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Full Length Research Paper

Assessment of fish products demand in some water bodies of Oromia, Ethiopia

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The study was conducted to prioritize the fish products per water bodies and to know the supply potential of the fish products in six different Oromia water bodies. As methodology PRA was conducted to accomplish the experiment. Multistage sampling technique was employed during data collection by using structured questioner. Different fish specimens was collected and processed in different fish products and demand was analyzed using five (5) point hedonic scale. Demand of fish products was inelastic in Ethiopian fasting season on the other hand fish products was supply elastic. Demand for fish products is higher in fasting season but supply is lower in comparison with non-fasting season. The price of fish per kg was higher in fasting season than when not fasting; which is not true of "demand law". At Zeway lake and Koka reservoir smoked, filleted and dried was preferred successively but gutted and whole fish was not preferred, Langano lake filleted and dried fish was preferred and gutted, smoked and whole fish was not preferred, Beseka lake and Melka wakena filleted and smoked fish was preferred and dried, gutted and whole fish was not preferred, Gilgel gibe reservoir filleted, whole fish and dried fish was preferred and smoked and gutted fish was not preferred depending on five point hedonic scale.

Key words: Demand, fish products, water bodies, preference, supply.

INTRODUCTION

There is an increase in the demand for fish products in Ethiopia during fasting season (March-April full month and Wednesday and Friday in year round) for Orthodox religion believers. Current annual per capita fish production is less than 240g (FAO, 2003). Despite this, based on only a single factor - population - current annual demand for fish in the country is estimated at 65,344 tones, equivalent to 1 kg/person. Future demand at the present population growth rate will reach 94,526tones in 2015 and 117,586tones in 2025 (Christopher L Delgado, 2003). This is the minimum demand, since factors other than population are not considered here. These positive factors which trigger demand include the relatively low price of fish or the increasing prices of its substitutes; a rise in income; improvement, expansion in fish distribution or supply networks and improvement in fish product quality. These factors may increase the projected demands by as much as 15 to 20% (Christopher L Delgado, 2003). Those factors that retard effective demand for fish require to be addressed through education, fish consumption promotion and product development (FAO, 2003). Food demand analysis is a subject of great interest given its importance for food policy and marketing decisions. Policymakers, now more than ever, need estimates of social welfare and market adjustment indicators under alternative policies in order to understand the nature of food demand and market structure (Dhehibi, 2005). Price, quality, convenience, year round availability, variety (species), nutritional concerns, safety and hygiene are principal determinants of consumer demand on fish. Food habits and food consumption behavior directly affects the consumer concerns on price and quality (De Silva, 2006). In this context, and despite the importance of the fish sector to the economy, the market structure for fish products in Ethiopia is not well understood. The effects of price changes and other socio-economic variables on market demand have not been studied (Ahmed, 2007). Several factors are affecting on the demand function of fish and fishery products like price, income, income distribution, substitutes, tastes and fashion, advertising and expectations of the consumers make the changes along the demand curve and demographic characters lead to change the position of the demand curve, upward or down

Table 1. Parameters for sample size determination per water bodies.

Name of water bodies	Altitude(m)	Surface area(km^2)	Production potential(tone)/year	Mean depth(m)	Number of fishermen cooperatives
Zeway lake	1636	434	3000-4500	2.5	15
Langano lake	1585	230	1300	12	6
Beseka lake	954	45	205	5.5	1
Gilgelgibe reservoir	1660	54	400	20	5
Melkawakena reservoir	2320	82	500	9	2
Koka reservoir	1590	230	2400	9	3

Source: Zeway Fisheries Resources Research Center 2012.

Table 2. Mean production and price of fish in Ethiopian fasting and not fasting season.

Fish production/ kg/day		Fish price in ETB/kg	
Fasting season	Not fasting season	Fasting season	Not fasting season
24.82±2.93	10.07±1.97	18.96±0.99	14.02±0.21

ward shifting of the curve. Global consumption of fish as food has doubled since 1973, and developing world have been responsible for over 90% of this growth (Christopher L Delgado et al., 2003; J.O Amao, IB Oluwatayo and FK Osuntope, 2006). At present, the country Ethiopia hasan estimated annual total exploitable fish potential of 51,481tone, which can meet only 79 percent of the current actual demand, 55 percent of the projected demand in 2010, and 44 percent of the projected demand in 2015, based solely on population size (FAO, 2003). Demand analysis for fish and fish products in developing countries has long been neglected for several years because of high degree of aggregation and the lack of empirical basis for estimating the underlying elasticity of demand (Harlan C Lampe 1973; Praduman Kumar et al., 2005; Christopher L Delgado et al., 2003). Generally, the main objective of this study is to prioritize the fish products in different water bodies at Oromia and to identify the supply potential of the fish products.

MATERIAL AND METHODS

The study included 6 water bodies in Oromia, Ethiopia. Multistage sampling technique and structured questioner was employed during data collection. The sample size was (Zeway lake 27.2%, Koka reservoir 18.5%, Langano lake 17.3%, Melka wakena reservoir 16%, Gilgel gibe reservoir 12.3% and Beseka lake 8.6%) depending on (Table 1). Sample size was determined depending on the fish production potential, fishermen population and market accessibility.

As methodology Participatory Rural Appraisal (PRA) was conducted to accomplish the experiment. Then different fish specimens was collected and processed in different fish products. The products were fillet, smoked, whole fish, gutted and drying. Demand identification was conducted based on Participatory Rural Appraisal (PRA) participants. In addition to this questioner survey was done from the community as a supplementation data.

Through training Development Agents (DAs), traders and fishermen (in order to strengthen their capacity and level of awareness), field days and visit was arranged at different phases of the project to collect demand for different fish products and supply potential.

Statistical analysis: Descriptive analysis and ANOVA was used using SPSS version 20 statistical tool.

RESULTS

Awareness on Fish Products and Species

From the respondents, 98.8% had awareness on the fish species which was found in their water bodies or surround-

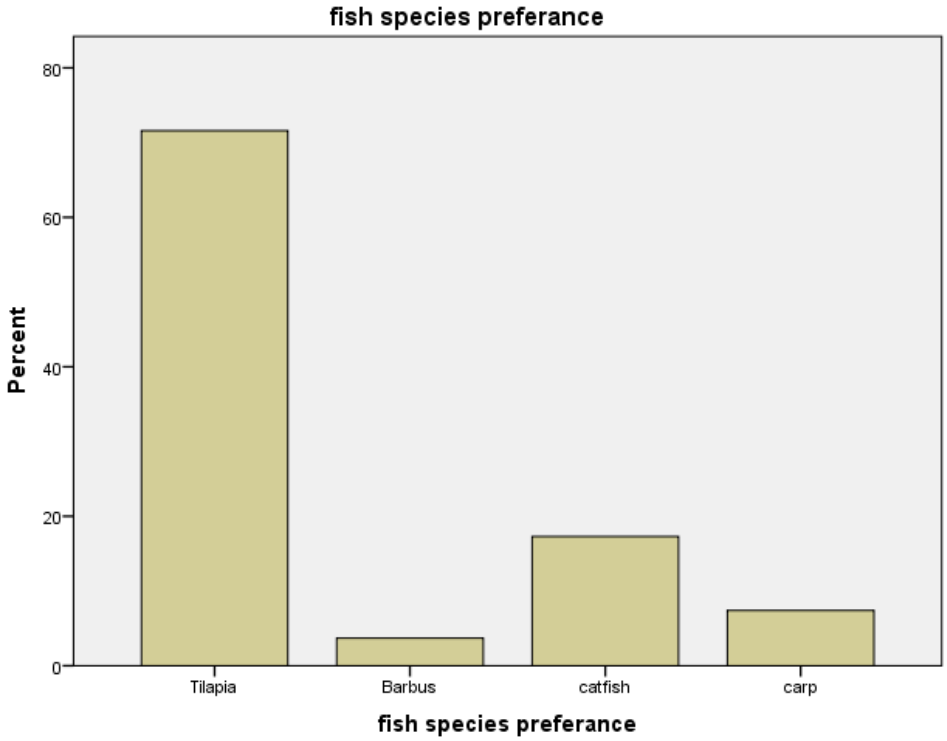

Figure 1. Preference of fish species in water bodies of Oromia, Ethiopia.

ing area, 1.2% had no full awareness and 60% of them had awareness on the different fish products, 40% has no awareness(n=81). This was done, because of different fish species was found at their water bodies.

Elasticity of Supply and Demand

Elasticity of supply and demand was calculated using (Edmund Quek, 2011).The result of Fish production/ kg/day and Fish price in ETB/kg during fasting and non-fasting season was indicated in Table 2**.** If price elasticity of supply (PES) is **elastic** – supply can react quickly to changes in price

$$PES = \frac{\%\ \text{change in quantity supplied}}{\%\ \text{change in price}}$$

$$PES = \frac{(\mathrm{Q1} - \mathrm{Q2})/(\mathrm{Q1} + \mathrm{Q2})}{(\mathrm{P1} - \mathrm{P2})/(\mathrm{P1} + \mathrm{P2})}$$

$$PES = \frac{(24.82 - 10.07)/(24.82 + 10.07)}{(18.96 - 14.02)/(18.96 + 14.02)}$$

$$PES = \frac{0.42}{0.15} = 2.8(\text{Elastic})$$

The result shows that, fish products was demand inelastic in Ethiopian fasting season because of it is the substitute of other fasting food like meat which is not recommended in that season and on the other hand fish products was supply elastic.

Source of fish products

The most fish product sources are fishery cooperatives from different lakes, street traders and brokers, fish shop, hotels and restaurant.

Fish species preference

Fish species preference was depends on the availability of species at different water bodies, but as a whole Tilapia, Cat fish, Carp and Barbus were the most preferred fish species successively. (Figure 1).

Demand and supply relation

The survey shows that demand is higher than supply especially, in Ethiopian fasting season and if it not fasting season supply is higher. The price of fish per kg was higher in fasting season and lower when not fasting. As the rule of demand law: when price increase the demand was decrease and vice versa but, in this case it is not sup-

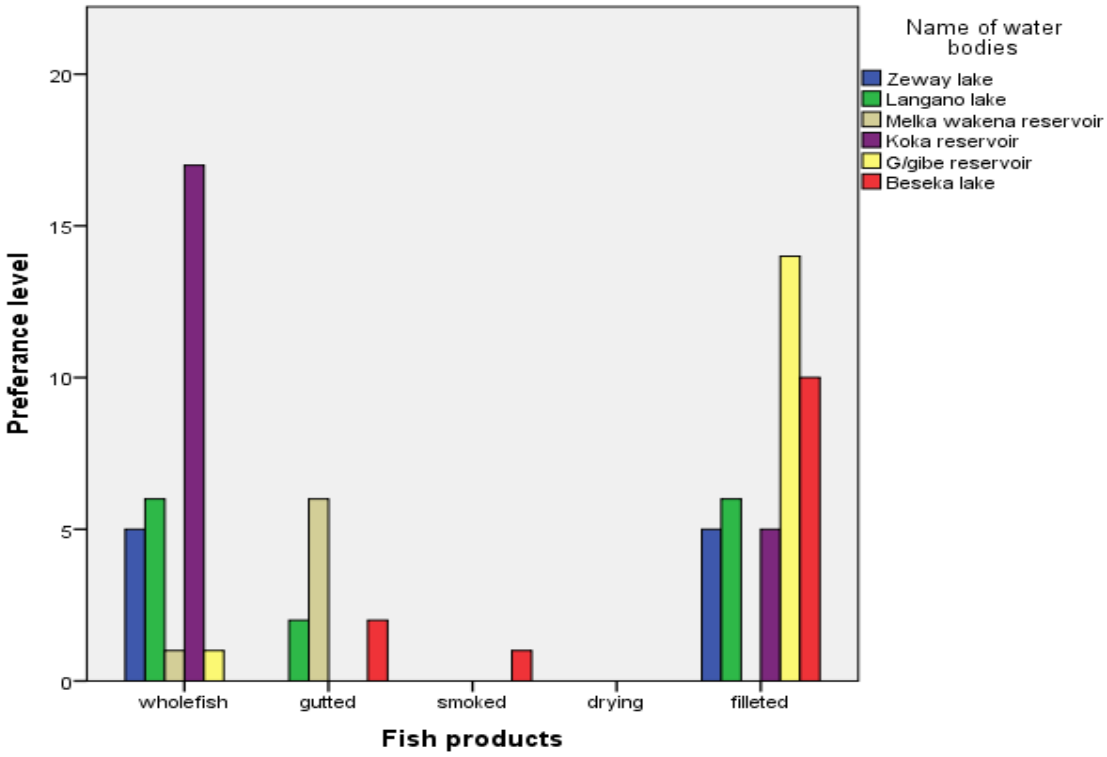

Figure 2. Preference of fish products per different water bodies before training(awareness creation).

ported by the demand law because of in fasting season the only allowed meat type is fish even if the price is high the supply was not enough for consumers. As the price increase in fasting season the supply increase too, this is the supply law.

Preferences of different fish products before and after awareness creation

As shown in Figure 2, whole fish was preferred at Zeway, Langano, Melkawakena, Koka and Gilgel gibe water bodies and Gutted was preferred at Langano, Melka wakena and Beseka water bodies. But, Smoked fish only preferred at Beseka lake and Dried fish was not preferred at all water bodies. Filleted fish was preferred at Zeway, Langano, Beseka, Koka and Gilgel gibe water bodies before training on different fish products was given for the respondents.

The Preference for Fish Products was Analyzed Using the 5-Point Hedonic Scale.

At Zeway lake and Koka reservoir smoked, filleted and dried was preferred successively but gutted and whole fish was not preferred, Langano lake filleted and dried fish was preferred and gutted, smoked and whole fish was not preferred, Beseka lake and Melka wakena filleted and smoked fish was preferred and dried, gutted and whole fish was not preferred, Gilgel gibe reservoir filleted, whole fish and dried fish was preferred and smoked and gutted fish was not preferred depending on five point hedonic scale.

At all water bodies filleted was the most preferred fish product except zeway lake smoked fish is the most preferred and koka reservoir smoked fish also the most preferred. (See from Table 3 and Figure 3)

The most problems encountered during fish production, marketing and consumption

- Transportation(lack of basic infrastructure)
- Market accessibility(price was controlled by traders but not suppliers)
- Illegal fishermen and traders
- Production and processing material availability
- No follow up from district and development agent

DISCUSSION

The result shows that, fish products was demand inelastic in Ethiopian fasting season because of it is the substitute of other fasting food like meat, egg which is not recommended in that season and on the other hand fish

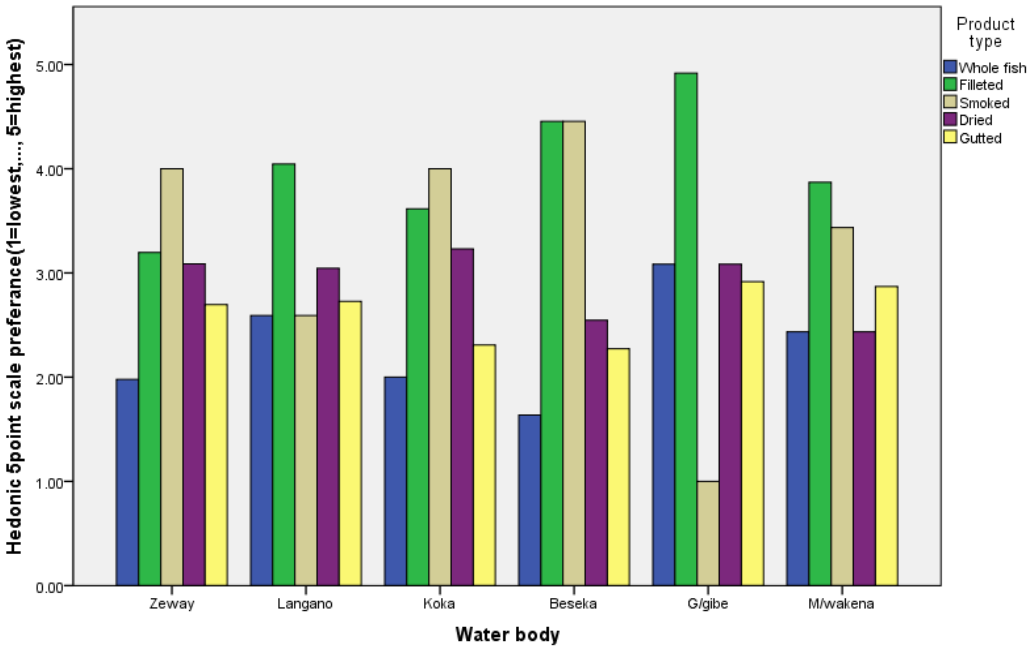

Figure 3. Preference of fish products per different water bodies after training (awareness creation).

Table 3. Analysis of Variance(ANOVA) for different fish products per different water bodies.

Product type	Name of water bodies					
	Zeway	**Langano**	**Koka**	**Beseka**	**G/gibe**	**M/Wakena**
Whole fish	1.9783±0.19779^{c}	2.5909±0.35223^{b}	2.0000±0.29957^{c}	1.6364±0.27872^{c}	3.0833±0.25990^{b}	2.4348±0.31325^{c}
Filleted	3.1957±0.20053^{b}	4.0455±0.22290^{a}	3.6154±0.86972^{a}	4.4545±0.20730^{a}	4.9167±0.08333^{a}	3.8696±0.18117^{a}
Smoked	4.0000±0.21082^{a}	2.5909±0.26855^{b}	4.0000±0.39223^{a}	4.4545±0.15746^{a}	1.0000±0.00000^{c}	3.4348±0.30037^{b}
Dried	3.0870±0.14536^{b}	3.0455±0.29037^{b}	3.2308±0.48243^{ab}	2.5455±0.28167^{b}	3.0833±0.28758^{b}	2.4348±0.30037^{c}
Gutted	2.9913±0.09386^{b}	2.7273±0.13546^{b}	2.3077±0.23709^{bc}	2.2727±0.30424^{bc}	2.9167±0.22891^{b}	2.8696±0.26898^{c}

products was supply elastic. This is because of religious influences on consumption patterns, the demand for fish is only seasonal. During lent, Christians who abstain from eating meat, milk, and eggs consume fish, since fish is the substitute of meat. (http://en.wikipedia.org/wiki/Fishing_in_Ethiopia, Salvanes K and DeVoretz D, 1993).

That fish demand is price-inelastic and that fish can be considered as a normal good (Boubaker Dhehibi et al., 2005).

A generally rising trend in per capita income will increase in demand of fish products increase e ven as the price of fish product increase the consumers' demand also goes rise which is supported by the research result in Nigeria (Fatunla GT et al., University of Ife, 11e-Ife, Nigeria).

This study shows that, preference of fish species is differ from place to place. But generally, tilapia is the leading species caught and consumed in Ethiopia, although this does not seize for all groups and for all areas. This is reported by different researchers, Nile Tilapia (*Oreochromis niloticus*) is the dominant fish species of the landings (FAO, 1995; LFDP 1998; Felegeselam Y, 2003). In fish production areas, fish consumption patterns are signs of the local availability of fish (Gordon A, Sewmehon et al., 2007). The study conducted in China shows that the same result: demand for fish depends on the production/species availability around the consumers (David L Ortega; H Holly Wang, 2011).

At landing site fishermen sold their product fresh which is processed to fillet and sometimes whole fish for rapid consumption & transaction and traders and consumers process the fish to smoked and dried due to the test and durability of this products.

Before awareness creation, most of producers and consumers have not enough knowledge on the value added fish products. Especially, on smoked and dried fish. However, after awareness creation was made 98.8% of them understand the difference between all products or advantages and highly demanded for value added products because of their durability, test and price (See from Figure 2 and 3).

Due to problem mentioned above, fresh fish will not reach those consumers far from the landing site. Therefore, they need fish product which is processed to manage deterioration.

CONCLUSION AND RECOMMENDATION

This study was conducted to prioritize the fish products at different Oromia state, Ethiopia water bodies. Therefore, at six different water bodies demand for different fish products was identified. Before scaling up/out of the products to other different water bodies of Ethiopia assessing the demand for product is the crucial step and for further research on the products. That is why this study was conducted and the result shows that at landing site fishermen sold their product fresh which is processed to filleted and sometimes whole fish for rapid consumption & transaction. Traders and consumers processes the fish to smoked and dried due to the test, durability and high price of the products. Demand for fish species was also identified. Tilapia (*Oreochromis Niloticus*) is the dominant fish species of the landing sites and through the consumers.

However the price of fish products in fasting season of Ethiopia rises, the demand for the products is also very high.

Awareness creation is needed for fishermen on the new products like smoking & drying and since Nile tilapia is the dominant fish species, the other species need more awareness/training for producers and consumers for effective utilization. Basic infrastructure should be built for easy transportation to reduce deterioration.

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REFERENCES

Ahmed M (2007). Fish production system in mid-rift valley of Ethiopia: Proceedings of the 15th annual conference of the Ethiopian Society of Animal Production (ESAP).

Boubaker Dhehibi, Lassaad Lachaal, Ali Chebil (2005). Demand Analysis for Fish in Tunisia: An Empirical Approach.

Christopher L Delgado (2003). Fish to 2020 supply and demand in changing global markets: International Food Policy Research Institute and World Fish Center.

David L Ortega, H Holly Wang (2011). Assessing Consumer Preferences and Demand for Fish: A Market Analysis of the Midwest Aquaculture Industry.

Desilva (2006). Value chain of Fish and Fishery products: Origin, Functions and Application in Developed and Developing country markets.

Edmund Quek (2011). "Elasticity of Demand and supply" book.

FAO (1995): Code of conduct for responsible fisheries, Rome.

Fatunla, *G.T.*, Oladimu, O.L. and. Ladipo, 0.0(1973) *University of Ife*, *11e-Ife*,. *Nigeria*.

Felegeselam Y (2003). Management of Lake Ziway fisheries in Ethiopia. Thesis of Master of Science in International Fisheries Management. Department of Economics, Norwegian College of Fishery Science, University of Tromsø.

Gordon A, Sewmehon Demissie Tegegne, Melaku Tadesse (2007). Marketing systems for fish from Lake Tana, Ethiopia: Opportunities for improved marketing and livelihoods. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 2. ILRI (International Livestock Research Institute), Nairobi, Kenya. p. 49.

Harlan C Lampe (1973) Demand analysis and its implication for fisheries development: Department of resource economics Rhode Island university http://en.wikipedia.org/wiki/Fishing_in_Ethiopia.

JO Amao, IB Oluwatayo, FK Osuntope (2006). "Economics of fish demand in Lagos state, Nigeria".

LFDP (1998): Lake fisheries development project report, Addis Ababa, Ethiopia.

Praduman Kumar (2005). Demand for Fish by Species in India: Three-stage Budgeting Framework: Agric. Econ. Res. Rev. 18, pp. 167-186.

Salvanes K, DeVoretz D (1993). "Household demand for fish and meat products": Separability and demographic effects. Discussion Papers dp93-05, Department of Economics, Simon Fraser University.

ZFRRC (2012). Lake fisheries management plan document.