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Fish consumers in the pioneer northern Region of the State of Paraná

Perfil dos consumidores de peixes na região Norte Pioneiro do Paraná

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Abstract

The social, economic and cultural situation and the habits and preferences of fish consumers are analyzed. The municipalities focused for current research are Bandeirantes, Cambará, Santo Antônio da Platina, Andirá, Cornélio Procópio and Itambaracá, within the meso-region of the so-called Pioneer Northern Region of the state of Paraná, Brazil. Three hundred and forty-six structured questionnaires with seventeen multiple choice objective questions, featuring qualitative and quantitative variables, were handed out. Results show that 92% of the interviewed people ate fish; 55% earned more than three Brazilian minimum wages; 41% went to secondary school and 66% of the families comprised between three and five members. Mean fish consumption reached 18 kg/inhab/year; 54% of interviewed were over 40 years old; 37% preferred fish fillet; mostly prepared as fried fish. Moreover, the main obstacles for increase in consumption for 53% of the interviewed were high prices and non-availability of the product. The supermarket was the preferred place for purchase. Consumers in the Pioneer Northern Region of the Paraná have a relevant preference for fish, with a high capacity for per capita consumption increase even though supply and prices are strategic issues which require investigation.
Key words: Fish intake. Fish supply. Nile tilapia.

Resumo

Este estudo teve como objetivo analisar a situação socioeconômica, cultural e conhecer os hábitos e preferências dos consumidores de peixes. Os municípios selecionados para realização da pesquisa foram Bandeirantes, Cambará, Santo Antônio da Platina, Andirá, Cornélio Procópio e Itambaracá, que estão inseridos na mesorregião do Norte Pioneiro do Paraná. Um total de 346 questionários estruturados com 17 questões objetivas de múltipla escolha foi aplicado, com variáveis qualitativas e quantitativas. Dentre o total de entrevistados 92% afirmam consumir peixes, 55% apresentam renda superior a três salários mínimos, 41% possuem nível escolar médio, 66% das famílias tem composição de três a cinco pessoas. O consumo médio de peixes verificado é de 18 kg/hab/ano, onde 54% apresentam idade superior a 40 anos, com frequência semanal de consumo de 37%, a forma de compra predileta do produto é o filé, e a forma de preparo mais utilizada pela grande maioria é peixe frito. Para 53% o alto preço no varejo e a disponibilidade do produto são os principais entraves para o aumento do consumo e tem o supermercado como o local preferido para compra. Verificou-se que os consumidores do Norte Pioneiro do Paraná apresentam grande aceitação ao consumo de peixes, bem como potencial para aumento de consumo *per capta*, entretanto, foi observada a necessidade que questões estratégicas como oferta e preço sejam trabalhadas.
Palavras-chave: Consumo de peixes. Oferta de pescado. Tilápia do Nilo.

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Introduction

According to data retrieved from the Ministry of Fishing and Aquiculture (BRASIL, 2014), the Brazilian population increased fish consumption in 2011 by 14.5% when compared to that of the previous year with 11.17 kg/hab/year, higher than rates for pork, chicken and beef, with the following variations 1.3%, 5.5% and 0.25% during the same period (RODIGHERI, 2012). Fish consumption rates are lower that mean world consumption with 18.8 kg/hab/year (FAO, 2014), with fish as the main animal protein source consumer worldwide.

According to Silveira et al. (2012), fish meat has been recently indicated as highly relevant in human diet and essential for the supplementation of protein sources derived from animals. During the last decades, health diets have been greatly underscored due to increasing demand for food with higher nutrition quality. According to the World Health Organization (OMS, 2010), fish are important nutrient-rich sources for humans. It is thus highly important to investigate information from consumers to understand the motives for fish consumption and, consequently, to define strategies to stimulate fish consumption.

In fact, people interested in fish production and commercialization should be attentive to the demands of target populations. Market research may elucidate several issues and help entrepreneurs to define strategies for the implantation of marketing and trade plans (GONÇALVES et al., 2008).

Current analysis focuses on the social, economic and cultural situation and the manner habits and preferences are constructed on fish intake within the meso-region of the Pioneer Northern region of the state of Paraná, to identify relevant variables for future activities within the production chain.

Materials and Methods

The so-called Pioneer Northern meso-region, one of the ten regions of the state of Paraná, comprises 46 municipalities grouped into five micro-regions, namely, Assaí with 8 municipalities, Cornélio Procópio with 14 municipalities, Ibaiti with 8 municipalities, Jacarezinho with 6 municipalities and Wenceslau Braz with 10 municipalities (IPARDES, 2004), featuring approximately 5% of the population of the state of Paraná, with 546,224 inhabitants (IBGE, 2010).

The municipalities where the research occurred were Bandeirantes (23º 06’ 36’’S; 50º 22’ 04’’W); Cambará (23º 02’ 45’’S; 50º 04’ 26’’W); Santo Antônio da Platina (23º 17’ 42’’S; 50º 04’ 37’’W); Andirá (23º 03’ 03”S; 50º 13’ 44”W); Cornélio Procópio (23º 10’ 51”S; 50º 38’ 49”W) and Itambaracá (23º 01’ 04”S; 50º 24’ 21”W), within the meso-regiion of the Pioneer Northern Region of the state of Paraná. (Table 1).

Table 1. Municipalities selected for sampling of consumers in the Pioneer Northern region of the state of Paraná, Brazil.

Municipalities	Population*	N. of Questionnaires
Bandeirantes	32,184	67
Cambará	23,886	50
Santo Antônio da Platina	42,707	82
Andirá	20,610	41
Cornélio Procópio	46,928	96
Itambaracá	6,759	10
TOTAL	173,074	346

Source: IBGE (2010).

The above municipalities were chosen due to their economic importance in the region and their representativeness within the fish culture production chain featuring earth tanks and net cages, with special reference to the micro-regions Jacarezinho and Cornélio Procópio. Supermarkets, trading fish and with large number of clients, were the sites in which the questionnaires were handed out to consumers.

Sampling method for finite population was employed to calculate the number of people interviewed (LEVINE et al., 2000).

- Equation to define a sample number in finite populations

$$n = \frac{N.Z^2.p.(1-p)}{Z^2.p.(1-p) + e^2.(N-1)}$$

where:

n – calculated sample

N – population

Z – standard normal variable associated to confidence level (95%)

p – true probability of event (66%)

e – sample error (5%)

The above equation defines the minimum sample number of 344 people to be interviewed and it is a good representation of the chosen municipalities for the application of the questionnaire.

Seventeen multiple choice objective, qualitative and quantitative, questions were prepared for data collection to investigate consumers´ social and economic profile, behavioral habits and food consumption preferences. The form "Consumer´s Questionnaire" was placed on the letter head of the municipality, coupled to date and number of the interviewed person according to sequence of interviews. The variables were 1 = schooling; 2 = family unit (number of members in the family), 3 = family wage, 4 = age bracket, 5 = "Do you eat fish?", 6 = "Why do you not eat fish?", 7 = frequency of consumption; 8 = average intake per month; 9 = buying preference, 10 = buying alternatives, 11= preference of origin; 12 = preference of species; 13 = obstacles to consumption; 14 = "Do you stimulate family consumption of fish?", 15 = preference in preparation of fish; 16 = purchase site, 17 = "Does it burden the budget?", followed by multiple choice options.

The questionnaire was applied between 15th and 23rd December 2014 in the above-mentioned municipalities by third and fourth year students of the Veterinary Medicine course of UENP – CLM (Bandeirantes PR Brazil), who were trained specifically for data collection and procedures involved. All interviewees signed the Free Consent Term complying with Resolution 466/2012 of 12/12/2012, and approved by Protocol 884.335 of 23/11/2014.

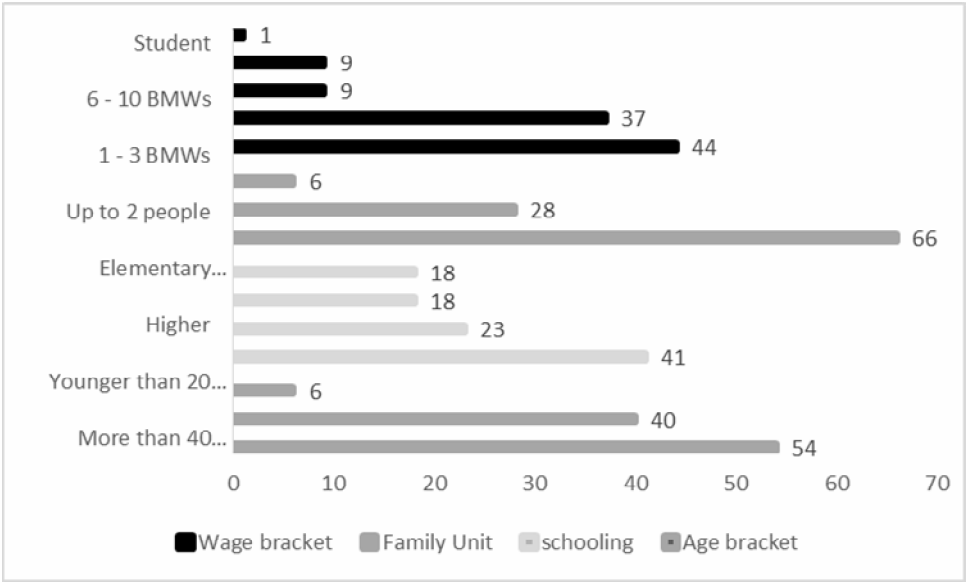
Data were tabulated and evaluated accordingly with descriptive statistics. Frequency tables were used for data analysis to visualize and interpret results, with percentages of information collected during sampling.

Pearson´s Correlation Coefficient (r) between variables (Schooling x Consumption), (Family Unit x Consumption), (Earnings x Consumption) and (Earnings x Frequency of consumption) were calculated.

Results and Discussion

It is highly important to underscore that the item Characterization of Consumers revealed that 41% of consumers have secondary schooling; 66% had a family unit featuring between three and five members; 44% earned 1 – 3 Brazilian minimum wages and 37% earned 3 – 4 Brazilian minimum wages; 54% were over forty years old (Figure 1).

Figure 1. Characteristics of consumers.



Regardless of schooling level, consumers´ schooling did not interfere in fish consumption (Table 2) since kg/month consumption tended towards a greater percentage of consumers for 1.5 kg/ month with interviewees Non-complete Elementary Schooling (40.32 %), Complete Elementary Schooling (38.71 %), Secondary Schooling (32.54 %) and Higher Education (39.51 %).

Table 2. Schooling level of consumers and fish consumption (kg/month).

Schooling	Consumption kg/month				
	0.0	**0.5**	**1.5**	**3.5**	**5.0**
Elementary (incomplete)	8.06	16.13	40.32	27.42	8.06
Elementary (complete)	17.74	17.74	38.71	19.35	6.45
Secondary	5.33	23.08	32.54	16.57	22.49
Higher	6.17	23.46	39.51	24.69	6.17

The size of Family Unit (number of members per home) interferes directly on fish consumption in kg/month due to *per capta* consumption. Results (Table 3) demonstrate that families with more than six members tend to consume a higher fish percentage at 1.5 kg/month, 3.5 kg/month and 5.0 kg/month levels.

Consumers´ earnings are also a variable that directly influences consumption: 55% of interviewed consumers earned more than 3 Brazilian minimum wages. Table 4 shows that the number of interviewees with earnings of more than 10 Brazilian minimum wages (in 2014) was greater at the consumption level of 3.5 kg/month. Association between these two variables corroborates the hypothesis that consumers with higher earnings have a higher buying power and consume more fish (PINTO et al., 2011). As a rule, the other earning brackets reveal a similar trend for greater concentration in the range of 1.5 kg/ month and show only a slight interference on consumption for earning levels below 10 Brazilian minimum wages.

Table 3. Size of Family Unit and fish consumption (kg/month).

Family unit	Consumption kg/month				
	0.0	**0.5**	**1.5**	**3.5**	**5.0**
Up to 2 people	11.70	23.40	37.23	21.28	6.38
3 – 5 people	7.46	24.12	39.91	21.93	6.58
More than 6 people	0.00	9.09	45.45	31.82	13.64

Consumers´ age is relevant to define behavior patterns for possible market strategies and aim at an increase in the consumption of fish at different age brackets. The over-40-years-old bracket represents 54% of consumers who are specifically concerned on health. Focusing marketing campaigns directed at consumption preferences (demonstration, preparation, obstacles to consumption; preferences) for different age brackets may be an efficient approach, due to people with different habits and at different life phases (VENTURINI et al., 2013).

Table 4. Wage percentage in fish consumption (kg/month).

Wage (x BMWs)	Consumption kg/month				
	0.0	**0.5**	**1.5**	**3.5**	**5.0**
Student	20	20	40	20	0
1 – 3	6	27	38	21	8
3 – 6	10	21	44	19	5
6 – 10	7	25	39	25	4
Higher than 10	0	14	28	41	17

Moreover, 92% of interviewed people are fish-consumers (Table 5). This fact reveals that there is a real concern with health and life quality. Demand for protein food, coupled to great technological progress in communication media and globalization, has provided relevant information to populations, especially on diets (GONÇALVES et al., 2008). High fish acceptance is mainly due to taste, nutrition facts, family habits and others (SILVEIRA et al., 2012).

However, mean fish consumption in Brazil falls short of international diet recommendations, or rather, twice a week (LICHTENSTEIN et al., 2006). According to Flores et al. (2014), high fish prices are a great obstacle. In fact, Table 6 shows that earnings and fish consumption frequency are related: consumers with 1 – 3 Brazilian minimum wages feature a higher consumption percentage within the option Rarely (57.6%), whereas consumers with over-ten-Brazilian minimum wages have a greater percentage in the option Frequency of Daily Consumption (28.6%).

Further, 75% of fish-consuming interviewees stated that they ate more than 1.5 kg/month, on an average, or rather, more than 18.0 kg/inhab/year. Result may be due to consumers´ culture in the region, affected by closeness to fish capture sites such as the river Paranapanema basin, currently transformed into great hydroelectric reservoirs with important tributaries, such as the rivers Cinzas and Laranjinha with significant capture capacity and, consequently, great fish supply. Moreover, the northern region of the state of Paraná, Brazil, has a great fish production in earth ponds and net cages. In areas close to production sites, fish may be consumed in a short time period, with excellent quality (sensorial, microbiological and nutritional) and better prices (SARTORIL; AMANCIO, 2012).

Table 5. Consumers´ habits and preferences.

Characteristics	Total	%
Frequency of Consumption		
Daily	7	2
Weekly	117	34
Fortnightly	60	17
Monthly	58	17
Rarely	75	22
Others	29	8
Monthly consumption		
1.5 kg/month	136	39
0.5 kg/month	79	23
3.5 kg/month	77	22
5.0 kg/month	24	7
Do not know	30	9
Preferences in fish preparation		
fried	213	53
roasted	110	28
cooked	63	16
Sashimi	12	3
Purchase place		
Supermarkets	198	57
Fish-and-Pay Parks	41	19
Fishmongerers	66	12
Other places	16	5
No reply	25	7

Table 6. Average percentage in wages and frequency of consumption.

Frequency of Consumption	**Wages (x BMWs)**				
	student	**1 – 3**	**3 – 6**	**6 – 10**	**over 10**
Daily	0.0	28.6	28.6	14.3	28.6
Weekly	0.0	43.2	34.2	7.2	15.3
Fortnightly	3.9	47.1	39.2	5.9	3.9
Monthly	0.0	35.7	48.2	8.9	6.1
Rarely	3.0	57.6	30.3	6.1	3.0

Supermarkets have the preference of 57% of the interviewed when compared to other purchase sites. This is due to lack of other local purchasing sites. Preference is due to practicality, facility, quality and the concentration of family purchase within a single locality (ALMEIDA et al., 2014).

Most interviewees (53%) prepare and eat the fish fried. Result requires future insertions so that varieties of fish preparation and broadening strategies that would facilitate the inclusion of the product within the consumer´s preference may be provided. The above strategy is important since several nutritionists do not accept fried food as healthy. Diverse manners for food preparation facilitate the introduction of any type of meat within people´s diet (PHILIPPI et al., 1999).

External aspect, origin, species and place of purchase are among the main variables that affect

purchase (Table 7). In fact 58% of consumers interviewed prefer fish fillets. Although cultural and economic factors should be highlighted with regard to the consumption of fish nationwide, the main factors are non-availability of processed products in quality and quality and easy preparation (BOMBARDELLI et al., 2005). Lack of fish bones, indicated by 22% of consumers, is one of the motives for consumers´ preference in selecting fish fillets, the third on the list of obstacles for non-consumption (SENA; OLIVEIRA, 2015).

When they were asked on alternative ways for preparing fish fillet, 38% answered they preferred dough-wrapped fillet, corroborating the fact that consumers prefer easy-to-do alternatives. In fact, there is a trend in consuming ready-made food or food which takes a shorter time to prepare (SCHLINDWEIN et al., 2015).

Table 7. Factors influencing purchase.

Characteristics	Total	%
Fish for sale		
Fillet	208	58
Eviscerated	70	20
In natura	50	14
Slices	13	4
Others	15	4
Alternative purchase types		
Dough-wrapped fillets	131	38
Spiced slices	86	25
Totally spiced	58	17
Fish-sausage	23	6
Fish nuggets	24	7
Others	24	7
Preference for fish origin		
Fishing	187	54
Cultivated	128	37
No reply	31	9
Preference for fish species		
Tilapia	237	67
Pacu	77	22
Carps	15	4
catfish	20	5
Others	6	2

Moreover, 54% of consumers prefer fish originating from extraction sources due to the tradition of consuming fish caught in the region, or rather, in the rivers Paranapanema, Cinzas, Laranjinha and in neighboring smaller ones. In fact, fishing is undertaken by a great number of professional and amateur fishermen from the municipalities under analysis. It also features fish production in ponds and net cages, another important source for fish production and consumption. Due to stagnation in fish production, the trend is for a greater supply of cultivated fish to supplement the deficit in Brazil and worldwide (BOMBARDELLI et al., 2005).

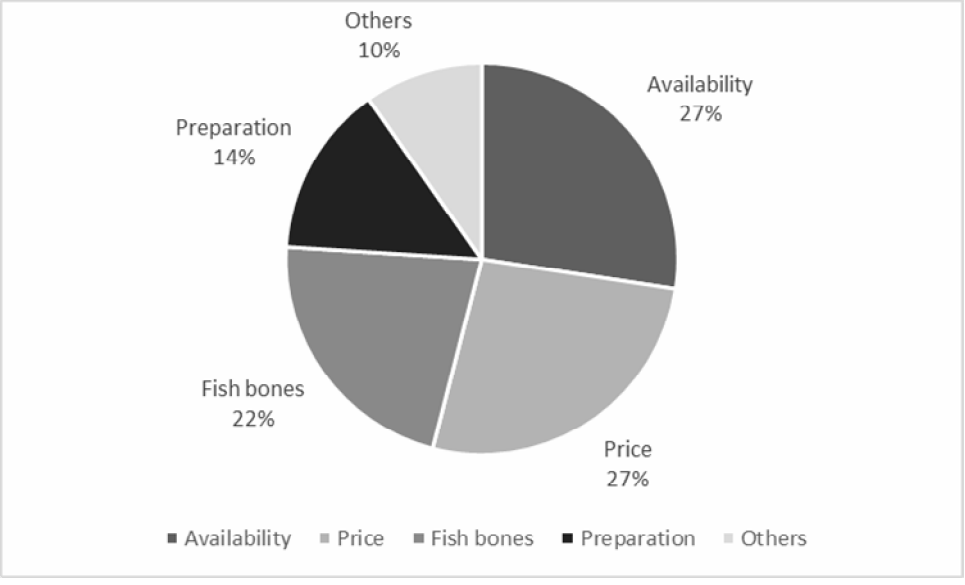
Preference for the consumption of the Nile tilapia is shared by 67% of interviewed people and reveals the species ranking first in Brazil

fish culture, or rather, 44.93% of fish production (IBGE, 2013), due to consumers´ acceptance and to excellent breeding performance and industrial processing (SOUZA; MARANHÃO, 2008). Such preference is also attributed to the species´s recent evolution within the cultivation process, comprising genetic improvement, good production practices and excellent aspect. This is due to processing and to the way the boneless fillet is supplied, which is precisely what the consumer desires (TURRA et al., 2010).

Twenty-eight consumers (8%) stated they did not eat fish owing to its sensorial characteristics, such as taste (35%), smell (28%), fish bones (25%), price (9%0 and availability (3%). However, acceptability may improve if aspect alternatives and different types of preparations are forwarded.

From the point of view of consumers in the Pioneer Northern region of the state of Paraná, the main obstacles for the increase of fish consumption comprise price (27%) and non-availability (27%) (Figure 2). Price and quality, or rather, origin and sanitary safety (SIF stamp), are taken into consideration on purchase and may limit or favor buying. So that such trend decreases, joint activities within the fish production chain should be endeavored to reduce costs and improve supply conditions in quality and quantity for consumers (MACIEL et al., 2015). Current analysis reveals that fish bones are consumption restrictive with 22% of interviewed mentioning the fact. When factors that interfere in the purchase of fish in Campo Grande, Brazil, are assessed, consumers prefer boneless fish in the purchase of the product for family consumption. In fact, they consider fish bones highly dangerous especially for children and elderly people, since serious accidents may ensue (ALMEIDA et al., 2014).

Figure 2. Main obstacles for the increase of fish consumption from the point of view of consumers.



The questionnaire also tried to identify whether consumers perceived the importance of fish consumption as a different product with high biological value and high health rates to the point of stimulating and motivating relatives and kin to consume fish. In fact, 80% encouraged kin to eat fish, a fact that is highly relevant for the production chain. Nutritional benefits from regular fish consumption underscore the validity of investments through public policies to increase availability of such food in Brazil (SARTORI; AMANCIO, 2012).

Co-relation rates ranged between –0.09 and 0.53 when the variables schooling levels and different levels of consumption kg/month. Co-relation rates were negative, ranging between –0.24 and –0.37, in the case of variables Family Unit brackets and consumption levels in kg/month. Co-relation rates were negative, ranging between –0.08 and –0.32 when variables wage bracket and consumption level kg/month were compared. Co-relation rates ranged between –0.40 and 0.45 when the variables wage bracket and different frequency in fish consumption were compared. Co-relation rates ranged between weak and moderate, with no interdependence between the variables analyzed. The above means that individualized strategies should be discussed for each item which is important to increase fish consumption within the consumers´ diet.

Conclusion

Consumers from the Pioneer Northern region of the state of Paraná reveal high *per capita* consumption of fish, with special reference to the Nile tilapia, preferentially as fillets.

Although consumers prefer fish which is caught in rivers and lakes, they actually migrated to cultivated fish due to the local production which facilitates more access of the product. Improvement in supply and price may increase consumption. Moreover, publicity campaigns focusing on nutritional facts on fish and on different alternatives in the preparation minimize the issue of fish bones and improve strategies for people with low fish consumption rates.

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