

ON CONSUMERS' WTP(WILLINGENSS TO PAY) FOR FISHERY PRODUCT TRACEABILITY SYSTEM IN CHINA

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ABSTRACT

Quality safety traceability system has adopted by most fishery enterprises as an important part of the strategic management. As the consequence, the end product is supposed to be higher. That consumers whether to accept has a direct impact on system successful implementation. This paper proposes a framework to research consumer awareness of fishery product and the traceability system and the degree of willingness to pay, cased study of consumers in Beijing on. The results contribute to the effectively apply the traceability system by aquatic products enterprises.

Keywords

Quality safety; Aquatic products; Consumer; Willingness to pay; traceability system

INTRODUCTION

Eating fish positively associates with the health (dietary & nutritional) benefits and preventing diseases, given that they are an excellent source of protein and are rich in essential poly-unsaturated fatty acids (B.E.Birgisdottir et al., 2008;). Recently International Food Policy Research Institute [IFPRI]/WorldFish Center study on global fish demand (Delgado and others 2003) predicts that the total demand for fish products will increase from 91.3 million tons in 1997 to 127.8 million tons in 2020, which equals an annual growth of 1.47 percent, and a per capita annual consumption increase from 15.7 kg to 17.1 kg in 2020 (<http://www.worldbank.org>). In China, both the nation's GDP and citizens' real income have substantially increased has spurred greater demand for aquatic products (<http://www.fao.org>). China's consumer price index (CPI) of aquatic products rose 5% from the same period of last year in November, year 2007.

Consumption of aquatic products has been influence the growth of the aquaculture sector as ocean stocks of wild fish diminish and fishing quotas are more strictly enforced, so farm-reared fish will continue to supply greater proportion of the growing consumption of aquatic food. Aquaculture, probably the fastest growing food-producing sector in the world, now provides for almost 50 percent of the world's food fish requirements. Nevertheless, aquaculture can play an important role in many developing countries, like China, not only within the context of rural development, but also as a commercial activity that focuses on export markets (Harald Rosenthal,1985;ZHANG XIAoshuan,SHI Yan,FU Zetian, 2004).

But in the same time, the quality and safety of aquatic products are becoming a more prominent problem. In recent years, there have been many incidents about quality safety of aquatic products, which not only affect export trade of aquatic products, but also have a significant impact on people's consumption. Therefore, quality, rather than price, is considered to be the most important factor affecting aquatic products purchasing decisions of Chinese consumers (Zhang Xiang-guo, 2002). Consumers call for food that can be fully trusted, they ask for safety guarantees and information with integrity to confirm their trust.

The traceability system as a tool can effectively trace quality and reduce information asymmetry problems of adverse selection and moral hazard in the food system (Sykuta and Michael, 2005). The United States, the EU and some other countries have issued relevant laws and regulations, which require aquatic products must have traceable. Repeated violation of the regulation governing such substances has led to a ban being imposed on those products originating from that country. China has also announced and issued corresponding laws and regulations to guarantee quality safety of aquatic products.

But the implementation of the safety traceability system would likely raise cost in breeding, production and processing process, which eventually result in higher retail price of aquatic products in markets. How much consumers know the traceability system of aquatic products and are willing to pay for safe aquatic products? How they view the safety system of aquatic products? So it is necessary to study consumers' awareness to quality and safety of aquatic products, purchasing behaviour and willingness to pay for safe aquatic products in context of recent quality assurance system.

Recent theoretical literatures provide some useful information concerning the mentioned problems. The cases and theoretical research, which focus on analyzing different consumers' increasing concerns about food quality and safety knowledge, and its effect on food choices (Henson and Northen, 2000; Verbeke and Viaene, 2001; A. Ro`hr et al., 2005; M. Jevs`nik et al., 2007; Mauro Conter et al., 2007; D.J. Bolton et al., 2008; Efsun Karabudak et al., 2008). Moreover, there are many special literatures about consumers' willingness to pay for safe food products (David L. Dickinson and DeeVon Bailey, 2005; Ana M. Angulo and Jose' M. Gil, 2007; Maria L. Loureiro and Wendy J. Umberger, 2007; Olga Kehagia et al., 2007), which are powerful and useful to assist in research of Chinese consumers' perception toward quality and safety of aquatic products and willingness to pay for safe aquatic products.

Based on the above analysis, this paper investigates and discusses Chinese consumers' attitudes, purchasing behaviour, and willingness to pay for safe aquatic products by a survey of Beijing consumers. The following is organized as: section 2 describes materials and methods, including the content, survey process and dealing method of questionnaire; section 3 discusses analysis results of questionnaire by statistical methods; the last section draws some conclusions and suggestions.

MATERIALS AND METHODS

Survey

A cross-sectional study on consumers' awareness toward quality and safety of aquatic products was conducted in Beijing, China, from November to December 2006. Before the survey was conducted, the questionnaire was pilot tested by 10 participants to confirm question clarity, identify response options, and likely completion time (Jevs`nik, M. et al., 2007). The same time some salespersons were interviewed about sales mode, food safety and the consumer response to aquatic products. Finally, the questionnaire was revised on the basis of pre-test results and other recommendations. The study sample consisted of 120 voluntary subjects who were selected randomly from six supermarkets (Meilianmei, Huapu, Chaoshifa, Yichulianhua, Wumei, Hualian) distributed in five districts (Haidian, Chaoyang, Changping, Daxing, Xicheng) in that city. The time of survey is conducted roughly from 10:00 to 19:00 every day. Face to face interviews were conducted at supermarket and the surrounding, and the average completion time for each questionnaire was 10 minutes.

Questionnaire

The factors influencing consumers' perception toward quality and safety of aquatic products are diverse, and they are linked to consumers' demographic and socio-economic status, culture, personal preferences and experience (Anne Wilcocky et al, 2004). A questionnaire about safety of aquatic products and willingness to pay for safe aquatic products was designed, which consisted of 22 questions, organized into several groups including: consumer social-economic characteristics (gender, age, job category, level of education); consumer purchasing behaviour (regularity of purchase, main purchasing place, number of purchase, type of aquatic products, packaging mode of consumption); awareness to quality and safety of aquatic products (the knowledge about nutrition, storage, production and processing, cooking, traceability knowledge of aquatic products, attention to quality and safety incidents, handling method for problematic products); and willingness to pay for safe aquatic products after traceability system was implemented. 120 questionnaires were distributed and returned in five districts, in which 103 questionnaires were valid.

Statistical methods

All statistical analyses were conducted using SPSS version 11.5 software. Mean responses with standard deviation, frequencies and percentages of responses in each category were calculated and presented in tabular form. Crosstabulation and the χ^2 test were used to examine the relationships among and between the variables (Efsun Karabudak et al., 2008).

RESULTS

Consumer characteristics

A total of 103 questionnaires were obtained. Table 1 shows the characteristics of these consumers by gender, age, job category and educational background. The sample consisted of 51 women and 52 men. The age of most respondents was between 20 and 35 in cases (21.2%). Staff for enterprise and government units were more than that of other occupation, which accounted for 61.2%. Of all consumers interviewed, it is notable that well educated respondents are more predominant in our sample (56.3%).

Table 1 Characteristics of the study subjects

Demographic characteristics	Category	Percent (%)	Subject (No.)
Gender	Male	50.5	52
	Female	49.5	51
Age	<20	2.9	3
	20-35	21.2	63
	36-50	19.4	20
	>50	16.5	17
Job category	Civil servant	1.9	2
	Staff for government units	30.1	31
	Staff for enterprise	31.1	32
	Student	10.7	11
	Farmer	1.9	2
	Retiree	13.6	14
	Inoccupation	5.8	6
	Other	4.9	5
Level of education	University	56.3	58

	High school	26.2	27
	Junior high school	11.7	12
	Primary school	5.8	6

Purchasing behaviour

The purchasing behaviour of consumers surveyed is shown in Table 2. Most informants preferred to buy aquatic products in bulk (60.2%) and fresh (76.7%) products rather than packaging and frozen products. And the primary processing products were more popular than deep processing products. In China, the consumption of aquatic products was affected by people's traditional customs and consumers' disposable income level. Usually more consumers cooked it themselves in home, so they preferred to purchase fresh or primary processing aquatic products. Moreover, Chinese consumption habits that they tend to buy the whole and fresh aquatic products may be another reason. They feel that fresh and live aquatic products are safe and reassuring. The majority of consumers (70.9%) believe that aquatic products on the market can meet demand basically, and they are now beginning to choose what they consume, namely consumption is based more on the quality and species of aquatic products than before (Zhang Xiang-guo, 2002).

Approximately 75.7% of informants bought aquatic products in supermarkets (Fig. 1), according to the research suggested by Harris, Knight, and Worosz (2006), supermarkets may be preferred because of their shopping choices, ambiance, and the easier personal inspection they allow. Moreover, the information on production origin, hygiene and sanitation can be identified, and the best assurance for food safety is provided in supermarkets. Hence, food safety is internalized to supermarket-the large scale detail chain operator. To confirm consumers' confidence in aquatic products, supermarkets should administer the legitimacy and availability of safe aquatic products.

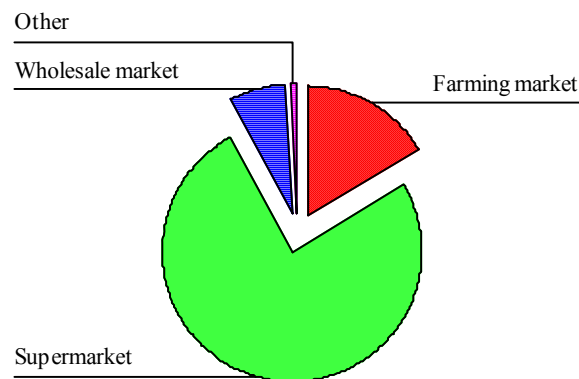


Fig. 1. Main purchasing place for aquatic products

According to the statistical results, the purchase frequency per month is focused in '0-2' and '3-4', which accounted for 74.8%. On the whole, the purchase frequency is low. But that doesn't mean income level of consumers is low. That reflects both purchasing behaviours. Those who had a high disposable income and liked aquatic products consumption may purchase more aquatic products as consumption for the whole week or month, because of his/her busy work and refrigeration technology improvement. Those who had a high disposable income and more abundant time, and preferred to eat fresh products may purchase

aquatic products frequently. So these consumers should be regarded as major customers for food distribution enterprises.

There are also other purchasing behaviours. 85.4% of respondents indicated they will buy more aquatic products in holidays for storage and guest hospitality. That is relevant with Chinese traditional consumption. During the holidays prices of consumption goods may increase and some agricultural products markets will be closed. Consumers had not very strong brand consciousness to the aquatic products, in which 61.2% implied the close attention is paid occasionally. That may be related to Chinese development status of aquatic enterprise. In China, the famous brand enterprises are still relatively in shortage, in which the majority of aquatic products are processed deeply for export. In such circumstances, the market is chaotic, and some enterprises may relax control over quality and safety of aquatic product for their own profit. So the government should attach more importance to the supervising of detailers and producers.

Table 2 Main purchasing place, packaging mode, type of aquatic products

Questions	Answers	Percent (n)
Which processing category of aquatic products do you prefer to purchase?	Fresh	76.7(79)
	Frozen	22.3(23)
Can aquatic products in market satisfy your requirement?	Yes	70.9 (73)
	No	29.1(30)
Which type of aquatic products do you buy usually?	Primary processing	68.9(71)
	Deep processing	31.1(32)
The main place where you purchase aquatic products is?	Farming market	16.5(17)
	Supermarket	75.7(78)
	The wholesale market	6.8(7)
	Other	1.0(1)
Which sales mode do you like?	In bulk	60.2(62)
	Packaging	39.8(41)
Do you consider the brand when you buy aquatic products?	Yes	30.1(31)
	Sometimes	61.2(63)
	No	7.8(8)
Whether to buy more aquatic products in holidays?	Yes	85.4(88)
	No	14.6 (15)
The purchase frequency per month is	0-2	34.0(35)
	3-4	40.8(42)
	5-7	14.6(15)
	8-10	2.9(3)
	>10	6.8(7)

Awareness of quality and safety on aquatic products

The results of survey on consumer's awareness of aquatic products, in table 3, indicate that the majority were anxious about aquatic products safety. Usually the consumers judged the quality of the aquatic products they bought by color, texture and odor (McSwane, Rue, and Linton, 1998). Taking into account quality and safety knowledge of aquatic products, most consumers only understood more nutritional knowledge and simple cooking knowledge, but storage, production and processing knowledge was in shortage, especially 7.8% of respondents knew the traceability knowledge, only 22.3% of respondents heard that traceability system had been implemented in early 2006. According to Woodburn and Raab

(1997), consumers were not good at identifying either the food borne illness or the groups of people particularly at risk for food poisoning.

Of all the consumers interviewed, most (52.4%) claimed to return, 19.4% complained to relevant department, 26.2% discarded if aquatic products purchased exists problem. Moreover, just 34.0% of respondents knew in detail incidents about quality and safety of aquatic products. Therefore, on the whole, the consumers revealed obvious lack of quality and safety knowledge and risk perception associated with aquatic products.

The results of a chi-square test revealed that level of education was not significantly related to handling method of problematic aquatic products and food safety knowledge ($P > .1$). However, the significant relationship was found between level of education and the attention that consumers paid to the quality and safety incidents of aquatic products ($P < .1$). So the government should enhance education level of consumers to promote concern about the quality and safety of aquatic products, which have an external supervisory role for food enterprises.

Table 3 Quality and safety knowledge about aquatic products, handling method for problematic product

Questions	Answers	Percent (n)
By which method do you deal with the problematic aquatic products?	Returning	52.4(54)
	Complaining to relevant department	19.4(20)
	Discarding	26.2(27)
	Other	1.9(2)
Do you understand storage knowledge about aquatic products?	Yes	29.1(30)
	No	70.9(73)
Do you understand production and processing knowledge about aquatic products?	Yes	20.4(21)
	No	79.6(82)
Do you understand nutritional knowledge about aquatic products?	Yes	54.4(56)
	No	45.6(47)
Do you understand cooking knowledge about aquatic products?	Yes	54.4(56)
	No	45.6(47)
Do you understand traceability knowledge about aquatic products?	Yes	7.8(8)
	No	92.2(95)
Do you know the incident about turbot and Steamed crab quality and safety?	Yes	34.0(35)
	Hearing about	50.5(52)
	No	15.5(16)
Do you know the traceability system of aquatic products have been implemented in Beijing?	Yes	22.3(23)
	No	77.7(80)

Willingness to pay

Where food safety is concerned, certification strategies (traceability or quality labels) have been developed to improve consumer perception of food safety. In any case, increasing controls for food safety have increased marginal production costs, which ultimately have been translated into higher retail price (Ana M. Angulo and Jose' M. Gil, 2007). Some consumers will be willing to pay higher aquatic products price to reassure safety but others will trade off price against the safety improvement. Table 4 shows consumer attitude and willingness to pay for aquatic products by quality and safety controls (traceability system), in which premiums are expressed as a percentage price increase over the price they are normally paying. It can be found, of all the consumers interviewed, 80.6% admitted that the price of aquatic

products will increase due to rising production cost after traceability system was implemented, but 39.8% were not willing to pay a premium for traceable aquatic products over the price they are actually paying, 49.5% were willing to pay a positive amount (0~10%) for traceable aquatic products to increase its safety level. As a consequence, for all the respondents, the average price premium is only 7% over prices consumers are actually paying for aquatic products. Therefore, the rising cost owing to the implementation of quality control measures (traceability system) needs to be reasonably allocated between enterprises and consumers.

Although for university graduates, willingness to pay for traceable aquatic products was relatively high, but the results of a chi-square test showed that there is not significant relationship between consumers' education level and willingness to pay ($P > .1$). The same phenomenon existed between job category and willingness to pay. But the analysis indicated that there is certain correlation between age and the willingness to pay, especially the young between 20-35 years old expressed higher willingness to pay. It can also be explained by the specific situation in China, the middle aged people are responsible for the education of their children and parents who are probably not guaranteed with insurance, who are more restricted by the budget and more sensitive for price (Wei Xia and Yinchu Zeng, 2005).

Table 4 Willingness to pay for safe aquatic products

Questions	Answers	Percent (%)	n
Do you believe the production cost will increase after traceability system is implemented?	Yes	80.6	83
	No	19.4	20
If the retail price of safe aquatic products increases because traceability system is implemented, how much you are willing to pay for a premium?	No	39.8	41
	0-10%	49.5	51
	10%-20%	10.7	11
	>20%	0	0

CONCLUSION AND DISCUSSION

Based on the above analysis, the main outcomes and proposals can be outlined as follows:

- It is no surprise to find that consumer educational background has a large impact on attention to aquatic products safety. They are familiar with various food safety knowledge by different ways such as internet, newspaper, communication with friends and colleagues. Those with a higher level of education adhered to pay attention to the food safety incidents than did consumers who had been educated to the primary level. So the education of consumers is an effective strategy for enhance the perception toward quality and safety of aquatic products.
- The majority of consumers interviewed revealed they usually purchase aquatic products in supermarket. Therefore, public health agencies should place food safety messages in places that are most frequently visited by consumers. Moreover, Chinese consumption habits were linked with the type of aquatic products, and they are more inclined to purchase fresh and primary processing aquatic products.
- Although consumers are increasingly concerned about aquatic products safety, it seems consumers place little value on the indication of quality control in nature. As a whole, respondents said they are willing to pay a 7% premium over the price they are actually paying. Younger people are more willing to pay for aquatic products labeled traceability, in contrast, middle-aged consumers around 40-year-old pay less. So that should be improved by intensive promotion of health concept, encouraging middle-aged people to borrow from future and invest in their health (Wei Xia and Yinchu Zeng, 2005). In evaluating willingness to pay for traceable aquatic products the role of information is crucial. The survey shows that consumer awareness and understanding of traceability

system are still low. Thus, the private and public sectors' provision of educational programs and information is a valuable strategy. Moreover, the factors influencing consumers' perception toward quality and safety of aquatic products need to be further researched. The distribution mechanism of rising cost due to quality control measures between aquatic enterprises and consumers need to be discussed.

- In the process of survey, many people indicated they are quite doubtful of the quality of aquatic products labeled traceability. This is related with consumers' anxious about food safety and the faultiness of the certification and surveillance systems which induces actions out of order (Wei Xia and Yinchu Zeng, 2005). But absolute food safety is just not possible. The consumers should be educated to the reality that there is no such thing as absolute safety. Regulation can never completely and totally protect the public. So they themselves also need to study more relevant quality and safety knowledge of aquatic products.
- In conclusion, this survey has made possible to understand consumers' awareness to quality and safety of aquatic products in the surveyed areas, and reinforced the impression that food consumption is neither an isolated phenomenon nor exclusively focused on food products, but is part of a wider social context regarding consumers (Dagevos, 2005; Iaccarino et al., 2006). Because the population of the study only consisted of consumers in Beijing, the results may not reflect the perception toward quality and safety of aquatic products of the Chinese population as a whole. So it is proposed that the researchers conduct survey in a larger scope and select more representative samples.

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ENDNOTES

This research is funded by the European Union (FP6-016333-2) and partly by NSFC (National Nature Science Foundation of China) under Grant No. 30700481.