar purposes regarding shrimp farming, and again in early 2010 Beland, Buckley, Miggins and Warren submitted a report entitled "Good Practices for the Cultivation of Trout in Costa Rica", which described the ways in which trout production could be made more consistent and standardized. The results and conclusions of these projects were of considerable help to this study since the previous projects provided us with a foundation for the need to make aquaculture products more competitive in the metropolitan area.

The goals of the previous projects were very similar, with the main difference being the type of aquaculture product considered; all three projects sought to improve the production methods of a specific species of aquaculture product. The research teams also chose a similar set of objectives to

help them accomplish their goals; each group of student researchers elected to conduct surveys with aquaculture producers to determine the best cultivation practices. Additionally, the results of the projects were similar since each group developed some form of literature detailing the important aspects of the best practices they discovered. These publications were meant to be distributed to aquaculture producers to help them improve their overall production. The past research only devoted attention to identifying local markets for the aquaculture products and how best to market these products at these venues, however they all lacked assessment of the potential for these products to be sold in the metropolitan markets.

2.3 Examination of Costa Rican Fish Imports and Exports

One goal that INCOPESCA and our team wanted to address in this project was how imported fish goods impacted the local economy in Costa Rica. In order to do this, we evaluated the trade of fish products into and out of the country. This analysis of imports and exports was necessary in order to find a better means of marketing the aquaculture products in Costa Rica. A study done by Rolando Ramírez Villalobos, the marketing chief of INCOPESCA, indicated that the national aquaculture industry has been important to the local economy as well as to the economies of surrounding countries, including the United States (Ramírez, 2007). This industry has been shown to create jobs for the local economy; in 2002, Costa Rican fisheries made up about 0.32% ($65.6 million) of the Gross Domestic Product. This report also shows that there was a steady increase in fish consumption by the general population from 2001 to 2004. Fisheries and fish farmers should have had to produce more in order to meet this demand, however they have not been able to (as the GDP indicates). In recent years, the deficit has been made up for by importing products from other countries. If this trend continues, the local fish farming economy will be less profitable than it could be if it were able to meet domestic demand (Ramírez, 2007).

Trout farming as a business in Costa Rica began in 1974; it did not start earning a significant profit until ten years later. These businesses have grown at a slow rate and consequently remain on a smaller scale than other types of fishery products. By contrast, large scale tilapia aquaculture was introduced to the country in 1998. Tilapia, a relatively new business, was produced at a much higher rate than other fish products, and some large scale tilapia farms are able to export their products to surrounding countries due to the larger amount of production. In 2006, over $25 million of tilapia was exported, and in 2008, the tilapia industry was valued at over $50 million dollars. On the other hand, the trout industry totaled $2 million dollars. Shrimp, another Costa Rican aquaculture product,

was introduced to farmers in 1987. According to the FAO database, by 2008, this product was shown to be nearly 15 times the value of trout (FAO, 2010).

A factor contributing to the increased demand for tilapia and shrimp in the local market is the increase of exportation and the value of the fish outside the country. Since the U.S. and other countries pay a premium price for the product, the local Costa Rican fisheries do not sell much of the fish to the local market if they can export their product at a higher profit. A simple example of this trend is the prices that are offered in the US market and the local Costa Rican fish marketplace. INCOPESCA website analyses indicated that fish sold for more money in the US market in 2010 than the same type of fish did in the greater San José area (INCOPESCA, 2010). In this case, it would not be profitable for the large-scale aquaculture industry to sell their products in the local Costa Rican marketplace.

A simple example to show the market's situation is an analysis of consumer versus producer nations throughout the world. Many countries in Central America are fish producing nations. In contrast, the United States and some other European nations are considered to be consumer nations of the industry since these countries import more than they export. Table 2 shows that in 2007, Costa Rica imported nearly $45 million worth of fish products. In the same year, the country exported over $107 million in fish products. By comparison, Honduras, Panama, and Nicaragua imported almost $19 million, $25 million and $6.6 million respectively. The table also shows an import to export ratio where a ratio lower than one represents a country with net exports; a ratio above one represents net imports (FAO, 2010).

Country	Imports	Exports	Ratio
Costa Rica	**$ 44,972,000**	**$ 107,255,000**	**0.4019**
Nicaragua	$ 6,599,000	$ 96,448,000	0.0648
Panama	$ 24,999,000	$ 362,304,000	0.0690
Honduras	$ 19,080,000	$ 186,934,000	0.1020
United States	$ 11,966,731,000	$ 4,436,746,000	2.6972

Table 2 - 2007 Fish Products Imports and Exports (Adapted from FAO, 2010)

These data show that these Central American countries export at least ten times or more than the amount they import. On the other hand, Costa Rica is importing fish at a higher rate in comparison to other Central American countries. This can be problematic from a consumer's

economic standpoint because it costs money to import and export the fish, when the product could be produced and consumed within the country (FAO, 2010).

Since exportation is so profitable, the benefits outweigh the costs. Importation, on the other hand, is associated with competition in the market with local products. One solution to decrease competition with foreign products is to increase the sales of the local fish products. This would consequently increase the local market since producers would be selling the products to the local businesses; this could potentially lead to a decrease in the amount of fish being imported. In economic terms, this is referred to as the opportunity cost; with respect to selling fish, this translates to decreasing the ratio of imports in relation to locally produced fish (Parkin, 2005).

In order to lower the opportunity cost, local small-scale fisheries must compete with imported fish in the local marketplace. Problems arise if the local fisheries are not producing the types of fish in demand by the local residents or if marketplaces are not selling those species of fish. This issue requires that local fisheries consider growing different types of fish to meet the demand of local expectations. We designed our market study to investigate whether or not new species are feasible for marketing to the local population (INCOPESCA, 2010).

Another problem local fisheries face is their reputation. If local farms and distribution centers are unregulated or unsanitary compared to the regulated imported goods, consumers will not purchase those goods. Rolando Ramírez Villalobos's 2007 report identified several issues that affect the local business; these include the means by which fish are transported, stations en route to the market, and the market itself. According to the report, the transportation vehicles, whether they are boats or trucks, have improper refrigeration and inadequate storage methods. The marketplaces also usually have insufficient refrigeration and there is cross-contamination between different products (Ramírez, 2007). All of these factors can add to the poor public perception of the local fisheries. To address the potential problem, our team investigated the public perception of fish products.

After analyzing the amounts of imports and exports of aquaculture products in Costa Rica, we have found that there is a potential for increasing the demand for locally raised fish by lowering the opportunity cost. Ramírez's (2007) study shows the local population could have a poor perception of the local products. By marketing these products to the local residents, perceptions can change and profits increase.

2.4 Case Study – Effects of Advertising on Perceptions and Behavior: The Case of Catfish

In order to change a public perception on a product, an advertisement campaign should be initiated. A very effective way to promote aquaculture is through generic advertisement. This type of advertisement "benefits a generic product or groups of similar products without identifying brand names or product origins" (Engle & Quagrainie, 2006, p. 118). By collaborating with each other, farmers can assess the market effectively and then advertise to the general public more efficiently (Engle & Quagrainie, 2006). Generic advertisement was utilized in a study conducted by United States researchers in the late 1980s to find the effect of advertisement on aquaculture-produced catfish.

The program started in April 1987, and the main medium of advertisement was print. Advertisements were published in *Time, Newsweek, People, Better Homes and Gardens, Sunset, Family Circle, Good Housekeeping, Woman's Day, Reader's Digest,* and *Southern Living* (Kinnucan & Venkateswaran, 1990, p. 141). The advertisements emphasized the nutritional value and taste of catfish. Furthermore, the advertisements included lay-person's phrases such as "'natural grain' diet" and "'pure' water of ponds" to describe the catfish's breeding conditions (Kinnucan & Venkateswaran, 1990, p. 141). Humorous catchphrases were added to enhance recall, such as "Think of [catfish] as a chicken that doesn't cluck," and "The beef and chicken people wish they had a story this good to tell" (Kinnucan & Venkateswaran, 1990, p. 141). In 1988, the researchers speculated that 73% of the desired demographic would view the advertisements, and that 54% of the same demographic would see it a minimum of three times (Kinnucan & Venkateswaran, 1990).

By surveying 2172 people that spanned nine census areas, researchers were able to conclude the following:

1. Consumer awareness of the aquaculture catfish increased by 15%
2. Consumer attitude and perception of aquaculture catfish increased by 3-6%
3. Consumer's purchasing rate (home and restaurant) increased by 12-13%
   (Kinnucan & Venkateswaran, 1990).

Overall, researchers hailed the study as a success. Generic advertisement had allowed for an increase in farm-raised catfish awareness, attitude, perception, and, most importantly, purchasing rate.

2.5 Case Studies – Marketing Strategies Employed by Neighboring Countries

In order to make a more comprehensive and effective study of the ways to improve the local aquaculture market in Costa Rica, we investigated market studies in the neighboring countries of Latin America. These countries share some common important traits with Costa Rica, including their culture, economic stability and the importance of the domestic fish industry.

2.5.1 Case Study 1: Nicaragua

In Nicaragua, the "total fish production (fisheries and aquaculture) has shown, with some fluctuations, an increasing trend during the decade from 1996 to 2005, having peaked in 2005 with approximately 40,000 [tons]" (FAO, 2010). This rise in aquaculture consisting mostly of shrimp in this case changed significantly from 1996 to 2001 from 18 percent to 34 percent of total fisheries production. While an important aspect of aquaculture production was access to foreign currency through exportation, the local consumption remained low since most of the fish obtained nationally came from "industrial fishing" rather than from local farms (FAO, 2010). Aquaculture also has many impacts on the domestic market of a country. It brings in economic benefits through the creation of jobs and proves to be less costly than setting up an international market for a certain product (Engle R. & Neira Ivano, 2003a, p. 1). According to the FAO (2010), shrimp farming in Nicaragua in 2004 resulted in the creation of "11, 749 jobs; 7.855 in companies and associations directly linked to the production, gathering and fishing 3.360 to larvae and 534 worked in laboratories and related activities" (FAO, 2010).

As a strategy to develop the fish industry, the Nicaraguan authorities planned to expose the local market to various types of fish production in order to obtain more revenue on the domestic level and to develop the potential for aquaculture in different areas of the country. A study conducted in 2001 in Nicaragua consisted of determining the feasibility of selling farm raised tilapia in open-air marketplaces, supermarkets and restaurants (Engle R. & Neira Ivano, 2003a). The research project was useful for gathering general information about the characteristics that consumers look for in the fish that they buy at these venues. From the survey conducted among fish vendors, "the researchers found that fish vendors tend to live in areas with larger population density where the standard of living is higher" (Engle R. & Neira Ivano, 2003a, pg 7). In addition, fish vendors affirmed that there are several factors that affect their choice of fish they display for sale: quality, size of the fish, price and supply, with quality being the most important criterion for the fish they buy from the fish farms (Engle R. & Neira Ivano, 2003a). Restaurant owners have many more

requirements for the fish they obtain from fish farms: quality, price, size, availability, odor, taste, variety of species, ease of preparation and color (Engle R. & Neira Ivano, 2003c). When interviewed, supermarket owners indicated that storing fish was a problem when they buy fish from wholesalers. From these findings, we concluded that the population wanted a fish product that is tasty, flavorful, good quality and safe for consumption (Engle R. & Neira Ivano, 2003b). Farmers and processors therefore must ensure the quality and taste of the fish to eradicate consumer doubts and fears while making sure that they can provide a "consistent supply" (Engle R. & Neira Ivano, 2003b, p. 18).

2.5.2 Case Study 2: Honduras

Honduras was another country of interest. The aquaculture industry proved not only to be a major source of foreign exchange but also provided a myriad of jobs to the national population thereby maintaining the economic stability of the country. According to the FAO, the consumption of fish per capita increased by 2.5 kg per person from 1991 to 2000 suggesting an increase in the demand for fish products on a national level (FAO, 2010). In a study conducted in 2001 to determine the scope of selling farmed raised fish, namely tilapia, fish vendors were randomly selected and interviewed. In contrast to the study carried out in Nicaragua, tilapia seemed to be a more popular product in Honduras. A Honduran study noted, "the tilapia farming industry debuted with small family run businesses which later expanded due to the increasing exports that made Honduras more attractive to foreign investors" (Fúnez, Neira & Engle, 2003). Similarly in Costa Rica, the tilapia industry was begun on a small scale with family-run businesses; later the government started exporting tilapia overseas to bring in foreign revenue and this overseas market has proven to be very lucrative for the Costa Rican economy.

Compared with other countries in Latin America, Honduras developed its aquaculture industry to a higher level by focusing on diversifying the fish cultivated in the farms, especially shrimp and tilapia, but catfish and eels as well. They also looked into expanding the aquaculture industry to marine aquaculture through the cultivation of mollusks. As this type of aquaculture involves breeding in cages, it would solve Honduras' problem of limited space (FAO, 2010). In an effort to develop its aquaculture industry, governmental organizations in Honduras obtained international help notably from the European Union, the Republic of China as well as Auburn University (Alabama, USA) (FAO, 2010). To improve the aquaculture sector in the future, the Honduran government is likely to impose new legislation to incorporate scientific research (FAO, 2010).

2.6 General Findings

The information obtained for this background helped us develop the basis for the study for INCOPESCA. We determined how the Costa Rican aquaculture market was begun and how it was developed over the last half of the century. We established that previous studies have primarily looked at the "standard practices" used in aquaculture farming rather than the marketing aspect of the local aquaculture products. Furthermore, an overview of the large scale imports and exports done in Costa Rica demonstrated the impact of foreign goods on the local aquaculture market. A more developed local aquaculture industry, which could be achieved by increasing the competitiveness of local aquaculture products, would eventually increase the profits from that local aquaculture producers earn from their products. Additionally, there was a need to develop an effective marketing strategy so that the national economy can benefit from the socio-economic aspects of aquaculture. We found that in order to make this step feasible, an effective method of advertisement should be adopted. Our research enabled us to obtain more information on how to incorporate advertisement techniques in the marketing of fish. Finally, a detailed study of the fish markets in neighboring countries helped us to understand the procedure we should use for assessing the market in Costa Rica since these countries share similar economic stability trends. With this knowledge, we established a foundation on which to build the Costa Rican aquaculture market.

Chapter 3: Methodology

The goal of our project was to assess the current state of the Costa Rican fish market in the cities of Alajuela, Cartago, Heredia, and San José in order to develop a marketing strategy to enhance local aquaculture products' competitive edge against all other fish goods, both national and foreign. We accomplished each of the following objectives:

1) Identify distribution routes for the accessibility of tilapia, trout, shrimp and other aquaculture products in order to determine the elasticity of demand
2) Determine if the quality of local aquaculture products influences their sales
3) Determine the level of competition between imported and local aquaculture products in the market, and analyze the impact of the imported products.
4) Measure the level of acceptance of the different types of products
5) Determine current advertisement methods for aquaculture products and assess the impact of some possible changes

Our methods for achieving these objectives included gathering information through surveys and interviews. We targeted the following populations: local producers, wholesalers, managers of markets, and consumers of fish products. This study was conducted in one month of data collection through interviews and surveys of all four populations. The data collected was later catalogued and analyzed; the results of this analysis will be discussed in Chapters 4 and 5.

3.1 Choosing a Representative Target Demographic

The target populations for this project consisted of the producers of aquaculture products in Costa Rica and the wholesalers, sellers and consumers of aquaculture products in the greater San José metropolitan area, which includes the cities of San José, Alajuela, Heredia and Cartago. Information on producers was obtained through INCOPESCA. Lists of wholesalers' and sellers' locations and affiliations were provided by INCOPESCA. Lastly, information found by the Instituto Nacional de Estadística y Censos provided a general demographic for the population of Alajuela, Cartago, Heredia and San José.

Aquaculture installations are scattered all over Costa Rica. Tilapia farms are located at the lower elevations of Costa Rica due to the fact that tilapia is more effectively cultivated in warmer climates. On the other hand, trout is cultivated at colder climates, which means that their farms are located at higher elevations. Lastly, shrimp farms are located in the northwestern Pacific coast of

Costa Rica near the Gulf of Nicoya, because they are cultivated in salt water (Ramirez and Otarola, Personal communication, November 8, 2010).

Wholesalers are companies or individuals who buy from the producers in order to distribute the goods to markets in bulk. Overall, there are 48 major wholesalers in Costa Rica. Markets, on the other hand, are general venues that sell fish to consumers. These include hypermarkets, supermarkets, municipal markets, and farmers' markets. The major hypermarket in Costa Rica is Hipermas. The major supermarkets in Costa Rica are Mas x Menos, Palí, Automercado, Grupo GESSA (Montelimar, Peri Club, Ecos, Perimercados, Jumbo Supermercados, and Super Compro), and Corporacion Megasuper. Furthermore, there are many other smaller markets and fisheries. In total, there are 298 markets in the greater San José metropolitan area. Divided up, there are 161 markets in San José, 59 markets in Alajuela, 42 markets in Heredia, and 36 markets in Cartago (Ramirez and Otarola, Personal communication, November 8, 2010). Appendix A contains a complete list of wholesalers and markets provided by INCOPESCA.

Consumers are the people living in the metropolitan regions of Costa Rica (Alajuela, Cartago, Heredia and San José). The Instituto Nacional de Estadística y Censos has estimated the following statistics for these cities. In San José there are a total of 349, 152 people, with 49.9% males and 50.1% females. In Alajuela there are a total of 283,166 people, with 50.6% males and 49.4% females. In Heredia there are 132,579 people, with 49.7% males and 50.3% females. In Cartago there are a total of 155,402 people, with 50% males and 50% females.

As shown in the above information, we were faced with a very large geographical area to travel and a very large amount of people to gather information from. We were also challenged by the very brief window of time allotted for completing this study. In order to narrow down our demographic to a manageable size, we had to make assumptions about our populations based on information shared by our sponsors. For instance, we elected to visit producers of tilapia, trout and shrimp because they are the most developed types of aquaculture production in Costa Rica; therefore they have the most potential to meet the market demand. We also chose to interview wholesalers at the Cenada wholesaler distribution center in Heredia because it distributes one of the largest volumes of national fish products in Costa Rica. Additionally we interviewed distributors from the Wal-Mart Corporation because they also distribute large volumes of national fish products. Lastly, we selected hypermarkets, supermarkets, municipal markets and farmers' markets as the

particular venues to interview market managers and consumers at because these venues are representative of different economic backgrounds. In general, we focused on the cities of Alajuela, Cartago, Heredia and San José as representative of the metropolitan area because they are the largest cities in Costa Rica; due to the time constraints of our project, we only visited Alajuela, Heredia and San José because Cartago had the fewest markets to interview at and therefore would not provide as much information as the other three cities.

3.2 Market Analysis through Interviews with Local Producers

We conducted interviews with local trout, tilapia, and shrimp producers in order to determine the current market situation and how the market could be improved. For these interviews, we developed questions to be addressed by local farmers about the species of fish cultivated, relevant information about their quantity and price, and the different venues at which the products are sold. In addition, we included questions about the demand for aquaculture products and different problems farmers encountered during the marketing of their aquaculture products. We conducted these interviews at the local farms in November 2010. The trout farms were located in San Gerardo de Dota and the areas surrounding Cartago. The tilapia farms were located in Venecia, Aguas Zarcas and La Fortuna in the region of San Carlos. The shrimp farms were located in Colorado near the Gulf of Nicoya. Appendix B.1 contains the full list of interview questions and Appendix D shows the locations of the farms. To gather additional information, we asked further interview questions based on our conversations with the producers and observed site-specific conditions relevant to marketing. We took note of the sizes of the farms and some of the advertising methods used to attract business.

We conducted these interviews and made observations in order to gather information to make a complete analysis of the fish market in the greater San José area. Interviewing the producers provided us with insight into whether or not proper fish farming techniques were being used, the quantity and price of fish that were being cultivated, where the fish were being sold and producers' opinions about the revenue they were earning from the sales of their products. An Excel spreadsheet was used to analyze the data to extrapolate trends found in the aquaculture market.

We also gathered information during informal interviews with Sr. Carlos Luis Barrantes who accompanied us to all of the aquaculture farms we visited and who was also of great assistance as a

liaison between ourselves and the producers. We inquired about the locations of the farms we were visiting and also about general history of each type of aquaculture production.

3.3 Market Analysis through Interviews with Wholesalers

For these interviews, we developed questions for wholesalers about the different types of fish that they sell, the organizations they represent, the venue at which the products are sold, and the areas of the market that their sales cover. To conduct these interviews, we held individual meetings with each wholesaler at their respective offices. We interviewed wholesalers from the following organizations: Cenada and the Wal-Mart Corporation. The interviews took place in November 2010; a full list of interview questions can be viewed in Appendix B.2 and the location of the wholesalers' market can be viewed in Appendix D.

These queries were important because wholesalers control the majority of fish distribution after producers distribute the fish to them. Wholesalers also influence the types and quantities of fish sold at each type of venue. The wholesalers provided us with information about current availability and cost of most types of fish goods sold in markets. The results of these interviews were quantified in an Excel spreadsheet to mine the data and address the questions of our problem statement.

3.4 Market Analysis through Surveys with Market Managers

For these surveys, we developed questions for market managers to inquire about the types of fish sold at their respective venues and to determine the ratio of imported fish sold to domestic aquaculture products sold. We also investigated the methods in which the products are preserved in the markets and how they were advertised to consumers. We investigated four types of "markets": hypermarkets, supermarkets, municipal markets, and farmers' markets. A hypermarket is a large scale department store with a grocery department similar to Wal-Mart or Target in the United States. One of the biggest hypermarket companies in Costa Rica is Wal-Mart, which runs Mas X Menos, Hipermas, and Palí. Supermarkets are small scale stores which sell mostly food. These markets include MegaSuper and AutoMercado. Municipal markets are general fisheries in the cities of Alajuela, Cartago, Heredia, and San José. Farmers' markets are markets where the producers sell directly to the consumers. To conduct these surveys we held individual meetings with the managers of the markets. In addition to the pre-developed interview questions, we also inquired after the estimated volumes and prices of fish species sold. The surveys took place in November 2010;

Appendix B.3 contains a full list of interview questions and Appendix D shows the locations of the markets we visited.

These surveys with market managers were important because markets are the connection between the fish products and the consumer. Markets set prices based on the demand of consumers and the supply of wholesalers and producers. Furthermore, markets determine how the fish are advertised and presented to the consumer. The various types of markets provided us with general information about the products (species, price, origin, and quantity) and how these products were advertised. The results of these surveys were quantified in an Excel spreadsheet to determine answers to our problem statement.

3.5 Market Analysis through Surveys of Consumers

Through these surveys, we inquired about the types of fish that consumers prefer to buy and their weekly amount of fish consumption. We additionally asked consumers about the prices they pay for fish products, the reason for their preferences, their opinions on the quality of the products, their awareness and opinions of the nutritional benefits of the products, and the species of fish they would like to have more readily available. Our team proceeded to collect data through surveys of individual consumers at marketplaces; we chose individual, random surveys as a more effective way to collect a representative sample of the population. In order to gather data, we interviewed consumers at different venues in the cities of Alajuela, Heredia and San José. The venues consisted of hypermarkets (e.g., Hipermas), supermarkets (e.g., Mas x Menos), municipal markets (e.g., Mercado Municipal de San José) and farmers' markets (e.g., Mercado Central de Alajuela) in November 2010; Appendix B.4 contains a full list of survey questions and Appendix D shows where we interviewed the consumers.

An analysis of the market from the consumers' points of view was an important aspect for our team to consider in assessing the current state of the Costa Rican aquaculture market. Consumers are situated at the final end of the fish product distribution chain. It was necessary to gather information from the consumers about which advertising methods were most appealing to them as well as which methods raised their awareness of certain types of fish on sale. In addition, consumer surveys helped us gather information about their opinions of the quantity, supply and price of the fish products that are sold at the different venues. The collected data was tabulated in an

Excel sheet to establish the impact of the sales of fish products to the consumers on the current fish market in the metropolitan area of San José.

3.6 Summary of Methods

For the protection of our subjects, all collected data was kept strictly confidential on a password-protected computer. We completed an analysis of the data by entering results in Excel spreadsheets; we used the Excel spreadsheets to determine both quantitative and qualitative results (both of which will be explained and analyzed in Chapter 4). From our results we developed recommendations for market expansion of aquaculture products, including a recommendation for INCOPESCA regarding the employment of effective marketing techniques that could potentially increase the sales of local aquaculture products in addition to potential procedures to be utilized that could make local aquaculture products more competitive in the urban market. Our data collection, analysis, and creation of recommendations followed the timeline outlined in Table 3. Appendix C contains a detailed calendar of our interview dates.

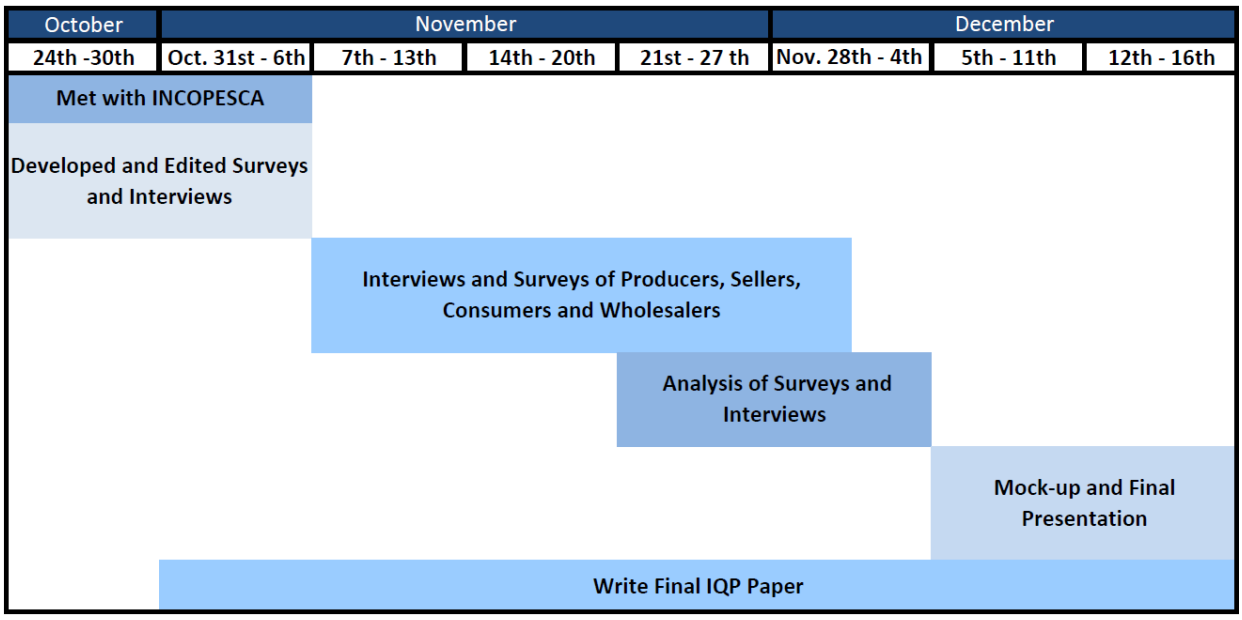


Table 3 - Project timeline

Chapter 4: Findings

For the purpose of gathering data for our analysis, we conducted a grand total of 167 interviews and surveys in Costa Rica. We interviewed 32 producers, which included 13 trout farmers, 12 tilapia farmers and 7 shrimp farmers. In addition, we interviewed 10 commercial wholesalers to gather information regarding the supply, quantity and price of the fish that they sell to the markets. We also conducted interviews with market managers in 30 different marketplaces to gather information about the commercialization of the types of fish that are sold at their respective venues. Simultaneously, we surveyed 95 consumers at these market locations. The following sections are an overview of the results from the analysis of these interviews and surveys conducted by our team. For reference in this chapter, 500 colones (Costa Rican currency, abbreviated as "c") is approximately equal to one U.S. dollar in the year 2010 and Appendix G contains a distribution flowchart for the movement of fish products through the market.

4.1 General Findings Overview

In general, we made several important discoveries from each of the populations we interviewed. First, we discovered that none of the producers were satisfied with the price at which they purchase fish feed. Producers reported that imported feed was good quality but also very costly and this prevented them from earning a high profit margin. Most of the producers we interviewed owned restaurants at their farms and focused mainly on running their business rather than concentrating on commercializing their product in the cities. When we inquired about their reasons for not selling their products in the cities, the producers explained that they would have to invest in both equipment for processing the fish and means for transporting the fish; many of the producers expressed that they did not have the monetary means to accomplish this.

We also made a series of findings that were specific to each type of producer. For the trout producers, some who were situated at lower elevations spoke of an eye disease which the fish contracted when the water temperature in the "tanks" increased too much. Another issue that trout producers mentioned was the high level of competition between producers due to their close proximity to one another. For the tilapia producers, their main concern was competition from large producers that produce tilapia and also competition from other small- and medium-scale tilapia producers. For the shrimp producers, their biggest issue was competition from Nicaragua. Products from Nicaragua were typically cheap, which forced shrimp producers to lower their prices when they sold their products to intermediaries. This loss of revenue resulted in a lower profit margin since

there were already so many costs involved with cultivating and harvesting the shrimp. Additionally, the shrimp producers reported that they only sold their products to intermediaries; the price of the product is increased before reaching the final consumer due to the use of the intermediaries.

All of the wholesalers reported selling marine products to the local population. Also, 4 out of the 10 wholesalers sold cultivated products in addition to marine products. The highest-selling product at the wholesalers' market was shark, with an average volume of 2895 kilograms sold per month. By comparison an average volume of 37.5 kilograms of panga (the least sold fish) was sold per month. Furthermore, the price of marine shrimp was the highest (3700 c/ kg) out of all the different prices for fish sold at the wholesalers' market.

For the market manager section of our findings, we analyzed a total of 30 interviews conducted in the greater San José area. Seventy percent of the interviewees were either market owners or managers while the other 30% were people who worked closely with fish. Many of the markets exhibited similarities in the way that they presented the fish for sale. Nearly 100% of the markets sold their fish fresh (preserved on ice). Almost all of the markets felt that local products (marine and aquaculture) earned more profits than imported goods.

We also discovered that different fish were in higher demand depending on which market was selling the fish. Certain fish were sold in different types of markets; for instance, municipal markets sold the most sea bass and porgy out of any other market type in the study. Overall, super- and hypermarkets mostly sold aquaculture products while municipal markets mostly sold marine products. Additionally we found in all venues that almost 50% of the aquaculture products were imported aquaculture products. We also found that the market was price-driven. Cheaper fish sold more readily than more expensive fish. We additionally found that as the demand for a certain species increased, so did its availability at that venue.

We performed a series of correlations and found that advertisement methods varied from market to market. For example, hyper- and supermarkets employed advertising techniques and were willing to advertise more readily than the other types of markets. Also, markets that advertised felt that the advertisements were very effective.

Our consumer results showed that consumers thought prices were reasonable, but leaned towards expensive. Additionally the general opinion of quality throughout was that it was of a high

caliber. The whole population had some awareness that fish had nutritional value. The main reasons for consuming fish were due to the fact that fish is nutritious and tasty. The population liked to buy their fish fresh. Finally, the majority of the consumers we interviewed talked about the lack of advertisements in the marketplace and reported that they usually inquired about the products available and their prices at the venue. Along with these general findings, we further examined other factors.

The first factor we examined was location of purchase. If we ignore demographics, the whole population mainly shops at hypermarkets, supermarkets, and municipal markets. We found that the majority of consumers purchased fish at the same place we interviewed them. We also saw that younger consumers tend to shop at hyper- and supermarkets, while older consumers shop at municipal markets. Likewise, employed consumers tend to shop at hyper- and supermarkets, while unemployed and pensioned consumers shop at municipal markets. For this section we also discovered that consumers with a higher level of education tend to shop at hypermarkets and supermarkets, while consumers with a lower level of education shop at municipal markets.

The next factor we compared was the species that consumers ate. The species that consumers ate most commonly were sea bass, shrimp, and tilapia. When comparing species consumed to interview locations, most species stayed close to the average consumption percentage. However, panga was mostly consumed by customers in supermarkets, porgy by customers in farmers' markets, and tilapia by customers in hypermarkets. We also found that employed consumers ate the widest variety of species and that a large percentage of employed consumers ate tilapia. Lastly, we found it significant that consumers with a lower level of education consumed shark, consumers with a higher level of education consumed tilapia, and a high percentage of consumers with a university education consumed shrimp and sea bass.

Next we compared desired species and their accessibility in terms of price. In general, shrimp and sea bass were the most desired species. Notably, a high percentage of consumers interviewed at farmers' markets desired shrimp; those at hypermarkets desired sea bass and porgy; and those at supermarkets desired sea bass, panga, and mahi mahi. When compared to age, key findings included: younger consumers wanted more accessible salmon and shark; consumers between 36 and 65 wanted accessible shrimp; and consumers above the age of 51 wanted accessible porgy. With the next demographic, marital status, we found that married consumers or consumers in

a free union desired more shrimp, sea bass, and tilapia compared to single consumers. In addition we found that employed consumers wanted accessible salmon, unemployed wanted accessible porgy, and pensioned wanted accessible tilapia compared to the other groups. Finally we found that as a consumer's education level increased, their desire for shrimp, sea bass, and salmon also increased, and additionally consumers with a technical and university education wanted more accessible trout compared to the other categories.

The last three factors that we compared were the volume of fish consumed, the frequency of fish consumption, and fish product expenses. In general, consumers ate 1.34 kg of fish per week. More specifically, in each of the demographic groups we saw that consumers above the age of 66 and consumers with a low level of education consumed the least amount of fish while employed consumers ate the most. Furthermore, consumers ate fish an average of 5.11 times per month. To be more specific, within each of the demographic groups we saw that consumers above the age of 66, single consumers, consumers with a low level of education, and pensioned consumers ate fish less frequently. Lastly, consumers spent an average of 5413 colones per week on fish.

4.2 Producer Findings

We visited 32 farms while gathering information about producers, the primary suppliers of cultivated fish in the distribution channel. We focused on trout, tilapia and shrimp farms. Figure 4 below depicts the total number of each type of farm as a percentage of the total number of farms visited.

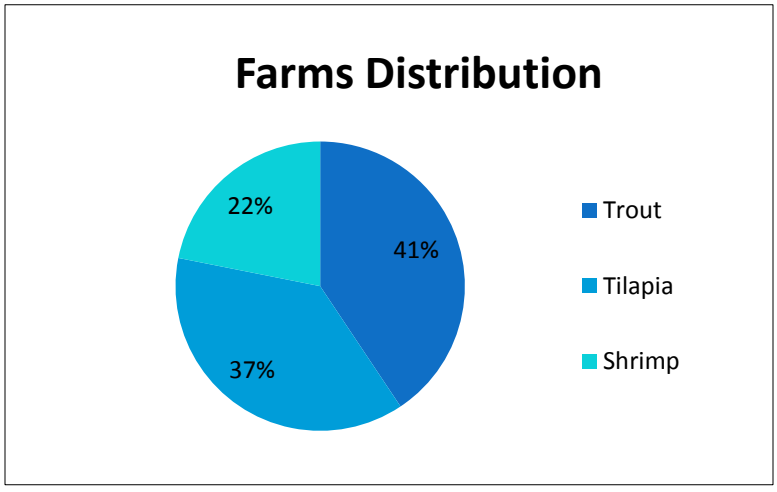


Figure 4 - Distribution of farm types interviewed

4.2.1 Trout Farm Findings

In general, trout farms are located at high elevations because trout is a cold water fish which requires a cooler climate for growth. During our visit to the farms located in San Gerardo de Dota and other areas near Cartago, we observed that all trout farmers managed their own restaurants and seemed to cultivate the trout solely for that purpose. Figure 5 below depicts a typical sign for a trout restaurant.

Figure 5 - Typical trout restaurant sign (English translation: "Bar, Restaurant, Urasca Ranch, Sport Fishing, Cabins, Green Lands")

Appendix E.1.a contains detailed information that we gathered during the trout farm interviews. The data demonstrated that only 2 farmers out of a total of 13 commercialized their product in the metropolitan area. This could be because many farmers do not want to invest in equipment for processing trout so that it can be transported to and sold in the cities. When questioned about problems encountered during the commercialization of trout to the city, most farmers said that they had no problems and asserted that they were satisfied with the way they run their business. Contrary to this, 6 farmers out of 13 said that they were not satisfied with the current demand for trout which results in a low profit margin. Most farmers wished to focus on stimulating and meeting the local demand before expanding to the outside market. A general observation we made when traveling to the farms was that the roads were not in good condition which might impede the transportation of fish to other areas; Figure 6 below depicts a common road condition that would prevent easy transportation of products. Another observation we made was that all of the interviewees showed a high level of interest in maintaining the freshness of the product they deliver.

Figure 6 - Example of road condition that prevents transportation of products to cities

With regards to the possibility of cultivating new types of fish, 9 farmers out of 13 were willing to cultivate new species. In general most farmers believed that the climate of the trout farms would not allow for the cultivation of other types of fish that would be in demand. Additionally, during our data collection in the trout farm region we noticed that some trout farms experienced the spreading of an eye disease; this was due to climate change which caused the water temperature to be higher than usual.

Figures 7 and 8 below represent the volume of trout produced and the price charged by each farmer. Two farmers did not specify the approximate volume of trout they sell per month. The prices and volumes vary for each farm. Farmer 2 commercializes the highest amount of trout (8000 kg/ month) which he sells to supermarkets in San José while most of the rest cultivate trout for their own restaurants. The prices charged by the farmers vary between 2000 c/kg to around 7000 c/ kg due to different preparations. The individual prices for trout farmers 3 and 11 are the highest (5000 c/ kg and 6750 c/ kg respectively) which might suggest that they produce trout at a lower monthly production level than the rest of the farmers. In general, we observed that producers sell their products for approximately the same price (if outliers are eliminated); this is done to maintain the competition between producers and to stay in the market.

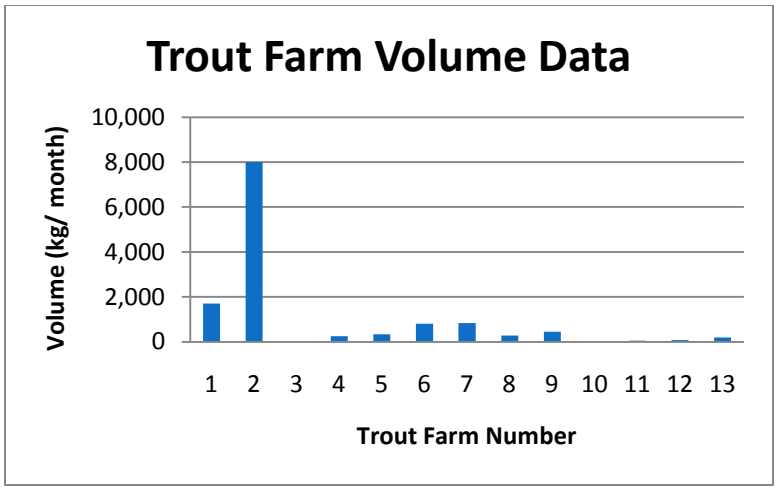


Figure 7 - Volume data for each trout farm

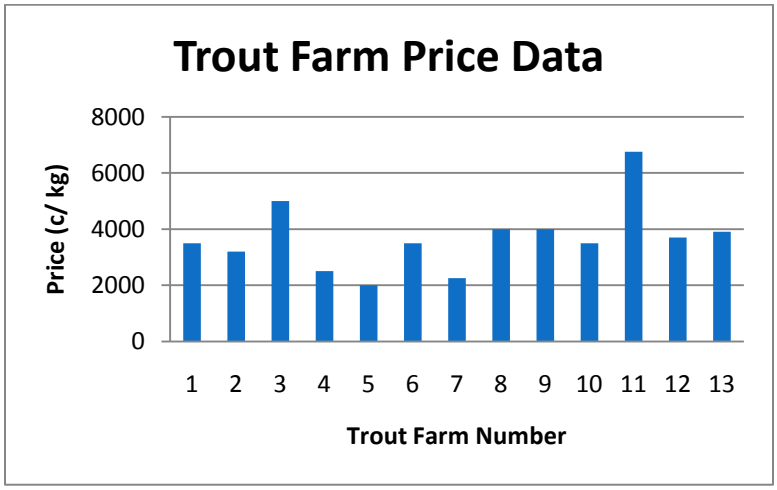


Figure 8 - Price data for each trout farm

A common problem related to production that most producers face is expensive feed (from Aguilar Solis) which usually results in a low profit margin. As a result, farmers typically have to sell the product at a higher price. Another major problem that trout farmers face is competition with other producers in the area. The concentration of trout farms in one major region far from the metropolitan area does not facilitate commercialization and marketing.

4.2.2 Tilapia Farm Findings

The tilapia farms we visited were found in San Carlos in regions of lower elevation where the climate is generally warmer than the climate of the trout farms. Figure 9 below depicts a typical tilapia farm. Most of the information we gathered came from small and medium scale producers

who sell their product locally. Appendix E.1.b contains detailed information gathered from the tilapia producers.

Figure 9 - Typical tilapia farm

Out of the 12 producers we interviewed, 4 of them sold their fish to supermarkets and at farmers' markets in the greater San José area. The remainder either owned their own restaurants or sold their product to nearby restaurants. All the producers complained about the expensive feed (from Aguilar Solis) which does not allow for a high profit margin. A major reason for commercializing the tilapia locally was because of additional expenses of processing and transportation that might render it difficult for the producers to make profits in the future. However 6 farmers out of 12 said that they had no major problems in commercializing their product because tilapia is a popular fish locally.

Figures 10 and 11 below represent the volume of tilapia produced and the price charged by each farmer. A comparison of the data showed an inverse correlation of -0.42 between the volume and price data. This means that an increase in volume of the fish is accompanied by a decrease in the price.

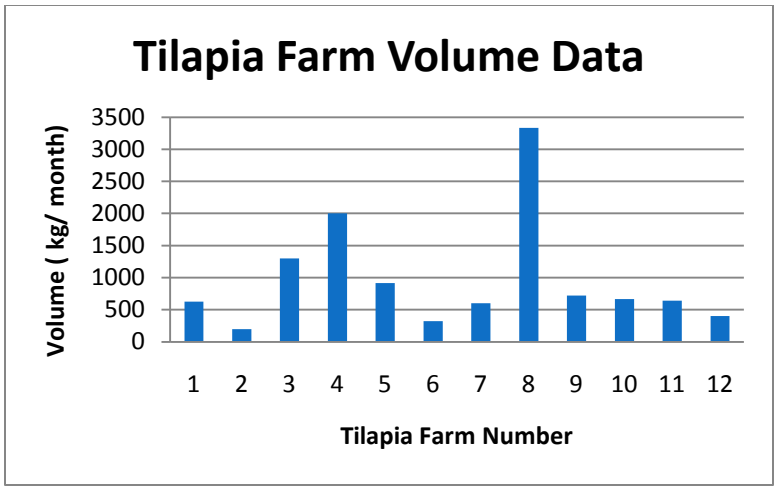


Figure 10 - Volume data for each tilapia farm

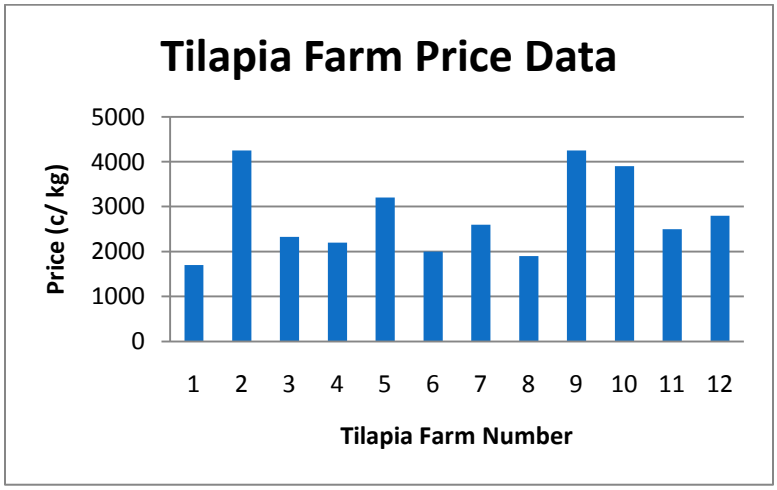


Figure 11 - Price data for each tilapia farm

A common problem that most tilapia producers mentioned was the competition they face from other producers and corporations in the country. When the corporations sell their products at a cheaper price, the tilapia producers are forced to lower the price of the product that they sell to local consumers. This does not benefit them since they have to make up for costly feed. In addition, a majority of the farmers confirmed that they were ready to cultivate other types of fish if there was a demand for them. Since tilapia grows in warmer climates, this might be a suitable climate for other types of fish. During our on-site visit to the farms, we observed that 2 of the producers were already cultivating and commercializing catfish along with tilapia.

4.2.3 Shrimp Farm Findings

The data collected from the shrimp farms was different from the data from the tilapia and trout farms due in part to differences in production methods. Shrimp requires more space for cultivation compared to fish; the "tanks" used for shrimp cultivation covered many more hectares than either the tilapia or trout farms did. The shrimp farms are located around the Gulf of Nicoya since shrimp requires salt water for a better growth.

The commercialization of shrimp depends heavily on its weight. For instance, the shrimp can be exported to other countries if it weighs 20 g or more. Our interviews with the shrimp farms revealed that 5 out of 7 shrimp producers sell their product to intermediaries who in turn sell the product to other individuals or to supermarkets in the nearby cities. Of the remaining two, one of the producers exports his products to Spain while the other sells his in the wholesalers' market. The size of the shrimp also determines its price on the market. The price is fixed at a specific weight and is increased in increments of 100 colones per additional gram.

Major problems that shrimp farmers face are competition with products from Nicaragua, the high price of feed and the White Spot Syndrome Disease, which arises during the dry season. The harvest of the shrimp occurs in several cycles during the year in an attempt to obtain a larger crop of healthy shrimp. On average, there are about 2 to 3 harvests every year. Coonaprosal, a corporation that helps shrimp producers cultivate and sell their products, does not finance the farmers during that period of the year. So during the dry season, some shrimp farmers use their ponds to produce salt through the evaporation of sea water while a few others prefer to keep their farm running and risk contracting the disease if they are late to harvest during a particular cycle. Shrimp farmers encounter the same dilemma of expensive feed as tilapia and trout farmers, however, shrimp farmers have the option to use locally produced feed which is of lower quality but cheaper. Overall the farmers acknowledged preference for imported feed from Peru (Nicovita) which is more expensive but yields a better product. In addition, 3 out of the 7 interviewed farmers complained about the competition that their shrimp products have to face on the market due to the cheaper prices set on Nicaraguan products. When we asked farmers about the possibility of cultivating new species, 4 out of the 7 interviewed producers said that they were ready to cultivate new types of fish.

4.3 Wholesaler Findings

For this round of data collection, we obtained information from 10 wholesalers at a wholesalers' market in Heredia (see Figure 12 below) and from a Wal-Mart distributor.

Figure 12 - Wholesalers' market in Heredia

4.3.1 Wholesalers' Market in Heredia

We conducted 10 interviews with wholesalers at Cenada, a wholesale distribution market in Heredia. Figure 13 below depicts the ratio of marine products to aquaculture products sold in the wholesale market. The fish are sold to different distributors and then sent to other venues including municipal markets, supermarkets and hypermarkets in the cities of Alajuela, Cartago, Heredia and San José.

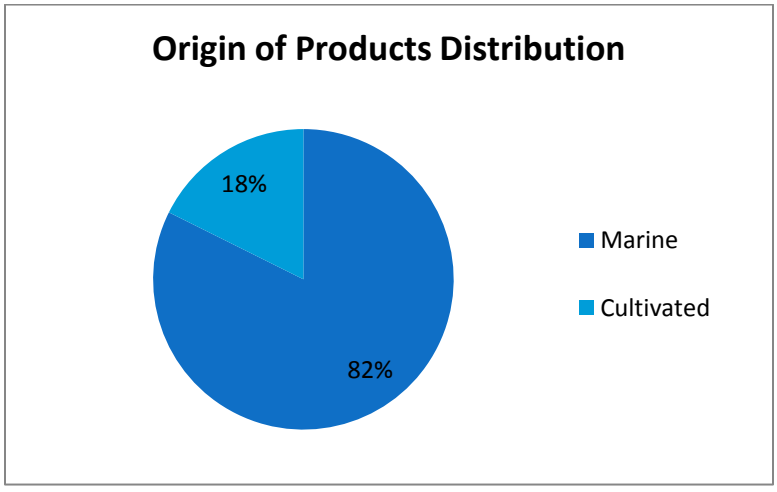


Figure 13 - Distribution of the origin of products at Cenada

The data showed that all except 2 wholesalers sell imported aquaculture fish (Panga and Salmon) to consumers of the local market. Appendix E.2 contains a full list of volumes of fish sold and selling prices for each wholesaler. Table 4 below summarizes the most popular types of fish commercialized by wholesalers along with the average volumes and prices.

Species of Fish	Average Volume (kg/ month)	Average Price (c/kg)	Sold At
Sea Bass (Marine)	1414	2100	7
Porgy (Marine)	608	2350	6
Shrimp (Marine)	1096	6317	5
Shrimp(Cultivated)	437	3750	6
Shark (Marine)	1250	1550	4
Marlin (Marine)	1319	3900	4
Mahi Mahi (Marine)	375	2150	2
Salmon (Cultivated)	1250	7000	1
Panga (Cultivated)	375	3000	1

Table 4 - Wholesaler data summary

Figures 14 and 15 are representations of the average volumes and prices for each wholesaler.

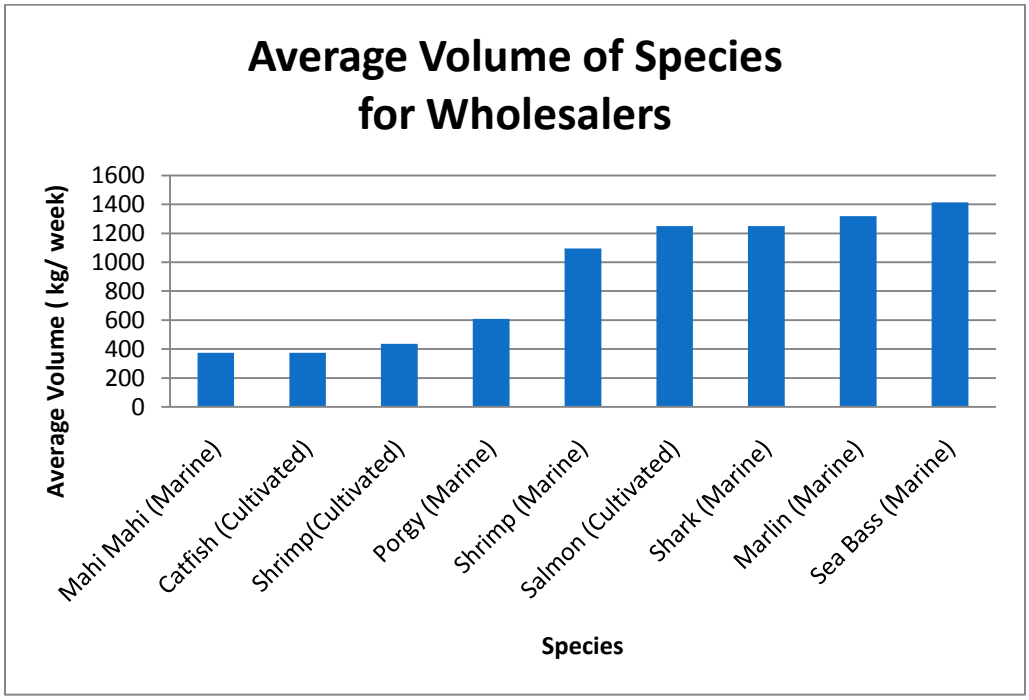


Figure 14 - Average volume of species sold by wholesalers

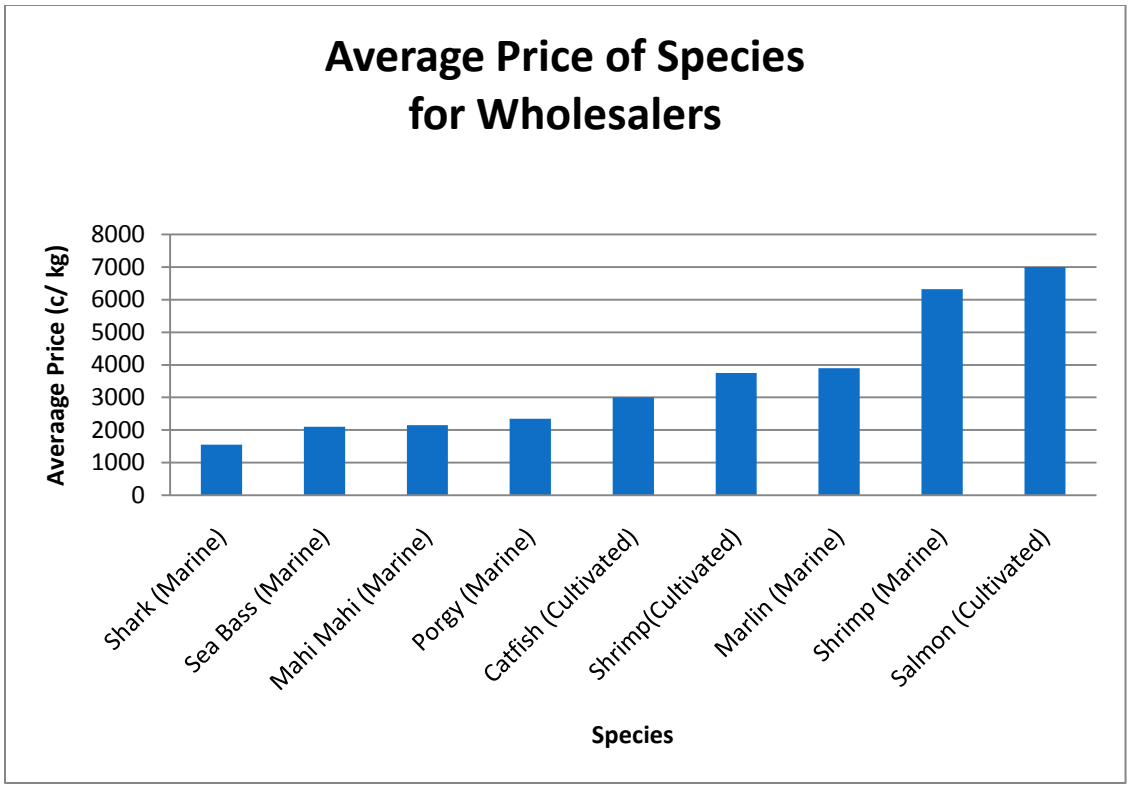


Figure 15 - Average prices of species sold by wholesalers

From the graphs, we inferred that marine sea bass was the highest-selling product on average (1414 kg/ month) with an average price of 2100 c/ kg; however, we found that one of the wholesalers commercialized a large amount of shark (25 200 kg/ month). This data was not included in our calculations of average volume for each species because the volume (according to that wholesaler) is prone to vary substantially. Another observation we made was that the price of cultivated shrimp on the local market was relatively high for a locally obtained product. We discovered through our data collection that intermediaries (who originally obtain them from producers) provide cultivated shrimp to the wholesalers; these intermediaries wish to maximize their profits after buying the shrimp from the producers, so they charge a higher price for the product. Due to this phenomenon, the cost of the shrimp increases at each step of the distribution channel; in the end, the consumer has to pay the price. The graphs also show that imported salmon is sold at a high price to account for the cost of importation and to allow the wholesaler to benefit as well.

4.3.2 Distributor from Wal-Mart

Our interview with Sr. Marco Freer helped us gather more information about the current state of the fish market in Costa Rica. Appendix F contains an outline of the major points discussed during the interview.

According to Sr. Freer, fish consumption in Costa Rica is relatively low compared to other Latin American countries; this is due to high prices in the local market. He also said that it is more profitable for Costa Rica to export locally grown products to more developed countries.

Sr. Freer stated that Wal-Mart focuses on two main areas when promoting fish products: health benefits and the sustainability of aquaculture. Consumers are generally aware of the nutrition benefits associated with fish products and Wal-Mart strives to increase consumers' awareness through brochures and pamphlets available at the point of purchase. In addition, Wal-Mart has adopted a policy of sustainability and believes that aquaculture is a key component to support this policy. Sr. Freer stated that aquaculture has become necessary in order to meet the demand for fish products as the supply of marine products becomes stagnant in the near future. The types of aquaculture products sold in stores are certified and produced in an environmentally-friendly manner. In addition, it is easier to certify cultivated products than marine products since the process for certifying marine products is costly. Consumers are encouraged through the media of brochures and pamphlets from Wal-Mart to adopt an environmentally-friendly and sustainable consumption method.

4.4 Market Manager Findings

As a team, we conducted 30 interviews with market owners in the greater San José area. This included interviewing 17 municipal markets, 9 farmers' markets, 3 supermarkets, and one hypermarket as depicted in Figure 16. Of the 30 markets, 21 were located in San José, 5 were located in Alajuela, and 4 were located in Heredia; this distribution of markets by city can be seen in Figure 17.

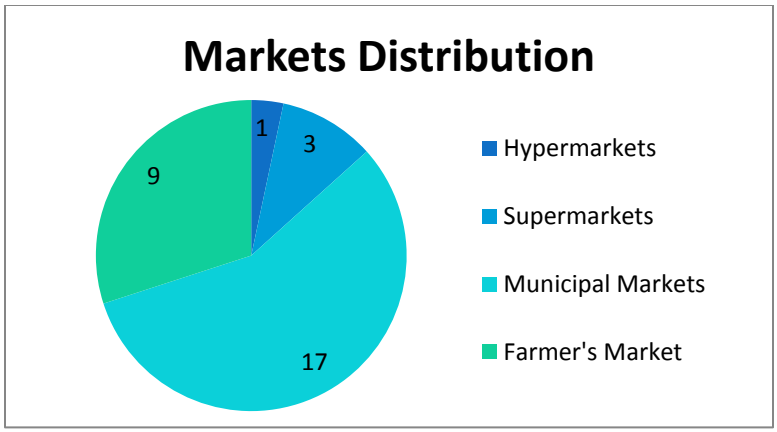


Figure 16 - Distribution of market types

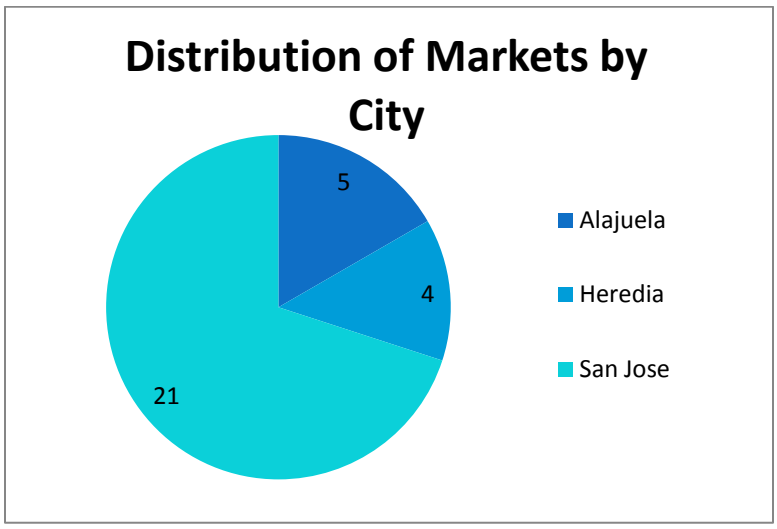


Figure 17 - Distribution of markets by city

Each of these markets exhibited different product presentation, but because they were marketing similar products to the same audience we observed that the venues had several things in common. For instance, 97% of the marketplaces sold their fish fresh because consumers have expressed a preference for fresh fish; markets have a problem commercializing fish if the only option is frozen fish.

In order to present the product in this manner, markets have the option to choose between different types of storage methods for their products; however, we took note that most of the vendors used the same methods for storage. Figure 18 shows that the most popular method for keeping fish fresh is to put it on ice. This graph also shows that many of the stores use more than one method of cold storage.

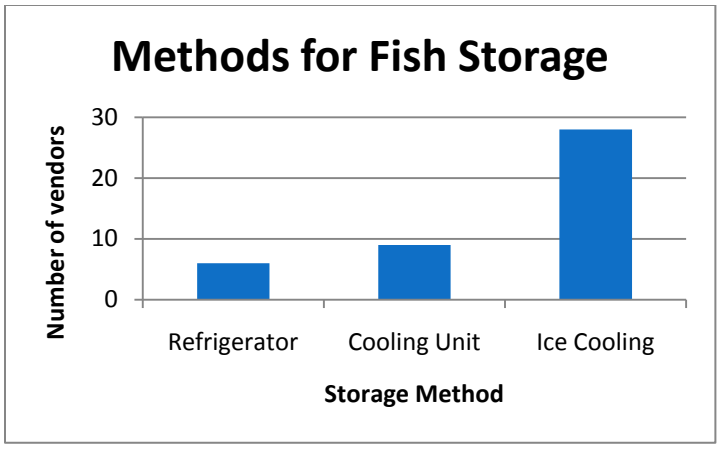


Figure 18 - Methods of fish storage employed by markets

Another prominent trend in the marketplace was which types of products, imported or national, yielded the largest margin of profit. Ninety-three percent of the market managers said that local products earn more profits than imported products.

Lastly, of the 30 markets interviewed, 70% were employers or managers of the fish department while the other 30% worked closely with the products in question. For this reason, the data we collected is more reliable because the interviewees were well aware of the facts surrounding the products.

The following sections are a summary of the data analysis conducted in Excel to find correlations between each of the sets of data from the interviews.

4.4.1 Product of Highest Demand vs. Volume of Fish Sold

We first compared the product of highest demand against the volume of fish sold. We expected these two sets of data to directly correlate, but because most of the data were estimates made by the market managers we needed to make a correlation to verify our assumption. We found that the data did, in fact, correlate; as a product had a higher demand, the volume sold of that product increased. A correlation coefficient of approximately 0.8 demonstrates the accuracy of our prediction.

4.4.2 Market Type vs. Product of Highest Demand

Different markets attract different demographics of consumers (we will discuss this phenomenon further in Section 4.5). Table 5 shows the total volume of each species sold, including all cut varieties (filet, cutlet, whole). As this table shows, different market types experience different

demands since the consumer demographic is varied. For example, panga and tilapia were in comparatively higher demand at supermarkets and hypermarkets whereas shark and mahi mahi were in higher demand at municipal markets. Lastly, tilapia was in higher demand at farmers' markets.

Type of Fish	Demand of Fish Sold (kg/week) vs. Market Type			
	Hypermarket	Supermarket	Municipal Market	Farmers' Market
Shrimp	42.00	10.17	80.21	52.67
Sea Bass	42.00	17.50	195.00	80.00
Panga	224.00	47.33	57.92	80.00
Mahi Mahi			253.33	50.00
Marlin			185.36	27.50
Porgy		7.00	82.50	15.00
Salmon	21.00			
Shark	42.00	8.67	377.14	22.50
Tilapia	315.00	29.83	66.50	300.00
Trout	77.00	21.00		
Total	763.00	141.50	1297.96	627.67

Table 5 - Demand of fish sold (kg/week) vs. market type

With the information we gathered about the origins of the fish, we were able to compare aquaculture products sold against marine products sold; Figure 19 shows this comparison. We were not able to include shrimp in this analysis since we were not able to distinguish between origins; we also could not consider the many types and sizes of shrimp in this analysis. We separated the amounts of each species sold by each of the markets. Interestingly, the different market types sold different amounts of each of the products. For instance municipal markets sold almost nine times the amount of marine fish (1093 kg/week) as they did aquaculture fish (124 kg/week). On the other hand hypermarkets (637 kg/week), farmers' markets (380 kg/week), and supermarkets (98 kg/week) relied on aquaculture products for their profits instead of marine fish (84,195 and 33 kg/week respectively).

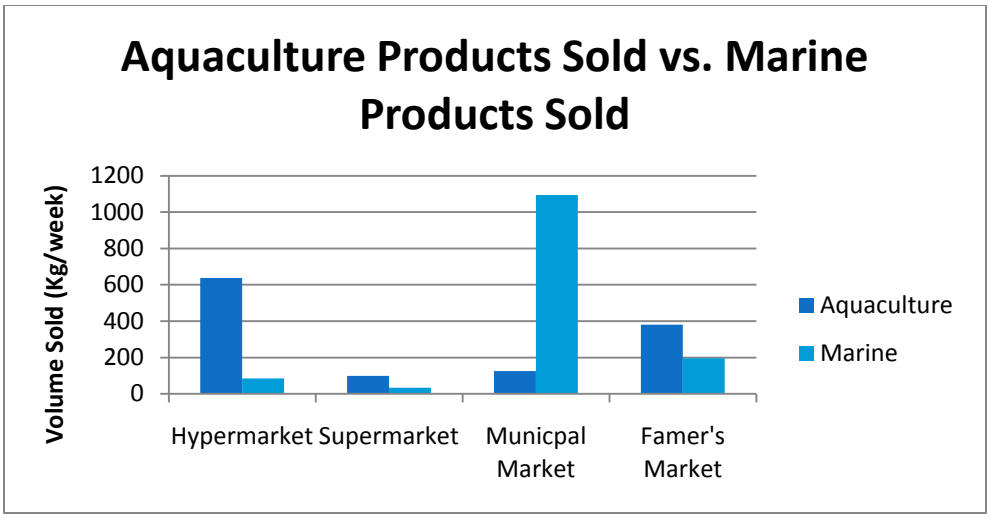


Figure 19 - Aquaculture products sold vs. marine products sold

We made a further comparison of products from the aquaculture market which can be seen in Figure 20. Again, we omitted shrimp from our analysis because of the variety of shrimp available in the marketplace (different species, different sizes, etc.). Out of all the fish sold in the San José markets four came from aquaculture cultivation (excluding shrimp). From these four types of cultivated fish, salmon and catfish were imported to Costa Rica whereas trout and tilapia were national. As Figure 20 shows, supermarkets and municipal markets sold approximately the same amount of imported aquaculture products (51 and 66 kg/week respectively) as national aquaculture products (47 and 58 kg/week respectively). On the other hand hypermarkets and farmers' markets sold more national aquaculture products (392 and 300 kg/week respectively) compared to imported aquaculture products (245 and 80 kg/week respectively).

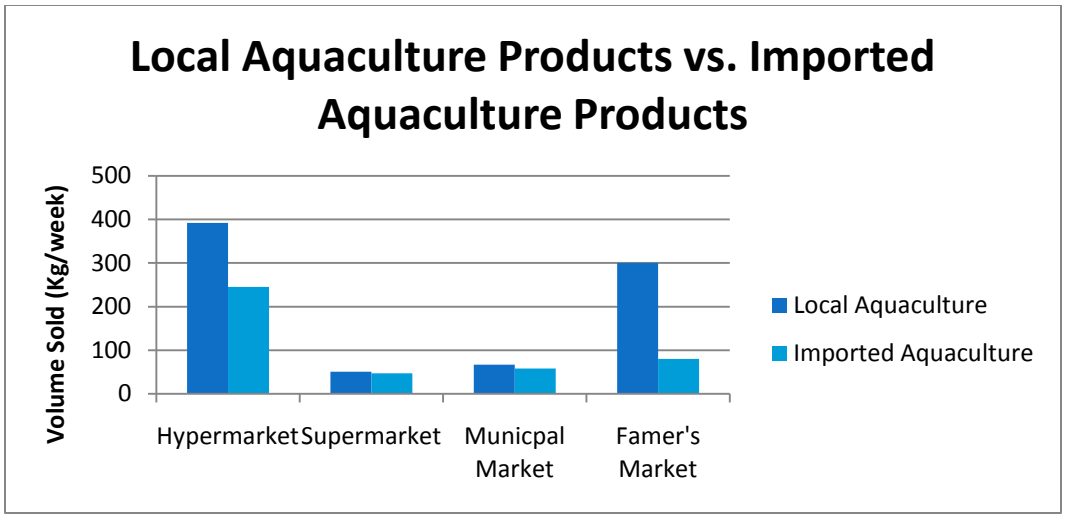


Figure 20 - Local aquaculture products vs. imported aquaculture products

4.4.3 A Prices vs. Product of Highest Demand

Table 6 below shows a side by side comparison of the price of filets (in colones per kilogram), volume sold (in kilograms/week), highest demand according to the vendors, and the number of venues that sold each species. We used the price of filets to keep variables equal (*ceteris paaribus*). The following sections show correlations between the four columns.

We completed a correlation between the price of fish sold and the amount of fish sold in the marketplace as well as a comparison between the product of highest demand (according to the market managers) and the product price. We found that the demand was largely driven by price. Holding all other variables equal, there was a relatively strong correlation between the product of highest demand and the price of the product. For the correlations, coefficients of -0.63 (price vs. amount) and 0.56 (price vs. demand) respectively were found.

In addition, we compared two species of aquaculture to determine their compatibility; these fish were tilapia (a nationally grown fish) and catfish (an imported fish). Tilapia was sold at a lower price in larger quantities, but at fewer venues. On the other hand, catfish was sold at a higher price at more venues even though the amount sold per week was lower. This comparison shows that there is a market for both of these fish, but only one of them is grown in Costa Rica.

Species of Fish	Price of Filet (in C/kg)	Amount (in kg/week)	Highest Demand	Sold At
Shrimp	8,151	60.6	1	27
Sea Bass	4,839	144.4	9	27
Catfish	4,691	59.5	5	16
Mahi Mahi	3,578	172.0	3	17
Marlin	4,300	136.3	1	16
Porgy	4,357	62.4	4	21
Salmon	5,390	21.0	0	4
Shark	3,297	257.0	16	28
Tilapia	3,773	101.7	5	12
Trout	7,543	40.0	0	2

Table 6 - Comparison of data collected from market managers

4.4.4 Product of Highest Demand vs. Availability of Products

Our group also studied whether the availability of each fish type sold in the markets had any impact on the demand for specific fish species. We noticed a strong correlation between the two lists. Figure 21 shows that as the demand for a product increases, so does the availability of that product. In this set of data, shark was sold in the most venues and it was also considered by the market managers to be in the highest demand by consumers; the same trend holds true for sea bass (the second most available and second most "in-demand" fish species). Shrimp was the only species that did not adhere to this trend; many of the vendors sold shrimp but only one claimed it to be in high demand.

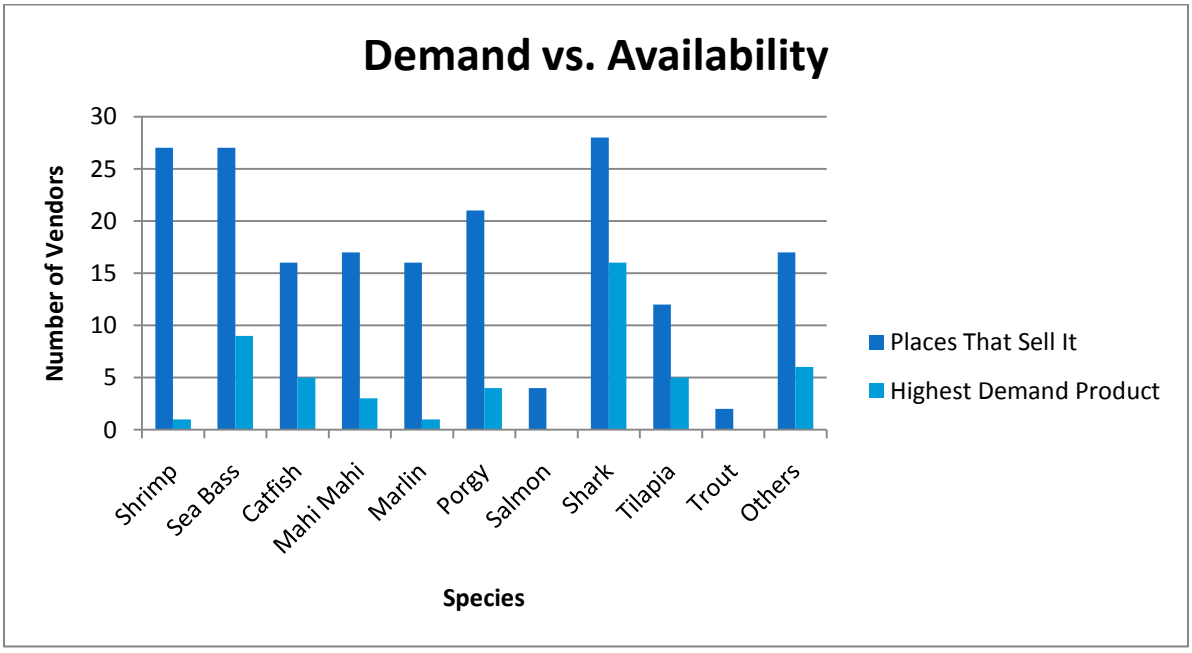


Figure 21 - Comparison between product of highest demand and product availability

4.4.5 General Observations of Various Markets

Each of the markets exhibited different presentations of their products. We observed that supermarkets and hypermarkets presented their products in a similar way, and municipal and farmers' markets sold their products equally. Figure 22 shows the typical presentation of fish at a supermarket in the greater San José area. The area is clean, neat and aesthetically pleasing to look at.

Figure 22 - Typical presentation of fish at hyper- and supermarkets

By comparison, Figures 23, 24, and 25 show typical municipal markets in different parts of the metropolitan area. Figure 23 shows a market manager preparing the fish for sale in plain view of the consumer. At first glance, these stands appeared to have the freshest fish of all of the markets we studied, however they did not seem to have the cleanest facilities.

Figure 23 - Market manager preparing fish for sale at a municipal market

Figure 24 - Typical presentation of fish at municipal and farmers' markets

Figure 25 - Typical presentation of fish at municipal and farmers' markets

Figure 26 shows the atmosphere of a typical farmers' market. Stands are set up along the edges of a street and vendors sell fresh fruits, vegetables, meat, and fish. The presentation of the fish in these markets was similar to that of the municipal markets because they relied on the freshness of the fish to sell the product. Their product appears to be as fresh as the municipal markets, and, unfortunately they too lack a certain level of cleanliness in their facilities.

Figure 26 - Typical farmers' market

4.4.6 Advertising

During our interviews, we gathered data about the types of markets and their use of advertising techniques as shown in Table 7.

Type of Market	Use of Advertising			
	Total	Yes	No	Percent
Hypermarkets	1	1	0	100.00%
Supermarkets	3	3	0	100.00%
Municipal Markets	17	7	10	41.18%
Farmers' Markets	9	0	9	0.00%
Total	30	11	19	36.67%

Table 7 - Use of advertisements by markets

We found that supermarkets and hypermarkets were most likely to use advertisements whereas farmers' markets were least likely to use advertisements. Within the municipal markets, the use of advertisements was approximately equal between those that used advertisements and those that did not. One of the reasons for the absence of advertisements in the municipal and farmers' markets was their reliance on word of mouth to publicize their products.

Our team also compared market types against the effectiveness of advertising. We revealed that supermarkets felt their advertisements were productive; all three supermarkets felt that their advertisements were very effective. On the other hand, many municipal markets felt that their advertisements were only "good" and many of the farmers' markets did not give an answer because they do not use formal advertisements.

We additionally investigated markets' willingness to invest in more advertisements. We discovered that 43% of the markets were willing to invest more for advertisements. The other 57% had no interest in investing more or did not respond to the question. Many of the 43% that responded positively also asserted that they would only invest more in advertising if it would ensure profit gains.

4.4.7 Comparisons with no Correlations

In addition to the above comparisons, we also performed the following analyses: market type vs. most profitable product (local or imports), city vs. product of highest demand and price vs. species sold. These comparisons did not yield any significant relationships.

4.5 Consumer Findings

We interviewed a total of 95 consumers in 4 types of markets: 20 from hypermarkets, 23 from supermarkets, 28 from municipal markets, and 24 from farmers' markets, as shown in Figure 27.

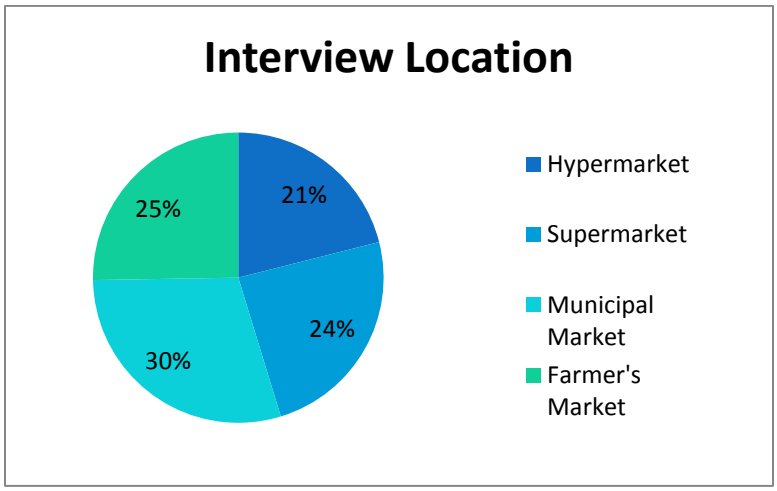


Figure 27 - Distribution of consumers by interview location

We first compared the locations of interviews with relevant data in order to reveal significant results. In addition to this comparison, we analyzed 5 major demographic categories: age, sex, marital status, employment, and education levels.

4.5.1 Demographic

The consumers we interviewed were 51.5 years old on average, with a standard deviation of 13.5 years. The age distribution can be seen in Figure 28. In order to make comparisons with other data, we separated consumers by age groups; there were 11 consumers in the 0 to 35 group, 31 in

the 36 to 50 group, 30 in the 51 to 65 group, and 11 in the 66+ group. We omitted those who did not report their age from further age analyses.

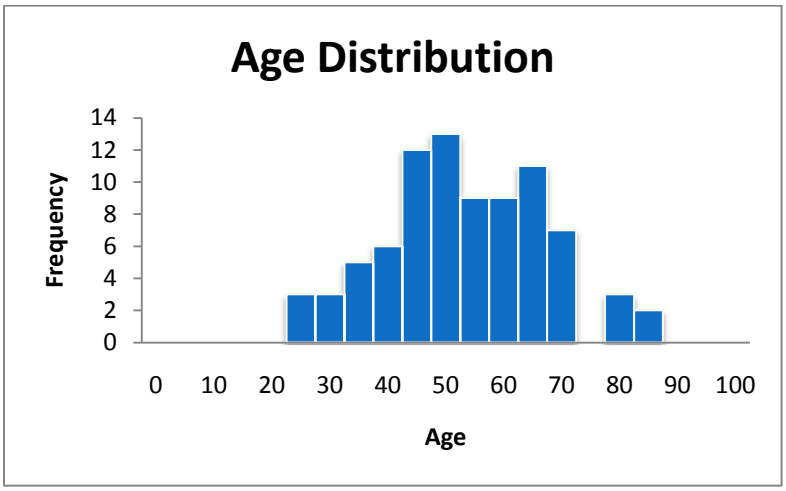


Figure 28 - Age distribution of consumers

The consumers we interviewed were 27 % male and 73% female. In addition, 73% of the consumers reported having a partner (married or in a free union) while 27% were single (including those who were widowed or divorced); we used only these two general categories in order to make our comparison simpler. Out of the total number of consumers, 57% were employed, 21% were unemployed, 20% were pensioned, and 2% did not report their employment status. Table 8 shows the education level distribution for the consumers we interviewed. In order to make statistical comparisons, education levels were given a numerical value from 0 (None) to 4 (University) based on education levels in order to find numerical correlations.

Education Level of Consumers	
None	3%
Primary	21%
Secondary	19%
Technical Bachelor Degree	17%
University	37%
n/a	3%

Table 8 - Distribution of consumers' education levels

For our analysis, we calculated correlations with the age and education demographics. We could not compute correlations for the gender, marital status, or employment status demographics due to the nature of the data. As an alternative comparison we examined significant percentage

discrepancies for these demographics. The following is a description of the results we obtained that were most significant to our problem statement; a full set of results can be viewed in Appendix E.4.

4.5.2 Overview of Consumer Findings

We discovered several results that are common through all the demographic categories. These results include opinions on prices, opinions on product quality, reasons for consuming fish, nutritional awareness, preferred product presentation, and advertisements seen by the consumer.

Consumers reported consistent opinions on product prices. On a scale of 1 (expensive) to 5 (cheap), consumers rated fish prices at 2.57 on average with a standard deviation of 0.94. This average demonstrated to us that consumers thought prices of fish were reasonable but leaning towards expensive. Similarly, consumers reported consistent opinions on product quality. The average quality rating, on a scale of 1 (bad) to 5 (great), was 4.29 with a standard deviation of 0.63. This average demonstrated to us that consumers seemed to be satisfied with the quality of the fish they buy. Another consistent response we obtained from consumers concerned their knowledge of the nutritional value of fish: 100% of consumers were aware of the nutritional value of fish. Additionally, consumers reported their reasons for eating fish were nutrition (92%) and taste (68%). We also asked consumers about their preferences in product presentation (frozen, fresh, smoked, or canned); the majority expressed that they wanted fish presented fresh in the markets (97%). Finally, we surveyed consumers about how they obtain information about promotions on fish products; the majority indicated that they went to the market to see what was on sale (83%). A few mentioned newspaper (12%) and television (8%) advertisements as their primary source of information.

4.5.3 Location of Purchase

The purchase locations that we investigated were hypermarkets/supermarkets, municipal markets, farmers' markets, and independent markets. Independent markets have no affiliation with other markets. The distribution showing what percentage of consumers shopped at certain locations can be seen in Figure 29. In our sample 54% of consumers shopped at a hypermarket or supermarket, 39% shopped at municipal markets, 18% shopped at farmers' markets, and 16% shopped at independent markets. The following sections compare the location of purchase with the interview location and the 5 previously mentioned demographic groups.

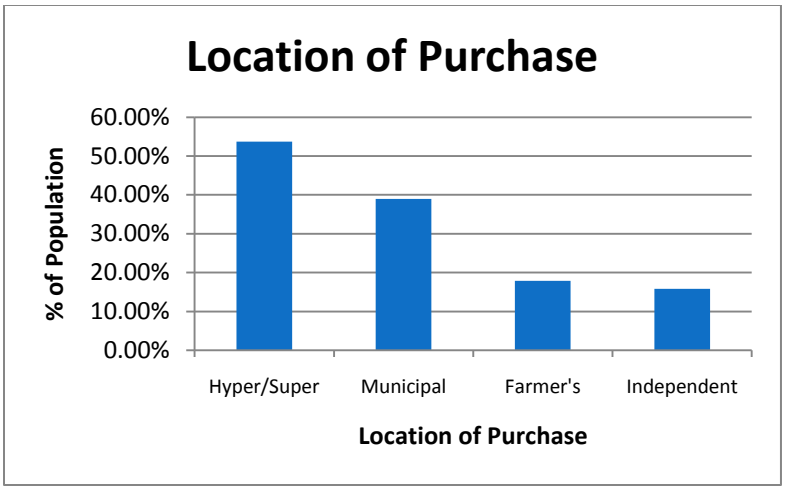


Figure 29 - Distribution of purchase location of consumers

4.5.3.1 Location of Purchase vs. Location of Interview

We compared the location of purchase against the location of the interview in order to verify that consumers shopped at the location of the interview. Figure 30 demonstrates that our assumptions were correct. The majority of consumers that we interviewed in hypermarkets (80%) and supermarkets (70%) stated that they shopped at hypermarkets and supermarkets. The majority of consumers that we interviewed in municipal markets stated that they shopped at municipal markets (89%). Likewise, the majority of consumers that we interviewed in farmers' markets stated that they shopped at farmers' markets (58%). Lastly, a few consumers stated that they shopped in independent markets; however they also stated that it was not their primary venue for obtaining fish.

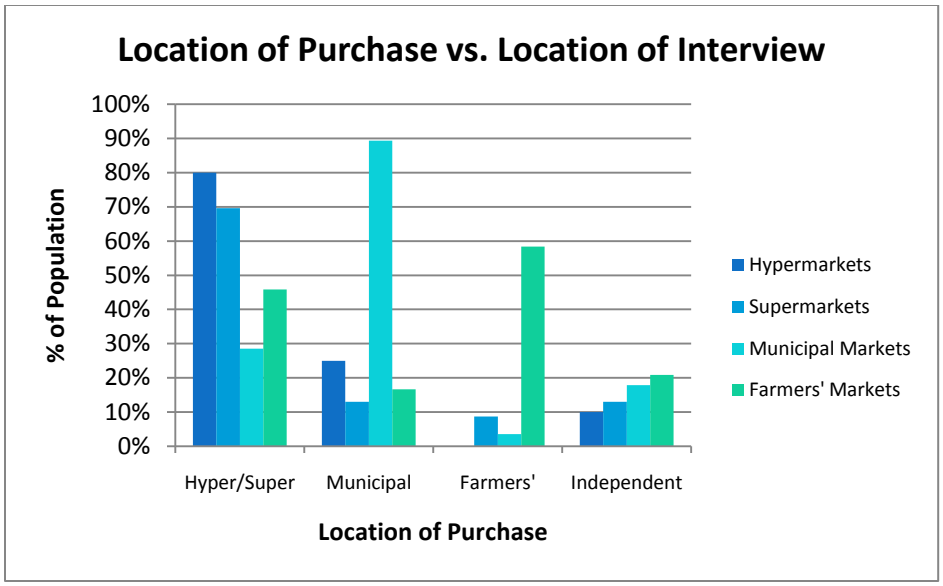


Figure 30 - Location of purchase vs. location of interview

4.5.3.2 Location of Purchase vs. Age

The comparison between location of purchase and age can be seen in Figure 31. We found two strong correlations from this comparison. The first correlation was between hyper- and supermarket consumers (-0.30); as the age of the consumers increased, their likeliness to shop at hyper- or supermarkets decreased. The second correlation was within municipal market consumers (0.32); as the age of consumers increased, their likeliness to shop at municipal markets also increased. In particular we noted that a high percentage of young consumers (91%), age 0 to 35, shop at hypermarkets and supermarkets, while very few shop at municipal markets (9%), farmers' markets (9%), and independent markets (9%).

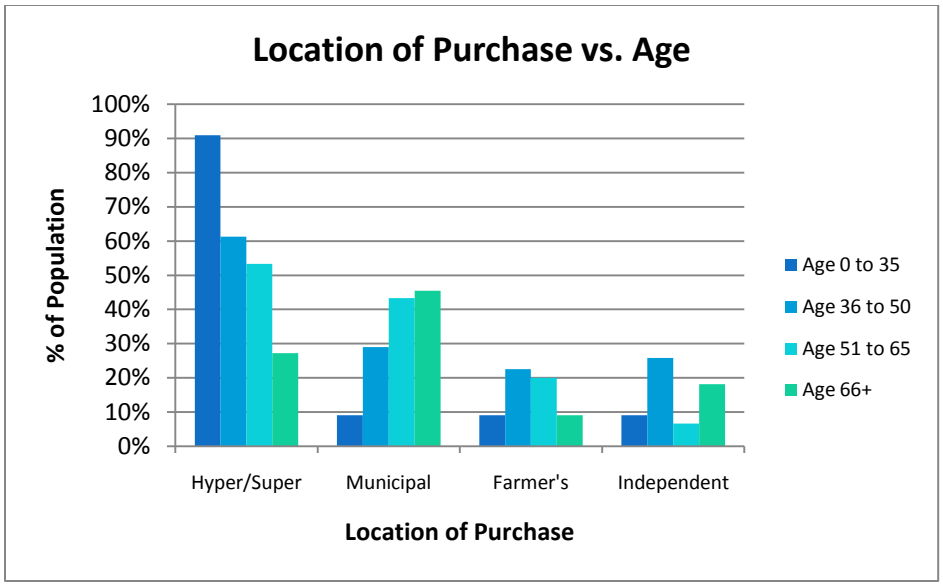


Figure 31 - Location of purchase vs. age

4.5.3.3 Location of Purchase vs. Employment Status

We identified two relationships between location of purchase and employment status which can be seen in Figure 32. We noticed that a high percentage of employed people (65%) shopped at hypermarkets and supermarkets, while fewer shopped at municipal markets (28%), farmers' markets (22%), and independent markets (17%). Furthermore, a high percentage of unemployed (60%) and pensioned (53%) consumers shopped at municipal markets.

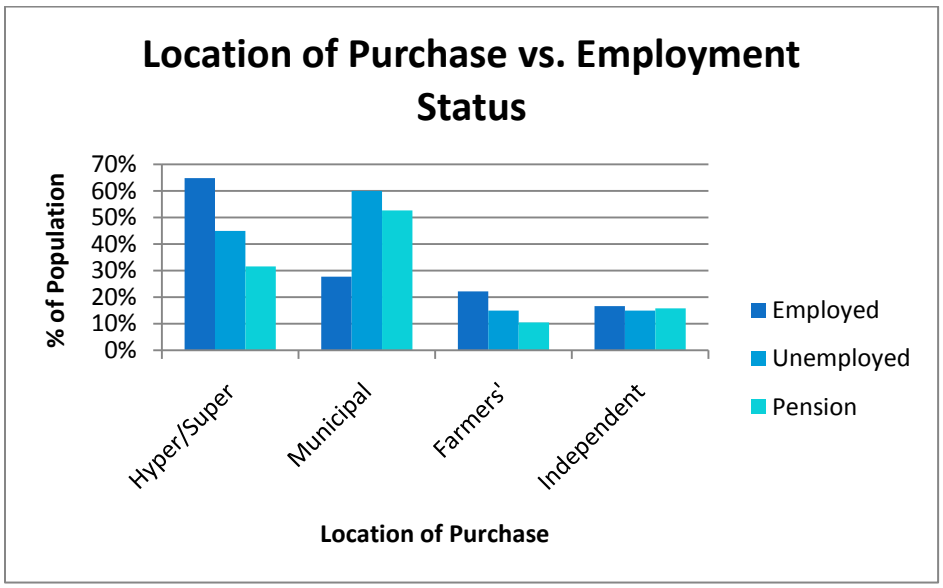


Figure 32 - Location of purchase vs. employment status

4.5.3.4 Location of Purchase vs. Education Level

The comparison between location of purchase and education yielded three strong correlations, which are depicted in Figure 33. First, we found that consumers with a higher level of education were more likely to shop at hypermarkets or supermarkets (0.33). Second, we found that consumers with a lower level of education were more likely to shop at municipal markets (-0.32). Lastly, we found that consumers with a higher level of education were somewhat likely to shop at farmers' markets (0.15).

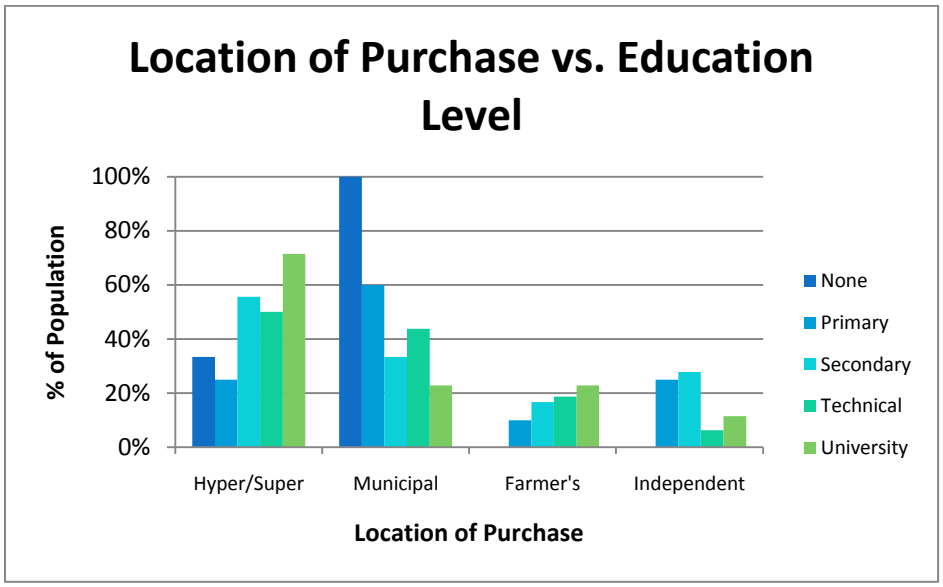


Figure 33 - Location of purchase vs. education level

4.5.3.5 Comparisons to Location of Purchase with no Correlations

In addition to the above comparisons, we also performed the following analyses: location of purchase vs. gender and location of purchase vs. marital status. These comparisons did not yield any significant relationships.

4.5.4 Species Consumed

The species that we included in our survey questions were shrimp, sea bass, corvineta (catfish), mahi mahi, marlin, porgy, salmon, shark, and trout. Consumers also reported eating other species, including vela, octopus, mariscos, and tuna. The distribution showing what percentage of consumers ate each species can be seen in Figure 34. In our sample, the species that consumers ate most was sea bass (73%), which was followed by shrimp (42%) and tilapia (42%). The species that consumers ate the least were marlin (11%), salmon (11%), and shark (13%). Catfish, which we expected to be popular based on information from our sponsors, only had a 21% consumption

percentage. The following sections will compare the species consumed with the interview location and the 5 previously mentioned demographic groups.

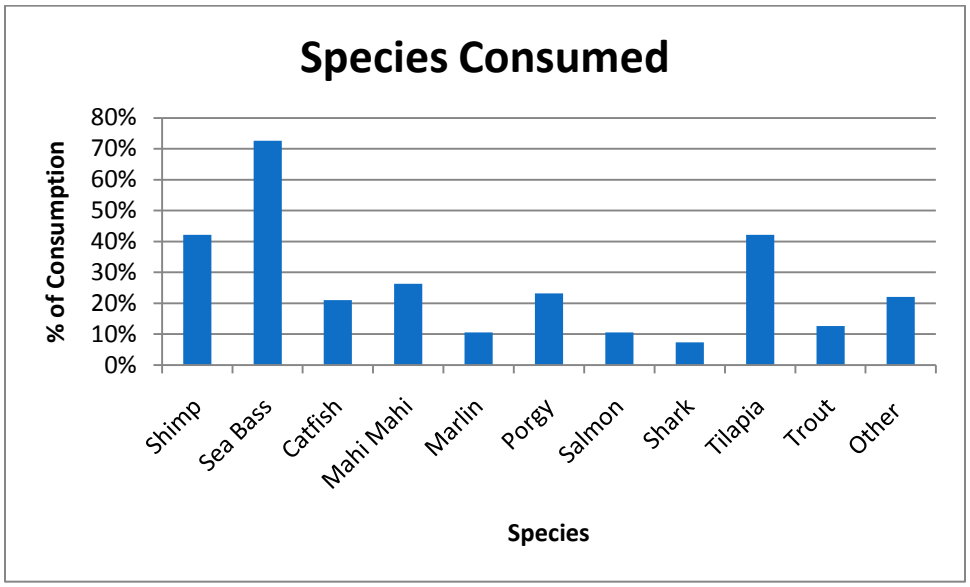


Figure 34 - Species consumed

4.5.4.1 Species Consumed vs. Interview Location

Since we established that interview location had a direct relationship to the location where products were bought, we also compared the species consumed against interview locations in order to analyze which species were most popular at each venue. Figure 35 shows the general results of this comparison. We unveiled 3 important results from these findings. First, more supermarket consumers (52%) ate catfish than hypermarket (20%), municipal market (7%) and farmers' market (8%) consumers. Second, more farmers' market (38%) consumers ate porgy than hypermarket (20%), supermarket (13%) and municipal market (21%) consumers. Lastly, more hypermarket consumers (70%) ate tilapia than supermarket (43%), municipal market (25%) and farmers' market consumers (38%).

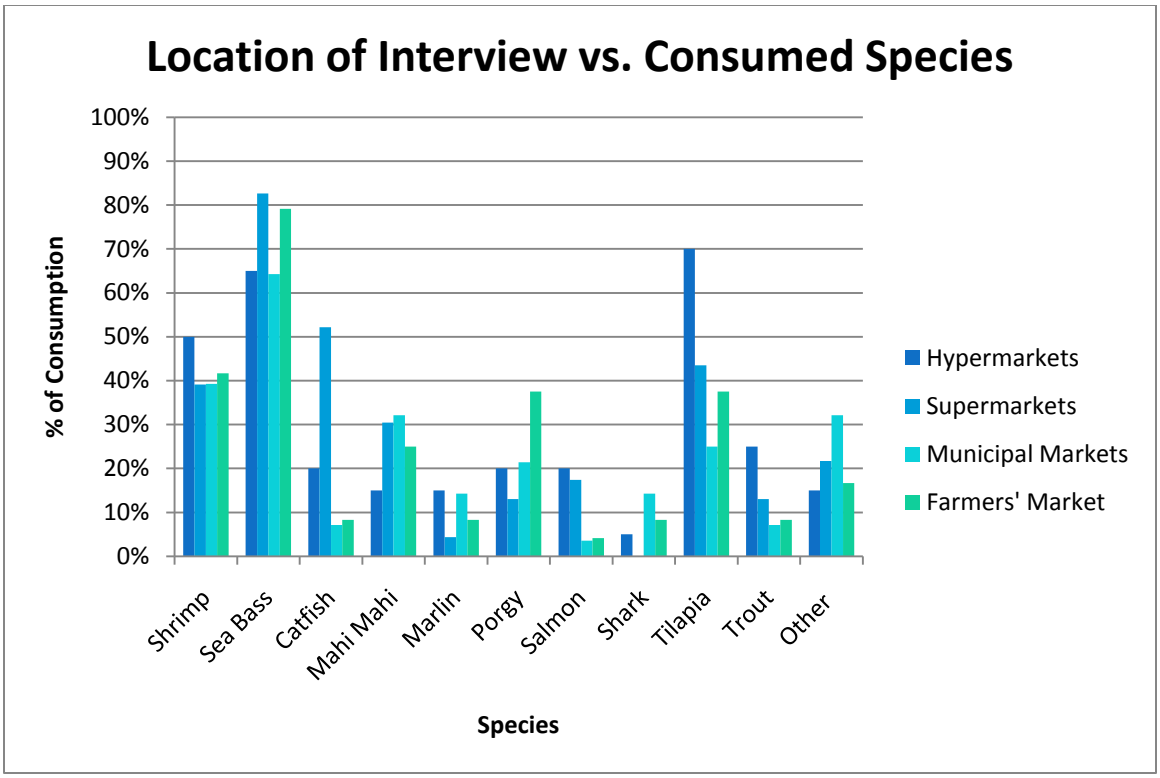


Figure 35 - Location of interview vs. species consumed

4.5.4.2 Species Consumed vs. Employment Status

We found one significant correlation from our comparison between species consumed and the consumer's employment status. Figure 36 shows the results of this comparison. Employed consumers (52%) ate more tilapia than unemployed (30%) and pensioned (32%) consumers. We also noticed that employed consumers ate a wider variety of species. This may have been influenced by the fact that employed consumers were able to afford more types of fish.

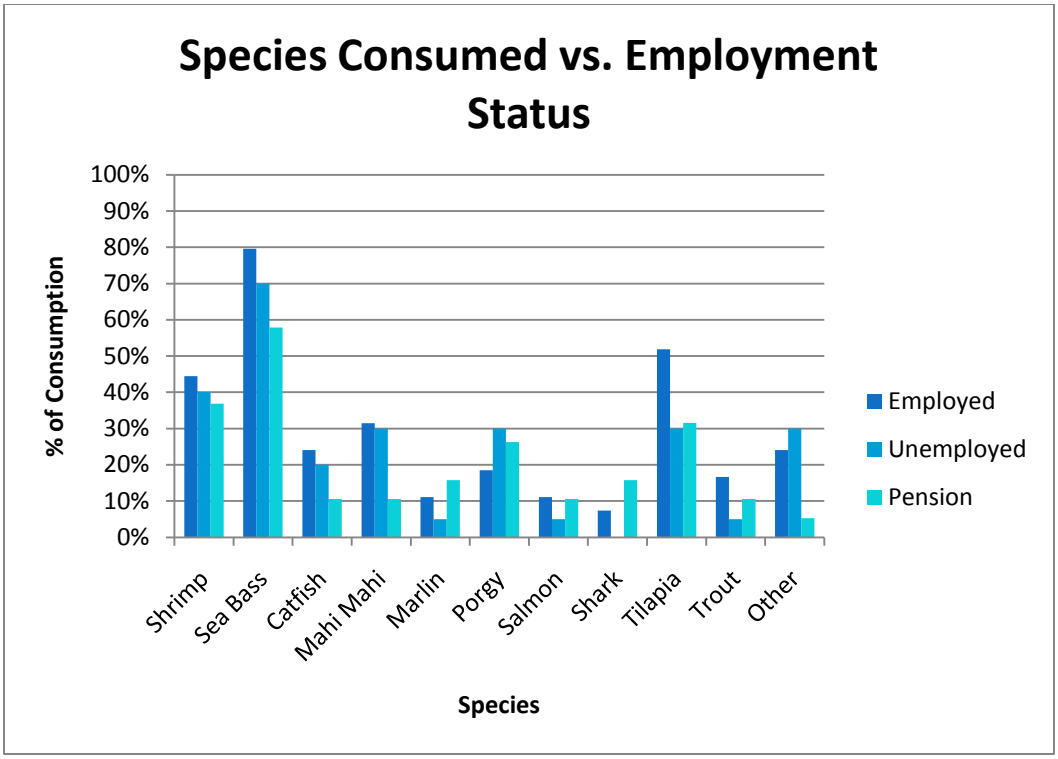


Figure 36 - Species consumed vs. employment status

4.5.4.3 Species Consumed vs. Age

The comparison between species consumed and age can be seen in Figure 37. In this section we found a relationship between age and two of the species. The first correlation showed that the older the consumer, the less chance that they would consume shrimp (-0.10). Tilapia also showed a negative correlation compared to age (-0.25). Although the numerical correlation is not strong due to the nature of the data, there was a slight decrease in tilapia consumption between the ages of 0 to 65, and a drastic drop in tilapia consumption after the age of 66.

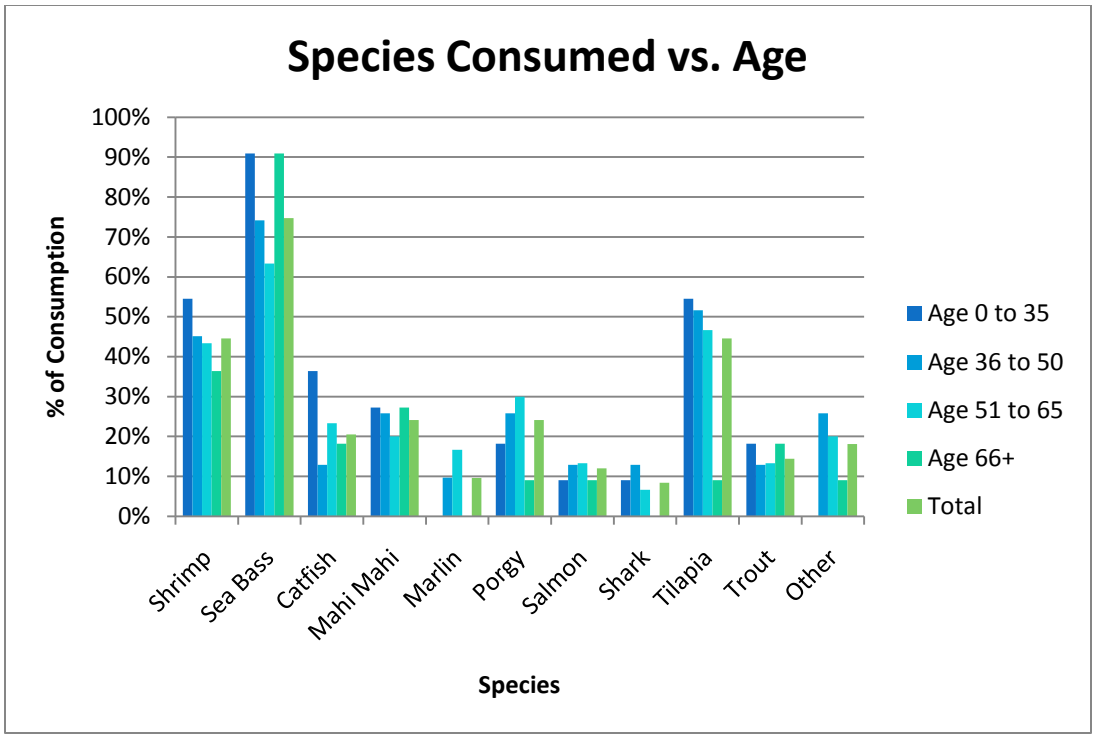


Figure 37 - Species consumed vs. age

4.5.4.4 Species Consumed vs. Education Level

When we compared species consumed against education level, we found two correlations which can be seen in Figure 38. First, we found that consumers with a lower level of education were more likely to eat shark (-0.21). We also found that consumers with a higher level of education were more likely to eat tilapia (0.25). Also, although we did not find a direct correlation, we thought it was interesting that consumers with a university education consumed the highest volumes of shrimp (49%) and sea bass (83%).

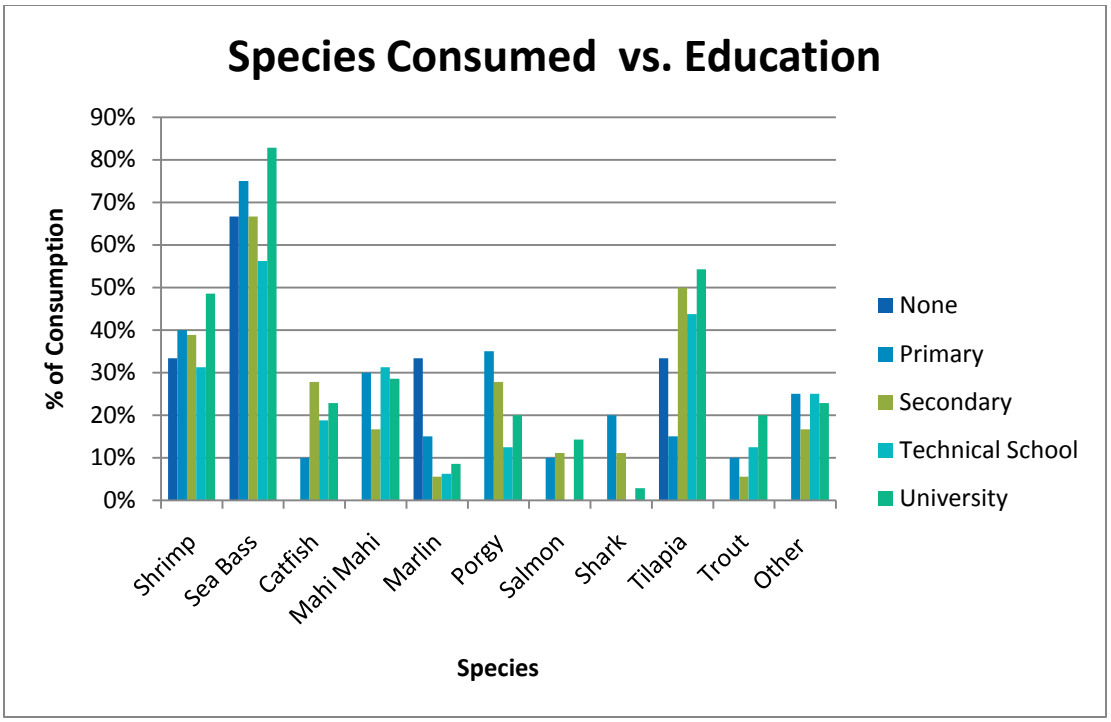


Figure 38 - Species consumed vs. education level

4.5.4.5 Comparisons to Species Consumed with no Correlations

In addition to the above comparisons, we also performed the following analyses: species consumed vs. gender and species consumed vs. marital status. These comparisons did not yield any significant relationships.

4.5.5 Desire for Accessibility of Species

In this section, we questioned consumers about which products they would like to be more accessible or cheaper. We used the same set of fish species in our questions as before, but for this section the other category included vela, robalo and pulpo. The distribution showing what percentage of consumers wanted a certain fish species to be more accessible can be seen in Figure 39. In our sample, the prominent species that consumers wished to be more accessible were shrimp (59%) and sea bass (50%). Furthermore, few consumers thought that catfish (9%), mahi mahi (14%), marlin (8%), shark (7%), and trout (12%) needed to be made more accessible. The following sections will compare the desired accessible species with the interview location and the 5 previously mentioned demographic groups.

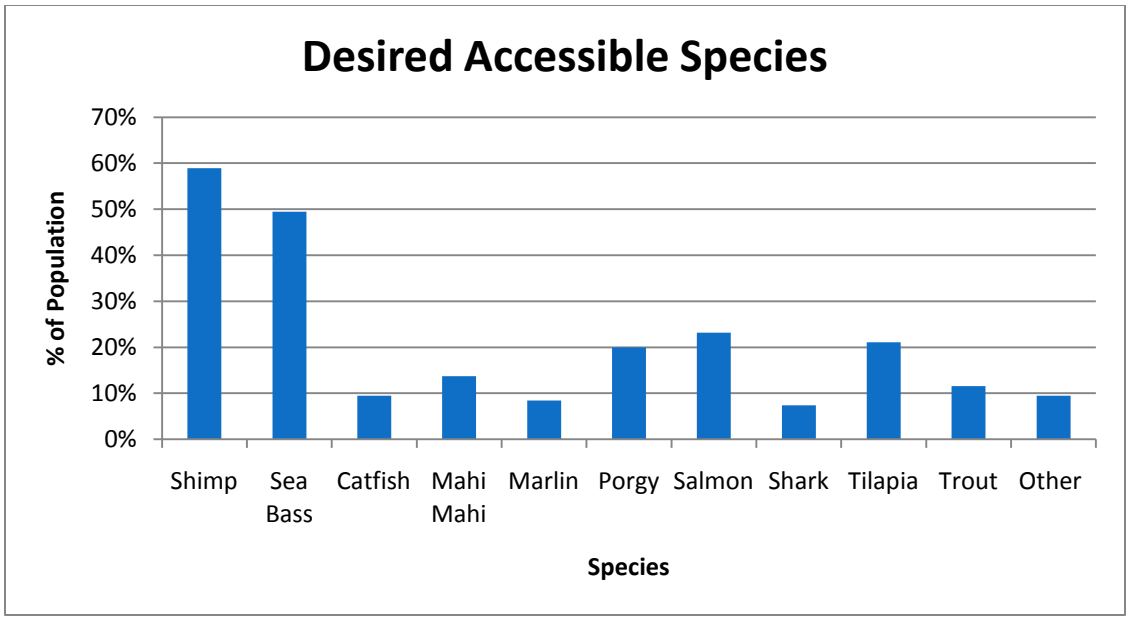


Figure 39 - Distribution of desire for accessibility of species

4.5.5.1 Desire for Accessibility of Species vs. Location of Interview

We compared these data in order to see if the desire for greater accessibility of products differed from location to location. The results can be seen in Figure 40. This comparison yielded a number of noteworthy results. First, a relatively large percentage of consumers who were interviewed in farmers' markets (79%) said they wanted more accessible shrimp whereas a smaller percentage of hypermarket (55%), supermarket (52%), and municipal market (46%) consumers desired shrimp to be more accessible. Also, sea bass and tilapia seemed to be desired by more customers in markets with better organization (e.g. Hypermarkets and supermarkets). Additional findings show that catfish, mahi mahi, and marlin are desired to be more accessible in supermarkets (22%, 26%, and 26% respectively); percentages of consumers desiring these products at the other venues are negligible. Also, 40% of consumers in hypermarkets and 34% of consumers in supermarkets desired more accessible salmon, which was a high percentage compared to municipal market (4%) and farmers' market (21%) consumers.

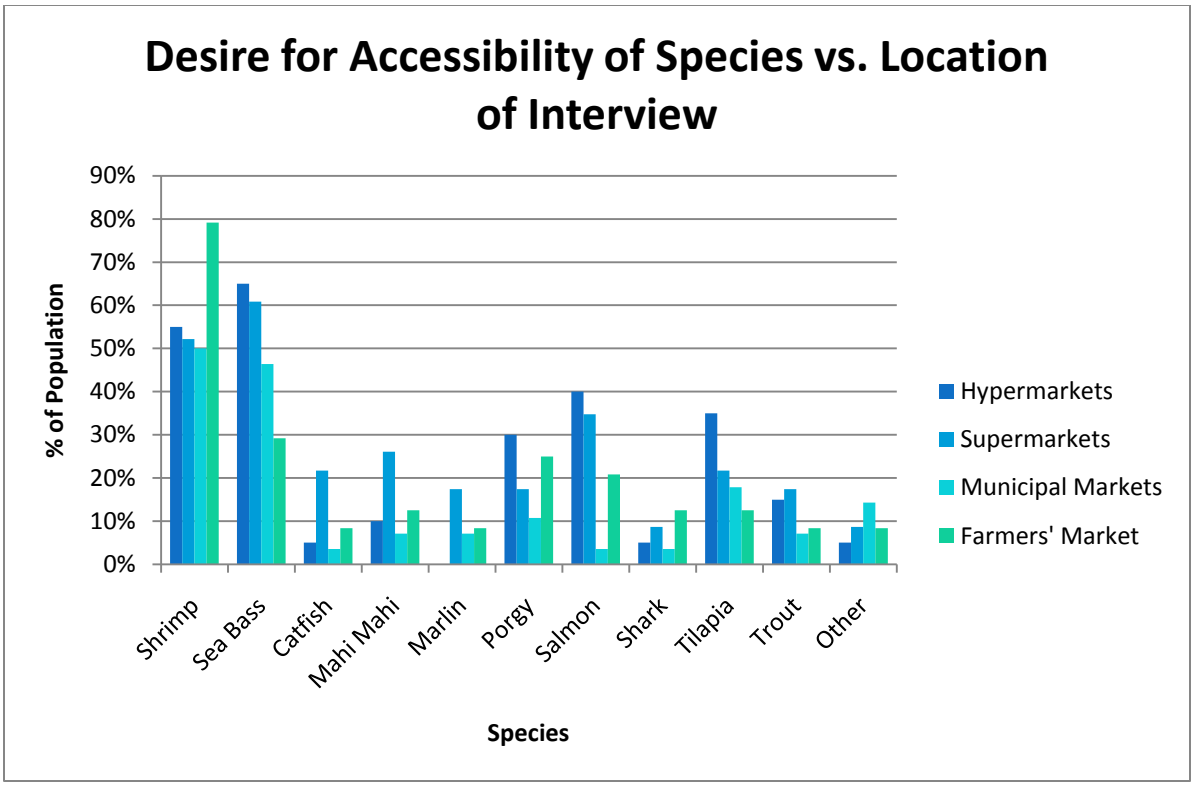


Figure 40 - Desire for accessibility of species vs. location of interview

4.5.5.2 Desire for Accessibility of Species vs. Age

The results of our comparison between desire for greater accessibility of products and age can be seen in Figure 41. We were able to identify two correlations. The first correlation showed us that older consumers were less likely to wish for salmon to be more accessible (-0.18). The second correlation showed us that older consumers were also less likely to wish for more accessible shark (-0.15). Furthermore, we noticed that consumers between the ages of 36 to 65 exhibited a higher demand for accessible shrimp (67%) than consumers below the age of 35 or those above age 66 (45%). In addition, we also discovered that consumers over the age of 51 reported a higher demand for accessible porgy (29%).

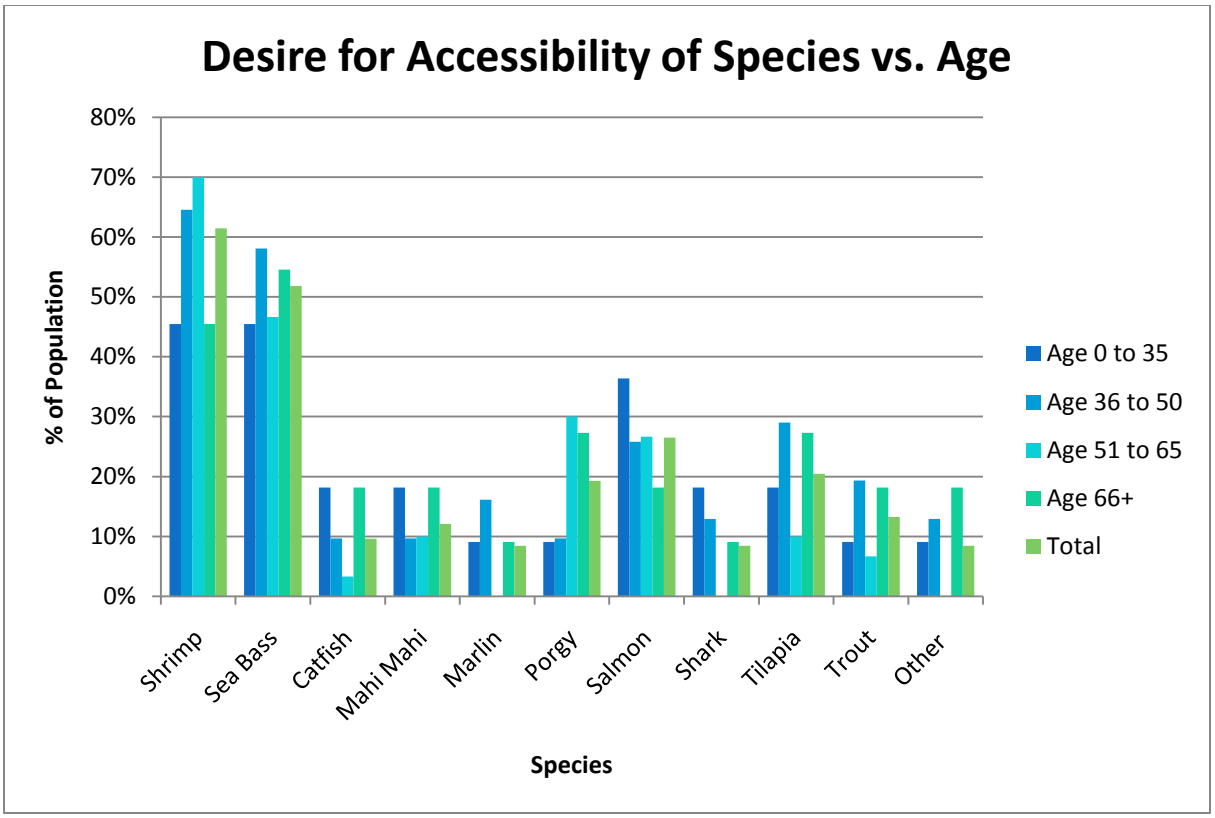


Figure 41 - Desire for accessibility of species vs. age

4.5.5.3 Desire for Accessibility of Species vs. Marital Status

Our next comparison between desire for greater accessibility of products and marital status can be seen in Figure 42. We found trends between marital status and certain species including shrimp, sea bass, and catfish. A higher percentage of consumers with partners (65%) reported a desire for greater accessibility to shrimp whereas single consumers (42%) reported a lesser desire for accessibility to shrimp. Likewise, a higher percentage of consumers with partners (54%) expressed a desire for more accessibility to sea bass, while single consumers expressed less desire for accessibility to sea bass (38%). Additionally, we found that a higher percentage of consumers with partners (12%) desired a greater accessibility to tilapia than single consumers (4%).

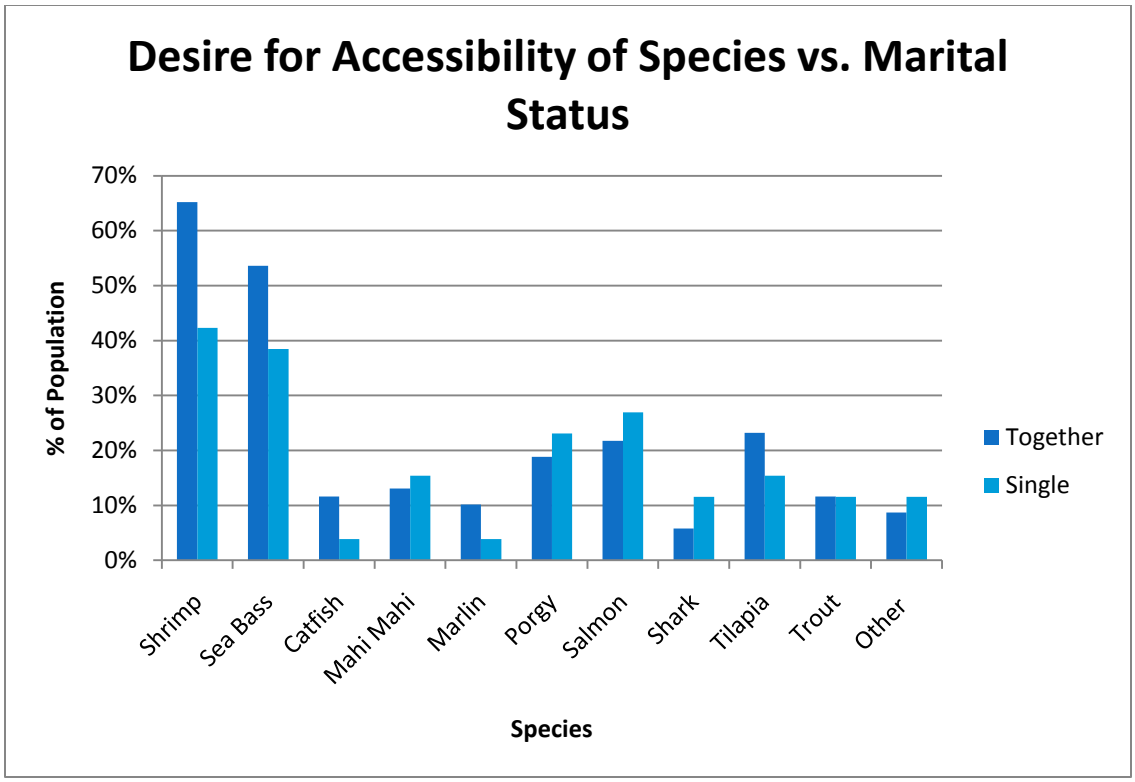


Figure 42 - Desire for accessibility of species vs. marital status

4.5.5.4 Desire for Accessibility of Species vs. Employment Status

Our comparison of desire for greater accessibility of products against employment status can be seen in Figure 43. We noticed that a very small amount of employed consumers (4%) desired catfish to be more accessible whereas unemployed (15%) and pensioned (16%) consumers expressed a greater desire for catfish to be more accessible. Also, a comparatively large percentage of unemployed consumers (30%) wanted more accessibility to porgy while employed (15%) and pensioned (21%) consumers reported a lesser desire for accessible porgy. In addition, a relatively low percentage of unemployed consumers (10%) desired more accessible salmon compared to employed (30%) and pensioned consumers (21%). Finally, a relatively high percentage of pensioned consumers (32%) wanted more accessible tilapia whereas employed (19%) and unemployed (20%) consumers did not express this same level of desire.

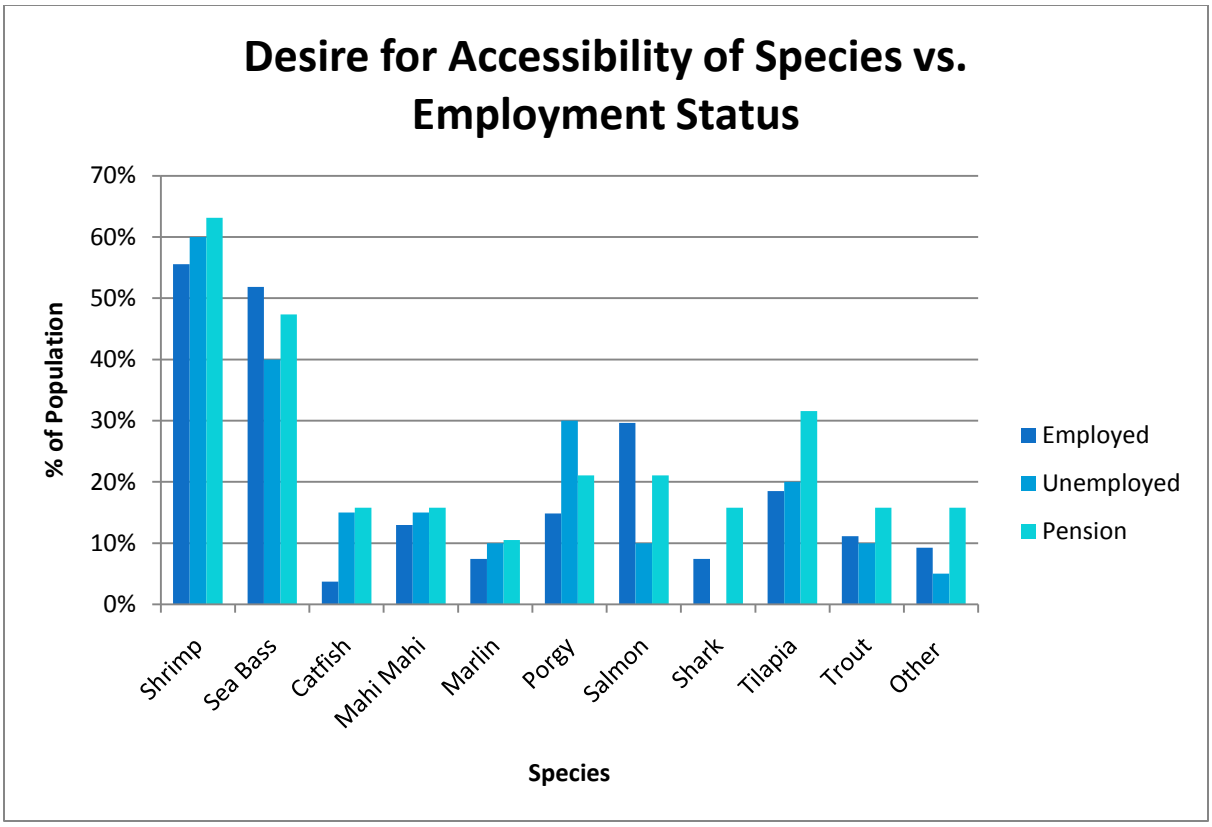


Figure 43 - Desire for accessibility of species vs. employment status

4.5.5.5 Desire for Accessibility of Species vs. Education Level

We also compared consumers' desire for greater accessibility of products against their education level; the results of this comparison can be seen in Figure 44. We discovered that consumers with a higher level of education expressed a greater desire for more accessible salmon (0.25). Additionally we found that consumers' desire for shrimp seemed to increase with their education level, although the correlation was only 0.09. We also noticed that only consumers with an education level above technical school desired trout to be more accessible (25% for technical and 14% for university).

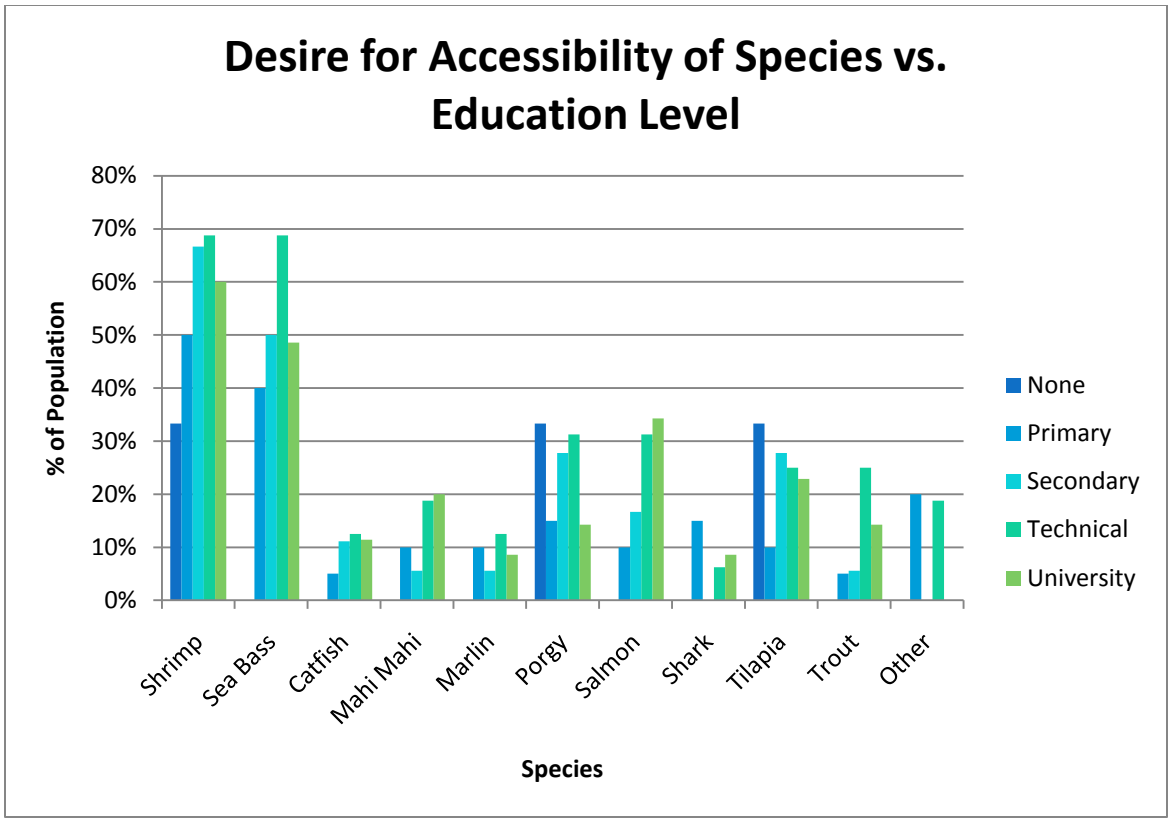


Figure 44 - Desire for accessibility of species vs. education level

4.5.5.6 Desire for Accessibility of Species vs. Gender

We completed a comparison between consumers' desire for greater accessibility of species and gender but found no significant correlations.

4.5.6 Volume of Fish Consumed

In addition to the other categories mentioned above, we surveyed consumers about how much fish they ate per week. Consumers reported eating an average of 1.34 kg per week with a standard deviation of 0.76. Table 9 shows the average volumes and standard deviations for fish consumed by each demographic. We noticed that consumers age 66+ consumed the least amount of fish per week (1 kg/week). In addition, we found that uneducated people consumed the least amount of fish in the education level demographic (0.15). It was interesting to note that employed consumers ate a larger amount of fish (1.45 kg/week) than unemployed (1.25 kg/week) and pensioned consumers (1.08 kg/week).

Volume Consumed (per week) vs. Demographic Groups

		Average	SD
Age Groups	0-35	1.39	0.80
	36-50	1.23	0.79
	51-65	1.46	0.78
	66+	1.00	0.50
Gender	Male	1.49	0.88
	Female	1.28	0.70
Marital Status	Together	1.38	0.74
	Single	1.24	0.81

		Average	SD
Education Level	None	0.50	0.00
	Primary	1.20	0.71
	Secondary	1.47	0.63
	Technical	1.17	0.95
	University	1.41	0.68
Employment	Employed	1.45	0.88
	Unemployed	1.28	0.62
	Pensioned	1.08	0.48

Table 9 - Volume consumed vs. demographic groups

4.5.7 Frequency of Fish Consumption

Our fourth category included surveying consumers about how many times per month they ate fish. Consumers reported eating fish an average of 5.11 times per month with a standard deviation of 2.48. Table 10 shows the average frequency of fish consumption and the standard deviations for each demographic group. We noticed that consumers age 66+ exhibited a very low frequency of fish consumption (3.91 times/month). We also discovered a relationship within the marital status demographic: people who reported having a partner seemed to consume fish more frequently (5.40 times/month) than single people (4.35 times/month). Within the education demographic we noticed a positive correlation between education level and the consumer's fish consumption frequency (0.25). Additionally we found that consumers who were employed consumed fish more frequently (5.51 times/month) than pensioned consumers (4.16 times/month), however this may be due to the fact that pensioned consumers also belong to the 66+ age group.

Frequency of Fish Consumption (per month) vs. Demographic Groups

		Average	SD
Age Groups	0-35	4.91	2.07
	36-50	5.39	2.91
	51-65	5.57	2.49
	66+	3.91	1.70
Gender	Male	5.23	2.85
	Female	5.06	2.35
Marital Status	Together	5.40	2.52
	Single	4.35	2.24

		Average	SD
Education Level	None	3.33	1.15
	Primary	4.30	2.11
	Secondary	5.44	2.55
	Technical	4.33	2.13
	University	5.97	2.71
Employment	Employed	5.51	2.75
	Unemployed	4.85	1.98
	Pensioned	4.16	1.95

Table 10 - Frequency of fish consumption vs. demographic group

4.5.8 Fish Product Expenses

Our final survey topic involved asking consumers about how many colones they spent per week on fish products. Consumers reported spending an average of 5413 colones per week on fish products with a standard deviation of 4065 colones. Table 11 shows the average amounts that consumers from each demographic group spent on fish products in addition to the standard deviations. We discovered that consumers age 66+ reported spending the lowest amount on fish products per week (4255 colones) compared to all other age groups. We also found that males spent slightly more on fish products per week (5865 colones) than women (5239 colones). In addition, consumers who reported having a partner spent a substantial amount more on fish per week (5847 colones) than single people (4413 colones). We found that as the educational level of the consumer increased, so did the amount that the consumer spent on fish each week (0.23). Lastly, we noticed that employed consumers spent the most on fish products per week (5805 colones) than unemployed (5325 colones) and pensioned (4325 colones) consumers.

Fish Products Expenses in Colones (per week) vs. Demographic Groups

		Average	SD
Age Groups	0-35	5,255	3,747
	36-50	5,398	3,819
	51-65	5,238	3,093
	66+	4,255	3,799
Gender	Male	5,865	5,481
	Female	5,239	3,404
Marital Status	Together	5,847	4,230
	Single	4,413	3,530

		Average	SD
Education Level	None	2,167	611
	Primary	4,179	3,117
	Secondary	5,103	2,243
	Technical	5,914	4,329
	University	6,077	4,916
Employment	Employed	5,805	4,613
	Unemployed	5,325	3,120
	Pensioned	4,325	3,488

Table 11 - Product expenses vs. demographic group

Chapter 5: Conclusions and Recommendations

After completing our analysis of the different market areas and sections of the distribution channel, we were able to better assess the current market and outline several conclusions and recommendations for INCOPESCA. Additionally, these conclusions and recommendations will be useful to INCOPESCA when establishing a marketing strategy.

5.1 Producer Conclusions and Recommendations

After studying the data we gathered from trout, tilapia and shrimp farmers, we formed conclusions that applied to all three types of farms. Additionally, there were a few conclusions and recommendations that were specific to different farms.

Overall, our results indicated that producers were not satisfied with the price at which they purchase feed. All of the farmers acknowledged that imported feed was of higher quality and it yielded a better and healthier product. We recommend that INCOPESCA (and other organizations that focus on the betterment of local producers) work towards one of the following: providing local feed of better quality or providing imported feed at a lower cost to producers.

In addition, most of the farmers sold their products in their locally-owned restaurant and were not willing to commercialize their product in cities; this was due to a lack of proper equipment for processing the products and also due to a lack of effective means for conserving freshness and transporting the fish. We recommend that INCOPESCA, perhaps in conjunction with other organizations, investigate means to provide producers with a facility used to get the fish ready for sale and charge the producers a small fee for using the facility. This will help producers commercialize their products in the metropolitan area and save them the expense of purchasing their own equipment. This facility could also serve as a source of employment if people are needed to operate the machinery.

5.1.1 Trout Producer Conclusions and Recommendations

Based on our data, we considered additional conclusions and recommendations specific to trout producers which pertained mostly to the environment and socio-economic aspects.

A major problem that some trout producers encountered concerned the climate at lower elevations. Some producers mentioned that, due to global warming, the temperature of the water in the "tanks" was not cold enough for cultivating trout; this negatively impacts production since warmer water causes diseases in the fish. Our recommendation for trout farmers located in regions

of lower elevations is that they specialize in new types of fish, such as salmon or tilapia, which grow better at higher temperatures and are in high demand in the metropolitan market.

Some trout farmers collaborate with each other to commercialize their product due to the lack of equipment for processing their fish. Nonetheless, they still have to face competition amongst themselves because the farms are located in the same region. A possible solution to this problem could be to use better visual displays or written advertisements to attract the people's attention as they are passing by; these advertisements could include information about the price and presentation of the fish.

Additionally, we recognize that the trout market is suffering in the metropolitan area since only a small percentage of consumers reported eating trout. In order to boost the production and sales of trout we suggest that it be promoted extensively at metropolitan venues. We also recommend (based on consumer demand) that trout producers begin the large-scale cultivation of salmon (a cold water fish) as one way to maximize their sales; this recommendation was based on our market study in which we found that cultivated salmon is currently imported and sold at a high price on the local market.

5.1.2 Tilapia Producer Conclusions and Recommendations

Farm-raised tilapia is the most common aquaculture product sold on the local market. Most of the producers we interviewed talked about a specific socio-economic problem that they encountered in addition to the generalized issues we mentioned above.

During our interviews, the producers spoke at length about the competition between their products and products from larger producers. The larger producers can afford to buy the feed at a much higher price which local producers then have to comply with. The larger producers can also sell their product for a lower price on the national market since they produce such a large volume of tilapia; smaller producers who cannot produce the same volumes lose money since they cannot expect to be competitive selling their product at a higher price. To eliminate the competition between small- and medium-scale producers and larger producers, we recommend that INCOPESCA set up an organization similar to Coonaprosal (the organization which aids shrimp farmers with commercializing their products). Collaboration between producers will help strengthen the market for tilapia on all levels.

5.1.3 Shrimp Producer Conclusions and Recommendations

In addition to our aforementioned general recommendations, we had an additional conclusion and recommendation to address a problem specific to shrimp producers.

We found that shrimp producers sell their product to intermediaries, and the product then moves through several more intermediaries before reaching the final market. This causes the price of the shrimp to be high and also decreases the freshness and quality of the product (Ken Dirst, Personal Communication, November 23, 2010). In order to improve the distribution channel for the commercialization of shrimp, we recommend for INCOPESCA to collaborate more with Coonaprosal and the shrimp producers to devise methods for improving the market, including means for eliminating some of the intermediaries.

5.2 Wholesaler Conclusions and Recommendations

Our analysis of wholesalers as a member of the distribution channel provided a better understanding of the distribution routes and the types of fish sold on the national market.

Out of all the wholesalers we interacted with, only a few stated that they sold imported products. Most of the products sold by wholesalers on the local market were marine products rather than cultivated products. We also discovered that aquaculture products are sold on the market to compensate for a deficiency of marine products.

Our recommendation for wholesalers would be to increase the volume of fish species that are in demand by consumers; this would maximize their sales and satisfy the consumer at the same time.

5.3 Market Manager and Consumer Conclusions and Recommendations

After analyzing our market and consumer findings, we made a few general conclusions about each of the market types. In addition, we made recommendations to each of the four types of markets included in this section with regards to the consumer.

Overall we concluded that markets could use advertisement campaigns to keep current customers and attract additional consumers from different demographic backgrounds. Our consumer demographic results showed information that advertisement campaigns can use for the short term goal of retaining current customers. From our interviews with consumers, we found that the average age of the consumer is 51.5 years old. We also discovered that the majority of consumers

were female. Furthermore, 73% of consumers live with a spouse or partner, 77% of consumers gain income through either employment or pension, and 54% of consumers have attained some level of higher education (technical or university). For the long term, markets should target the demographics of different markets, in order to increase the variety of customers.

We also unveiled that the demand for certain fish species dictated the total amounts of each fish species sold. We recommend that markets continue to commercialize the products they believe are in the highest demand. In order to gain more profits, the products in lower demand should be advertised to exhibit their health benefits and quality of taste, since the consumers expressed these reasons for consuming fish. In these advertisements, the products in lower demand could be compared next to higher demand products in a way that would make the products seem comparable to one another; this would ideally increase their sales. Additionally, for frozen products, the convenience of the product should be advertised. We came to this conclusion since 57% of our consumer sample was employed, therefore they might want a convenient product that can be placed in an oven or microwave at the end of a long day.

Since the market is price-driven, markets can change their prices based on the fish in highest demand using the information we found through our surveys. With this information they may increase the total profits for the sales of each market's fish.

We also recommend that different venues sell different products. We noticed in our results that municipal markets sold large quantities of shark, but hypermarkets and supermarkets did not sell as much. We recommend that the fish in higher demand in the municipal and farmers' markets (shark and sea bass) be sold in a higher volume at the hyper- and supermarkets to increase product variety; similarly, tilapia and catfish should be sold at the municipal and farmers' markets in greater quantities to attract other customers. In order to do this, hyper- and supermarkets as well as municipal and farmers' markets should consider using other wholesaler outlets that supply the other markets. Furthermore, according to the consumer results markets should make shrimp, sea bass, salmon and tilapia more accessible to the consumer. This can be done by buying products in bulk, advertising sales on fish, or diminishing the number of intermediaries for products. In particular, shrimp should be more accessible in farmers' markets; sea bass, salmon, and tilapia should be more accessible in hypermarkets and supermarkets.

5.3.1 Hyper- and Supermarket Conclusions and Recommendations

Based on our observations, we found that hypermarkets and supermarkets displayed evidence of good sanitation. Because their products are not processed and cleaned for the consumer to see, freshness is not as evident as other market types. These markets should focus their advertisements not only on the health benefits of the product but also on the freshness of the product; this should be done to further raise awareness since these issues are important to the consumer.

In the short term, hyper- and supermarkets should advertise to younger consumers with a high education. Furthermore, they should keep advertising the popular aquaculture products, such as tilapia, trout, catfish, and salmon. For the long term, these markets should advertise to older consumers with a lower education and market more marine products.

5.3.2 Municipal Market Conclusions and Recommendations

Municipal markets should focus on the presentation of the fish they sell as well as on the cleanliness and organization of their venue. The addition of small details, such as garnishes or organized presentations of fish (like the supermarket arrangement), would attract more customers of different demographic backgrounds to their stands. They should advertise to their strengths and market their product as fresh.

For short term advertisement, municipal markets should focus on older consumer with a low education to keep their current customers. Additionally, they should keep advertising the marine products they sell. In the future, the municipal markets should switch their advertisements to target younger consumers with a higher education. They should also experiment with selling more aquaculture products to attract other demographics.

5.3.3 Farmers' Market Conclusions and Recommendations

Since many consumers do not shop for fish at farmers' market, our first recommendation for farmers' markets in San José would be to begin advertising their products with fliers. Since many vendors did not wish to advertise, this should only be done if the fliers are affordable. If this is the case, a more prominent sign depicting where the fish is sold may be a worthwhile investment because the markets are popular and busy. Also, as with the municipal market, they should try to arrange their products in an aesthetically pleasing way to attract more customers.

5.4 Final Conclusions and Recommendations

In conclusion, our group accomplished several objectives set by INCOPESCA (described previously) for a complete analysis of the current market in the metropolitan area of San José. The data we collected from several trout, tilapia and shrimp farms helped us identify the distribution routes for the accessibility of these aquaculture products. Appendix G contains a flowchart that depicts the typical channels of distribution for many fish products before they reach the final consumer. We also discovered that intermediaries extend the distribution route for some products (such as shrimp); these intermediate steps cause the price to increase before the product reaches the consumer. Additionally, we surveyed 95 consumers in different market areas to determine whether quality was an important factor influencing the sales of fish products. In general, consumers admitted that their choices when buying fish were more price-driven than quality-driven but they also said that they trusted their preferred venue to offer products of high caliber. Additionally, we saw that almost 50% of the aquaculture products in the market are imported. Although local aquaculture (tilapia and trout) is sold more than imported (catfish and salmon), the imported aquaculture products are cheaper than the local. In order to assess the level of acceptance for different types of products, we questioned several market managers about the demand for different products on sale. Our analysis showed that prices and the type of market consumers shopped at influenced the acceptance level of certain fish products. For instance, sea bass was popular at municipal markets since it was cheaper there. We fulfilled our final objective by interviewing market managers and surveying consumers about current advertisement techniques. We found that hyper- and supermarkets used different forms of advertisements while municipal and farmers' markets relied on word-of-mouth.

We hope that the information in this project, which includes a detailed analysis of our findings, conclusions and recommendations from our study of the Costa Rican metropolitan area, will help INCOPESCA to develop an effective marketing strategy for the sale of aquaculture products. Due to the time constraints placed on our work, we were only able to focus our study on the cities of Alajuela, Heredia and San José as a representation of the entire metropolitan area. We believe that our project provides a very basic foundation for the development of a marketing strategy, and therefore we recommend that INCOPESCA conducts further studies of each of these market populations to obtain more detailed results. We propose that additional studies focus on only

one or two populations (particularly the markets or the consumers), focus on one type of product, or be conducted over a longer time period.

References

Beland, D.K., Buckley, J.H., Miggins, L.M., Warren, A.L. (2010) Good Practices for the Cultivation of Trout in Costa Rica (Report No. E-project 121609-173245). Retrieved from Worcester Polytechnic Institute Electronic Projects Collection: http://www.wpi.edu/Pubs/E-project/Available/E-project-121609-173245

Broders, A.C., Douville, M.T., & Slonski, M.R. (2005) Best Practices for Small to Medium Scale Tilapia Aquaculture (Report No. E-project 071305-115404). Retrieved from Worcester Polytechnic Institute Electronic Projects Collection: http://www.wpi.edu/Pubs/E-project/Available/E-project-071305-115404

Bryand, D.L., Kadilak, A.L., & Pani, S.R. (2006) Good Management Practices for Shrimp Farming in Costa Rica (Report No. E-project-070506-110444). Retrieved from Worcester Polytechnic Institute Electronic Projects Collection: http://www.wpi.edu/Pubs/E-project/Available/E-project-070506-110444

Engle, C. R., & Neira, I. (2003a). Potential for open-air fish market outlets for tilapia in Nicaragua. Aquaculture CRSP Research Report, 03-194.

Engle, C. R., & Neira, I. (2003b). Potential for supermarket outlets for tilapia in Nicaragua. Aquaculture CRSP Research Report, 03-190.

Engle, C. R., & Neira, I. (2003c). Potential for restaurant markets for tilapia in Nicaragua. Aquaculture CRSP Research Report, 03-192.

Engle, C. R., & Quagrainie, K. (2006). Aquaculture marketing handbook. Ames, Iowa: Blackwell Publishing.

Food and Agricultural Organization of the United Nations (FAO). (2010). Retrieved from http://www.fao.org/

Fúnez, O., Neira, I., & Engle, C. (2003). Potential for open-air fish market outlets for tilapia in Honduras. Aquaculture CRSP Research Report, , 03-193.

Hernandez-Rodriguez, A., Alceste-Oliviero, C., Sanchez, R., Jory, D., Vidal, L., & Constain-Franco, L. F. (2000). Aquaculture development trends in latin america and the caribbean. Paper presented at the *Aquaculture in the Third Millennium. Technical Proceedings of the Conference on Aquaculture in the Third Millennium, Bangkok, Thailand,* 20-25. INCOPESCA. (2010). INCOPESCA: Instituto Costarricense de Pesca y Acuicultura. Retrieved 09/20, 2010, from http://www.incopesca.go.cr

Instituto Costarricense de Pesca y Acuicultura INCOPESCA. (2010). Retrieved from http://www.incopesca.go.cr

INEC Instituto Nacional de Estadística y Censos de Costa Rica. (2010). Retrived from http://www.inec.go.cr/Web/Home/pagPrincipal.aspx

Kinnucan, H. W., & Venkateswaran, M. (1990). Effects of generic advertising on perceptions and behavior: The case of catfish. Southern Journal of Agricultural Economics, 22(02)

Kutty M.N. & Pillay T.V., (2005). Aquaculture: Principles and Practices, Oxford, UK: Wiley-Blackwell Publishing

Leyva, C. M., & Engle, C. R. (2008). Optimizing tilapia, oreochromis sp., marketing strategies in Nicaragua: A mixed-integer transshipment model analysis. Journal of the World Aquaculture Society, 39(3), 339-351.

Parkin, M. (2005).The Economic Problem. In D. Clinton & A D'Ambrosio (Eds.), Macroeconomics (pp. 31-50). New York, NY: Pearson; Addison Wesley.

People and the planet. (2006). 2006 Aquaculture key to meeting demand for fish. Retrieved from http://www.peopleandplanet.net/?lid=28378&topic=23&section=35

Ramírez, R. (2007). Mejoramiento de los Mercados Internos de Productos Pesqueros (No. 3111). San José, Costa Rica: INCOPESCA. Retrieved from http://www.incopesca.go.cr/Mercadeo/Varios/MERCADOS%20INTERNOS%20PROYECTO%20FAO.pdf

Glossary of Fish Names

Spanish Name	English Name
Camarón	Shrimp
Corvina (Robalo)	Sea Bass
Panga (Corvineta)	Catfish
Dorado	Mahi Mahi
Marlín	Marlin
Pargo	Porgy
Tiburón (Bolillo)	Shark
Vela	Sail Fish
Tilapia	Tilapia
Chatarra	Scraps
Atún	Tuna
Macarela	Mackerel
Trucha	Trout
Salmon	Salmon

This glossary of terms is for reference for the materials in the following appendices

Appendix A: Market Lists

Appendix A.1: Alajuela Markets

LICENSEE	MARKET	LOCATION
Automercado S.A.	Automercado Alajuela	Alajuela
Corp. Illion Internacional S.A.	Galerion de las ofertas	
Corporacion Supermercados Unidos S.A.	Pali La Parada	
Corporacion Supermercados Unidos S.A.	Mas x Menos Alajuela Tropicana	
Corporacion Supermercados Unidos S.A.	Pali Naranjo	Naranjo
Corporacion Supermercados Unidos S.A.	El LLano-Alajuela	El llano
Corporacion Supermercados Unidos S.A.	Pali Villa Bonita	
Corporacion Supermercados Unidos S.A.	Mas x Menos Aeropuerto	
Corporacion Supermercados Unidos S.A.	Mas x Menos Alajuela Centro	Alajuela Centro
Corporacion Supermercados Unidos S.A.	Pali Pacifico Alajuela	
Corporacion Supermercados Unidos S.A.	Maxi Bodega Alajuela	
Corporacion Supermercados Unidos S.A.	Pali Barrio San Jose-Alajuela	
Corporacion Supermercados Unidos S.A.	Pali Atenas	Atenas
Corporacion Supermercados Unidos S.A.	Pali Tejar Del Guarco	Tejar Del Guarco
Corporacion Supermercados Unidos S.A.	Pali Orotina	Orotina
Corporacion Supermercados Unidos S.A.	Pali San Carlos	San Carlos
Corporacion Supermercados Unidos S.A.	Pali Alajuela Plaza Feria	Plaza feria
Corporacion Supermercados Unidos S.A.	Pali Poas Alajuela	Poas Alajuela
Corporacion Supermercados Unidos S.A.	Pali Sarchi alajuela	Sarchi
Corporacion Supermercados Unidos S.A.	Pali Naranjo	Naranjo
Corporacion Supermercados Unidos S.A.	Pali San Ramon	San Ramon
Corporacion Supermercados Unidos S.A.	Pali Florência San Carlos	San Carlos
Corporacion Supermercados Unidos S.A.	Pali Grecia	Grécia
Corporacion Supermercados Unidos S.A.	Pali Upala	Upala
Corporacion Supermercados Unidos S.A.	Maxi Bodega San Ramon	San Ramon
Corporacion Supermercados Unidos S.A.	Pali Palmar Norte	Palmar Norte
Corporacion Supermercados Unidos S.A.	Pali San Rafael Alajuela	San Rafael
Corporacion Supermercados Unidos S.A.	Pali Desamparados Alajuela	Desamparados
Corporacion Supermercados Unidos S.A.	Pali Ciudad Quesada	Ciudad Quesada
Corporacion Supermercados Unidos S.A.	Pali Pacifico Alajuela	
Corporacion Supermercados Unidos S.A.	Pali El Coyol Alajuela	El Coyol
Corporacion Supermercados Unidos S.A.	Maxi Bodega Grecia	Grécia
Corporacion Supermercados Unidos S.A.	Pali Alajuela	Alajuela
Corporacion Supermercados Unidos S.A.	Pali-La Fortuna	La Fortuna
Corporacion Mega Super	Mega Super San Ramon	San Ramon
Corporacion Mega Super	Mega Super Pital San Carlos	San Carlos
Corporacion Mega Super	Mega Super Alajuela Centro	Alajuela Centro
Corporacion Mega Super	Mega Super Acosta	Acosta
Corporacion Mega Super	Mega Super Perez Zeledon	Perez Zeledon
Corporacion Mega Super	Mega Super Ciudad Quesada	Ciudad Quesada
Corporacion Mega Super	Mega Super Atenas	Atenas
Fabio Marin Rubi	Pescaderia La Tarcoleña	Mercado Central

Fabio Marin Rubi	Pescaderia Pargo Rojo	Mercado Central
Joaquin Rodriguez Cascante	Geminis	Mercado Atenas
John Arroyo Ugalde	Pescaderia El Rey del mar	Alajuela
Juan Felix Alpizar Vargas	Pescaderia Jimenez	Mercado Alajuela
Mariscoa de San Carlos S.A.	Mariscos San Carlos	Mercado San Carlos
Mariscos Zaragoza S.A.	Mariscos Zaragoza	Palmares
Miguel Angel Jimenez Villalta	Pescaderia Jimenez	Mercado Alajuela
Neftali Gdo Briceño Gonzalez	Distribuidora Mariscos	Mercado Alajuela
Otto Calvo Corella	Mariscos Apromar	Mercado Alajuela
Perimercados S.A.	Perimercado San Ramon	San Ramon
Perimercados S.A.	Perimercado Alajuela	Alajuela
Perimercados S.A.	Perimercado Grecia	Grecia
Prismar de Costa Rica S.A.	Pricesmart Alajuela	Alajuela
Rancho Portalon S.A.	Rancho Portalon	Tejar Alajuela
Roberto Batalla Gallegos	Delicias del Mar Pacifico	Coyol Alajuela
Rodrigo Jimenez Acuña	Distribuidor Ebenezer	Naranjo Alajuela
Ronald Fco. Solis Corrales	Delicias del Mar	San Carlos Alajuela

Source: Marketing Department of INCOPESCA

Appendix A.2: Cartago Markets

LICENSEE	MARKET	LOCATION
Corporacion Supermercados Unidos S.A.	Mas x menos Metrocentro	Metrocento
Corporacion Supermercados Unidos S.A.	Pali Los Angeles	Los Angeles
Corporacion Supermercados Unidos S.A.	Pali Três Rios	Tres Rios
Corporacion Supermercados Unidos S.A.	Pali Cartago Centro	Cartago Centro
Corporacion Supermercados Unidos S.A.	Pali Paraiso	Paraíso
Corporacion Supermercados Unidos S.A.	Pali Turrialba	Turrialba
Corporacion Supermercados Unidos S.A.	Pali San Isidro P.Z.	San Isidro Perez Zeledon
Corporacion Supermercados Unidos S.A.	Pali Pitahaya-Cartago	Pitahaya
Corporacion Supermercados Unidos S.A.	Pali Cartago-Linea	
Corporacion Supermercados Unidos S.A.	Pali Taras	Taras
Corporacion Supermercados Unidos S.A.	Pali Santa Lucia Paraiso	Paraiso
Corporacion Supermercados Unidos S.A.	Pali Oreamuno	Oreamuno
Corporacion Supermercados Unidos S.A.	Hipermas Cartago	
Corporacion Supermercados Unidos S.A.	Pali Concepcion Três Rios	Concepcion
Corporacion Megasuper	Mega Super Cartago P.I.	
Corporacion Megasuper	Mega Super Mall Paraiso	Paraíso de Cartago
Corporacion Mega Super	Mega Super Cartago Centro	Cartago Centro
Corporacion Mega Super	Mega Super Turrialba	Turrialba
Corporacion Mega Super	Mega Super Tierra Blanca	Tierra Blanca
Corporacion Mega Super	Mega Super Tejar El Guarco	El Guarco
Corporacion Mega Super	Mega Super Cot. Oreamuno	Oreamuno
Corporacion Mega Super	Mega Super Paraiso Centro	Paraiso
Corporacion Mega Super	Mega Super Tres equis	Turrialba
Corporacion Mega Super	Mega Super Tres Rios Autop.	
Dagoberto Camacho Gomez	Delicias del Mar	San Blas Cartago
Edwin Chan Figueroa	Pescaderia Super Mar	Mercado Cartago
Gilberto Vargas Ramirez	Pescaderia Vargas	Mercado Cartago
Grupo Empresarial de Supermerc.	Supercompro Bogaro	Turrialba
Jose Arturo Sanchez Solano	Marisqueria El Caracol	Mercado Cartago
Juan Tenorio Bustos	Pescaderia Altamar	Mercado Cartago
Olman Chan Figueroa	Pescaderia El Pacifico	Mercado Cartago
Oscar Gmo Calvo Sanchez	Pescaderia El Piolin	Mercado Cartago
Perimercados S.A.	Perimercado Terramall	Terramall
Virginia Cabalceta Gomez	Marisqueria Linda Vista	Rio Azul La Union
William Guevara Ramirez	El Mundo del Sabor	Paraiso
Willy Rojas Quiros	Faro del Norte	Mercado Cartago

Source: Marketing Department of INCOPESCA

Appendix A.3: Heredia Markets

LICENSEE	MARKET	LOCATION
Alcides Quiros Quiros	Pescaderia San Isidro	San Isidro
Automercado S.A.	Automercado Heredia	
Bernardo Valerio Oviedo	Pescaderia Berny	Santa Barbara
Corp. Illion Internacional S.A.	Galerion de las ofertas	Lagunilla
Corporacion Supermercados Unidos S.A.	Mas x menos Heredia	
Corporacion Supermercados Unidos S.A.	Pali-Heredia	
Corporacion Supermercados Unidos S.A.	Pali San Blas	San Blas
Corporacion Supermercados Unidos S.A.	Pali Belen	Belen
Corporacion Supermercados Unidos S.A.	Pali Barva	Barva
Corporacion Supermercados Unidos S.A.	Mas x menos San Pablo	San Pablo
Corporacion Supermercados Unidos S.A.	Pali Aurora heredia	Aurora
Corporacion Supermercados Unidos S.A.	Hipermas Heredia	
Corporacion Supermercados Unidos S.A.	Pali San Joaquin de Flores	San Joaquin de Flores
Corporacion Supermercados Unidos S.A.	Pali Unicentro	
Corporacion Supermercados Unidos S.A.	Pali Santo Domingo	Santo Domingo
Corporacion Supermercados Unidos S.A.	Pali Los Lagos-Heredia	Los Lagos
Corporacion Supermercados Unidos S.A.	Pali Santa Barbara	Santa Barbara
Corporacion Supermercados Unidos S.A.	Mas x Menos Paseo lãs Flores	Paseo Lãs Flores
Corporacion Supermercados Unidos S.A.	Pali San Rafael Heredia	San Rafael
Corporacion Supermercados Unidos S.A.	Pali San Isidro Heredia	San Isidro
Corporacion Supermercados Unidos S.A.	Mas x menos Santo Domingo	Santo Domingo
Corporacion Supermercados Unidos S.A.	Pali San Pablo	San Pablo
Corporacion Megasuper	Mega Super Real Cariari	Mall Real Cariari
Corporacion Megasuper	Mega Super San Joaquin Flores	San Joaquin Flores
Corporacion Megasuper	Mega Super La Valencia	La Valencia
Corporacion Mega Super	Mega Super San Pablo L:C.	San Pablo
Corporacion Mega Super	Mega Super Heredia Centro	Heredia Centro
Corporacion Mega Super	Mega Super San Rafael Heredia	San Rafael
Corporacion Mega Super	Mega Super La Ribera	La Ribera
Corporacion Mega Super	Mega Super San Isidro Heredia	San Isidro
Corporacion Mega Super	Mega Super Barva	Barva
Jose Angel Guerrero Chavarria	Pescaderia Marlin	Belen
Juan de Dios Garcia Alfaro	Pescaderia La Sirena	Mercado Heredia
Luis Amado Ugalde Barrantes	La Estrella del Mar	Mercado Heredia
Luis Armado Ugalde Barrantes	Pescaderia La Unica	Mercado Heredia
Luis Enrique Rodriguez Zuñiga	Super La Perla	San Pablo Heredia
Manuel Harley Vargas	Pescaderia Ambos Mares	Mercado Heredia
Oscar Antonio Niño Marin	Pescaderia El Pulpo	Mercado Heredia
Perimercados S.A.	Perimercado Belen	Belen
Prismar de Costa Rica S.A.	Pricesmart Heredia	
Rolando Borbon Madrigal	Pescaderia El Golfo	Heredia Centro
Victor Henry Anson	Pescaderia Rio Mar	San Isidro

Source: Marketing Department of INCOPESCA

Appendix A.4: San José Markets

LICENSEE	MARKET	LOCATION
Abraham Salazar Blandon	Pesc. Marisc. Mar y Sombra	Guadalupe
Ananias Mena Perez	Delicias del Mar	Puriscal
Automercado del Oeste S.A.	Automercado del Oeste	Santa Ana
Automercado del Oeste S.A.	Automercado Escazu	Escazu
Automercado El Limite S.A.	Automercado Moravia	Moravia
Automercado El Limite S.A.	Automercado Centro	
Automercado Multiplaza S.A.	Automercado Multiplaza	
Automercado S.A.	Automercado Escazu	Escazu
Automercado S.A.	Automercado Plaza del Sol	
Automercado S.A,	Automercado Plaza Mayor	
Automercado S.A.	Automercado Los Yoses	
Carlos Enrique Espinoza Brito	Pescaderia La Familiar	Guadalupe
Carlos Luis Jimenez Castro	Pescaderia Elias	Av.2, C.6y8
Carlos Luis Serrano Mena	Pescaderia La Barca	Mercado Borbon
Carlos Manuel Madrigal Rojas	Pescaderia Rojas	Paseo Estudiantes
Cecilia Peralta Cubillo	Pescaderia El Sabalo	Mercado Central
Cia Pesq. Hermanos Rojas S.A.	Pescaderia Marea Baja	Paseo Estudiantes
Comercializ. Prod. Marinos S.A.	Pescaderia Pexgo	Desamparados
Coproma S.A.	Pescaderia Coproma	La Uruca
Corp. Illion Internacional S.A.	Galeron de las Ofertas	Pavas
Corp. Illion Internacional S.A.	Carniceria La Paz	Parque La Paz
Corp. Illion Internacional S.A.	Carniceria Desamparados	Desamparados
Corporacion Supermercados Unidos S.A.	Mas x menos Escazu	Escazu
Corporacion Supermercados Unidos S.A.	Mas x menos Guadalupe	Guadalupe
Corporacion Supermercados Unidos S.A.	Mas x menos La Granja	
Corporacion Supermercados Unidos S.A.	Mas x menos San Gerardo	
Corporacion Supermercados Unidos S.A.	Mas x menos Hatillo	
Corporacion Supermercados Unidos S.A.	Mas x menos Sabanilla	
Corporacion Supermercados Unidos S.A.	Mas x menos Coronado	
Corporacion Supermercados Unidos S.A.	Mas x menos Sabana	
Corporacion Supermercados Unidos S.A.	Mas x menos Plaza America	
Corporacion Supermercados Unidos S.A.	Pali Alajuelita	
Corporacion Supermercados Unidos S.A.	Pali Escazu	Escazu
Corporacion Supermercados Unidos S.A.	Pali Estudiantes	
Corporacion Supermercados Unidos S.A.	Mas x menos Tibas	Tibas
Corporacion Supermercados Unidos S.A.	Pali Lourdes	Montes de Oca
Corporacion Supermercados Unidos S.A.	Pali Calle Blancos	
Corporacion Supermercados Unidos S.A.	Pali Tibas	Tibas
Corporacion Supermercados Unidos S.A.	Pali Colima- Tibas	Tibas
Corporacion Supermercados Unidos S.A.	Pali Ipis	
Corporacion Supermercados Unidos S.A.	Pali Curridabat	
Corporacion Supermercados Unidos S.A.	Pali La Verbena-Hatillo	Hatillo
Corporacion Supermercados Unidos S.A.	Pali San Sebastian	
Corporacion Supermercados Unidos S.A.	Pali Sauces	

Corporacion Supermercados Unidos S.A.	Pali Aserri Abajo	
Corporacion Supermercados Unidos S.A.	Pali San Miguel Desamparados	Desamparados
Corporacion Supermercados Unidos S.A.	Pali Fatima	Desamparados
Corporacion Supermercados Unidos S.A.	Pali Guadalupe	Guadalupe
Corporacion Supermercados Unidos S.A.	Hipermas San Sebastian	San Sebastian
Corporacion Supermercados Unidos S.A.	Mas x Menos Cuesta Moras	Cuesta Moras
Corporacion Supermercados Unidos S.A.	Pali Santa Aana	Santa Ana
Corporacion Supermercados Unidos S.A.	Pali Desmaparados Centro	Desamparados Centro
Corporacion Supermercados Unidos S.A.	Pali Pavas San Jose	
Corporacion Supermercados Unidos S.A.	Mas x Menos Desamparados	Desamparados
Corporacion Supermercados Unidos S.A.	Pali San Rafael Abajo	San Rafael Abajo
Corporacion Supermercados Unidos S.A.	Maxi Bodega El Cruce	Desamparados
Corporacion Supermercados Unidos S.A.	Pali El Alto Guadalupe	Guadalupe
Corporacion Supermercados Unidos S.A.	Pali Desamparados	Desamparados
Corporacion Supermercados Unidos S.A.	Pali Coronado	Coronado
Corporacion Supermercados Unidos S.A.	Hipermas Curridabat	
Corporacion Supermercados Unidos S.A.	Pali Tibas-El Parque	
Corporacion Supermercados Unidos S.A.	Pali Rohmoser	
Corporacion Supermercados Unidos S.A.	Pali San Felipe Alajuelita	Alajuelita
Corporacion Supermercados Unidos S.A.	Pali Concepcion	Alajuelita
Corporacion Supermercados Unidos S.A.	Hipermas Escazu	
Corporacion Supermercados Unidos S.A.	Pali Paseo Colon	Paseo Colon
Corporacion Supermercados Unidos S.A.	Pali Lomas Pavas	Pavas
Corporacion Supermercados Unidos S.A.	Mas x Menos Rohmoser	Rohmoser
Corporacion Supermercados Unidos S.A.	Hipermas Guadalupe	Guadalupe
Corporacion Supermercados Unidos S.A.	Pali Aserri Arriba	Aserri
Corporacion Supermercados Unidos S.A.	Pali Tirrases	
Corporacion Supermercados Unidos S.A.	Pali Puriscal	Puriscal
Corporacion Supermercados Unidos S.A.	Pali Ciudad Colon	Ciudad Colon
Corporacion Supermercados Unidos S.A.	Mas x Menos Santa Ana	Santa Ana
Corporacion Supermercados Unidos S.A.	Pali San Rafael M. de Oca	Montes de Oca
Corporacion Supermercados Unidos S.A.	Pali Cinco Esquinas Tibas	Tibas
Corporacion Supermercados Unidos S.A.	Pali Piedades Santa Ana	
Corporacion Supermercados Unidos S.A.	Pali San Francisco dos rios	San Francisco de Dos Rios
Corporacion Mega Super	Mega Super Barrio San Jose	
Corporacion Mega Super	Mega Super Desamparados	Desamparados
Corporacion Mega Super	Mega Super La Paz	Parque la Paz
Corporacion Mega Super	Mega Super La Uruca	La Uruca
Corporacion Mega Super	Mega Super San Juan Dios	
Corporacion Mega Super	Mega Super San Francisco	
Corporacion Mega Super	Mega Super San Antonio	Desamparados
Corporacion Mega Super	Mega Super Hatillo	Hatillo
Corporacion Mega Super	Mega Super Alajuelita	Alajuelita
Corporacion Mega Super	Mega Super Coronado	Coronado
Corporacion Mega Super	Mega Super Frailes	
Corporacion Mega Super	Mega Super Guadalupe	

Corporacion Mega Super	Mega Super Sabanilla	
Corporacion Mega Super	Mega Super San Rafael Abajo	
Corporacion Mega Super	Mega Super Santa Ana	Santa Ana
Corporacion Mega Super	Mega Super Moravia	Moravia
Corporacion Mega Super	Mega Super San Jose Borbon	
Corporacion Mega Super	Mega Super San rafael Abajo	
Corporacion Mega Super	Mega Super Cuatro Reinas	Tibas
Distribuidora El Dorado S.A.	Pescaderia La Corvina	Mercado Central
Distribuidora El Dorado S.A.	Pescaderia El Bagre	Mercado carnes
Distribuidora Mariscos Altamar	Dist. Mariscos Alta Mar	Guadalupe
Dulce maria Chaves Herrera	Pescaderia La despensa	Mercado Carnes
Edwin Acuña Rodriguez	Pescaderia El Mercado	Mercado Coca Cola
Evelio Quesada Godinez	Pesc. Y marisq Rojas	Plaza Viquez
Franklin Hernandez Morales	Tramo El Principe	
Franmar S.A.	Pescaderia Mar de Plata	Mercado Borbon
Gerardo Oviedo Fernandez	Almacen America	
Gerardo Rodriguez Arrieta	Cabo Velas	San Antonio Coronado
Javier Fco. Gutierrez Alvarez	La Rosa del mar S.A.	Mercado Carnes
Jose Alberto Arce Arce	Pesc. Marisq. Reina del Sur	Paseo Estudiantes
Jose Antonio Gutierrez Quesada	Pescaderia El Rey	Mercado Central
Jose Eduardo Hernandez Montoya	Mini Super La Cañada	
Jose Eduardi Hernandez Montoya	Pejibayera Las Delicias	
Jose Francisco Gutierrez Acuña	Pescaderia El Caracol	Mercado Central
Jose Ramon Hernandez Montoya	Pañalera Alejandra	
Jose urbano Quesada Godinez	Pescaderia Lepanto Nª1	Aserri San Jose
Jose Urbano Quesada Godinez	Pescaderia Lepanto Nª2	Aserri
Laura Rojas Salazar	Pescaderia Costa Rica	Mercado Central
Limber Espinoza Garcia	Pescaderia Faro del Norte	Mercado Central
Lourdes Espinoza Garcia	Pescaderia La Macarela	Desamparados
Luis Angel Hernandez Montoya	Tramo El Principe	
Marco Antonio Morales Vargas	Pesc. Mar del Plata	Mercado Borbon
Maria Irza Loria Velasques	Fruteria El Gato	
Mario Bonilla Padilla	Pescaderia San Rafael	Mercado Borbon
Maritza Gutierrez Leiva	Pescaderia El Dolfin	Mercado Central
Mayela Rogers Barboza	Pescaderia La Sabana	Mercado Mayoreo
Olman Chan Figueroa	Pescaderia Dos Mares	Mercado Central
Pedro Picado Rodriguez	Pescaderia Moravia	Moravia Centro
Perimercados S.A.	Perimercado Anonos	
Perimercados S.A.	Perimercado Guadalupe	Guadalupe
Perimercados S.A.	Perimercado Pavas	Pavas
Perimercados S.A.	Perimercado Curridabat	Curridabat
Perimercados S.A.	Perimercado del Sur	
Perimercados S.A.	Perimercado Carritos	
Perimercados S.A.	Perimercado Desamparados	Desamparados
Perimercados S.A.	Perimercado Tibas	Tibas
Perimercados S.A.	Perimercado Jumbo Moravia	Moravia

Perimercados S.A.	Perimercado Gran Via	
Perimercados S.A.	Perimercado Coronado	Coronado
Perimercados S.A.	Perimercado Montelimar	
Perimercados S.A.	Perimercado Plaza Pavas	Pavas
Perimercados S.A.	Perimercado Paso Ancho	Paso Ancho
Perimercados S.A.	Perimercado Vargas Araya	
Perimercados S.A.	Perimercado Tibas Centro	Tibas
Pescaderia El Dorado S.A.	Pescaderia El Dorado	Mercado Central
Pescaderia El Dorado S.a.	Pescaderia El Dorado	Mercado central
Pescaderia oceano S.a.	Pescaderia Oceano	Desamparados
Pescaderia oceano S.a.	Pescaderia Oceano	Barrio Cordoba
Pescaderia Oceano S:a:	Pescaderia Oceano	Vargas Araya
Pescaderia Puntarenas S.A.	Pesc. Puntarenas San Jose	San Jose
Pescaderia Puntarenas S.A.	Pesc. Puntarenas Guadalupe	Guadalupe
Pescaderia Puntarenas S.A.	Pesc. Puntarenas Los Yoses	Los Yoses
Prismar de Costa Rica S.A.	Pricesmart Curridabat	Curridabat
Prismar de Costa Rica S.A.	Pricesmart Escazu	Escazu
Prismar de Costa Rica S.A.	Pricesmart Llorente Tibas	Llorente Tibas
Roberto Rojas Naranjo	Pescaderia Marea Baja	c.9 av 9-11
Rodolfo Acuña Aguero	Pescaderia Moravia	Moravia
Rodrigo A. Alvarado Naranjo	Pescaderia El Principe	Mercado Borbon
Ronald Agüero Morales	Pescaderia Costa Azul	Puriscal
Victor Manuel Chaves Arrieta	Pescaderia Oriental	C.8 Av.1-3
Victorino Bastos Chaves	Pescaderia Galapagos	Mercado Central
Yerlene Betrano Valverde	Almacen Avenida	

Source: Marketing Department of INCOPESCA

Appendix A.5: List of Wholesalers

INSTITUTO COSTARRICENSE DE PESCA Y ACUACULTURA
DEPARTAMENTO DE MERCADEO
LISTADO DE COMERCIALIZADORES DE PESCADO Y MARISCOS
CENTRO NACIONAL DE ABASTECIMIENTO Y DISTRIBUCION DE ALIMENTOS
(CENADA)

NOMBRE	TELEFONO	FAX	CELULAR	PRODUCTOS
Alpizar Gutiérrez Hugo	2237-3571	----------	8394-1267	Bolillo, Vela, Calamar
Alvarado Alpizar José Manuel	2678-8057		8366-3396 o 8821-5640	Pescado y Camarón
Alvarado Delgado Orlando	2661-0709		8392-3834	Camarón
Álvarez Sánchez Henry	2661-0463	2661-0984	8823-2414	Mariscos
Aragón Alfaro Gerardo	2663-5596		8385-9214	Mariscos
Araya Castillo Marvin (Almar S.A.)	2293-5849	2293-5836	8381-2461	Bolillo, Pescado, Camarón
Barquero Rodríguez Rafael			8383-9928	Pescado
Carmiol León	2441-4518		8384-9912	Pescado y Mariscos
Castillo Martínez Carlos Luis	2231-5251		8814-8961	Pescado
Chavarría Arias Gilbert	2661-1632			Mariscos
Cipamar	2663-1656		8827-2938	Pescado, Camarón
Comercializadora de Mariscos y Pescados (Catalina Aguilar)	2239-4852			Pescado y Mariscos
Distribuidora de Mariscos Multimar (Mauricio Fernández)	2239-2591	2293-2570	83915747	Pescado y Mariscos
Espinoza Bonilla José Luis	2661-3136	2663-2323	8381-3954	Pescado
García Santamaría Gilbert	2271-4922			Camarón
González Rivera Johel (Mariscos Kinei Maru S.R.L.)	2663-0792		8847-8706	Pescado y Camarón
González Hernández Gilberto	2661-0386		8386-4248	Bolillo
Gutiérrez Jiménez Franklin	2244-2919		8376-7502	Pescado, Camarón
Hernández Rojas Carlos A.			8362-2499	Mariscos
Herrera Ortega Luis Gerardo			8382-6033	Pescado, Corvina, Camarón Blanco
Inversiones Palma Real (William Sancho)	2239-4263		8381-0923	Pescado y Mariscos
Jiménez Rojas Jaime			8867-4096	Mariscos
López Pérez Fernando	2255-3834			Pez Vela
Madrigal Vargas Edwin	2661-3718		8380-1720	Pescado-Filete
Mairena Juan Carlos			8382-2561	Camarón
Marín Rodríguez Raúl			8382-8480	Camarón
Marín Rodríguez Vesalio	2663-2482		8383-5626	Camarón
Mariscos Alan Castro	2679-1009 2679-1011		8382-3020 8393-9210	Pez Vela, Pulpo Pescado
Mariscos Ensenada (Danilo Barquero Vargas)	2293-1918		8833-7691	Mariscos
Mariscos Franju S.A. (Mauricio González Gutiérrez)	2661-3007 2661-2006		8381-1331	Bolillo, Vela
Marveliz Arrieta Virginia	2661-3008			Pescado
Miranda Guevara Jorge	2275-7007			Mariscos
Mora García Rafael	2661-1959			Camarón
Mora Mena Elizabeth	2237-3571		8394-1267	Bolillo, Vela, Calamar
Navarro Rivera Olberth-			8392-5366	Pescado

Valverde C. Olger				
Núñez Cerdas Ángel Emel (Pulpo Mar)	2661-4745		8350-9952 8391-7957	Mariscos
Ortiz Hizaba Ali	2678-0234			Pescado, Corvina, Camarón Blanco
Picado Lizano Oscar		22397022	8391-7222	Pescado, Camarón
Rodríguez A. Gerardo (Pescadería Cabo Velas S.A.)	2229-3466		8365-3306	Mariscos
Rodríguez Arrieta Rafael A.	2443-4270			Mariscos
Rodríguez Torres Roberto	2661-1379			Pescado
Rodríguez Sánchez Jorge	2663-2578		8380-9187	Tiburón, Pescado, Camarón
Romero Quesada Henry	2777-1428	2777-1428	8393-4237	Pescado
Ruiz Maroto Oscar	2663-1130		8382-6082	Bolillo, Pescado, Camarón
Sánchez Cascante Gerardo (Mariscos Perlita)	2221-8126		8812-8081 8856-3234	Mariscos
Ugalde Castillo Álvaro	2661-2152		8387-4754	Bolillo, Vela, Pescado
Vindel Sirias Harry	2664-1487			Pescado y Mariscos
Willen Vis Michel	2663-9442			Tiburón

Appendix B: Interviews and Surveys

Appendix B.1.a: Questionnaire for Producers of Aquaculture Products

1) Name of interviewee:_____

2) What type of fish do you cultivate?
___Tilapia
___Trout
___Shrimp
___Other; specify_____

For questions 3 to 8, answer with respect to the fish you cultivate the most (from question 2).

3) Where do you sell your product?
___ Supermarkets
___ Fish markets
___ Restaurants
___ Wholesalers
___ Open air markets
___ Other; specify_____

4) Indicate the amount (in kg) of this product that you sell at the respective locations:

_____kg: Supermarkets _____kg: Fish markets

_____kg: Restaurants _____kg: Wholesalers

_____kg: Open air markets _____kg: Other; specify_____

5) Indicate the price per kilogram that you sell this product for at the respective locations:

_____: Supermarkets _____: Fish markets

_____: Restaurants _____: Wholesalers

_____: Open air markets _____: Other; specify_____

6) Do you practice techniques to preserve the freshness of your products?
___Yes ___No

7) Where are the fish stored?
____ Freezer ____ Cooling unit ____ Ice Storage

8) How is the fish sold?
___ Frozen
___ Dried
___ Fresh

___ Smoked
___ Cleaned
___ Other; specify_____

9) What are the major problems you encounter with the marketing of this product?

_____

_____

10) Do you consider the demand that this product incurs satisfactory?
___Yes ___No

Why? _____

For questions 9 to11, answer with respect to the current practices of your facility.

11) Have you received education on good fish farming practices within the last year?
___Yes ___No

12) If you response was positive for question 9, where did you receive your education?

_____

13) Have you been following good fish farming practices?
___Yes ___No

14) Would you be willing to cultivate other types of fish based on consumer demands?
___Yes ___No

15) Level of education of interviewee:
___Primary ___Secondary
___Bachelor's or Technical Degree ___University studies
___Other studies

16) Gender: ___M ___F

17) Age:_____

Appendix B.1.b: Cuestionario para Productores de Productos de Acuicultura

1) Nombre del entrevistado: _____

2) ¿Qué especies de pescado cultiva?
   _____ Tilapia
   _____ Trucha
   _____ Camarón
   _____ Otro: especifica: _____

Para las preguntas 3 a 8, responde con respeto al pescado más cultivado de pregunta 2.

3) ¿Dónde vende el pescado cultivado?
   ___ Supermercados
   ___ Pescaderías
   ___ Restaurantes
   ___ Comerciantes Mayorista
   ___ Tianguis
   ___ Otro, especifique _____

4) Indique el volumen que comercializa semanalmente de este producto a los lugares respectivos (en kg).

   _____kg: Supermercados _____kg: Pescaderías

   _____kg: Restaurantes _____kg: Comerciantes Mayorista

   _____kg: Mercados al Aire Libre _____kg: Otro, especifique _____

5) Indique el precio de venta por kilogramo a los lugares respectivos (en colones/kg).

   _____: Supermercados _____: Pescaderías

   _____: Restaurantes _____: Comerciantes Mayorista

   _____: Mercados al Aire Libre _____: Otro, especifique _____

6) ¿Practican técnicas para conservar la frescura?
   ___Si ___No

7) ¿Con que tipo de instalaciones cuenta para la preservación del producto?
   _____ Frigoríficos _____ Cámaras de frio _____ Conservación con hielo

8) ¿Cuál es la presentación con la que comercializa este producto?
   ___ Congelado
   ___ Seco
   ___ Fresco

___ Ahumado
___ Limpio
___ Otro, especifique _____

9) ¿Cuáles son los principales problemas a los que se enfrenta al comercializar este producto?

_____

_____

10) ¿Considera que la demanda que tiene el producto se encuentra satisfecha?
___ Si ___No

¿Por qué? _____

Para las preguntas 9 a 11 responde con respeto a las prácticas actuales de su complejo

11) ¿Ha recibido capacitación en buenas prácticas del cultivo de peces en el último año?
____Si ____ No

12) Si la respuesta fue positiva para pregunta 9, ¿dónde recibió la capacitación?

_____

13) ¿Ha estado siguiendo las buenas prácticas?
____Si ____No

14) ¿Estaría usted dispuesto a cultivar otros tipos de pescado basado en las demandas de los consumidores?
____Si ____No

15) Escolaridad del encuestado
____ Primaria ____ Secundaria
____ Bachillerato o técnica ____ Estudios Universitarios
____ Otros estudios

16) Sexo: ___M ___F

17) Edad:_____

Appendix B.2.a: Questionnaire for Wholesalers and Exporters

1) Name of the interviewee:_____

2) Name of the organization or company that you represent:

_____

3) Job Title:_____

4) Total volume of aquaculture products and other fish products that you sell (kg):

Weekly Monthly

_____ _____

5) Types of local aquaculture or marine products that you sell?

	Average volume in kg. Weekly	Monthly
Aquaculture Products		
Tilapia	_____	_____
Shrimp	_____	_____
Trout	_____	_____
Other	_____	_____
Marine Products (fish and crustaceans)		
Sea bass	_____	_____
Mahi mahi	_____	_____
Porgy	_____	_____
Shark	_____	_____
Marlin	_____	_____
Other	_____	_____

6) Types of foreign aquaculture or marine products that you sell?

	Average volume in kg. Weekly	Monthly
Aquaculture Products		
Catfish	_____	_____
Trout	_____	_____
Salmon	_____	_____
Shrimp	_____	_____
Other	_____	_____

Marine Products (fish and crustaceans)

Sea bass	_____	_____
Shark	_____	_____
Salmon	_____	_____
Other	_____	_____

7) On what scale do you sell these products?
___For exportation
___Large-scale wholesale
___Medium-scale wholesale
___Small-scale retail

8) What area of the market do you cover with the sales of this product?
___International
___National
___Regional
___Local

9) Where do you sell your products?

___Other countries:_____

___Supermarkets:_____
_____

___Fish markets:_____

___Other:_____
_____

10) What is the price of your product per kg?

Local Aquaculture Products

Tilapia	_____
Shrimp	_____
Trout	_____

Local Marine Products (fish and crustaceans)

Sea bass	_____
Mahi mahi	_____
Porgy	_____
Shark	_____
Marlin	_____

Foreign Aquaculture Products

Catfish	_____
Trout	_____
Salmon	_____
Shrimp	_____

Foreign Marine Products (fish and crustaceans)

Sea bass	_____
Shark	_____
Salmon	_____

Appendix B.2.b: Cuestionario para los Comerciantes Mayoristas

1) Nombre del entrevistado:_____

2) Nombre de la organización o empresa que representa:

_____

3) Puesto que desempeña:_____

4) Volumen total de productos acuícolas y pesqueros comercializados (kg):

Semanal Mensual

_____ _____

5) Tipos de productos que comercializa de producción o extracción nacional:

	Volumen (promedio) en kg. Semanal	Mensual
Cultivados		
Tilapia	_____	_____
Camarón	_____	_____
Trucha	_____	_____
Otros	_____	_____
Pesca (Peces y crustáceos)		
Corvina	_____	_____
Dorado	_____	_____
Pargo	_____	_____
Tiburón	_____	_____
Marlín	_____	_____
Otros	_____	_____

6) Tipos de productos que comercializa de producción o extracción internacional:

	Volumen (promedio) en kg. Semanal	Mensual
Cultivados		
Corvineta (Panga)	_____	_____
Trucha	_____	_____
Salmon	_____	_____
Camarón	_____	_____
Otros	_____	_____

Pesca (Peces y crustáceos)

Corvina	_____	_____
Tiburón	_____	_____
Salmon	_____	_____
Otros	_____	_____

7) ¿En qué escala lo comercializa?
___Exportación
___Mayoreo
___Medio mayoreo
___Menudeo

8) ¿Qué cobertura tiene en el mercado con este producto?
___Internacional
___Nacional
___Regional
___Local

9) ¿Dónde vende su producto?

__ Otros países:
_____

__ Supermercados:
_____

__ Pescaderías:
_____

__ Otro:
_____

_____

10) ¿Cuál es el precio de su producto por kg.?

Cultivados Nacionales

Tilapia	_____
Camarón	_____
Trucha	_____

Pesca (peces y crustáceos) Nacionales

Corvineta (Panga)	_____
Dorado	_____
Parga	_____
Tiburón	_____
Marlín	_____

Cultivados Internacionales

- Panga (Corvineta) _____
- Trucha _____
- Salmon _____
- Camarón _____

Pesca (peces y crustáceos) Internacionales

- Corvina _____
- Tiburón _____
- Salmon _____

Appendix B.3.a: Questionnaires for Hypermarket, Supermarket, Municipal Market and Farmers' Market Owners

1) Name of interviewee:_____

2) Of the following species, which do you sell? Check all that apply
   __ Shrimp
   __ Sea bass
   __ Catfish
   __ Mahi mahi
   __ Marlin
   __ Porgy
   __ Salmon
   __ Shark
   __ Tilapia
   __ Trout
   __Other, please specify _____

3) Of the species that you sell, which are imported fish and which are locally produced fish? Check which are imported and which are locally produced. If you don't sell these fish, leave the space blank.

	Imported		National	
	Aquaculture	Marine	Aquaculture	Marine
Shrimp	___	___	___	___
Sea bass	___	___	___	___
Catfish	___	___	___	___
Mahi mahi	___	___	___	___
Marlin	___	___	___	___
Porgy	___	___	___	___
Salmon	___	___	___	___
Shark	___	___	___	___
Tilapia	___	___	___	___
Trout	___	___	___	___
Otros: specify _____	___	___	___	___

4) Which fish give you the greatest margin of earnings?
   _____ Imported _____ Local

5) How is the fish sold? Check all that apply.
   _____ Frozen
   _____ Dry
   _____ Fresh
   _____ Smoked
   _____ Clean
   _____ Other, please specify _____

6) What is the main reason for selling this product in the specified way (question 3)?

_____

_____

7) Is the fish sold in the same way as it is obtained from the primary supplier? ___ Yes ___ No

Why? _____

8) Do you agree with the prices of this type of fish in the current market?

____ Yes ___No Why? _____

9) What are the major problems that you encounter with the sales of this type of fish?

_____

_____

10) Of the species of fish that you sell, which has the greatest demand?

_____

11) Where are the fish stored, and what is the capacity of the storage unit (in kg.)?
____ Freezer ____ Cooling unit ____ Ice Storage
____ Other, please specify _____

Capacity: _____

12) Do you use any advertisement methods for aquaculture products? If yes, which types?
___Yes ___No

_____

_____

13) How effective do you think these methods are?
___ Not very effective ___ Somewhat effective ___ Very effective

14) How much are you willing to invest for additional/improved advertisement?

_____

15) Please specify your actual occupation : ____ Employee ____ Employer

Appendix B.3.b: Cuestionario para Administradores de Hipermercados, Supermercados, Ferias del Agricultor, Mercados Municipales y Ferias de Agricultor

1) Nombre del entrevistado:_____

2) ¿De las siguientes especies, cuales comercia usted? Señale las que aplican.
   __ Camarón
   __ Corvina
   __ Corvineta (Panga)
   __ Dorado
   __ Marlín
   __ Pargo
   __ Salmon
   __ Tiburón
   __ Tilapia
   __ Trucha
   __ Otro: especifique _____

3) De las especies acuícolas que vende, cuales son:
   ¿Los pescados son importados o productos locales? Señale a los que son importados. Si no son vendidos, dejen el espacio blanco.

	Importado		Nacional	
	Cultivado	Pesca	Cultivado	Pesca
Camarón	___	___	___	___
Corvina	___	___	___	___
Corvineta (Panga)	___	___	___	___
Dorado	___	___	___	___
Marlín	___	___	___	___
Pargo	___	___	___	___
Salmon	___	___	___	___
Tiburón	___	___	___	___
Tilapia	___	___	___	___
Trucha	___	___	___	___
Otros: especifique _____	___	___	___	___

4) ¿Cuáles especies les dejan un mayor margen de ganancia?
   _____ Importados _____ Locales

5) ¿Cuál es la presentación con la que comercializa este producto? Señale a los que aplican.
   _____ Congelado
   _____ Seco
   _____ Fresco
   _____ Ahumado
   _____ Limpio
   _____ Otro, especifique _____

6) ¿Cuál es la razón por la que comercializa el producto en esta presentación?

_____

_____

7) ¿Compra el producto con la misma presentación que lo comercializa? ___ Si ___ No

¿Por qué? _____

8) ¿Está usted de acuerdo con los precios que actualmente tiene el producto en el mercado?

____ Si ___No ¿Por qué? _____

9) ¿Cuáles son los principales problemas a los que se enfrenta al comercializar este producto?

_____

_____

10) ¿De las especies que comercializa cuál tiene la mayor demanda?

_____

11) ¿Con que tipo de instalaciones cuenta para el almacenamiento del producto y que capacidad (en kg)?
____ Frigoríficos ____ Cámaras de frio ____ Conservación con hielo
____ Otro, especifique _____

Capacidad: _____

12) Utilizan métodos de divulgación para los productos acuícolas. Si responde "si," ¿Cuáles?
__ Si __ No

_____

_____

13) ¿Qué tan efectivo cree que es este método?
___ Malo ___ Bueno ___ Muy Bueno

14) ¿Cuánto está dispuesto a invertir para anuncios adicionales / mejores?

_____

15) Señale su ocupación actual: ____ Empleador ____ Empleado

Appendix B.4.a: Questionnaire for Consumers of Fish Products

1) What species of fish do you consume? Check all that apply
   __ Shrimp
   __ Sea bass
   __ Catfish
   __ Mahi Mahi
   __ Marlin
   __ Porgy
   __ Salmon
   __ Shark
   __ Tilapia
   __ Trout
   __ Other: _____

For questions 2 to 14, respond with respect to the most preferred fish from question 1.

2) Do you habitually consume this fish? ___Yes ___No
   (If the response is negative, go to question 17)

3) Approximately how much per month do you and your family consume?
___ 1 to 2 kg ___ more than 5 kg
___ 3 to 4 kg ___ other, specify _____

4) How often do you consume the fish?
___ 1 time per week ___ 2 times a week
___ 3 or more times per week ___ 1 time per month
___ 2 times per month ___ 3 times per month

5) How much do you usually spend on these products per month? _____

6) What is your opinion of the prices of these products?

__ Very Expensive __ Expensive __ Average __ Cheap __Very Cheap

Why? _____

7) Check the reason why you consume the fish. Check all that apply.
   ___ it is easy to buy
   ___ it is nutritious
   ___ it is affordable
   ___ it is tasty
   ___ other, specify: _____

8) How is the fish bought?
___ Frozen ___ Fresh ___ Smoked
___ Canned ___ Other, specify: _____

9) In what way would you prefer it to be sold?

_____

10) Where do you usually buy the product?
___ Supermarkets ___ Markets ___ Open Air Markets
___ Fish Markets ___ Other, specify: _____

11) What is your opinion on the quality of the fish you buy? Please explain.

___Very Bad ___Bad ___Average ___Good ___Very Good

_____

12) Are you aware of the nutritional value that the species offers? ___ Yes ___No

13) Which products do you wish were more easily accessible? Please list them
__ Shrimp
__ Sea bass
__ Catfish
__ Mahi Mahi
__ Marlin
__ Porgy
__ Salmon
__ Shark
__ Tilapia
__ Trout
__ Other: _____

14) How do you typically find out about promotions for fish that you buy?
___ Newspapers
___ Market Advertisement
___ Fliers
___ Billboards
___ Other, specify: _____

15) Age and gender of interviewee: ___ Age Sex: ___M ___F

16) Marital Status: ___ Married ___ Single ___ Other, specify: _____

17) Job Title: ___ Employer ___ Employee

18) Level of family income:
___ 1 to 2 minimum wages
___ 3 to 4 minimum wages
___ more than 5 minimum wages

19) Number of dependents: _____

20) Highest level of education

_____ Primary
_____ Secondary
_____ Bachelor's Degree or High School Diploma
_____ University
_____ Others, please specify _____

Appendix B.4.b: Cuestionario para Consumidor Final de Productos Pesqueros

1) ¿Qué tipos de pescado compra usted? Selecciona los que aplican.
   __ Camarón
   __ Corvina
   __ Corvineta (Panga)
   __ Dorado
   __ Marlín
   __ Pargo
   __ Salmon
   __ Tiburón
   __ Tilapia
   __ Trucha
   __ Otro: _____

Para las preguntas 2 a 14, responde con respeto al pescado más preferido de pregunta 1.

2) ¿Lo consume habitualmente? ___Si ___No
(Si la repuesta fue negativa pase a la pregunta 17)

3) ¿Señale aproximadamente qué cantidad al mes consume Ud. y su familia?
___ de 1 a 2 kg ___ más de 5 kg
___ de 3 a 4 kg ___ otro, especifique _____

4) ¿Con qué periodicidad lo consume?
___ 1 vez por la semana ___ 2 veces por semana
___ 3 o más veces por semana ___ 1 vez al mes
___ 2 veces por mes ___ 3 veces por mes

5) ¿Cuánto pagan por estos productos cada mes? _____

6) ¿Cuál es su opinión de los precios de este producto?

__ Muy Caro __ Caro __ Más o menos __ Barato __Muy Barato

¿Por qué? _____

7) Señale la razón por la cual lo consume:
___ Porque es fácil de adquirirlo
___ Por nutritivo
___ Porque tiene un precio accesible
___ Porque tiene un buen sabor
___ Otro, especifique _____

8) ¿En qué presentación adquiere el producto?
___ Congelado ___ Fresco ___ Ahumado
___ Enlatado ___ Otra, especifique _____

9) ¿De qué forma preferiría que sea presentado?

_____

10) ¿Dónde acostumbra adquirir el producto?
___ Supermercados ___ Mercados ___ Ferias de Agricultor
___ Pescaderías ___ Otra, especifique _____

11) ¿Cuál es su opinión de la calidad de los pescados que compra usted? Explique su respuesta.

__ Muy Mala __ Mala __ Mas o menos __ Buena __ Muy Buena

_____

12) ¿Está consciente de valor nutricional con que cuenta estas especies? ___Si ___No

13) ¿Cuáles productos quisiera que sea más accesible?
__ Camarón
__ Corvina
__ Corvineta (Panga)
__ Dorado
__ Marlín
__ Pargo
__ Salmon
__ Tiburón
__ Tilapia
__ Trucha
__ Otro: _____

14) ¿Cómo se informar sobre las promociones para el pescado que usted compra?
___ Periódicos
___ Avisos en el mercado
___ Folleto
___ Cartelera
___ Otro, especifica: _____

15) Edad y sexo del entrevistado: ___ Edad Sexo: ___M ___F

16) Estado civil: ___ Casado ___ Soltero ___ Otro, especifica: _____

17) Actualmente trabaja como: ___ Empleador ___ Emplead

18) Nivel de ingreso promedio familiar:
___ de 1 a 2 salarios mínimos
___ de 3 a 4 salarios mínimos
___ más de 5 salarios mínimos

19) ¿Número de personas que dependen económicamente de Ud.? _____

20) Nivel de escolaridad:

_____ Primaria _____ Secundaria

_____ Bachillerato-Técnica _____ Estudios superiores

_____ Otro, especifique_____

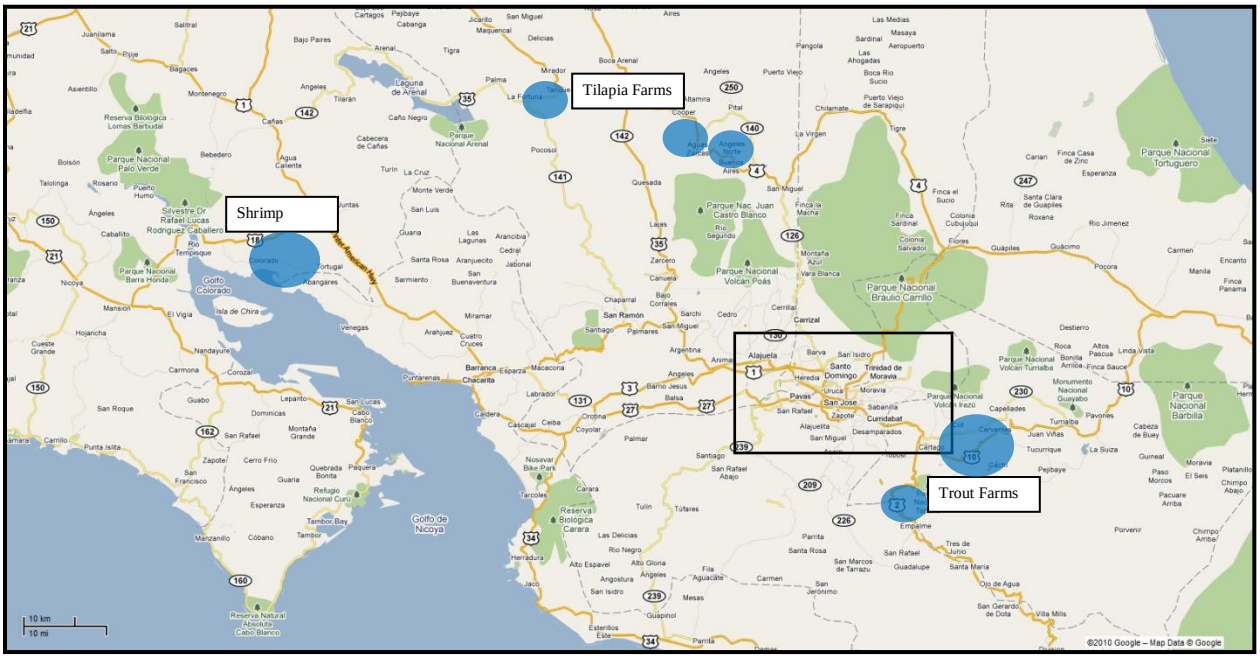
Appendix C: Calendar

November 2010

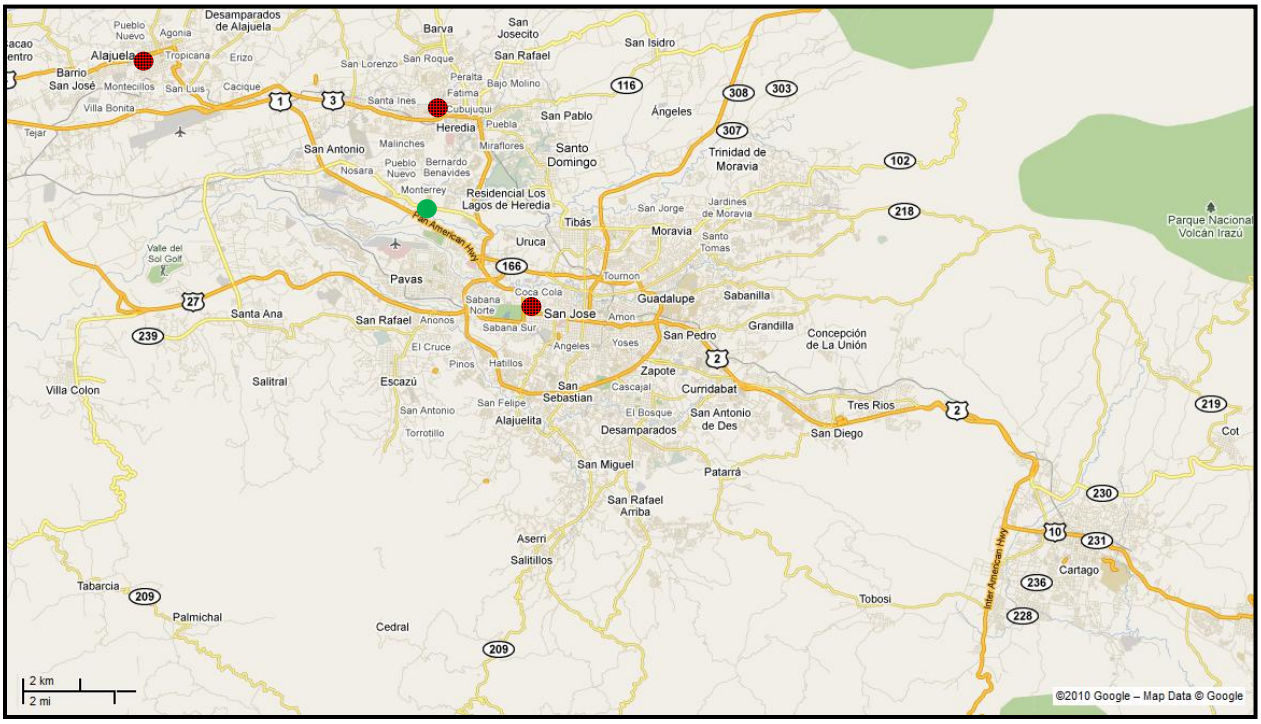
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Notes:	1	2 Meeting with sponsor, 9am	3	4	5	6
7	8 Meeting with sponsor, 2pm	9 Visit trout farms, 8am	10 Visit trout farms, 8am	11 Interview with Walmart 8am, Market interviews Alajuela	12	13
14	15 Market interviews, San Jose, 8am	16 Market interviews, Heredia, 8am	17 Visit tilapia farms, 8am	18 Visit tilapia farms, 8am	19 Market interviews, interviews with wholesalers, Heredia, 4am	20 Farmers' markets, interviews with Hipermas and Mas x Menos, 8am
21	22 Meeting with sponsor, 8am	23 Visit shrimp farms (stay overnight)	24 Visit shrimp farms	25	26	27
28	29	30	Notes:			

Appendix D: Map of Onsite Locations

Appendix D.1: Map of Costa Rica



Appendix D.2: Map of San José, Costa Rica



Map Legend:
Green – Wholesalers
Red and Black – Marketplaces (Sellers and Consumers)
Blue – Producers

Appendix E: Findings

Appendix E.1: Producer Findings

Appendix E.1.a: Trout Farm Findings

DAY 1

Trout Farm 1

- Location:
- Sold at: Hotels (Local)
- Volume:
  - Hotels (Local): 1,700 kg / month
- Price:
  - Hotels (Local): 3,500 C / kg
- Conserve Freshness: Yes (Refrigerator)
- Presentations: Fresh, Clean
- Problems: No; owns own hotel and restaurant
- Demand Satisfied: Yes
- Training: Yes (INCOPESCA; Personal classes in Vancouver, Canada)
- Good Practices: Yes
- Cultivate New Products: No
- Notes:
  - Owner of own restaurant

Trout Farm 2

- Location:
- Sold at: Supermarkets (San José); Fish Markets (Local); Restaurants (Local)
- Volume:
  - Supermarkets (San José): 8,000 / month
  - Fish Markets (Local) and Restaurants (Local): 2,000 / month
- Price:
  - Supermarkets (San José): 3,200 C / kg
  - Fish Markets (Local) and Restaurants (Local): 3,200 C / kg
- Conserve Freshness: Yes (Ice)
- Presentations: Fresh, Smoked
- Problems: No
- Demand Satisfied: No
- Training: Yes (INCOPESCA; Experience)
- Good Practices: Yes
- Cultivate New Products: Yes

- Notes:
    - Biggest producer of trout in Costa Rica
    - Experimenting with Salmon
    - Rents some land to other trout farmers
    - Farm cannot expand due to space constraints

Trout Farm 3

- Location:
- Sold at: Restaurant (Local)
- Volume: unknown
- Price: 5000 C / kg (prepared plate)
- Conserve Freshness: Not needed
- Presentations: Fresh
- Problems: No; Want to stay local for freshness
- Demand Satisfied: Yes
- Training: Yes (INCOPESCA; Experience: 4 years)
- Good Practices: Yes
- Cultivate New Products: No
- Notes:
    - Owner of own restaurant/hotel

Trout Farm 4

- Location:
- Sold at: Supermarkets (Local); Fish Markets (Local)
- Volume: 250 kg / month
- Price: 2,500 C / kg
- Conserve Freshness: Yes (Ice)
- Presentations: Fresh (Whole)
- Problems: No
- Demand Satisfied: No
- Training: Yes (INCOPESCA; Experience)
- Good Practices: Yes
- Cultivate New Products: No (Too cold)

Trout Farm 5

- Location:
- Sold at: Restaurant (Local); Producers (Biques)
- Volume:
    - Total: 340 kg / month
- Price: 2000 C / kg
- Conserve Freshness: No
- Presentations: Fresh
- Problems: Yes; Requirements and Preparation Certificate is too expensive; Competition with imports and national products
- Demand Satisfied: No
- Training: Yes (Experience)
- Good Practices: Yes
- Cultivate New Products: Yes
- Notes:
    - Complained about Aguilar Solis; monopoly on feed
    - Sells to Biques, because he has equipment for processing and transport

Trout Farm 6

- Location:
- Sold at: Supermarkets (Cities); Restaurants (Local); Hotels (Local)
- Volume:
    - Supermarkets: 800 kg / month
    - Restaurants/Hotels: 200 kg / month
- Price:
    - Supermarkets: 3,500 C / kg
    - Restaurants/Hotels: 4,500 C / kg
- Conserve Freshness: Yes (Refrigerator; Ice)
- Presentations: Fresh (Filete)
- Problems: Yes; Feed is expensive
- Demand Satisfied: No
- Training: No (Experience: 25 years)
- Good Practices: Yes
- Cultivate New Products: Yes

Trout Farm 7

- Location:
- Sold at: Recreational (Local)
- Volume: 830 kg / month
- Price: 2,250 C / kg
- Conserve Freshness: No
- Presentations: Fresh
- Problems: Yes; low demand
- Demand Satisfied: Yes
- Training: Yes (INCOPESCA)
- Good Practices: Yes
- Cultivate New Products: Yes
- Notes:
    - Rough roads might impede business

Trout Farm 8

- Location:
- Sold at: Recreational (Local)
- Volume: 280 kg / month
- Price: 4000 C / kg
- Conserve Freshness: No
- Presentations: Fresh
- Problems: Yes; Very low production
- Demand Satisfied: Yes
- Training: Yes (University; INCOPESCA)
- Good Practices: Yes
- Cultivate New Products: Yes (If they can be grown)
- Notes:
    - Small Scale Farm

DAY 2

Trout Farm 9

- Location:
- Sold at: Restaurant (Local); Recreational (Local)
- Volume:
    - Restaurant (Local): 450 kg / month
    - Recreational (Local): 50 kg / month
- Price: 4000 C / kg

- Conserve Freshness: No
- Presentations: Fresh
- Problems: Yes; No space for growing more; Climate change killing trout
- Demand Satisfied: No
- Training: Yes (INCOPESCA; Experience: 9 years)
- Good Practices: Yes
- Cultivate New Products: No (Trout is the best for the climate)
- Notes:
    - Fish become stressed at different temperature conditions
    - Normal temperature: 15-20 °C
    - 2008: temperatures rose to 23 °C
    - Automercado made an offer, but refused so he could keep up with local demand

Trout Farm 10

- Location:
- Sold at: Recreational (Local)
- Volume: unknown
- Price: 3,500 C / kg
- Conserve Freshness: No
- Presentations: Fresh
- Problems: No; No interest in an outside market
- Demand Satisfied: Yes
- Training: Yes (INCOPESCA; Experience: 10 years)
- Good Practices: Yes
- Cultivate New Products: Yes

Trout Farm 11

- Location:
- Sold at: Restaurant (Local); Recreational (Local)
- Volume:
    - Restaurant (Local): 45 kg / month
    - Recreational (Local): 15 kg / month
- Price:
    - Restaurant (Local): 6750 C / kg
    - Recreational (Local): 4000 C / kg
- Conserve Freshness: No
- Presentations: Fresh
- Problems: Yes; Low production

- Demand Satisfied: No
- Training: Yes (INCOPESCA; Experience: 3 years)
- Good Practices: Yes
- Cultivate New Products: Yes (If fish adapts to climate)
- Notes:
    - Owner of own restaurant for 1 year

Trout Farm 12

- Location:
- Sold at: Restaurant (Local)
- Volume:
    - Restaurant (Local): 75 kg / month
- Price:
    - Restaurant (Local): 3,700 C / kg
- Conserve Freshness: No
- Presentations: Fresh
- Problems: Yes; There is no demand
- Demand Satisfied: Yes
- Training: Yes (INCOPESCA; Experience: 2 years)
- Good Practices: Yes
- Cultivate New Products: Yes

Trout Farm 13

- Location:
- Sold at: Restaurant (Local)
- Volume:
    - Restaurant (Local): 200 kg / month
- Price:
    - Restaurant (Local): 3900 C / kg
- Conserve Freshness: No
- Presentations: Fresh
- Problems: Yes; Too much competition
- Demand Satisfied: Yes
- Training: Yes (INCOPESCA; Experience: 12 years)
- Good Practices: Yes
- Cultivate New Products: Yes
- Notes:
    - Owner of own restaurant

Appendix E.1.b: Tilapia Farm Findings

DAY 1

Tilapia Farm 1

- Sold at: Others (Tilapia Soto-Local)
- Volume:
    - Others (Local): 625 kg/month
- Price:
    - Others(Local): 1700 c/kg
- Preservation method: None
- Presentation: Fresh, Clean
- Problems: No
- Demand Satisfied: Yes; there is enough consumption
- Training: Yes (INCOPESCA; INA (Instituto Nacional de Aprendizaje))
- Good Practices: Yes
- Cultivate New Products: No; Don't want to start from scratch
- Notes:
    - Fish goes to Tilapia Soto which processes it and sends it to San José

Tilapia Farm 2

- Sold at: Restaurants (Locally owned)
- Volume:
    - Restaurants (Locally owned): 200 kg/ month
- Price:
    - Restaurants (Locally owned): (3500-5000) c/kg
- Preservation method: Yes; Refrigerator
- Presentation: Frozen
- Problems: Yes; Currently the business is disorganized due to personal problem
- Demand Satisfied: No; The production is not sufficient
- Training: No; New to the Tilapia business
- Good Practices: No
- Cultivate New Products: Yes
- Notes:
    - Personal problem: Mother recently died
    - Taking over family business with rocky start
    - Owns 7 cement tanks and 6 pond tanks
    - Estimated Production per year: 18 000 kg (if production is picking up)

Tilapia Farm 3

- Sold at: Restaurants (Local); Others: Individuals
- Volume:
  - Restaurants (Local): (1200-1300) kg/ month
  - Others (Individuals): 40 kg/ month
- Price:
  - Restaurants (Local): 1850 c/kg
  - Others (Individuals): 2800 c/kg
- Preservation method: No
- Presentation: Fresh
- Problems: No; demand is ok at this time
- Demand Satisfied: Yes
- Training: Yes; INCOPESCA; 10 years of experience
- Good Practices: Yes
- Cultivate New Products: Yes
- Notes:
  - Profit margin is not too high
  - The price of the fish feed is quite high and it is hard to have a high gain

Tilapia Farm 4

- Products cultivated:
  - Tilapia
  - Catfish (about 2% of the farm raised fish)
- Sold at: Supermarkets (San José), Farmer's Market
- Volume:
  - Supermarkets(San José): 2000 kg/ month
  - Farmer's market: 400 kg/month
- Price:
  - Supermarkets(San José):
    - Tilapia(live): 2200 c/kg
    - Catfish(live): 2000 c/kg
  - Farmer's market:
    - Tilapia Filet: 5700 c/kg
    - Tilapia Whole Fish: 2700 c/kg
- Preservation method:
  - Supermarkets: No
  - Farmer's market: Yes; Preserved with ice
- Presentation:
  - Supermarkets: Fresh

    - Farmer's market: Frozen
- Problems: No; Satisfied with final product
- Demand Satisfied: Yes
- Training: Yes; INCOPESCA in San José; 13 years of experience
- Good Practices: Yes
- Cultivate New Products: Yes; Larger scale production of Catfish
- Notes:
    - Big family business; cultivation of fish and production of cheese for national consumption
    - The feed is very expensive
        - Feed 30 % protein: 12900 c for 30 kg; needs 31 bags per week
        - Feed 35 % protein: 14400 c for 30 kg; needs 2 bags per week
    - Owns a restaurant which is used for special events so it doesn't take up too much time and management
    - Sells some of the fish to Anna Soto which processes it before it is sold in San José

Tilapia Farm 5

- Sold at: Supermarkets (Local), Restaurants (Local), Wholesalers (National), Producers
- Volume:
    - Supermarkets: 300 kg/month
    - Restaurants: 250 kg/month
    - Wholesalers: 267 kg/month
    - Producers: 100 kg/month
- Price:
    - Supermarkets: 2500 c/kg
    - Restaurants:
        - Filet: 6000 c/kg
        - Live: 2500 c/kg
    - Wholesalers: (2000-3000) c/kg
    - Producers: 2500 c/kg
- Preservation method: Yes; Refrigerator (filet)
- Presentation:
    - Restaurants and Supermarkets: Frozen
    - Producers, Restaurants and Wholesaler: Fresh, Live
- Problems: No; Sells products on a contract basis
- Demand Satisfied: No; There is room for bigger demand
- Training: Yes; INCOPESCA, INA, Aguilares Solis; 10 years of experience
- Good Practices: Yes
- Cultivate New Products: Yes

- Notes:
    - The price of the fish feed is quite high and it is hard to have a high gain.
    - Owns 4 ponds and 5 cement tanks

DAY 2

Tilapia Farm 6

- Sold at: Restaurants (Local), Others: Individuals
- Volume:
    - Restaurants: 320 kg/month
    - Others (Individuals): 80 kg/ month
- Price:
    - Restaurants: 2000 c/kg
    - Others (Individuals): 2000 c/kg
- Preservation method: No
- Presentation: Clean and Fresh
- Problems: Yes; Feed is too expensive
- Demand Satisfied: No
- Training: Yes; INCOPESCA; 15 years of experience
- Good Practices: Yes
- Cultivate New Products: No
- Notes:
    - The price of the fish feed is high thereby limiting the profit margin

Tilapia Farm 7

- Sold at: Restaurant (Locally owned), Others: Individuals
- Volume:
    - Restaurant (Locally owned): 600 kg/month
    - Others (Individuals): Varies
- Price:
    - Restaurants: 2600 c/kg
    - Others (Individuals):
- Preservation method: No
- Presentation: Clean and Fresh
- Problems: Yes; Feed is too expensive; Size of some tilapia fish is too big for restaurant use
- Demand Satisfied: Yes; Cultivates tilapia for use in his own restaurant
- Training: Yes; INCOPESCA; 11 years of experience
- Good Practices: No
- Cultivate New Products: Yes

Tilapia Farm 8

- Sold at: Others
    - Tilapia Soto
    - Travelling Salesmen (Local)
- Volume:
    - Tilapia Soto: 583 kg/ month
    - Travelling Salesmen (Local): 2750 kg/ month
- Price:
    - Tilapia Soto: 1800 c/kg
    - Travelling Salesmen (Local): 2000 c/kg
- Preservation method: Yes; cold storage
- Presentation: Fresh and Clean
- Problems: Yes; Weather affects the production, Feed price
- Demand Satisfied: No
- Training: Yes; INCOPESCA; 15 years of experience
- Good Practices: Yes
- Cultivate New Products: Yes; Preferentially Catfish if there is a sufficient demand
- Notes:
    - The price of the fish feed is high thereby limiting the profit margin
    - Dry season is the optimum season for tilapia cultivation

Tilapia Farm 9

- Sold at: Restaurant (Locally owned), Others: Individuals
- Volume:
    - Restaurant (Locally owned): 240 kg/month
    - Others (Individuals): 480 kg/ month
- Price:
    - Restaurant (Locally owned): 6000 c/kg
    - Others (Individuals): 2500 c/kg
- Preservation method: No
- Presentation: Fresh
- Problems: Yes
- Demand Satisfied: No; can't produce more
- Training: Yes; INCOPESCA; 10 years of experience
- Good Practices: Yes; to renew the project
- Cultivate New Products: Yes; if the quality and demand are good and efficient, might invest in oysters
- Notes:
    - The price of the fish feed is high thereby limiting the profit margin

    - Demand is too high; can't invest to produce more because of financial problem
    - Change of seasons affects the level of production

Tilapia Farm 10

- Sold at: Open air markets (Place Viques, San José and La Fortuna, Arenal)
- Volume:
    - Open air markets: 666 kg/ month
- Price:
    - Filet: 5000 c/kg
    - Whole Fish: 2800 c/kg
- Preservation method: Yes; Refrigerator, preserved in ice
- Presentation: Clean and Fresh
- Problems: No
- Demand Satisfied: No
- Training: Yes; INCOPESCA and Senasa; 12 years of experience in processing the fish, 3 years in cultivation of tilapia
- Good Practices: Yes
- Cultivate New Products: Yes

Tilapia Farm 11

- Sold at: Restaurant (Locally owned), Others: Individuals
- Volume:
    - Restaurant (Locally owned): 240 kg/month
    - Others (Individuals): 400 kg/ month
- Price:
    - Restaurant (Locally owned): 2000 c/kg
    - Others (Individuals): 3000 c/kg
- Preservation method: No
- Presentation: Fresh
- Problems: No problem with the commercialization
- Demand Satisfied: Yes
- Training: Yes; INCOPESCA; 8 years of experience
- Good Practices: Yes
- Cultivate New Products: Yes
- Notes:
    - Capacity of fish tanks: 10000 but tanks are filled with 3000 fish only
    - Total: 41 tanks
        - 8 empty tanks

    - Volume that the farm could produce is 35 000 kg/ year but produced only 5000 kg last year

Tilapia Farm 12

- Sold at: Restaurant (Local)
- Volume:
    - Restaurants (Local): (300-500) kg/month
- Price:
    - Restaurant (Locally owned): 2800 c/kg
- Preservation method: No
- Presentation: Fresh
- Problems: Yes; Competition with bigger producers in the country
- Demand Satisfied: Yes
- Training: No; 10 years of experience, frequent communication with INCOPESCA representatives
- Good Practices: Yes
- Cultivate New Products: Yes
- Notes:
    - Feed price is expensive: 12000c for 30kg; decreases the profit margin while the feed price increased and price of the fish stayed the same
    - There is competition with bigger corporations that can sell their products at a cheaper price

Appendix E.1.c: Shrimp Farm Findings

DAY 1

Shrimp Farm 1

- Sold at: Wholesale market (Exports to Spain)
    - Export to Spain
    - National
- Average size of shrimp:
    - Export to Spain: 22 g
    - National: (13-17) g
- Volume:
    - Export to Spain: 35 000 kg
    - National: 20 000 kg
- Price of shrimp:
    - Export to Spain: 2500 c/ kg
    - National: 2000 c/ kg
- Preservation method: Yes; Preserved in ice
- Presentation: Fresh
- Problems: Yes; Exportation norms and regulations
- Demand Satisfied: Yes
- Training: Yes; Coonaprosal, Biologists; 5 years of experience
- Good Practices: Yes
- Cultivate New Products: Yes; maybe tilapia
- Notes:
    - Difference between the price and quality of feed. Prefers Nicovita(Peru) over Aguilar Solis(local)
    - Weather affects the cultivation of shrimp (the temperature is too high over the summer- White Spot Syndrome)

Shrimp Farm 2

- Sold at: Intermediates (Local)
- Average size of shrimp:
    - 15 g
    - 25 g
    - 45 g
- Volume:
    - Local: 7000 kg
- Price of shrimp:
    - 15 g: 2000 c/ kg
    - 25 g: 3000 c/ kg
    - 45 g: 4000 c/ kg

- Preservation method: No
- Presentation: Fresh
- Problems: Yes; Cost of feed, Spreading of the White Spot Syndrome
- Demand Satisfied: No
- Training: Yes; Coonaprosal, 9 years of experience
- Good Practices: Yes
- Cultivate New Products: No
- Notes:
    - The price of the feed is too high since it is imported
    - White Spot Syndrome is a concern

Shrimp Farm 3

- Sold at: Wholesale market (Local)
- Average size of shrimp:
    - (11-13) g
    - (14-16) g
    - (17-20) g
- Volume: total- (12 000-15000) kg/ cycle; 2 cycles per year
    - (11-13) g : 4000 kg/ cycle
    - (14-16) g: 4000 kg/ cycle
    - (17-20) g: (4000-7000) kg/ cycle
- Price of shrimp:
    - (11-13) g: 1800 c/ kg
    - (14-16) g: 2000 c/ kg
    - (17-20) g: 2200 c/ kg
- Preservation method: Yes; Preserved in ice
- Presentation: Fresh
- Problems: Yes; White Spot Syndrome that affects the production
- Demand Satisfied: No; Need to produce more
- Training: Yes; Coonaprosal, Nicovita; 8 years of experience
- Good Practices: Yes
- Cultivate New Products: No
- Notes:
    - Feed is cost effective
        - Aguilar Solis is of lower quality
        - Producers prefer Nicovita but it is more expensive (10000 c/ 25 kg)- 35% protein

DAY 2

Shrimp Farm 4

- Sold at: Intermediates (Local)
- Average size of shrimp:
  - (15-18) g
  - 22 g
- Volume:
  - (15-18) g: (4000-5000) kg
  - 22 g: 2500 kg
- Price of shrimp:
  - (15-18) g: 2600 c/ kg
  - 22 g: 3100 c/ kg
- Preservation method: Yes; Preserved in ice
- Presentation: Fresh
- Problems: Yes; Competition with products from Nicaragua
- Demand Satisfied: No; White Spot Syndrome caused a decrease in the level of production
- Training: Yes; Coonaprosal, Nicovita; 1.5 years of experience
- Good Practices: Yes
- Cultivate New Products: Yes; Oysters and Clams
- Notes:
  - Feed is cost effective

Shrimp Farm 5

- Sold at: Intermediates (Local)
- Average size of shrimp: 15 g
- Volume: 5500 kg/cycle; 2.5 cycles per year
- Price of shrimp: 2100 c/ kg
- Preservation method: No
- Presentation: Fresh
- Problems: Yes; Competition with products from Nicaragua; need to lower the price to stay in the market; White Spot Syndrome
- Demand Satisfied: Yes; Level of demand for National Products is good
- Training: Yes; Nicovita (Conferences organized in Boston Honduras); 15 years of experience
- Good Practices: Yes
- Cultivate New Products: No
- Notes:
  - Because of the spreading of the White Spot Syndrome disease during the dry season, the farmer is not financed by Coonaprosal
  - Still makes profits in the dry season because the product gets sold

Shrimp Farm 6

- Sold at: Others (Intermediates-Local)
- Average size of shrimp:
  - 12 g
  - (15-16) g
- Volume:
  - 12 g: 1000 kg
  - (15-16) g: 3500 kg
- Price of shrimp:
  - 12 g: 1700 c/ kg
  - (15-16) g: 1850 c/ kg
- Preservation method: Yes; Preserved in ice
- Presentation: Fresh
- Problems: White Spot Syndrome disease affects the production and sale
- Demand Satisfied: Yes
- Training: Yes (INCOPESCA; Nicovita); 7 years of experience
- Good Practices: No
- Cultivate New Products: Yes; depends on the type of fish in demand

Shrimp Farm 7

- Sold at: Others (Intermediates-Local)
- Average size of shrimp: (12-14) g
- Volume:
  - Others (Local): (2800-3500) kg/cycle; 3 cycles per year
- Price of shrimp:
  - (12-14)g: 1900 c/kg
- Preservation method: Yes; Preserved in ice
- Presentation: Fresh
- Problems: None for commercialization
- Demand Satisfied: No
- Training: Yes (INCOPESCA; Nicovita); 10 years of experience
- Good Practices: Yes
- Cultivate New Products: Yes; depends on the type of fish in demand
- Notes:
  - Owns 1 pool- 3.5 hectares
  - Shrimp is harvested every 66 days
  - White Spot Syndrome is not a problem for this farmer
  - Price of feed is expensive

Appendix E.2: Wholesaler Findings

	Wholesaler 1	
Species	**Price in c/ kg**	**Weekly Amount in kg**
Corvina (Marine)	2000	600
Pargo (Marine)	3000	1000
Chatarra (Marine)	750	3000
Camarón (Marine)	11100	4000
Camarón(Cultivated)	0	0
Cola Amarilla(Marine)	0	0
Tiburón (Marine)	0	0
Marlín (Marine)	0	0
Vela (Marine)	0	0
Clase (Marine)	0	0
Macarela (Marine)	0	0
Dorado (Marine)	0	0
Anguila (Marine)	0	0
Espada (Marine)	0	0
Raya(Marine)	0	0
Salmon (Cultivated)	0	0
Corvineta (Imported, Cultivated)	0	0

	Wholesaler 2	
Species	**Price in c/ kg**	**Weekly Amount in kg**
Corvina (Marine)	0	0
Pargo (Marine)	2500	300
Chatarra (Marine)	500	100
Camarón (Marine)	0	0
Camarón (Cultivated)	0	0
Cola Amarilla (Marine)	1500	100
Tiburón (Marine)	0	0
Marlín (Marine)	0	0
Vela (Marine)	0	0
Clase (Marine)	0	0
Macarela (Marine)	0	0
Mahi Mahi (Marine)	0	0
Anguila (Marine)	0	0
Espada (Marine)	0	0
Raya (Marine)	0	0
Salmon (Cultivated)	0	0
Corvineta (Imported, Cultivated)	0	0

	Wholesaler 3	
Species	**Price in c/ kg**	**Weekly Amount in kg**
Corvina (Marine)	0	0
Pargo (Marine)	0	0
Chatarra (Marine)	1000	1250
Camarón (Marine)	6000	375
Camarón (Cultivated)	4000	375
Cola Amarilla (Marine)	0	0
Tiburón (Marine)	3000	2000
Marlín (Marine)	4000	1000
Vela (Marine)	2000	625
Clase (Marine)	0	0
Macarela (Marine)	0	0
Dorado (Marine)	0	0
Anguila (Marine)	0	0
Espada (Marine)	0	0
Raya (Marine)	0	0
Salmon (Cultivated)	0	0
Corvineta (Imported, Cultivated)	0	0

	Wholesaler 4	
Species	**Price in c/ kg**	**Weekly Amount in kg**
Corvina (Marine)	1800	250
Pargo(Marine)	2200	50
Chatarra (Marine)	800	1500
Camarón (Marine)	15700	500
Camarón(Cultivated)	3500	500
Cola Amarilla (Marine)	0	0
Tiburón (Marine)	0	0
Marlín (Marine)	0	0
Vela (Marine)	0	0
Clase (Marine)	1400	1250
Macarela (Marine)	0	0
Dorado (Marine)	0	0
Anguila (Marine)	0	0
Espada (Marine)	0	0
Raya(Marine)	0	0

Salmon (Cultivated)	0	0
Corvineta (Imported, Cultivated)	0	0

	Wholesaler 5	
Species	**Price in c/ kg**	**Weekly Amount in kg**
Corvina (Marine)	1800	500
Pargo(Marine)	2500	400
Chatarra (Marine)	700	500
Camarón (Marine)	3500	200
Camarón(Cultivated)	0	0
Cola Amarilla (Marine)	0	0
Tiburón (Marine)	1100	1500
Marlín (Marine)	0	0
Vela (Marine)	8000	500
Clase (Marine)	0	0
Macarela (Marine)	0	0
Dorado (Marine)	0	0
Anguila (Marine)	0	0
Espada (Marine)	0	0
Raya(Marine)	0	0
Salmon (Cultivated)	0	0
Corvineta (Imported, Cultivated)	0	0

	Wholesaler 6	
Species	**Price in c/ kg**	**Weekly Amount in kg**
Corvina (Marine)	1000	3500
Pargo(Marine)	0	0
Chatarra (Marine)	700	666
Camarón (Marine)	0	0
Camarón(Cultivated)	0	0
Cola Amarilla (Marine)	0	0
Tiburón (Marine)	0	0
Marlín (Marine)	0	0
Vela (Marine)	1300	666
Clase (Marine)	1000	666
Macarela (Marine)	0	0

Dorado (Marine)	0	0
Anguila (Marine)	0	0
Espada (Marine)	0	0
Raya(Marine)	0	0
Salmon (Cultivated)	0	0
Corvineta (Imported, Cultivated)	0	0

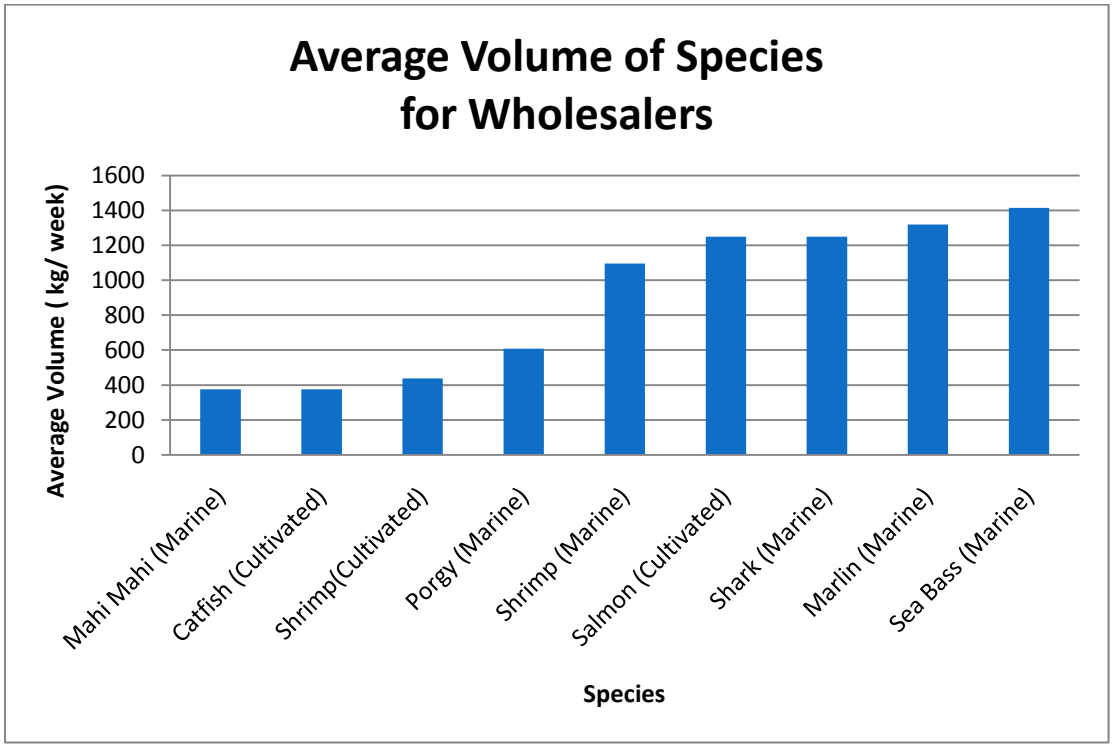
	Wholesaler 7	
Species	**Price in c/ kg**	**Weekly Amount in kg**
Corvina (Marine)	1600	3600
Pargo(Marine)	2300	1800
Chatarra (Marine)	0	0
Camarón (Marine)	0	0
Camarón(Cultivated)	0	0
Cola Amarilla (Marine)	0	0
Tiburón (Marine)	1000	25200
Marlín (Marine)	3600	3600
Vela (Marine)	0	0
Clase (Marine)	0	0
Macarela (Marine)	0	0
Dorado (Marine)	0	0
Anguila (Marine)	0	0
Espada (Marine)	0	0
Raya(Marine)	0	0
Salmon (Cultivated)	0	0
Corvineta (Imported, Cultivated)	0	0

	Wholesaler 8	
Species	**Price in c/ kg**	**Weekly Amount in kg**
Corvina (Marine)	1500	200
Pargo(Marine)	1600	100
Chatarra (Marine)	1050	1000
Camarón (Marine)	0	0
Camarón(Cultivated)	0	0
Cola Amarilla (Marine)	0	0
Tiburón (Marine)	0	0

Marlín (Marine)	3000	600
Vela (Marine)	0	0
Clase (Marine)	0	0
Macarela (Marine)	0	0
Dorado (Marine)	1300	250
Anguila (Marine)	750	100
Espada (Marine)	1200	400
Raya(Marine)	450	200
Salmon (Cultivated)	0	0
Corvineta (Imported, Cultivated)	0	0

	Wholesaler 9	
Species	**Price in c/ kg**	**Weekly Amount in kg**
Corvina (Marine)	0	0
Pargo(Marine)	0	0
Chatarra (Marine)	0	0
Camarón (Marine)	4000	1250
Camarón(Cultivated)	0	0
Cola Amarilla (Marine)	0	0
Tiburón (Marine)	0	0
Marlín (Marine)	0	0
Vela (Marine)	0	0
Clase (Marine)	0	0
Macarela (Marine)	0	0
Dorado (Marine)	0	0
Anguila (Marine)	0	0
Espada (Marine)	0	0
Raya(Marine)	0	0
Salmon (Cultivated)	7000	1250
Corvineta (Imported, Cultivated)	0	0

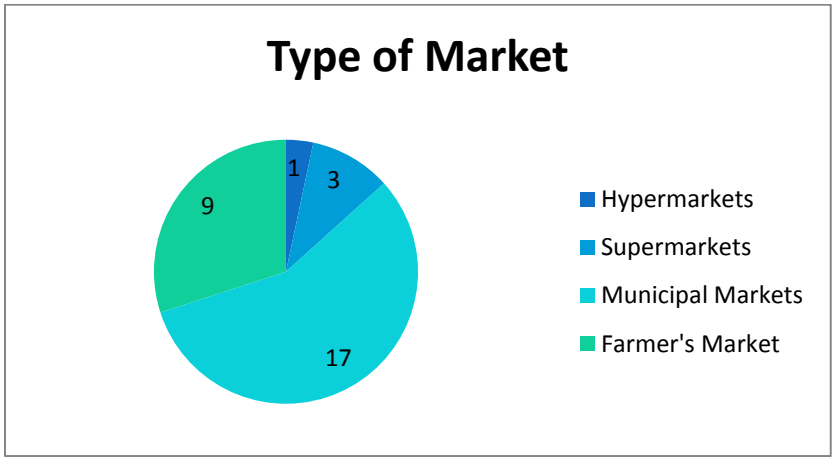
	Wholesaler 10	
Species	**Price in c/ kg**	**Weekly Amount in kg**
Corvina (Marine)	5000	1250
Pargo(Marine)	0	0
Chatarra (Marine)	0	0
Camarón (Marine)	5000	250
Camarón(Cultivated)	0	0
Cola Amarilla (Marine)	0	0
Tiburón (Marine)	1100	250
Marlín (Marine)	5000	75
Vela (Marine)	1600	250
Clase (Marine)	0	0
Macarela (Marine)	0	0
Dorado (Marine)	3000	500
Anguila (Marine)	0	0
Espada (Marine)	0	0
Raya(Marine)	0	0
Salmon (Cultivated)	0	0
Corvineta (Imported, Cultivated)	3000	375



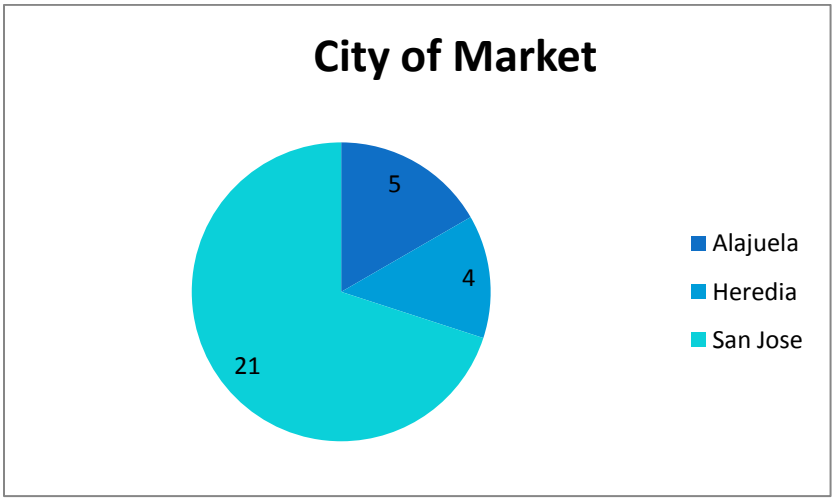

Average Price of Species for Wholesalers
Averaage Price (c/ kg)
8000
7000
6000
5000
4000
3000
2000
1000
0
Shark (Marine)
Sea Bass (Marine)
Mahi Mahi (Marine)
Porgy (Marine)
Catfish (Cultivated)
Shrimp(Cultivated)
Marlin (Marine)
Shrimp (Marine)
Salmon (Cultivated)
Species

Appendix E.3: Market Manager Findings

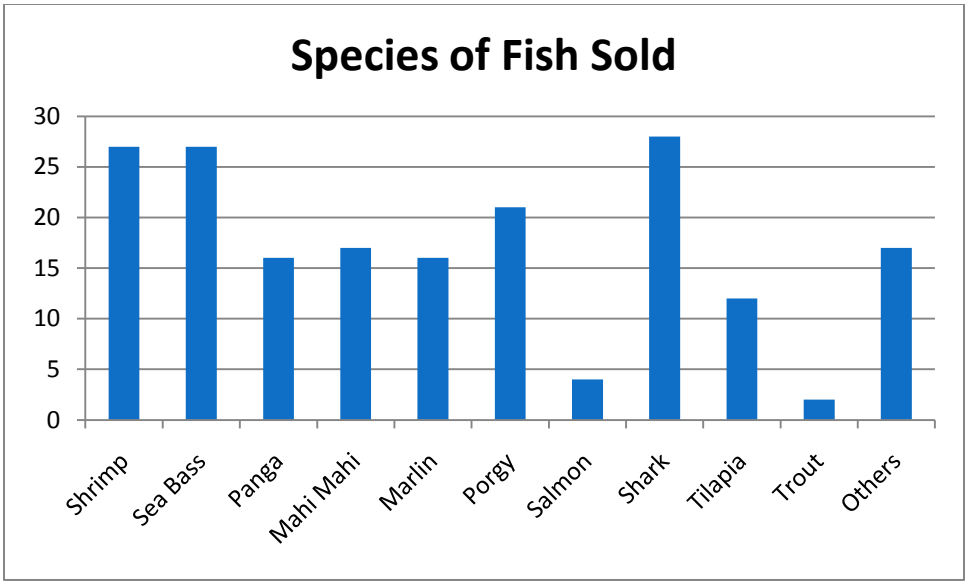
	Totals	Percentages (out of 30)
Type of Market		
Hypermarkets	1	3.33%
Supermarkets	3	10.00%
Municipal Markets	17	56.67%
Farmer's Market	9	30.00%



City of Market		
Alajuela	5	16.67%
Heredia	4	13.33%
San José	21	70.00%

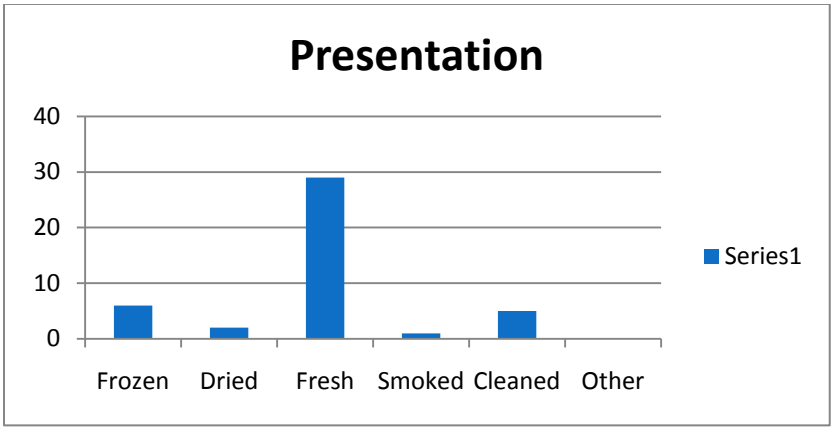


Species of Fish Sold		
Shrimp	27	90.00%
Sea Bass	27	90.00%
Panga	16	53.33%
Mahi Mahi	17	56.67%
Marlin	16	53.33%
Porgy	21	70.00%
Salmon	4	13.33%
Shark	28	93.33%
Tilapia	12	40.00%
Trout	2	6.67%
Others	17	56.67%



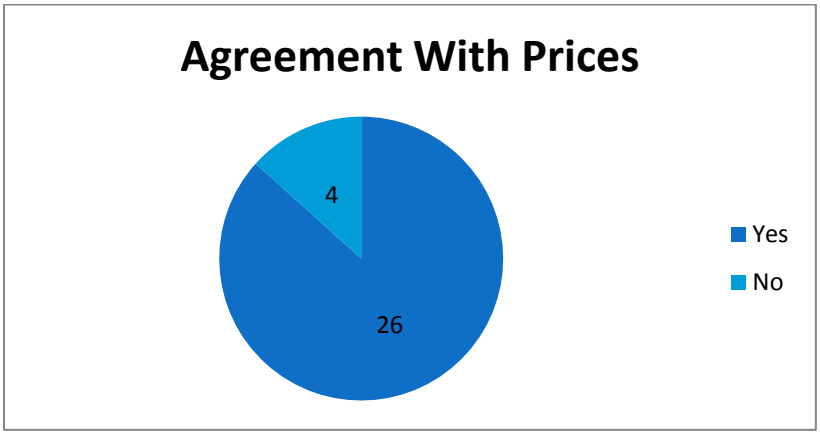
Most Profitable Fish		
Imported	2	6.67%
National	27	90.00%
*not 100% due to unanswered data		

Presentation		
Frozen	6	20.00%
Dried	2	6.67%
Fresh	29	96.67%
Smoked	1	3.33%
Cleaned	5	16.67%
Other	0	0.00%

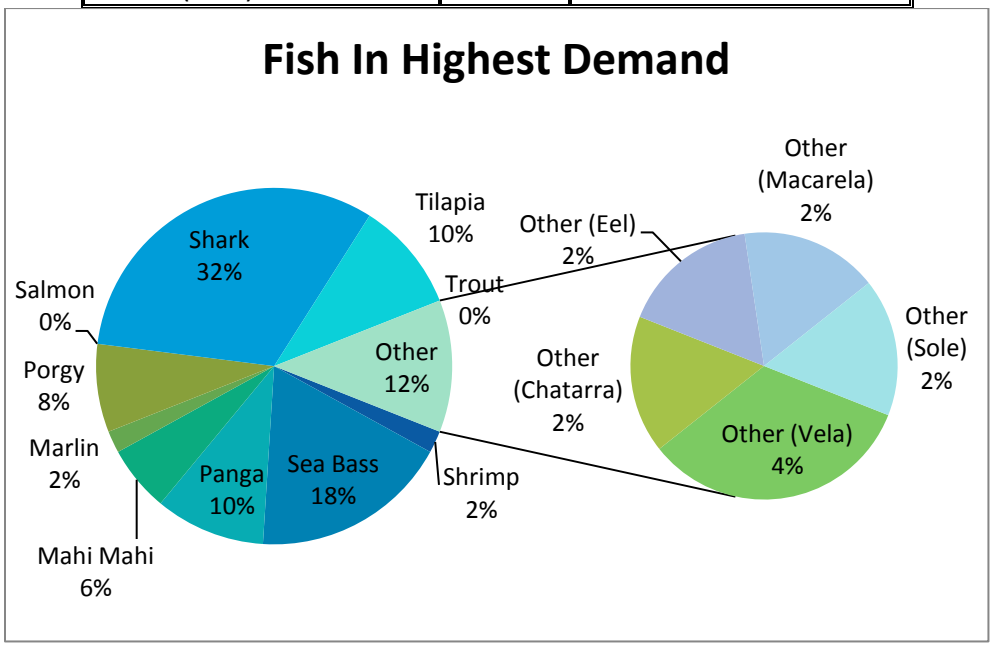


Sold Same As Bought		
Yes	27	90.00%
No	4	13.33%
*Over 100% due to double answer		

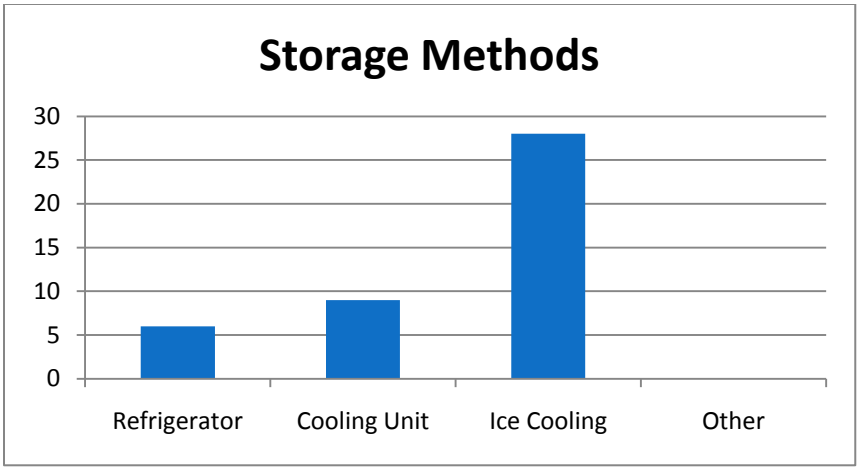
Agreement With Prices		
Yes	26	86.67%
No	4	13.33%



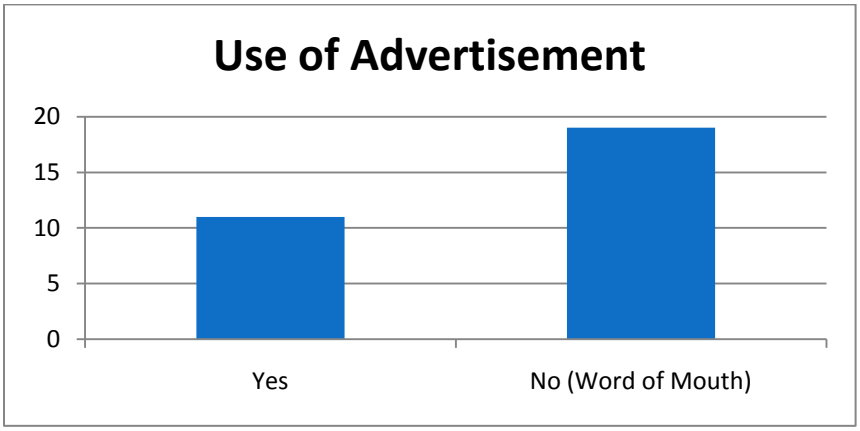
Highest Demand Product		
Shrimp	1	3.33%
Sea Bass	9	30.00%
Panga	5	16.67%
Mahi Mahi	3	10.00%
Marlin	1	3.33%
Porgy	4	13.33%
Salmon	0	0.00%
Shark	16	53.33%
Tilapia	5	16.67%
Trout	0	0.00%
Other (Vela)	2	6.67%
Other (Chatarra)	1	3.33%
Other (Eel)	1	3.33%
Other (Macarela)	1	3.33%
Other (Sole)	1	3.33%



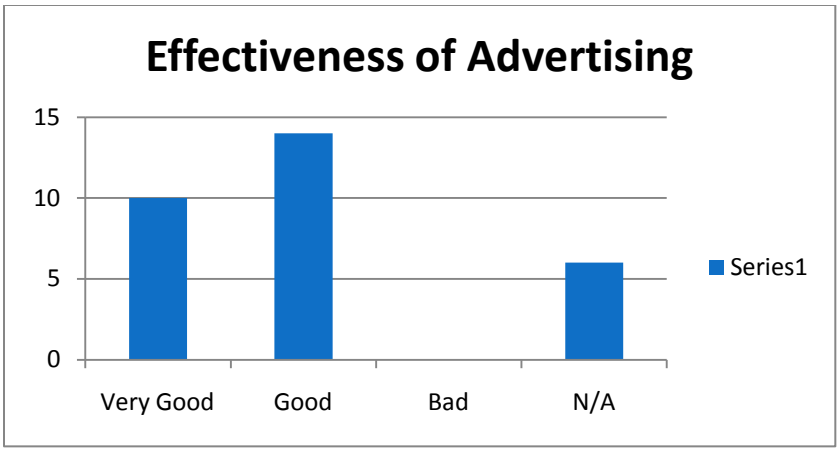
Storage Methods		
Refrigerator	6	20.00%
Cooling Unit	9	30.00%
Ice Cooling	28	93.33%
Other	0	0.00%



Use of Advertisments		
Yes	11	36.67%
No	19	Word of mouth 63.33%

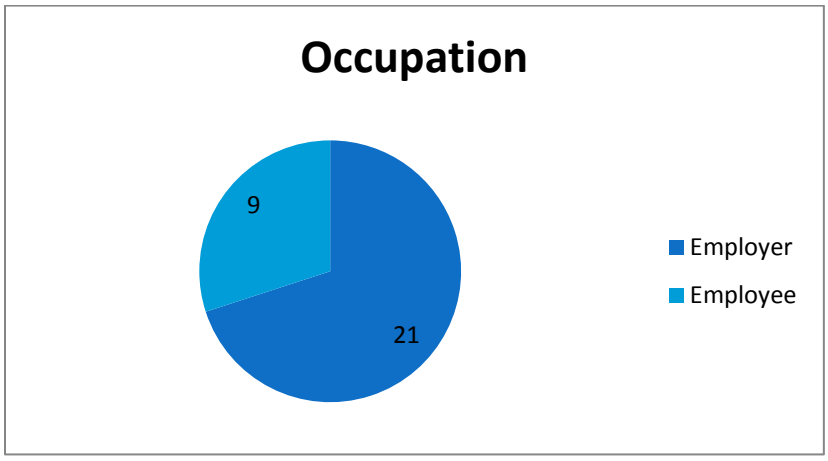


Effectiveness		
Very Good	10	33.33%
Good	14	46.67%
Bad	0	0.00%
N/A	6	20.00%



Willingness to Invest More		
Yes; amount	13	43.33%
No	9	30.00%
N/A	8	26.67%

Occupation		
Employer/Manager	21	70.00%
Employee	9	30.00%



Species	Average Price (in colones)		Species	Average Price (in colones)
Tilapia Entera	2707.8		Camarón Blanco	10350
Tilapia (pachitas)	3752		Camarón Cultivado	6293.75
Filete Trucha	7542.5		Camarón Jumbo	11583.33
Filete Corvineta	4690.58		Camarón Juvenil	11000
Filete Salmon	5390		Trucha Entera	3773
Filete Tilapia	4859.09		Pargo (Entero)	3466.67
Filete Corvina (Peq.)	5734.6		Chuleta Bolillo	3426.08
Filete Corvina (Grande)	4366.67		Vela	2514.6
Filete Corvina (Reina)	5496.2		Filete Marlín	4300
Filete Tiburón	3296.67		Baracuda Filete	4000
Filete Pargo	4357.14		Baracuda Entera	2000
Filete Cabrilla	5500		Robalo	4000
Corvina (entera)	3100		Dorado Filete	3578.2
Camarón Pink	6295.88		Dorado (Chuleta)	3200
Camarón Fidel	5646.58		Dorado Posta	2500
Camarón Pelado	5890.5			

Species	Average Amount (in kg/week)		Species	Average Amount (in kg/week)
Camaron	60.55		Chatarra	102.1429
Corvina	144.4286		Atun	37.5
Panga (Corvineta)	59.45833		Macarela	31.5
Dorado	172		Jurel	190
Marlin	136.25		St. Peter's Tilapia	13.8125
Pargo	62.36364		Robalo	35
Tiburon	257		Trucha	40
Vela	111.375		Salmon	21
Tilapia	101.7			
			Total	1576.081

Type of Fish	Type of Market			
	Hypermarket	Supermarket	Municpal Market	Famer's Market
Shrimp	42.00	6.17	80.21	52.67
Sea Bass	42.00	5.50	195.00	80.00

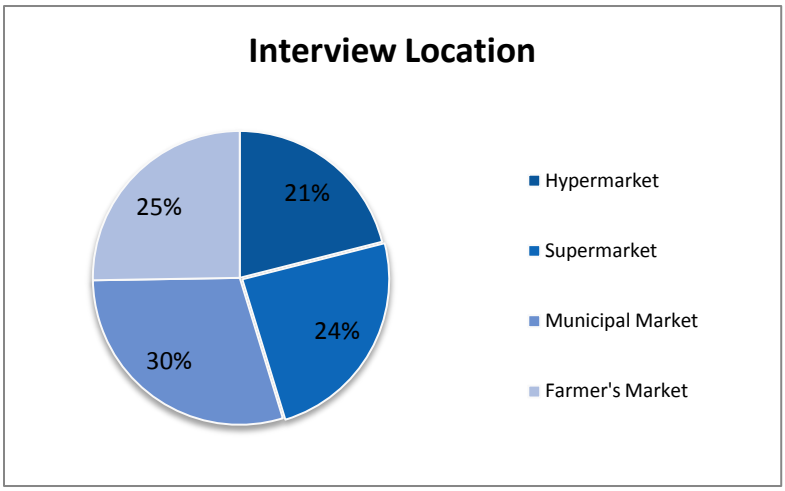
Panga	224.00	17.33	57.92	80.00
Mahi Mahi			253.33	50.00
Marlin			185.36	27.50
Porgy		1.00	82.50	15.00
Salmon	21.00			
Shark	42.00	6.67	377.14	22.50
Tilapia	315.00	23.17	66.50	300.00
Trout	77.00	3.00		
Total	763.00	62.83	1297.96	627.67

Correlations with each of these sets of data were done in the results section of the IQP

Appendix E.4: Consumer Findings

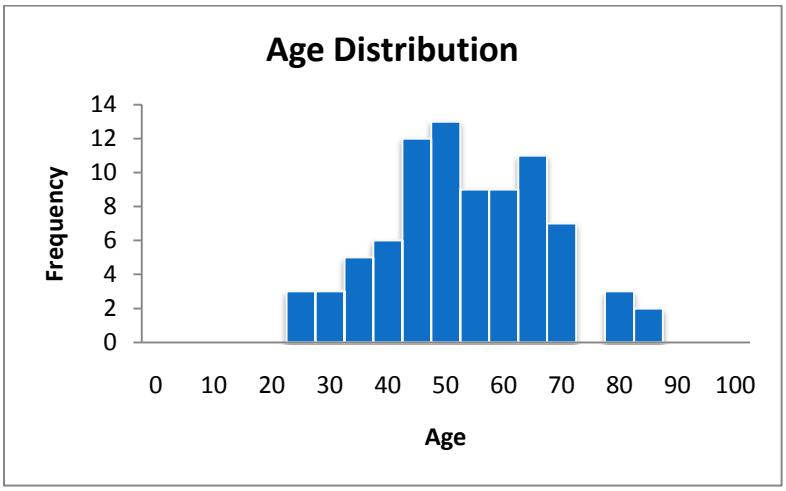
Appendix E.4.a: Interview Demographics

Interview Location



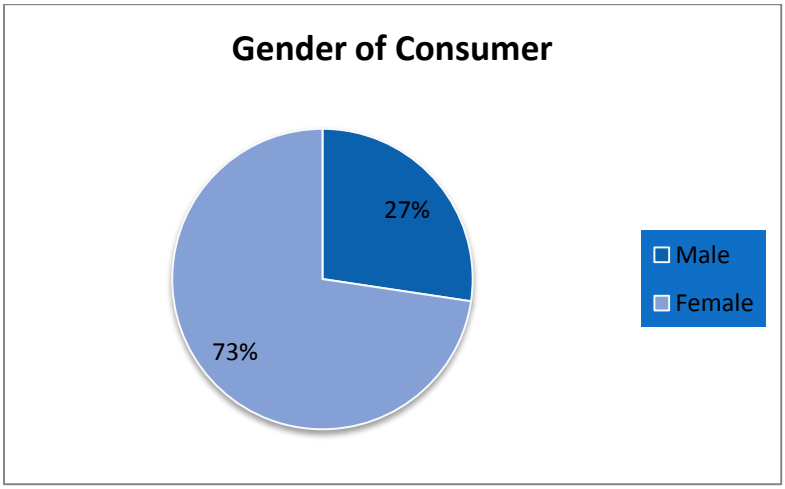
Interview Location	Total	Percentage
Hypermarket	20	21.05%
Supermarket	23	24.21%
Municipal Market	28	29.47%
Farmer's Market	24	25.26%

Age



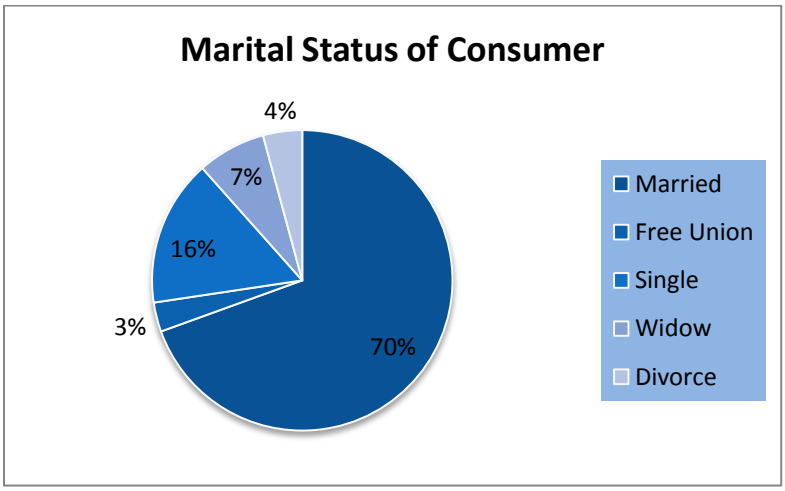
	Average	Standard Deviation
Age	51.5	14.0

Gender



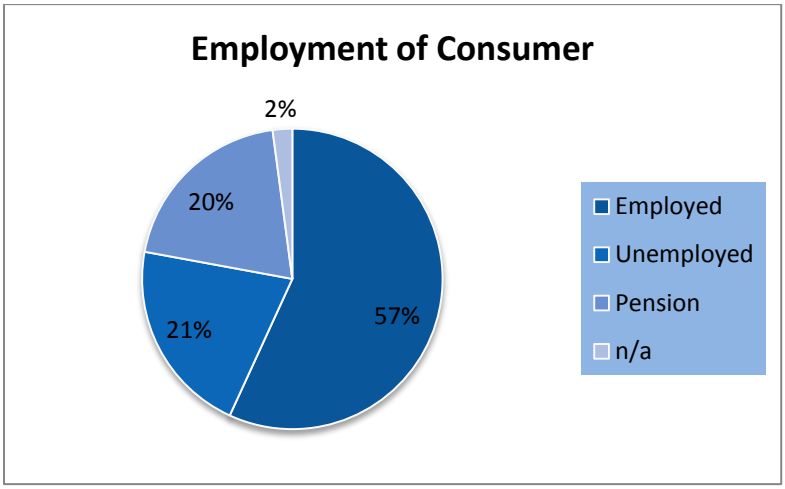
	Total	Percentage
Male	26	27.37%
Female	69	72.63%

Marital Status



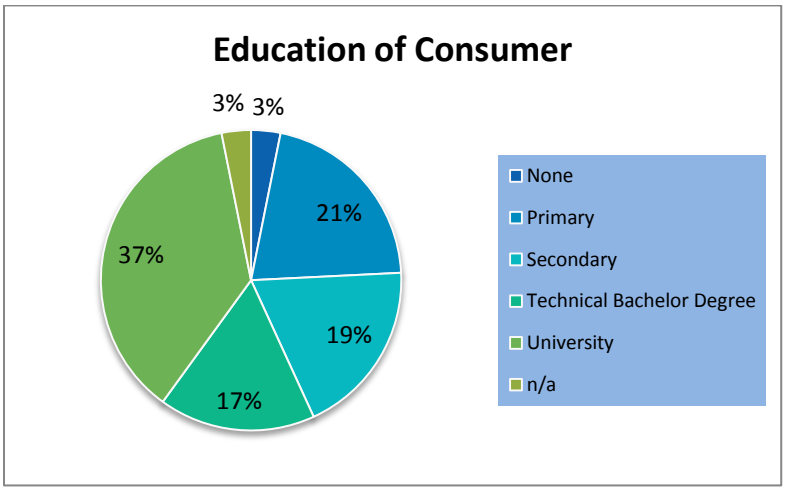
	Total	Percentage
Married	66	69.47%
Free Union	3	3.16%
Single	15	15.79%
Widow	7	7.37%
Divorce	4	4.21%

Employment



	Total	Percentage
Employed	54	56.84%
Unemployed	20	21.05%
Pension	19	20.00%
n/a	2	2.11%

Education



	Total	Percentage
None	3	3.16%
Primary	20	21.05%
Secondary	18	18.95%
Technical Bachelor Degree	16	16.84%
University	35	36.84%
n/a	3	3.16%

Appendix E.4.b: Standalone Findings

Opinion on Price

	Average	Standard Deviation
Opinion on Price (1=high;5=cheap)	2.57	0.94

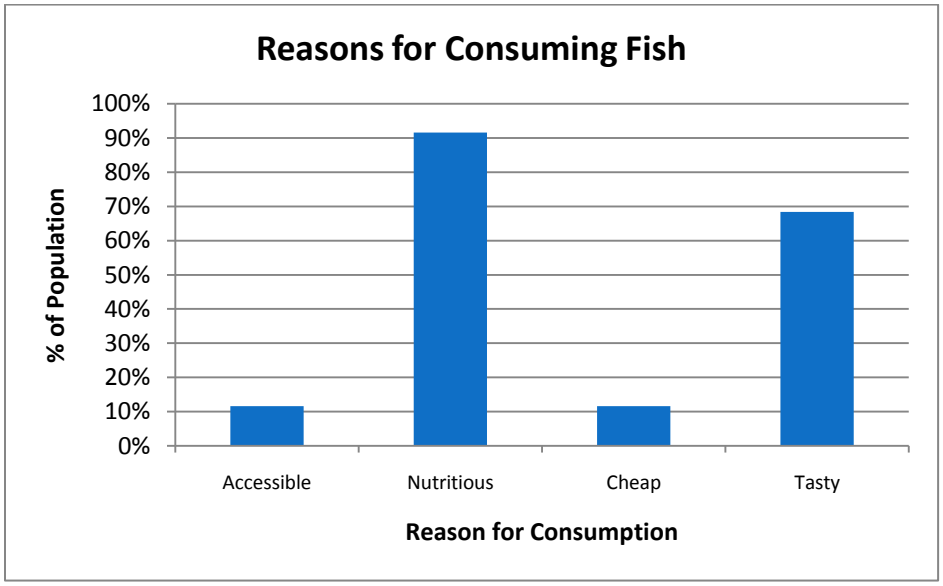
Opinion on Quality

	Average	Standard Deviation
Opinion on Quality (1=bad;5=great)	4.29	0.63

Nutritional Awareness

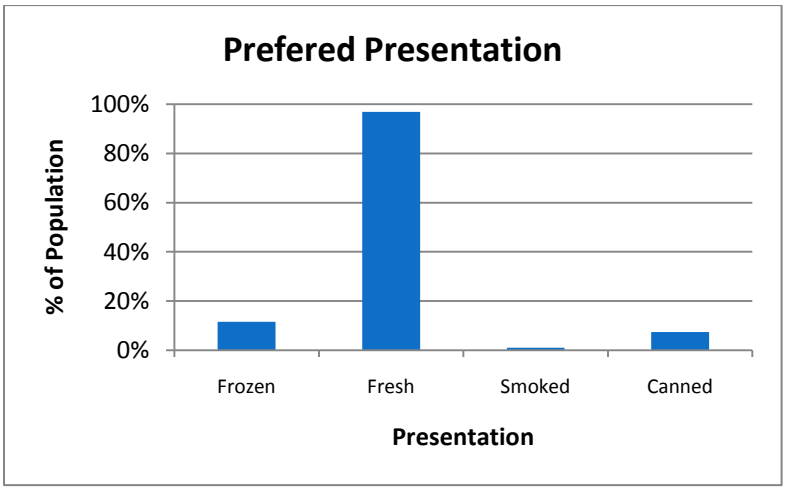
Nutritional Awareness	Total	Percent
Yes	95	100.00%
No	0	0.00%

Reason for Consuming Fish



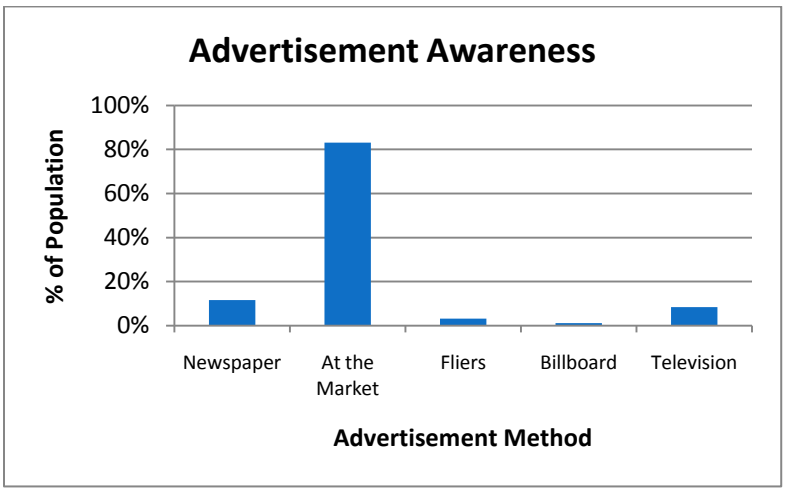
	Total	Percentage
Accessible	11	11.58%
Nutritious	87	91.58%
Cheap	11	11.58%
Tasty	65	68.42%

Preferred Presentation



	Total	Percentage
Frozen	11	11.58%
Fresh	92	96.84%
Smoked	1	1.05%
Canned	7	7.37%

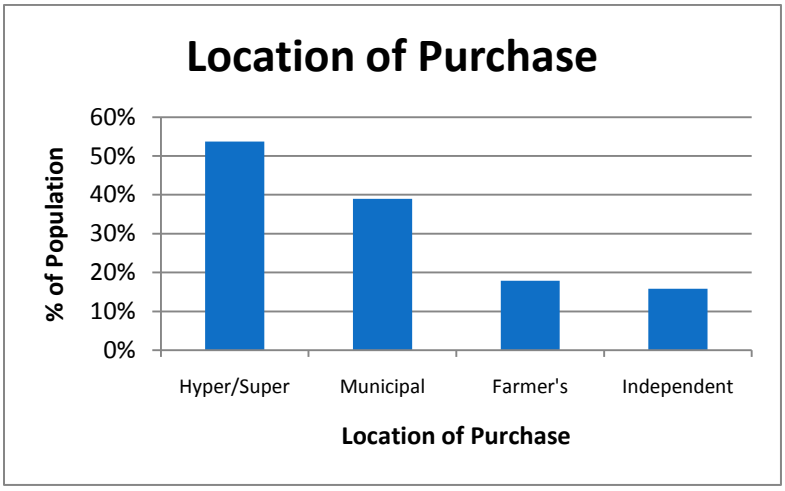
Advertisement Awareness



	Total	Percentage
Newspaper	11	11.58%
At the Market	79	83.16%
Fliers	3	3.16%
Billboard	1	1.05%
Television	8	8.42%

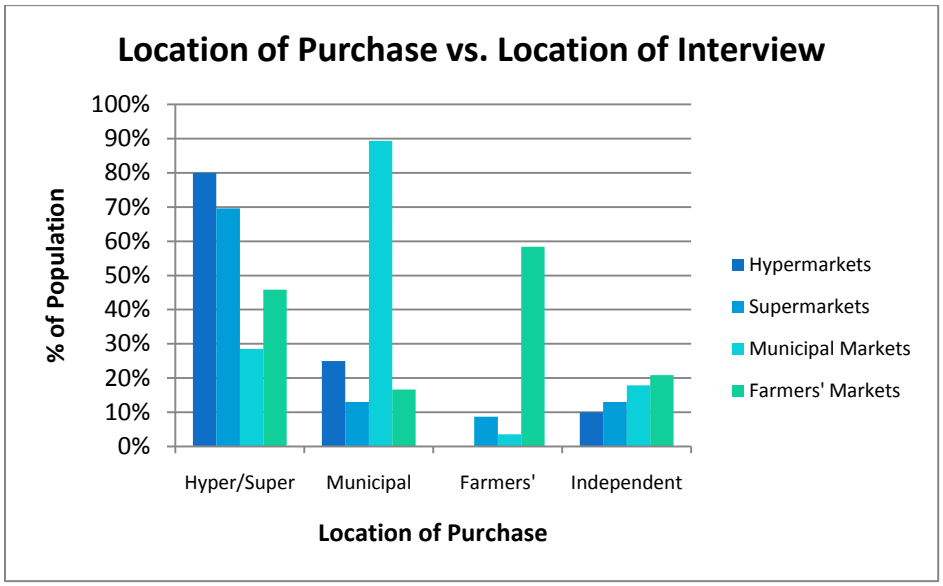
Appendix E.4.c: Comparisons against Location of Purchase

General



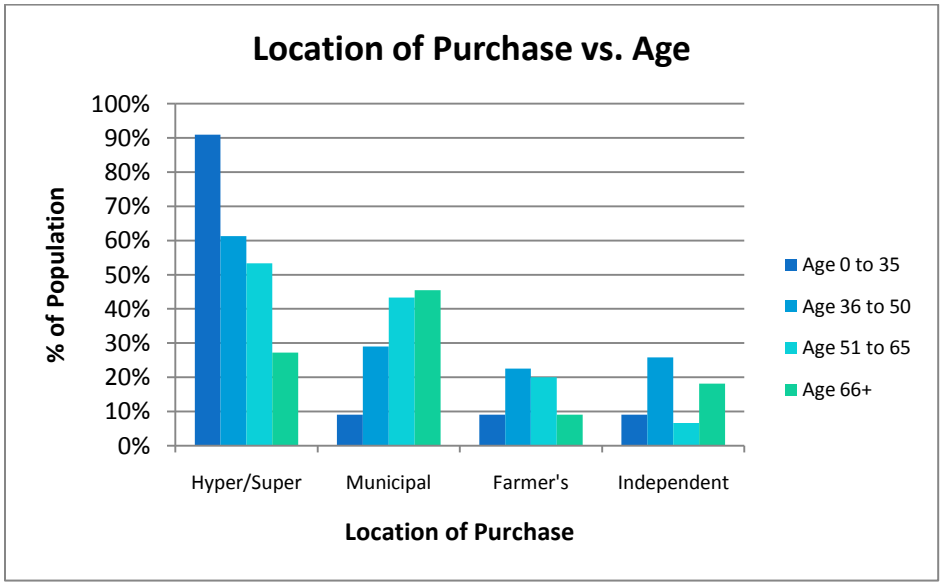
	Total	Percentage
Hyper/Super	51	53.68%
Municipal	37	38.95%
Farmer's	17	17.89%
Independent	15	15.79%

Location of Purchase vs. Location of Interviewer



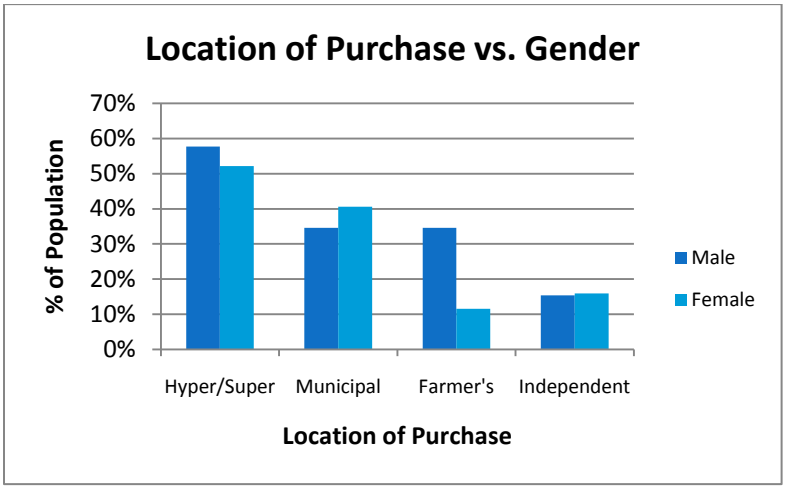
	Hypermarkets		Supermarkets		Municipal Markets		Farmers' Markets	
Location of Purchase	Total	%	Total	%	Total	%	Total	%
Hyper/Super	16	80.00%	16	69.57%	8	28.57%	11	45.83%
Municipal	5	25.00%	3	13.04%	25	89.29%	4	16.67%
Farmers'	0	0.00%	2	8.70%	1	3.57%	14	58.33%
Independent	2	10.00%	3	13.04%	5	17.86%	5	20.83%

Location of Purchase vs. Age



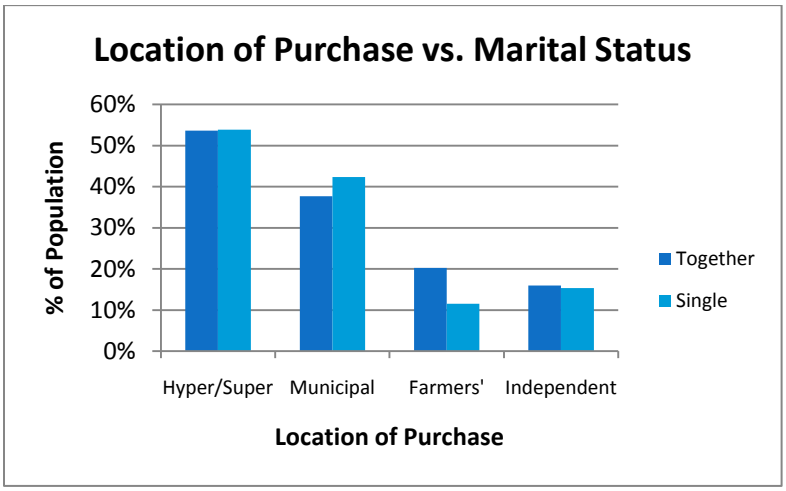
	0-35		36-50		51-65		66+		
	Total	%	Total	%	Total	%	Total	%	Correlation
Hyper/Super	10	90.91%	19	61.29%	16	53.33%	3	27.27%	-0.30
Municipal	1	9.09%	9	29.03%	13	43.33%	5	45.45%	0.32
Farmer's	1	9.09%	7	22.58%	6	20.00%	1	9.09%	-0.05
Independent	1	9.09%	8	25.81%	2	6.67%	2	18.18%	-0.04

Location of Purchase vs. Gender



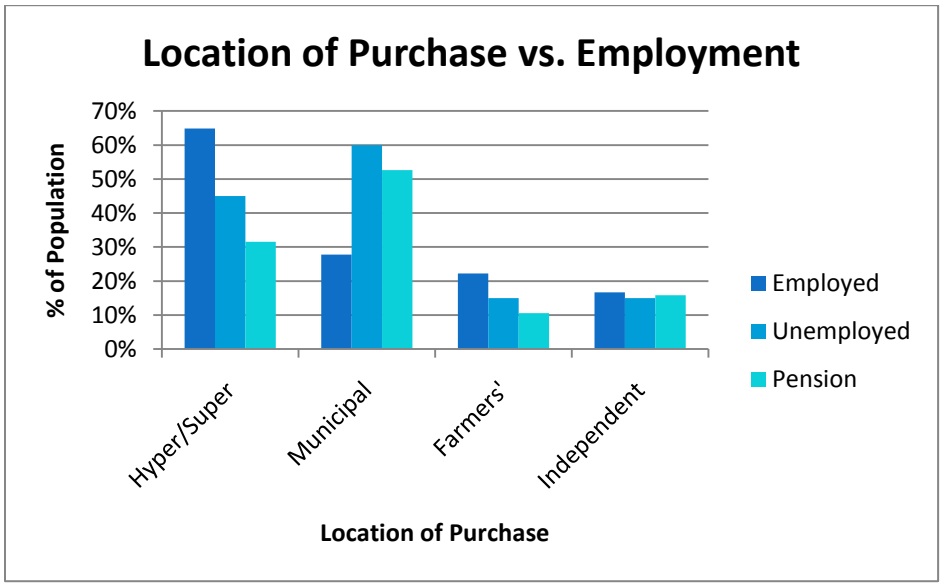
	Male		Female	
	Total	%	Total	%
Hyper/Super	15	57.69%	36	52.17%
Municipal	9	34.62%	28	40.58%
Farmer's	9	34.62%	8	11.59%
Independent	4	15.38%	11	15.94%

Location of Purchase vs. Marital Status



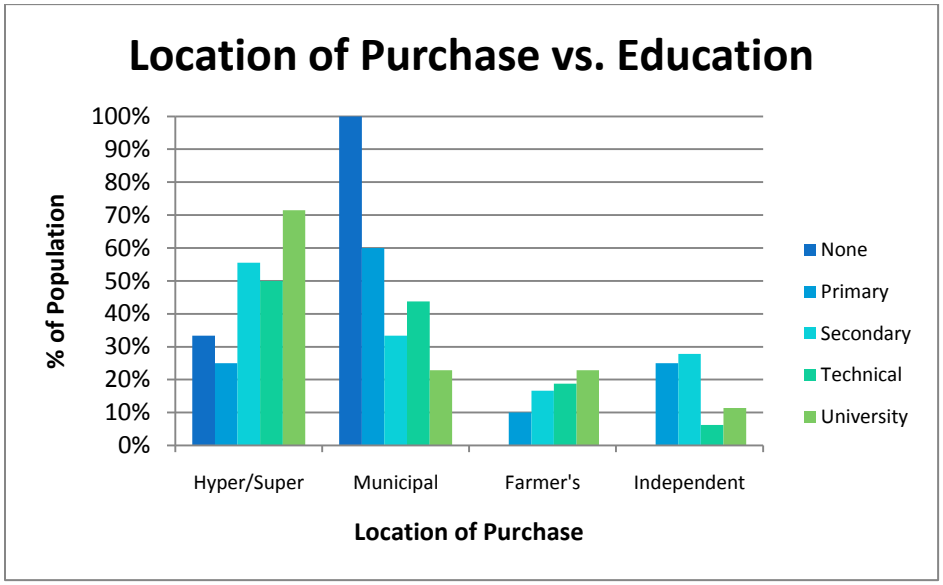
	Together		Single	
	Total	%	Total	%
Hyper/Super	37	53.62%	14	53.85%
Municipal	26	37.68%	11	42.31%
Farmers'	14	20.29%	3	11.54%
Independent	11	15.94%	4	15.38%

Location of Purchase vs. Employment



	Employed		Unemployed		Pension	
	Total	%	Total	%	Total	%
Hyper/Super	35	64.81%	9	45.00%	6	31.58%
Municipal	15	27.78%	12	60.00%	10	52.63%
Farmers'	12	22.22%	3	15.00%	2	10.53%
Independent	9	16.67%	3	15.00%	3	15.79%

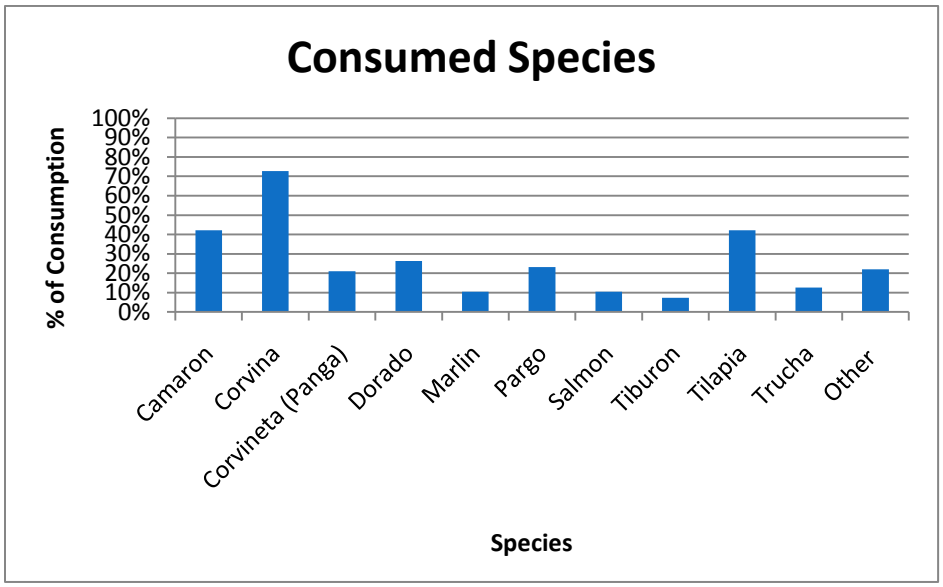
Location of Purchase vs. Education



	None		Primary		Secondary		Technical		University		
	Tot	%	Tot	%	Tot	%	Tot	%	Tot	%	Correl.
Hyper/Super	1	33.33%	5	25.00%	10	55.56%	8	50.00%	25	71.43%	0.33
Municipal	3	100.00%	12	60.00%	6	33.33%	7	43.75%	8	22.86%	-0.32
Farmer's	0	0.00%	2	10.00%	3	16.67%	3	18.75%	8	22.86%	0.15
Independent	0	0.00%	5	25.00%	5	27.78%	1	6.25%	4	11.43%	-0.13

Appendix E.4.d: Comparisons against Consumed Species

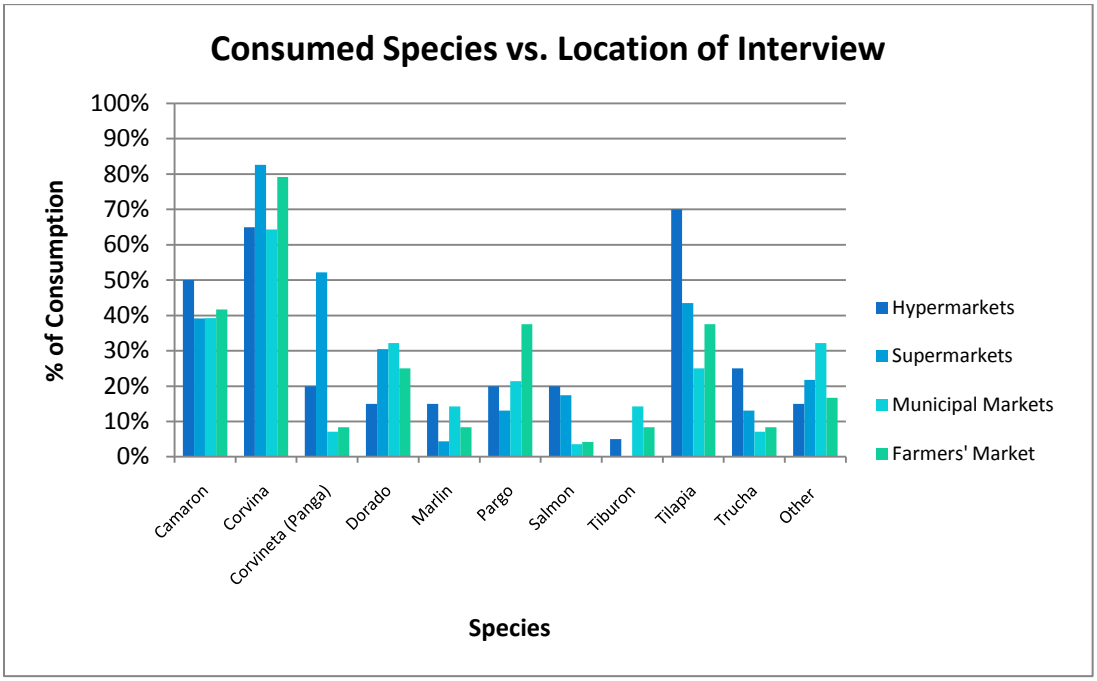
General



	Total	Percentage
Camarón	40	42.11%
Corvina	69	72.63%
Corvineta (Panga)	20	21.05%
Dorado	25	26.32%
Marlin	10	10.53%
Pargo	22	23.16%
Salmon	10	10.53%
Tiburon	7	7.37%
Tilapia	40	42.11%
Trucha	12	12.63%
Other*	21	22.11%

*Other includes: Vela, Pulpo, Seafood, and Tuna

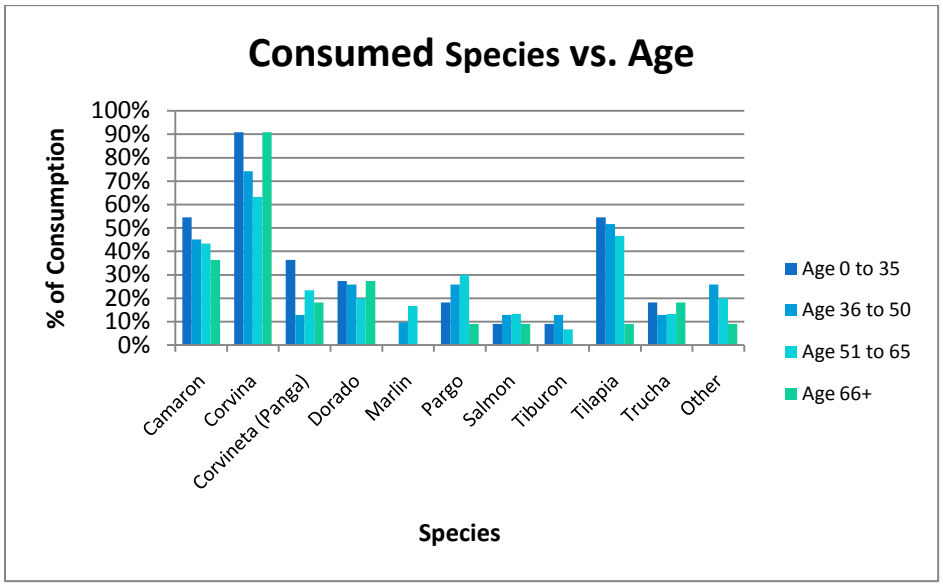
Consumed Species vs. Location of Interview



	Hypermarkets		Supermarkets		Municipal Markets		Farmer's Markets	
	Total	%	Total	%	Total	%	Total	%
Camarón	10	50.00%	9	39.13%	11	39.29%	10	41.67%
Corvina	13	65.00%	19	82.61%	18	64.29%	19	79.17%
Corvineta (Panga)	4	20.00%	12	52.17%	2	7.14%	2	8.33%
Dorado	3	15.00%	7	30.43%	9	32.14%	6	25.00%
Marlin	3	15.00%	1	4.35%	4	14.29%	2	8.33%
Pargo	4	20.00%	3	13.04%	6	21.43%	9	37.50%
Salmon	4	20.00%	4	17.39%	1	3.57%	1	4.17%
Tiburon	1	5.00%	0	0.00%	4	14.29%	2	8.33%
Tilapia	14	70.00%	10	43.48%	7	25.00%	9	37.50%
Trucha	5	25.00%	3	13.04%	2	7.14%	2	8.33%
Other*	3	15.00%	5	21.74%	9	32.14%	4	16.67%

*Other includes: Vela, Pulpo, Seafood, and Tuna

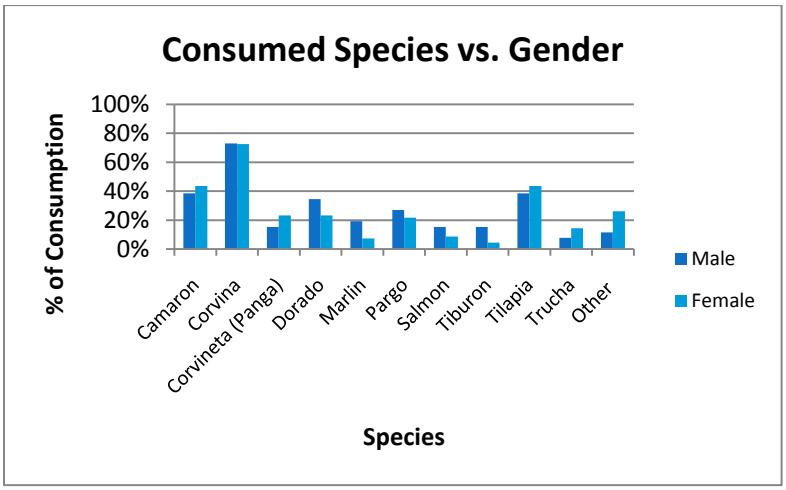
Consumed Species vs. Age



	0-35		36-50		51-65		66+		
	Total	%	Total	%	Total	%	Total	%	Correlation
Camarón	6	54.55%	14	45.16%	13	43.33%	4	36.36%	-0.10
Corvina	10	90.91%	23	74.19%	19	63.33%	10	90.91%	-0.11
Corvineta (Panga)	4	36.36%	4	12.90%	7	23.33%	2	18.18%	-0.06
Dorado	3	27.27%	8	25.81%	6	20.00%	3	27.27%	0.00
Marlin	0	0.00%	3	9.68%	5	16.67%	0	0.00%	0.10
Pargo	2	18.18%	8	25.81%	9	30.00%	1	9.09%	0.00
Salmon	1	9.09%	4	12.90%	4	13.33%	1	9.09%	-0.07
Tiburon	1	9.09%	4	12.90%	2	6.67%	0	0.00%	-0.03
Tilapia	6	54.55%	16	51.61%	14	46.67%	1	9.09%	-0.25
Trucha	2	18.18%	4	12.90%	4	13.33%	2	18.18%	0.00
Other*	0	0.00%	8	25.81%	6	20.00%	1	9.09%	0.01

*Other includes: Vela, Pulpo, Seafood, and Tuna

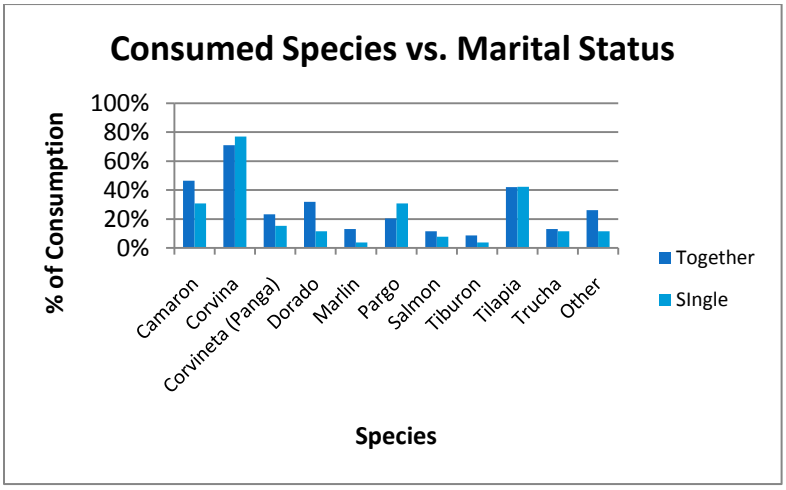
Consumed Species vs. Gender



	Male		Female	
	Total	%	Total/Average	%/SD
Camarón	10	38.46%	30	43.48%
Corvina	19	73.08%	50	72.46%
Corvineta (Panga)	4	15.38%	16	23.19%
Dorado	9	34.62%	16	23.19%
Marlin	5	19.23%	5	7.25%
Pargo	7	26.92%	15	21.74%
Salmon	4	15.38%	6	8.70%
Tiburon	4	15.38%	3	4.35%
Tilapia	10	38.46%	30	43.48%
Trucha	2	7.69%	10	14.49%
Other*	3	11.54%	18	26.09%

*Other includes: Vela, Pulpo, Seafood, and Tuna

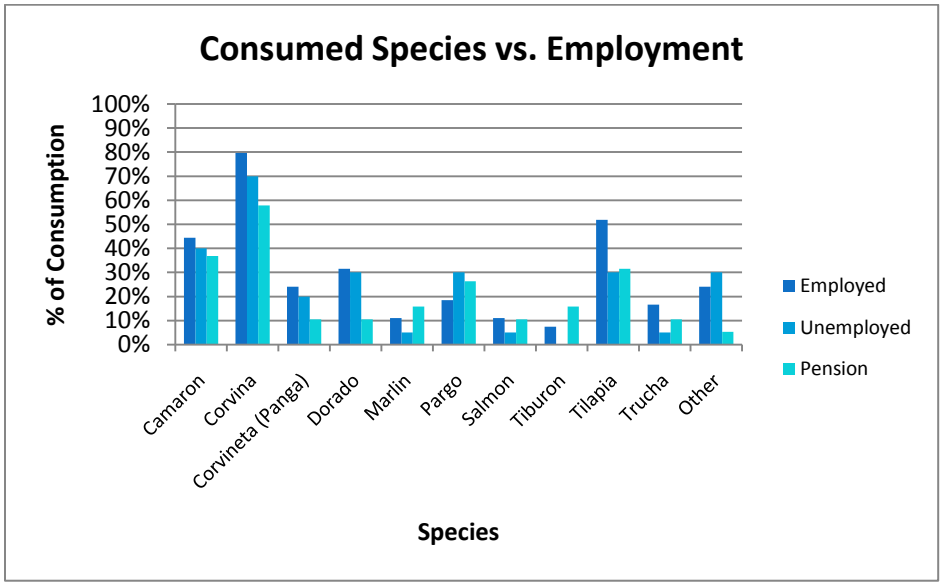
Consumed Species vs. Marital Status



	Together		Single	
	Total	%	Total	%
Camarón	32	46.38%	8	30.77%
Corvina	49	71.01%	20	76.92%
Corvineta (Panga)	16	23.19%	4	15.38%
Dorado	22	31.88%	3	11.54%
Marlin	9	13.04%	1	3.85%
Pargo	14	20.29%	8	30.77%
Salmon	8	11.59%	2	7.69%
Tiburon	6	8.70%	1	3.85%
Tilapia	29	42.03%	11	42.31%
Trucha	9	13.04%	3	11.54%
Other*	18	26.09%	3	11.54%

*Other includes: Vela, Pulpo, Seafood, and Tuna

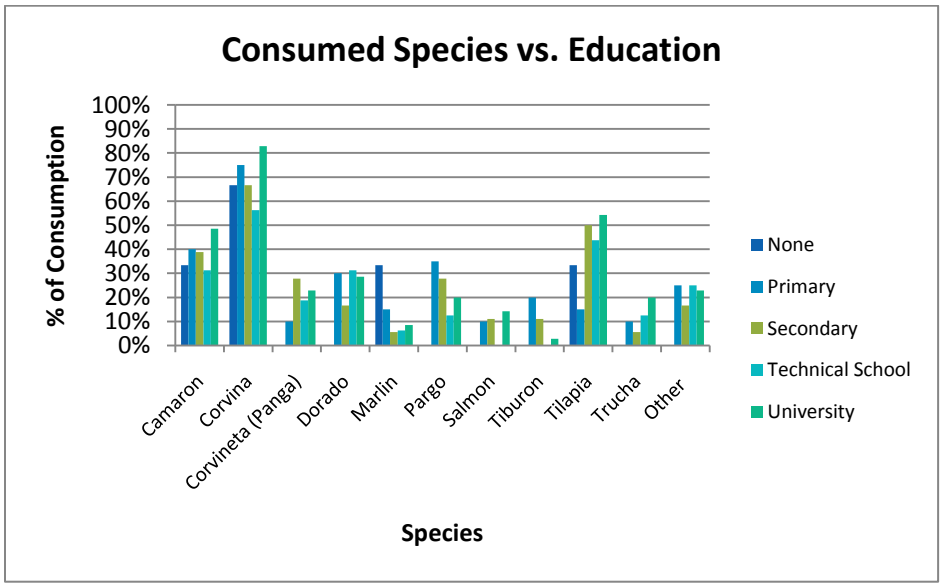
Consumed Species vs. Employment



	Employed		Unemployed		Pensioned	
	Total	%	Total	%	Total	%
Camaron	24	44.44%	8	40.00%	7	36.84%
Corvina	43	79.63%	14	70.00%	11	57.89%
Corvineta (Panga)	13	24.07%	4	20.00%	2	10.53%
Dorado	17	31.48%	6	30.00%	2	10.53%
Marlin	6	11.11%	1	5.00%	3	15.79%
Pargo	10	18.52%	6	30.00%	5	26.32%
Salmon	6	11.11%	1	5.00%	2	10.53%
Tiburon	4	7.41%	0	0.00%	3	15.79%
Tilapia	28	51.85%	6	30.00%	6	31.58%
Trucha	9	16.67%	1	5.00%	2	10.53%
Other*	13	24.07%	6	30.00%	1	5.26%

*Other includes: Vela, Pulpo, Seafood, and Tuna

Consumed Species vs. Education

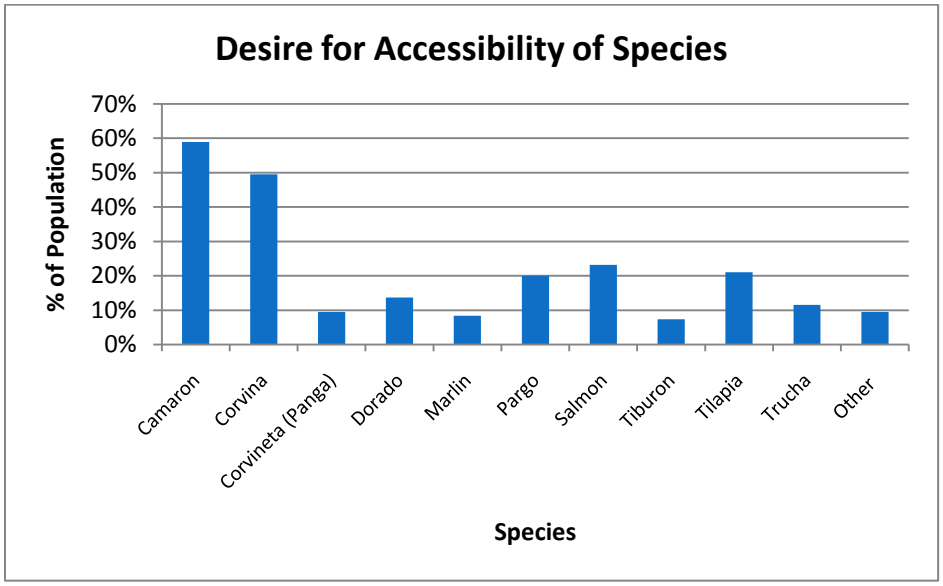


	None		Primary		Secondary		Technical		University		
	Tot	%	Tot	%	Tot	%	Tot	%	Tot	%	Correl
Camaron	1	33.33%	8	40.00%	7	38.89%	5	31.25%	17	48.57%	0.07
Corvina	2	66.67%	15	75.00%	12	66.67%	9	56.25%	29	82.86%	0.08
Corvineta (Panga)	0	0.00%	2	10.00%	5	27.78%	3	18.75%	8	22.86%	0.11
Dorado	0	0.00%	6	30.00%	3	16.67%	5	31.25%	10	28.57%	0.07
Marlin	1	33.33%	3	15.00%	1	5.56%	1	6.25%	3	8.57%	-0.11
Pargo	0	0.00%	7	35.00%	5	27.78%	2	12.50%	7	20.00%	-0.10
Salmon	0	0.00%	2	10.00%	2	11.11%	0	0.00%	5	14.29%	0.06
Tiburon	0	0.00%	4	20.00%	2	11.11%	0	0.00%	1	2.86%	-0.21
Tilapia	1	33.33%	3	15.00%	9	50.00%	7	43.75%	19	54.29%	0.25
Trucha	0	0.00%	2	10.00%	1	5.56%	2	12.50%	7	20.00%	0.16
Other*	0	0.00%	5	25.00%	3	16.67%	4	25.00%	8	22.86%	0.04

*Other includes: Vela, Pulpo, Seafood, and Tuna

Appendix E.4.e: Comparisons against Desire for Accessibility of Species

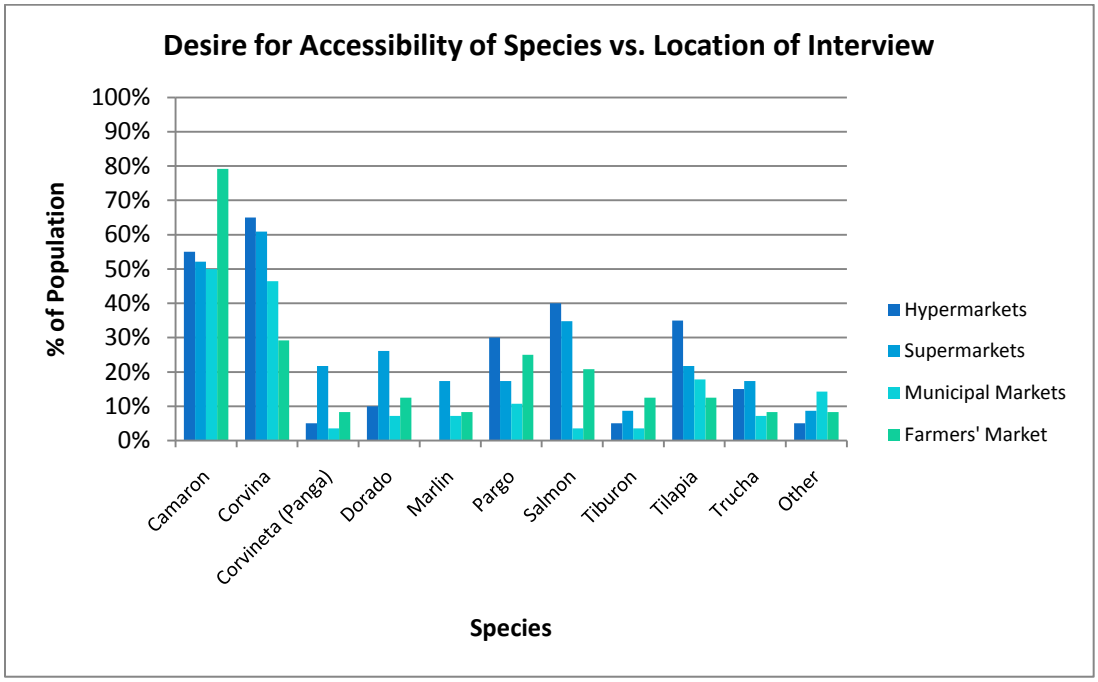
General



	Total	Percentage
Camarón	56	58.95%
Corvina	47	49.47%
Corvineta (Panga)	9	9.47%
Dorado	13	13.68%
Marlin	8	8.42%
Pargo	19	20.00%
Salmon	22	23.16%
Tiburon	7	7.37%
Tilapia	20	21.05%
Trucha	11	11.58%
Other*	9	9.47%

*Other includes vela, robalo, and pulpo

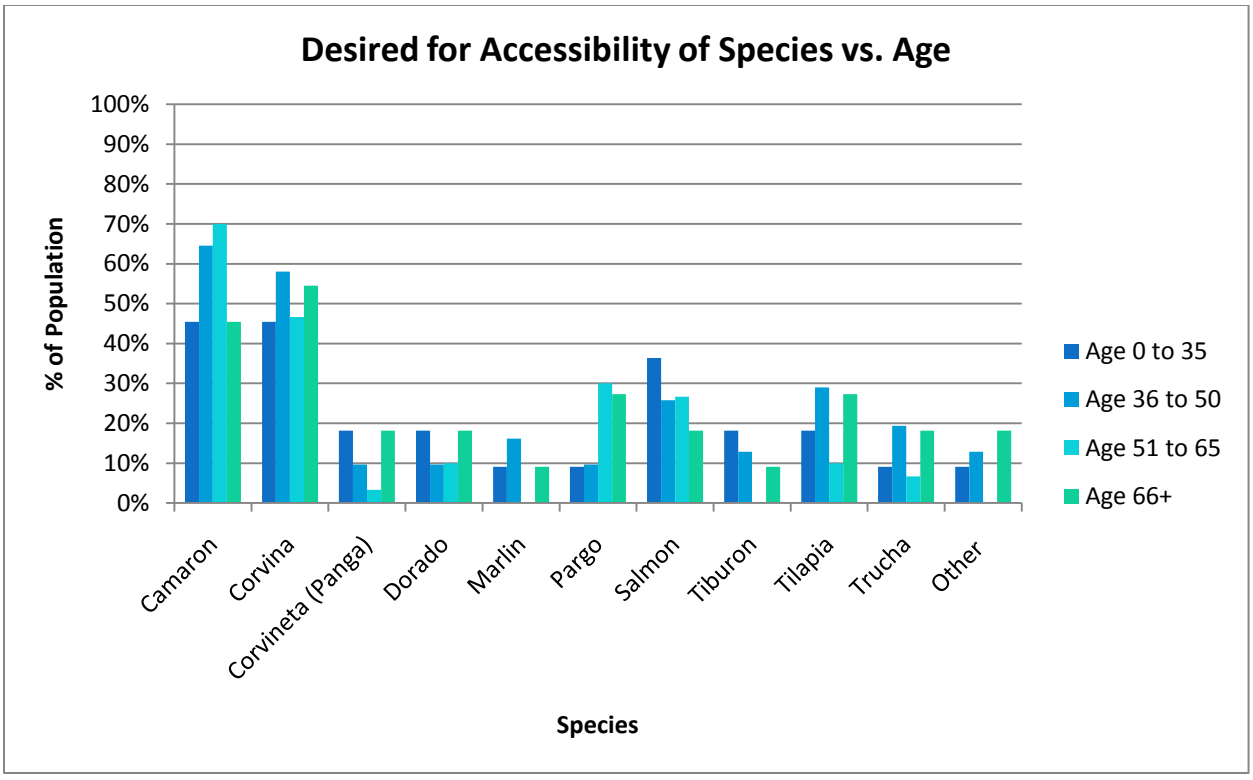
Desire for Accessibility of Species vs. Location of Interview



	Hypermarkets		Supermarkets		Municipal Markets		Farmer's Markets	
	Total	%	Total	%	Total	%	Total	%
Camaron	11	55.00%	12	52.17%	14	50.00%	19	79.17%
Corvina	13	65.00%	14	60.87%	13	46.43%	7	29.17%
Corvineta (Panga)	1	5.00%	5	21.74%	1	3.57%	2	8.33%
Dorado	2	10.00%	6	26.09%	2	7.14%	3	12.50%
Marlin	0	0.00%	4	17.39%	2	7.14%	2	8.33%
Pargo	6	30.00%	4	17.39%	3	10.71%	6	25.00%
Salmon	8	40.00%	8	34.78%	1	3.57%	5	20.83%
Tiburon	1	5.00%	2	8.70%	1	3.57%	3	12.50%
Tilapia	7	35.00%	5	21.74%	5	17.86%	3	12.50%
Trucha	3	15.00%	4	17.39%	2	7.14%	2	8.33%
Other*	1	5.00%	2	8.70%	4	14.29%	2	8.33%

*Other includes vela, robalo, and pulpo

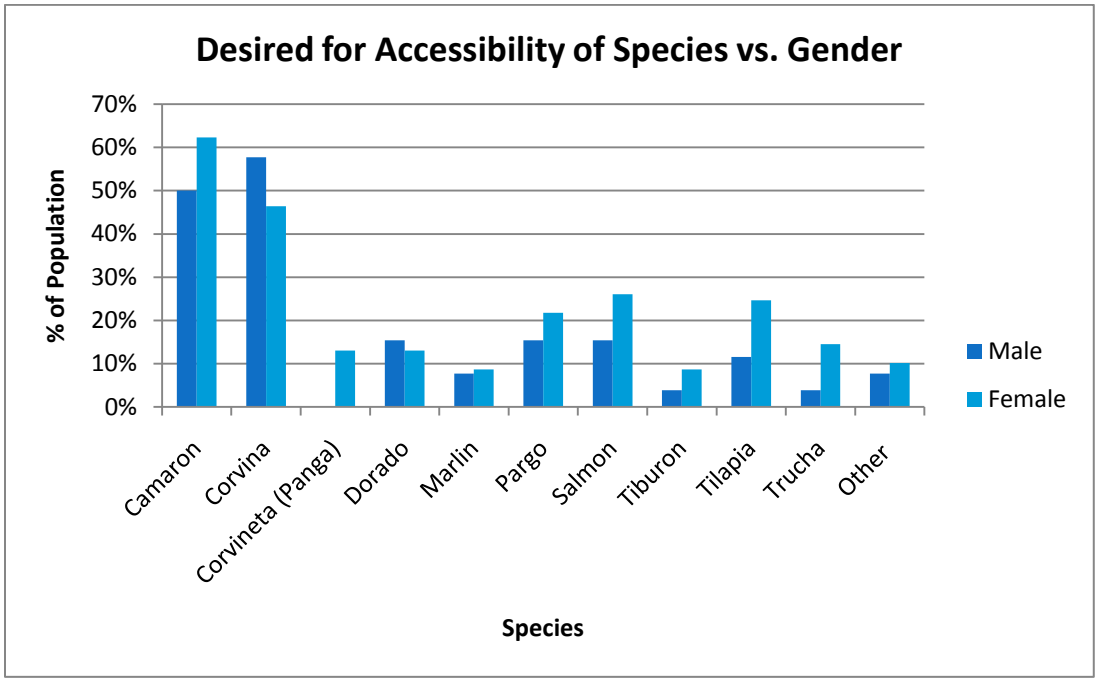
Desire for Accessibility of Species vs. Age



	0-35		36-50		51-65		66+		
	Tot	%	Tot	%	Tot	%	Tot	%	Correl.
Camaron	5	45.45%	20	64.52%	21	70.00%	5	45.45%	0.10
Corvina	5	45.45%	18	58.06%	14	46.67%	6	54.55%	0.03
Corvineta (Panga)	2	18.18%	3	9.68%	1	3.33%	2	18.18%	-0.04
Dorado	2	18.18%	3	9.68%	3	10.00%	2	18.18%	0.04
Marlin	1	9.09%	5	16.13%	0	0.00%	1	9.09%	-0.12
Pargo	1	9.09%	3	9.68%	9	30.00%	3	27.27%	0.19
Salmon	4	36.36%	8	25.81%	8	26.67%	2	18.18%	-0.18
Tiburon	2	18.18%	4	12.90%	0	0.00%	1	9.09%	-0.15
Tilapia	2	18.18%	9	29.03%	3	10.00%	3	27.27%	0.00
Trucha	1	9.09%	6	19.35%	2	6.67%	2	18.18%	-0.05
Other*	1	9.09%	4	12.90%	0	0.00%	2	18.18%	-0.03

*Other includes vela, robalo, and pulpo

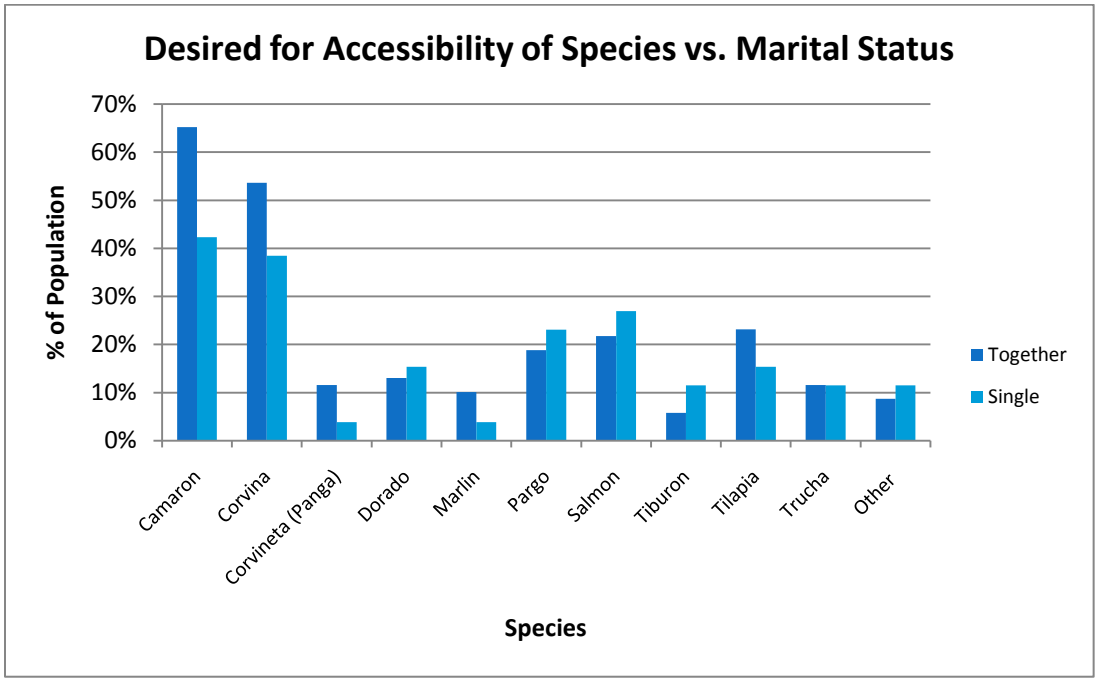
Desire for Accessibility of Species vs. Gender



	Male		Female	
	Total	%	Total	%
Camaron	13	50.00%	43	62.32%
Corvina	15	57.69%	32	46.38%
Corvineta (Panga)	0	0.00%	9	13.04%
Dorado	4	15.38%	9	13.04%
Marlin	2	7.69%	6	8.70%
Pargo	4	15.38%	15	21.74%
Salmon	4	15.38%	18	26.09%
Tiburon	1	3.85%	6	8.70%
Tilapia	3	11.54%	17	24.64%
Trucha	1	3.85%	10	14.49%
Other*	2	7.69%	7	10.14%

*Other includes vela, robalo, and pulpo

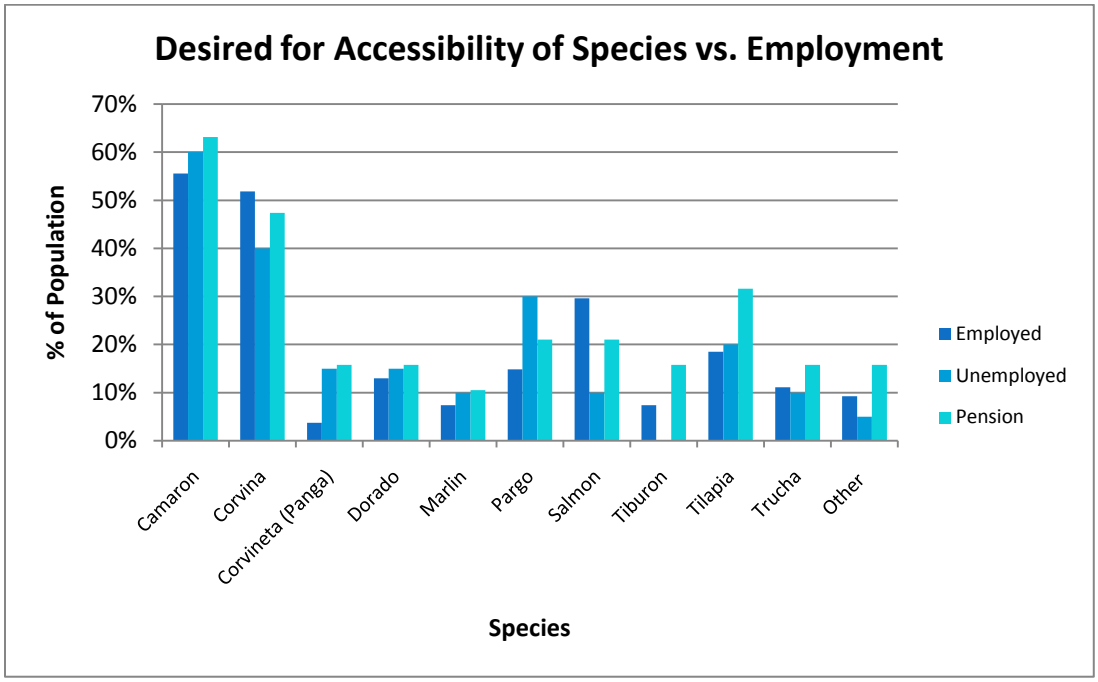
Desire for Accessibility of Species vs. Marital Status



	Together		Single	
	Total	%	Total	%
Camarón	45	65.22%	11	42.31%
Corvina	37	53.62%	10	38.46%
Corvineta (Panga)	8	11.59%	1	3.85%
Dorado	9	13.04%	4	15.38%
Marlin	7	10.14%	1	3.85%
Pargo	13	18.84%	6	23.08%
Salmon	15	21.74%	7	26.92%
Tiburon	4	5.80%	3	11.54%
Tilapia	16	23.19%	4	15.38%
Trucha	8	11.59%	3	11.54%
Other*	6	8.70%	3	11.54%

*Other includes vela, robalo, and pulpo

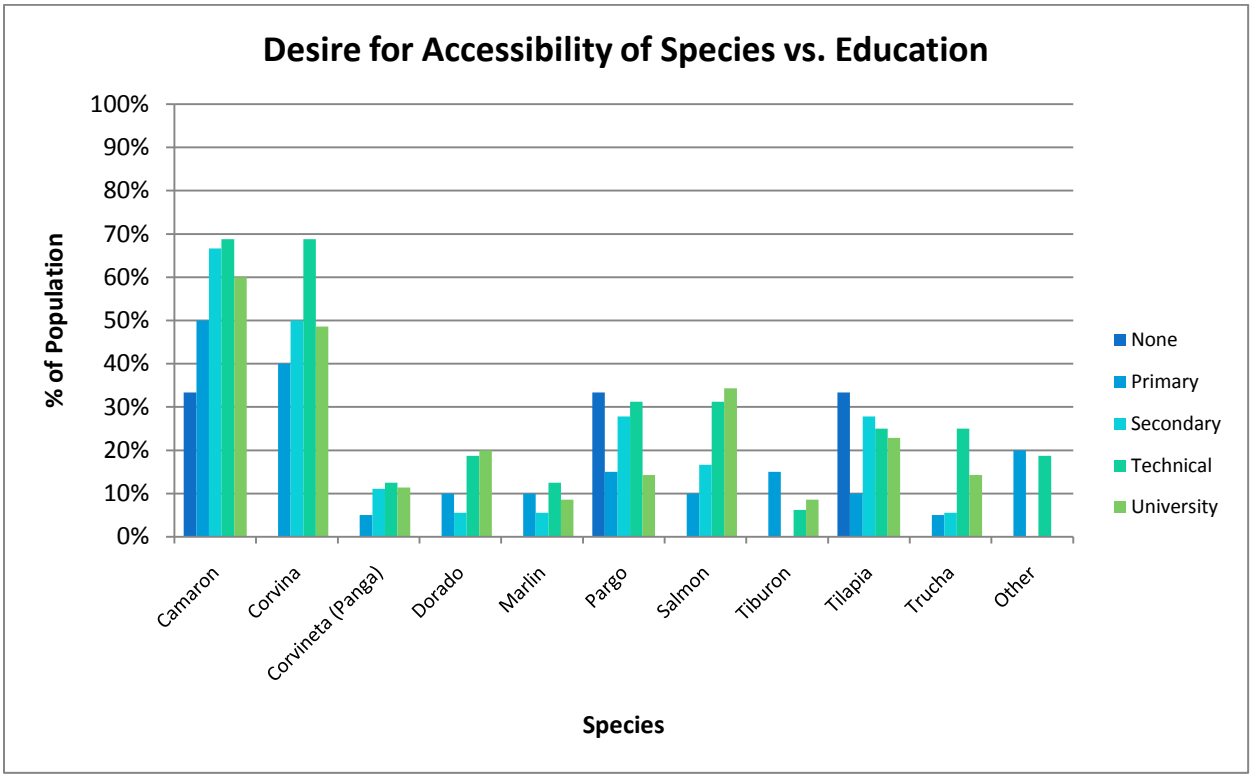
Desire for Accessibility of Species vs. Employment



	Employed		Unemployed		Pension	
	Total	%	Total	%	Total	%
Camarón	30	55.56%	12	60.00%	12	63.16%
Corvina	28	51.85%	8	40.00%	9	47.37%
Corvineta (Panga)	2	3.70%	3	15.00%	3	15.79%
Dorado	7	12.96%	3	15.00%	3	15.79%
Marlin	4	7.41%	2	10.00%	2	10.53%
Pargo	8	14.81%	6	30.00%	4	21.05%
Salmon	16	29.63%	2	10.00%	4	21.05%
Tiburon	4	7.41%	0	0.00%	3	15.79%
Tilapia	10	18.52%	4	20.00%	6	31.58%
Trucha	6	11.11%	2	10.00%	3	15.79%
Other*	5	9.26%	1	5.00%	3	15.79%

*Other includes vela, robalo, and pulpo

Desire for Accessibility of Species vs. Education



	None		Primary		Secondary		Technical		University		
	Tot	%	Tot	%	Tot	%	Tot	%	Tot	%	Correl.
Camarón	1	33.33%	10	50.00%	12	66.67%	11	68.75%	21	60.00%	0.09
Corvina	0	0.00%	8	40.00%	9	50.00%	11	68.75%	17	48.57%	0.13
Corvineta (Panga)	0	0.00%	1	5.00%	2	11.11%	2	12.50%	4	11.43%	0.09
Dorado	0	0.00%	2	10.00%	1	5.56%	3	18.75%	7	20.00%	0.16
Marlin	0	0.00%	2	10.00%	1	5.56%	2	12.50%	3	8.57%	0.02
Pargo	1	33.33%	3	15.00%	5	27.78%	5	31.25%	5	14.29%	-0.05
Salmon	0	0.00%	2	10.00%	3	16.67%	5	31.25%	12	34.29%	0.25
Tiburon	0	0.00%	3	15.00%	0	0.00%	1	6.25%	3	8.57%	-0.02
Tilapia	1	33.33%	2	10.00%	5	27.78%	4	25.00%	8	22.86%	0.06
Trucha	0	0.00%	1	5.00%	1	5.56%	4	25.00%	5	14.29%	0.15
Other*	0	0.00%	4	20.00%	0	0.00%	3	18.75%	2	5.71%	-0.08

*Other includes vela, robalo, and pulpo

Appendix E.4.f: Comparisons against Amount Consumed

Amount Consumed vs. Age

Age	Average (kg. per week)	Standard Deviation
0-35	1.39	0.80
36-50	1.23	0.79
51-65	1.46	0.78
66+	1.00	0.50
Correlation: -0.12		

Amount Consumed vs. Gender

Gender	Average (kg. per week)	Standard Deviation
Male	1.49	0.88
Female	1.28	0.70

Amount Consumed vs. Marital Status

Marital Status	Average (kg. per week)	Standard Deviation
Together	1.38	0.74
Single	1.24	0.81

Amount Consumed vs. Employment

Employment	Average (kg. per week)	Standard Deviation
Employed	1.45	0.88
Unemployed	1.28	0.62
Pensioned	1.08	0.48

Amount Consumed vs. Education

Education	Average (kg. per week)	Standard Deviation
None	0.50	0.00
Primary	1.20	0.71
Secondary	1.47	0.63
Technical	1.17	0.95
University	1.41	0.68
Correlation: 0.15		

Appendix E.4.g: Comparisons against Frequency

Frequency vs. Age

Age	Average (times per month)	Standard Deviation
0-35	4.91	2.07
36-50	5.39	2.91
51-65	5.57	2.49
66+	3.91	1.70
Correlation: -0.02		

Frequency vs. Gender

Gender	Average (times per month)	Standard Deviation
Male	5.23	2.85
Female	5.06	2.35

Frequency vs. Marital Status

Marital Status	Average (times per month)	Standard Deviation
Together	5.40	2.52
Single	4.35	2.24

Frequency vs. Employment

Employment	Average (times per month)	Standard Deviation
Employed	5.51	2.75
Unemployed	4.85	1.98
Pensioned	4.16	1.95

Frequency vs. Education

Education	Average (times per month)	Standard Deviation
None	3.33	1.15
Primary	4.30	2.11
Secondary	5.44	2.55
Technical	4.33	2.13
University	5.97	2.71
Correlation: 0.25		

Appendix E.4.h: Comparisons against Amount Paid

Amount Paid vs. Age

Age	Average (Colones per week)	Standard Deviation
0-35	₡5,255	₡3,747
36-50	₡5,398	₡3,819
51-65	₡5,238	₡3,093
66+	₡4,255	₡3,799
Correlation: -0.07		

Amount Paid vs. Gender

Gender	Average (Colones per week)	Standard Deviation
Male	₡5,865	₡5,481
Female	₡5,239	₡3,404

Amount Paid vs. Marital Status

Marital Status	Average (Colones per week)	Standard Deviation
Together	₡5,847	₡4,230
Single	₡4,413	₡3,530

Amount Paid vs. Employment

Employment	Average (Colones per week)	Standard Deviation
Employed	₡5,805	₡4,613
Unemployed	₡5,325	₡3,120
Pensioned	₡4,325	₡3,488

Amount Paid vs. Education

Education	Average (Colones per week)	Standard Deviation
None	₡2,167	₡611
Primary	₡4,179	₡3,117
Secondary	₡5,103	₡2,243
Technical	₡5,914	₡4,329
University	₡6,077	₡4,916
Correlation: 0.23		

Appendix F: Notes from Interview with Marco Freer

- Species that they commercialize: Shrimp, Sea Bass, Panga, Mahi Mahi, Salmon, Snapper, Shark, Tilapia, Trout
- Species not commercialized: Marlin, SwordFish
    - Stopped commercialization 3 years ago
    - They are in danger of extinction because of the adoption of the environmental policy of sustainable development
- Target population: Housewives; they are the ones who shop in different markets.
- Process the food to produce products in different output forms: Filet, Sausages, Food mixes, Smoked fish.
- Fish consumption is low in Costa Rica compared to other countries mainly because of high prices.
- Costa Rica imports fish for local use at a comparatively lower price than it exports
- Developing countries(for example: Countries of Latin America) are mostly producers and export to other countries; Locals don't buy the fish because of the high price on the local market; Developed countries are consumers of fish products
    - Consumption of fish per person in Costa Rica: (7-8) kg/ year
    - Consumption of fish per person in Latin America: 15 kg/ year
    - Consumption of fish per person in Japan: (70-80) kg/ year
- The fish sector is very problematic right now. The key to the problem are the producers and farmers and their revenue. If they produce a bigger quantity of product, the price on the market will be cheaper.
- The demand of fish depends on the time period, the supply, the quality and the prices charged.
    - For instance, due to a problem in Chile the production of Salmon decreased from 6000 kg/month to 500 kg/ month. Larger fish died increasing the production and exportation of smaller fish to Costa Rica. Thus it was cheaper to import fish at that time.
- Methods to promote and market the fish products at Wal-Mart:
    - Target area: Point of Purchase (Punto de Venta)
    - Use of brochures on what to buy, recipes, competition and tasting of products
- Wal-Mart focuses mostly on two main ideas to promote the fish products

    - Health Benefits
        - The consumers are well aware of the benefits of eating fish (good blood circulation). A clean and hygienic product is important for positively benefiting from the product.
    - Aquaculture
        - Wal-Mart has a policy of sustainability. Cultivated products have to be produced using good practices which have been certified internationally.
        - It is too costly for countries of South America to certify marine products.
- Environmental Issues
    - There are specific seasons to buy protected species
- Social Issues
    - Promote responsible fishing, small farming projects along with NGOs (Non-governmental organizations)
- According to statistics from the FAO, if there were no aquaculture production, there would not be enough fish for World Consumption. Further, the FAO states that in the near future, the production of marine products will be stagnant while aquaculture production will increase.
- The aquaculture industry will help in meeting the increasing demand for fish for World Consumption. At the moment, the aquaculture industry accounts for 50% of the World Fish Production.
- Costa Rica exports the most fish from Central American Countries. Costa Rica is situated at a strategically important point, near the United States, Mexico and Canada which are important consumer nations.

Appendix G: Distribution Channel Flowchart