

Fish Consumption and Market Potential of Uganda Farmed Chinese Carps

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Abstract

The study was undertaken to achieve four objectives namely: to establish the demographic characteristics and fish consumption habits of Chinese living in selected districts of Uganda; to describe Uganda farmed Chinese carp characteristics; to evaluate how demographic characteristics and fish consumption habits of Chinese living in Uganda influence their fish consumption rates; and to evaluate how Uganda farmed Chinese carp factors influence the consumption of Chinese carp in selected districts of Uganda. Data were gathered using a questionnaire interview with 36 randomly selected individuals of Chinese origin residing in Uganda. Analysis done using Chi-square tests of independence revealed no association between respondents' demographic characteristics and their fish consumption rates. Investigation further revealed that Chinese (77.7%) regard fish as an import dietary item, and mainly consume Tilapia (41.7%) and Nile perch (36.1%), because these fish are readily available (36.1%) and are tasty (52.8%). The Chinese spend a lot of money on fish (>Ush50,000; 44.4%), which is the main driver of the rate of fish consumption in this community. They would however freely consume the Chinese carp (55.6%) if it was available. Unfortunately, very few (33.3%) Chinese are aware of Chinese carps farmed in Uganda, since the species is not readily available on the market. Many (72.2%) are however willing to buy it in live form, from Chinese supermarkets (66.7%) because they believe that the fish is clean and hygienic (22.2%) in this form. They (58.3%) would buy at a least 1.1 to 2kg a week and mainly consider price (69.4%) as the main driver when choosing this fish. This suggests that farmed Chinese carps have market amongst Chinese nationals living in Uganda.

Keywords: Marketing Survey, Aquaculture, Chinese carps, Uganda

1. Introduction

Uganda's fish production has tremendously declined over the years, falling from 39,201 tons in 2005 to about 24,965 tons in 2008 due to declining stocks in the country's natural water bodies (DFR 2010). Yet the sector sustains several livelihoods that increased from 700,000 to over 1.2 million individuals by 2007 (Kayiso 2009). This has curtailed the sector's contribution to the national economy, from its 3.1% contribution to national GDP in 2011/12 to 1.7% by 2014 (UBOS 2014). Relatedly, the current fish catch trends are not likely to sustain economic growth, for example, due to the decrease in fish catch, foreign exchange earnings fell from USD 143.6 million in 2005 to USD 88.14 million in 2013, equivalent to a loss of USD 55.46 million (Muhoozi 2008). This situation requires strong interventions to enhance fish production, and aquaculture is the likely alternative. Though still in its infancy in Uganda, aquaculture is expected to expand to meet the ever increasing gap between fish supply and demand (Rutaisire *et al.* 2009). Current efforts are geared towards increasing production of indigenous fish species through aquaculture, particularly Nile tilapia *Oreochromis niloticus* and the African Catfish *Clarias gariepinus*. However, as Uganda continues to host international communities that prefer varieties of fish species, there is need to culture new species that suite the taste of divergent consumer communities. The culture of new species has been advocated for in aquaculture for a long time, especially if the species have got superior attributes over the indigenous fish species. New species introductions have been done before as a way of increasing fish production (Berka 1990, FAO 2005-2015). For example; the introduction of Nile perch in Lake Victoria in the 1950s and 1960s (Ogutu-Ohwayo 1993) resulted in the increased production of Uganda's fishery that saw fish become one of Uganda's major non-traditional exports in the 2000s (DRF 2010). Such interventions have largely depended on the nutrient value, community perceptions, plus the marketability of the candidate fish species. This study therefore purposed to investigate the market and consumption potential of a new species, particularly the Chinese carp currently farmed in selected districts of Uganda.

2. Assessment of aquaculture product markets

Much as it is important to introduce new species in aquaculture, it is equally important that their acceptance and marketability is well understood before the production is scaled up. Previous efforts to promote the culture of particular fish species have not been informed by species specific market survey, but follow general observations and assumptions that the demand for fish highly surpasses its supply in Uganda. Such assumptions do not provide proper guidance; especially to fish farmers who have ended up producing fish that cannot ably be

accepted on the market. Several farmers end up stranded with produce because they are oblivious of the market dynamics. This study therefore sought to study the market drivers of Chinese carps on the market before encouraging fish farmers to grow this fish species on large scale.

2.1 *Rationale for market assessment*

Market studies are a common practice with new and old products on the market. They promote and protect consumer interests, examine the causes of why particular markets are not working well for consumers, and open up for proposals as to how they might be made to work better (Silk & Urban, 1978, Benedetto 1999). These studies also improve knowledge of markets or practices. Market studies help to relate practices across a range of goods and services; look at developing markets, for example where the potential risks to consumers may be high, or where there may be potential barriers to entry; develop better products and services; exploit strengths plus skills, and other advantages to meet consumers' needs more effectively. This process encourages innovation and provides consumers with increased choice. A market study can also examine whether there is a problem with the intended product. If it finds one, the study looks at its effects, and the causes of those effects, and considers how those causes may be best addressed by the most proportionate means. Since Chinese carps are a new species in culture and intended for the market, it was imperative that a study is undertaken to examine how the market will accept the new product before it is fully launched.

2.2 *Application to new culture species*

Diverse research has been carried out on marketing of agricultural products and fish in particular. Studies done to investigate fish consumption trends reveal that fish consumption frequency is affected by several demographic factors. High consumption levels are observed in younger people than the older group and in females than in the male but with no relationship between level of income, level of education and frequency of consumption (Can *et al.* 2015). In addition, the number of individuals in the household may influence fish consumption, with more populous household consuming more fish than the less populated (Onurlubas 2013). Relatedly, several studies (Cronström & Månsson 2003, EU 2011, FAO 2012) also recognise the influence of product cost, product presentation form, choice of market, attitude towards fish, taste of product, knowledge about the product, cultural values attached to the product, product availability, and hygiene at the market, as major factors influencing fish consumption habits. This study therefore sought to investigate the various factors that affect fish consumption and that may contribute to the marketing of Uganda farmed Chinese carps amongst the Chinese community in Uganda.

2.3 *Application to Uganda cultured Chinese carp market*

To assess the Chinese carp market, the study was guided by problem specific research questions that would well elucidate the factors that contribute to fish consumption and marketing. These were:

1. What are the demographic characteristics of Chinese currently living in selected districts in Uganda?
2. What are the fish consumption habits of the Chinese living in Uganda?
3. How likely is it that the Chinese living in Uganda can buy and consume Chinese carps farmed in Uganda?

The study's general objective was to investigate the market and consumption drivers of Chinese carps farmed in Uganda. The specific objectives were: to establish the demographic characteristics and fish consumption habits of Chinese living in selected districts of Uganda; to describe Uganda farmed Chinese carp characteristics; to evaluate how demographic characteristics and fish consumption habits of Chinese living in Uganda influence their fish consumption rates; and to evaluate how Uganda farmed Chinese carp factors influence the consumption of Chinese carp in selected districts of Uganda.

2.4 *Chinese carps consumption- behaviour conceptual and theoretical frame work*

The study was based on the concept that several independent variables such as demographic characteristics, fish consumption habits and Chinese carp factors do influence the rate of Chinese carp consumption amongst the study groups (Figure 1). Relatedly, study inquiries were based on the Theory of Planned Behaviour cited by Higuchi *et al.* (2016) which suggests that fish consumption is influenced by attitude, subjective norms, past experience and health involvement, which characteristics could similarly explain fish consumption partners in this study. In the same light the study hypothesised that consumer demographic characteristics and Chinese carp factors/characteristics influence fish consumption habits.

4. Study procedure

In order to achieve the objectives, the study used a cross-sectional and correlation survey to determine the relationship between factors affecting fish consumption and the market and to assess the consumption potential of Chinese carps farmed in Uganda. The study was carried out in Kampala, Wakiso, and Mukono districts of

Uganda, using non-probability samples, by selecting Chinese nationals residing and working in the various construction sites, shops, restaurants and pharmacies as respondents. Data were collected from thirty six purposively selected individuals using a structured questionnaire that had both close ended and open ended questions. Open ended questions cut across general issues about Chinese carp consumption and were important in collecting qualitative data from key informants that verified quantitative data right at source. Thirty six individuals were interviewed. The questionnaires investigated the demographic characteristics of the respondents; their fish consumption habits, and Chinese carp related factors/characteristics. Data from the field were cleaned, sorted and entered in the computer using a statistical package for social science (SPSS) version 16.0.

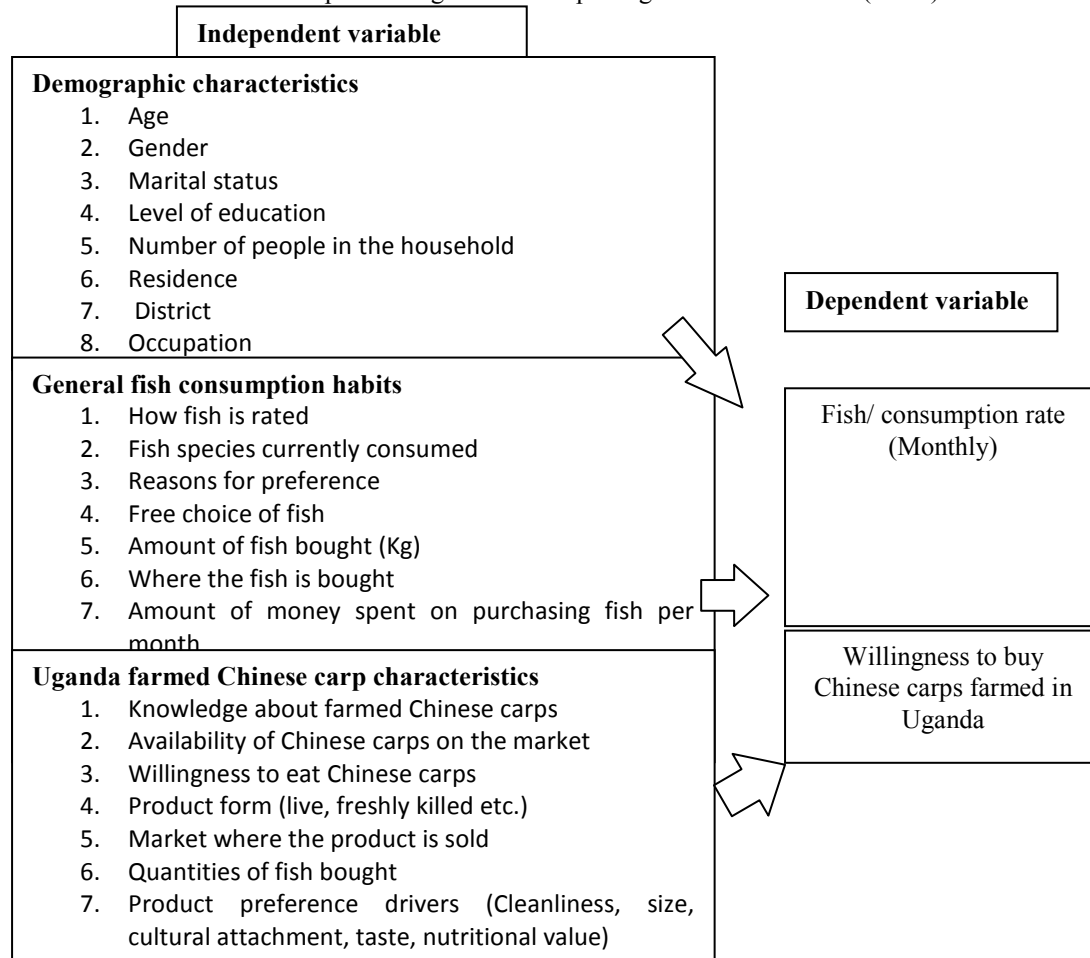


Figure 1: Conceptual framework

5. Study Results

Investigations from the study revealed that most of the respondents were aged between 30 and 39, most were male, several were married, and most had diplomas as their highest level of education. Majority had between 1 and 5 people in their households and were not formally employed, with close to 60% residing in Kampala (Table 1). Further analysis however indicated no significant relationship ($p > 0.05$) between demographic characteristics and fish consumption rates of the respondents (Table 2).

Table 1: Demographic characteristics of respondents

Respondents' characteristics	Description	Frequency	Percentage
Age	20 - 29	9	25.0
	30-39	11	30.6
	40-49	9	25.0
	50-59	2	5.6
	>60	3	8.3
Sex	Male	22	61.1
	Female	14	38.9
Marital status	Married	25	69.4
	Single	9	25.0
	Separated	1	2.8
Level of education	Degree	9	25.0
	Diploma	10	27.8
	Tertiary	5	13.9
	High school	8	22.2
	Others	2	5.6
No. of people in the HH	1- 5	32	88.9
	6 - 10	2	11.1
Occupation	Formal	14	38.9
	Informal	17	47.2
	Not employed	1	2.8
District	Kampala	21	58.3
	Mukono	13	36.1
	Wakiso	2	5.6

Table 2: Chi-square analysis of demographic characteristics and fish consumption rate

Variable	X ²	df	p
Age	3.51	3	0.32
Gender	11.46	12	0.49
Marital status	5.36	6	0.50
Level of education	10.01	12	0.62
No. of people in the household	1.98	3	0.58
Occupation	4.86	6	0.56
District	6.65	9	0.67

Results from the analysis of fish consumption habits of respondents indicated that majority of the respondents regard fish as an import dietary item. Respondents consumed species commonly available in Uganda especially Tilapia and Nile perch with very few respondents consuming Chinese carps. Respondents indicated that they currently consume other fish species mainly because they are tasty. They however revealed that if they had a choice they would freely consume other fish species at ease especially the Chinese carp (Table 3). Further analysis revealed no significant ($p > 0.05$) relationship between respondents' fish consumption habits (importance attached to fish, fish currently consumed, reasons for fish consumption, fish freely preferred, and where the fish is bought) and their rate of monthly fish consumption. There was however a significant relationship ($p < 0.05$) observed between the money spent to buy fish and the frequency of fish consumption (Table 4).

Table 3: Respondents' Fish consumption habits

Questions	Characteristics					
Importance attached to fish consumption	Very Important 33.30%		Important 44.40%		Not very important 22.20%	
Fish currently consumed	Nile perch 38.9%	Tilapia 41.7%	Chinese carp 5.6%	Others 13.9%		
Reasons for fish consumption	Readily available 36.1%	Tasty 52.8%	Big in size 8.3%	Easy to cook 2.8%		
Fish spp. freely preferred	Nile perch 19.4%	Tilapia 8.3%	Chinese carp 55.6%	others 16.7%		
Where fish is bought	Super markets 33.3%	Retailers in markets 52.8%		others 13.9%		
How much is spent on fish per month	<10,000/= 25%	10,000-20,000/= 2.8%	20,000-30,000/= 2.8%	30,000-40,000/= 11.1%	40,000-50,000/= 13.9%	>50,000/= 44.4%
How many time fish is consumed in a month	Once 5.6%	Twice 25%	Thrice 36.1%	>Thrice 33.3%		

Table 4: Association between fish consumption habits and fish consumption rate

Variable	X ²	df	p
Importance attached to fish	9.50	6	0.15
Fish spp. currently consumed	15.12	9	0.09
Reasons for consumption	6.43	9	0.70
Fish spp. freely preferred	4.28	9	1.00
Source of fish	6.64	6	0.36
Amount spent on fish per month	46.60	15	0.00*

*significant at $p=0.05$

Analysis carried in this study to investigate Chinese carp factors amongst the respondents indicated that very few of them (Table 5) had heard about Chinese carps farmed in Uganda. They further revealed that these carps were not readily available on the market, though most of them would be willing to buy them mainly in live form. Majority of the respondents (Table 5) were not sure about the source of carps currently available in Uganda. However, majority of them (Table 5) indicated that they would eat carps farmed in Uganda, because they largely believed that they were clean and hygienic. Respondents mentioned that they would buy the carps mainly from Chinese supermarkets and buy at a least 1.1 to 2kg a month. Price and size were mentioned as the main determinants of fish consumption (Table 5). Further analysis using Chi square test for independence revealed no significant relationship ($p>0.05$) between willingness to buy carps farmed in Uganda and knowledge about the carps in Uganda, availability, product form, markets where the carps are to be sold, and factors to consider when buying. However, there was a significant relationship ($p<0.05$) between willingness to buy Chinese carps farmed in Uganda and willingness to eat them (Table 6).

Table 5: Responses to Uganda farmed Chinese carp characteristics

Questions	Response						
Knowledge about Chinese carps farmed in Uganda	Yes 33.3%	No 66.7%					
Availability of farmed Chinese carps on the market	Rarely 27.8%	Occasionally 5.6%	Never 66.7%				
Willingness to buy farmed Chinese carps	Extremely willing 2.8%	Very willing 50%	Moderately willing 27.8%	slightly willing 2.8%	Not willing at all 16.7%		
In what product form would they buy farmed Chinese carps	Live 72.2%	Freshly killed 11.1%	Others 16.7%				
What is the source of the Chinese carps currently consumed	Imported 2.8%	farmed in Uganda 22.2%	not sure 75%				
Willingness to eat Chinese carps farmed in Uganda	Strongly Agree 22.2%	Agree 58.3%	Disagree 5.6%	strongly disagree 8.3%			
Reasons for the above	Clean & hygienic 30.6%	Big in size 11.1%	Culture allows 19.4%	Nutritious 8.3%	Tasty 5.6%	Bony 16.7%	Others 5.6%
Where would you wish to buy the product from	Chinese supermarkets 66.7%	General markets 16.7%	others 13.9%				
Quantities that you would buy per week	0.5-1kg 25%	1.1-2kg 58.3%	2.1-3kg 11.1%	3.1-4kg 5.6%			
Factors you would consider when buying Chinese carps	Price 69.4%	Nutrient value 8.3%	Size 16.7%	others 2.8%			
Do you think other Chinese would be willing to eat Chinese carps farmed in Uganda	Yes 66.7	No 13.7	I don't know 19.4				
Reasons for the above answer	Clean & hygienic 22.2	Big in size 13.9	Culture allows 11.1	Nutritious 13.9	Tasty 30.6		

Table 6: Association between willingness to buy Chinese carps farmed in Uganda and Uganda farmed Chinese carp characteristics

Variable	X ²	df	p
Knowledge about Chinese carps farmed in Uganda	1.3	4	0.860
Availability of farmed Chinese carps on the market	5.44	8	0.710
Product form in which they buy farmed Chinese carps	4.56	8	0.800
Source of the Chinese carps currently consumed	7.20	12	0.844
Willingness to eat Chinese carps farmed in Uganda	37.86	12	0.000*
Reasons for the above	44.27	24	0.070
Preferred source for buying these products	19.09	12	0.086
Quantities that you would buy per week	10.72	12	0.553
Factors you would consider when buying Chinese carps	8.15	9	0.520

Some respondents were willing to recommend Chinese carps to their Chinese friends staying in Uganda because they believed that they are clean and hygienic. They also recommended that: *there should be efforts to avail Chinese fish, reduce the price of Chinese carps, increase consumption through adverts, avail the species on the local market, grow more fish in Uganda, target to supply factories, train fish farmers to produce this species, supply seed to the farmers, and that bones should be removed from the fish before packaging for sale.*

6. Discussions

Most of the Chinese residing in the area of investigation were between 30 and 39 years, male, have high school

education and above, informally employed and stay in Kampala. However, these characteristics are not related to their fish consumption rates. This suggests that marketing Chinese carps farmed in Uganda should not consider age, gender, level of education or residence location as criteria for marketing farmed fish.

Majority of the Chinese staying in the study area regards fish as an important dietary item. They mainly consume Tilapia and Nile perch, because they are tasty. They would however freely consume the Chinese carp if it was available. The Chinese spend a lot of money on fish, which is the main driver of the rate of fish consumption in this community. This suggests that the Chinese are willing to spend money on Chinese carps if the fish were readily available on the market.

Very few Chinese are aware of Chinese carps farmed in Uganda, since the species is not readily available on the market. Many are however willing to buy it in live form, from Chinese supermarkets because they believe that the fish is clean and hygienic and are culturally acceptable. They would buy at a least 1.1 to 2kg a week and mainly consider price and size as the main drivers when choosing this fish. Willingness to buy carps farmed in Uganda is mainly driven by the fact that the Chinese community living in Uganda is willing to eat this species. This implies that there is a ready market for Chinese carps farmed in Uganda. They however need to be popularised as a way of increasing product awareness amongst the intended market, supply them to Chinese supermarkets, most appropriately in live form under good sanitary conditions. Suggested future works include a drive to popularize and market the Chinese carps farmed in Uganda and to lay strategies of producing new species to cater for specific markets.

7. Conclusion

The observations made from this study suggest that the aquaculture industry in Uganda still has room to expand to accommodate many more new species such as the Chinese carp, so as to satisfy the interests of the different clients. However, precautions should be undertaken during the culture of Chinese carp escapes into natural water bodies.

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