PJN

NPAKISTAN JOURNAL OF UTRITION

The Most Preferred and Tasty Fish in Zambia:
A Case Study of Three Copperbelt Province Markets

Diana Malumbe[1] and Confred G. Musuka[2]
[1]Box 4461, Luanshya, Zambia
[2]The Copperbelt University, School of Natural Resources, P.O. Box 21692, Kitwe, Zambia

Abstract: A research was conducted in three districts (Luanshya, Ndola and Kitwe) of the mineral-rich Copperbelt Province, from 1st May to 30th June 2012 to determine the most preferred and tasty fish on the market through administration of questionnaires to randomly selected respondents. The study also examined the different types of fish found on the market at any given time. A total of 130 questionnaires were administered, 40 to traders and 30 to consumers in each of the three districts. Slightly over forty-seven per cent (47.50%) of the respondents indicated that the Bream, was most preferred fish species among consumers, while 30, 10 and 10% preferred Buka buka (*Luciolates* spp.), Kapenta (*Limnothrissa* spp.) and Mintesa (Mormyrids). A further 62.5% of the respondents felt that fresh fish was most preferred form on the market, as 62% of the consumers purchased more of fresh than dry fish. Over and above, 67.5% of the fish sold on the market had good taste, with the tasty preference for bream being 37%. Fish traders were also aware of the fact that stocking the right species preferred by customers helped to improve on the marketing strategy, thereby increasing on their net returns. It was further noted that 58% of the traders ventured into fish trading to earn a living, 32% due to lack of formal employment, while 5%, as a result of family tradition and another 5% considered it as good business.

Key words: Fish, fish trading, Bream (Tilapia), Copperbelt, Zambia

INTRODUCTION
Fish demand is increasing as a result of increasing world population, resulting in higher living standards and a good overall image of fish among consumers (Percy and Hishamunda, 2001). The fish sources in Zambia are rivers, lakes and dams (capture fisheries) and with a steadily increasing supply from the aquaculture sector (Mwango *et al.*, 1999). The current national fish per capita consumption was estimated to be at 5.8 kg (DoF, 2010) and most Zambian homes fish is highly consumed and was prepared in a variety of ways thus adding diversity to diets of families. According to CSO (2010), Copperbelt Province of Zambia is known to have an increasing population of 1, 958, 623; therefore there is an increase in fish demand in the province. Fish species differ significantly from each other in terms of taste, price, production volume and location (Ajana, 1999). Among the most common fish species found on most Copperbelt markets; include, Breams (Tilapia), Kapenta (*Stolothrissa* and *Limnothrisa* spp.), Catfish (*Clarias spp.*), and Buka Buka (*Luciolates spp.*), Mbowa (*Auchenaglanis spp.*) and many more. An increase in consumers' preferences and taste for a particular product tends to increase the quantity demanded for it. Furthermore, the growing knowledge that fish constitute an important and healthy part of the human diets, mainly owing to the presence of Polyunsaturated Fatty Acids (PUFA) which plays an essential role in human health but also due to the presence of vitamins, minerals and proteins with a high biological value (Fox, 1992). However, choices among fish species are particularly significant in these markets. Choices depend on the consumers who often express strong preferences for certain types of fish species based on the taste, appearance and texture. Consumer's preferences and taste often affect demand for a given product.

MATERIALS AND METHODS
A total of forty (40) questionnaires were administered to traders, 20 in Kitwe, 10 in Luanshya and another 10 in Ndola, while 90 were administered to consumers, thirty (30) in each of the three mineral-rich towns of Luanshya, Ndola and Kitwe of the Copperbelt province (Fig. 1), bringing the total number of respondents to 130.
Sequential sampling was used to carry out a survey on people buying and selling fish at the market and in fish shops. On the other hand for assessing fish taste, data was collected from respondents using interview schedules to randomly selected fish consumers. Fish taste was measured using a scale of 1 through 3, with 1 = Very tasty, 2 = tasty, up to 3 = not tasty. In this study, 62.5% of the traders were females and 37.5% were males. Traders' age grouping ranged from 15 to above 50 years. The breakdown of the age group was as
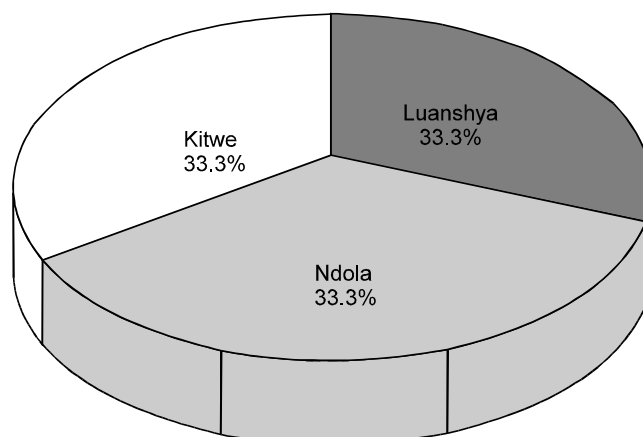
Corresponding Author: Confred G. Musuka, The Copperbelt University, School of Natural Resources, P.O. Box 21692, Kitwe, Zambia

Fig. 1: Fisher traders' representation by district
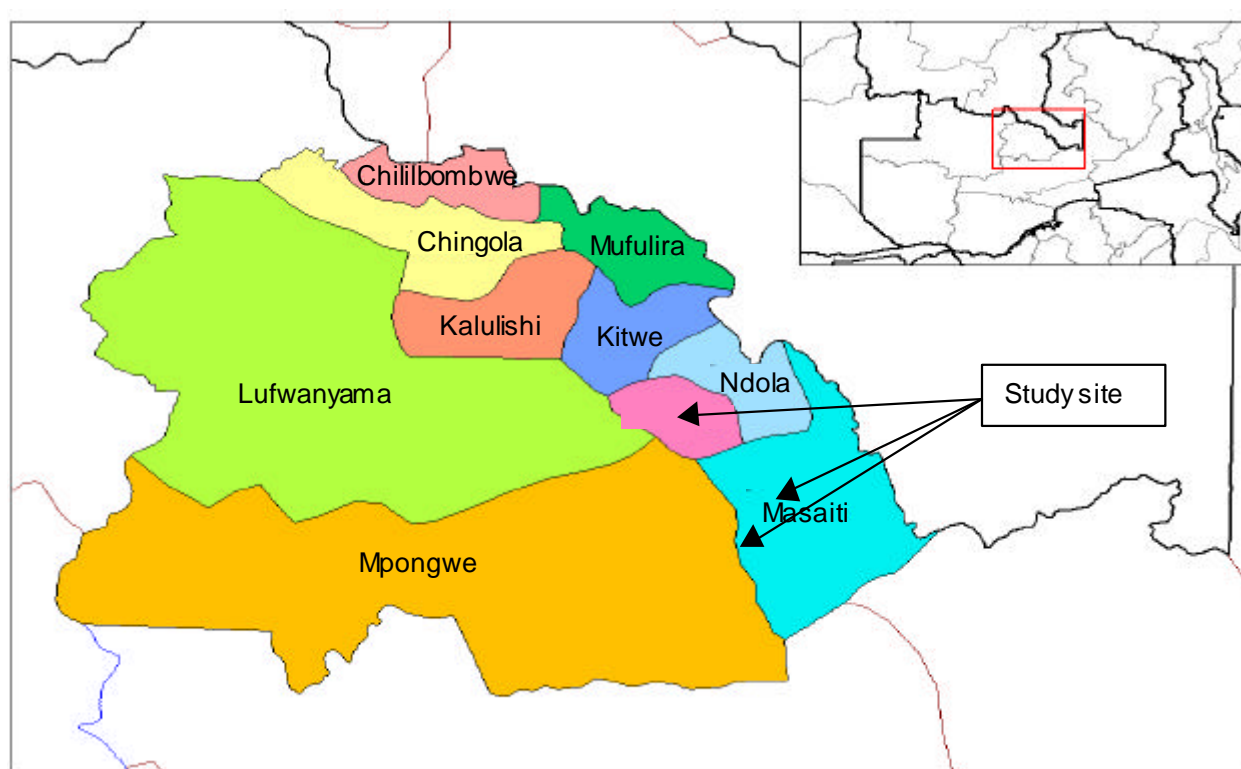
Fig. 2: Map of the Copperbelt Province, Zambia showing the study sites. Source: http://maps.google.co.zm/maps

follows: 22.5%, in the age group of 15-25, 30% between 26 and 36, while 32.5% were in the range of 37 to 47 and 15% were above 50 years. Statistical package for Social Scientists (SPSS) version 16.0 was used in the analysis of data.

RESULTS AND DISCUSSION
Many fish species (Fig. 3) were found being sold by traders on the market. From the results obtained 47.5% of traders indicated that Bream (Tilapia) was the most popular fish species that was offered at a very

acceptable price to the consumer, while 30%, 10%, 10% preferred Buka buka (*Luciolates* spp.), Kapenta (*Limnothrissa* spp.) and Mintesa (Mormyrids). The imported Mackerel, catfish and *Synodontis* spp. and others were less preferred. Less common fish species; such as the Bottle nose, Yellow-belly and Silver bubble were only sold by fish shops in order to increase a variety of fish species on the market. It was further observed that up to 87.5% of the most popular fish species were sold on the market in a matter of days to the preferred consumers, while 5% were readily
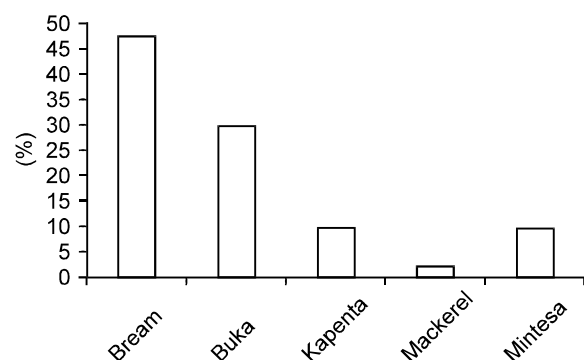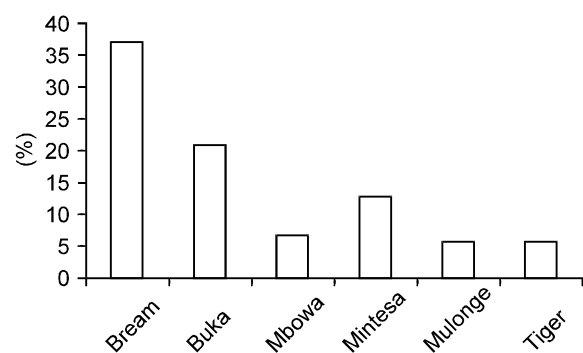
Fig. 3: The most commonly sold fish types

Fig. 4: Most preferred fish by consumers

Fig. 5: Different forms of fish

available over time and the rest that did not appeal to the consumers were perceived to be selling much more slowly, ending up as waste or fetching low prices. Fish traders were aware of the fact that stocking the right species preferred by customers helped to improve on the marketing strategy, thereby increasing on their net returns. Therefore, whoever was involved in the business of selling fish, he/she understand that consumers were selective when purchasing fish on the market because they had different tastes.

However, fish traders had different views on the reason why consumers preferred one type of fish species to others. Most of them (67.5%) felt that the fish that sold most had good taste, 20% indicated that fish was readily available and 12.5% attributed it to affordability by consumers. Consumers also indicated that the most preferred fish was bream (Fig. 4).

The study revealed that 37% of the consumers preferred Bream (Tilapia), 21% Buka buka (*Luciolates* spp.), 12% Mormyrids (Mintesa), 7% *A. occidentalis* (Mbowa) and 6% Catfish (Mulonge) and Tiger fish respectively. This study was in agreement with studies conducted by Kwamena *et al.* (2008), that showed that the top fish/shellfish sold was tilapia followed by catfish and bass; Musa and Ala (2007), reported the results that showed 26% of the respondents preferring Tilapia
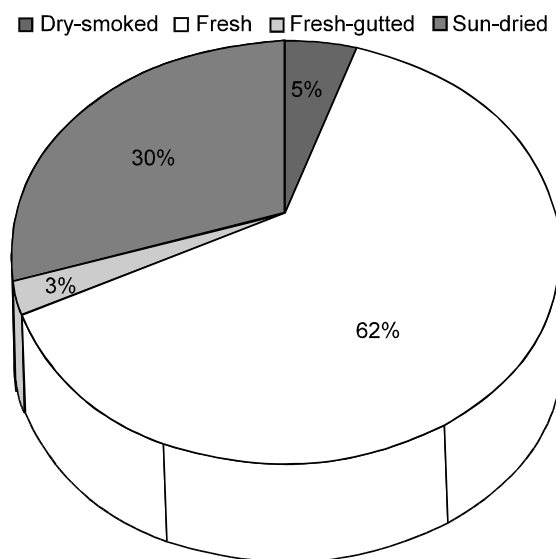
(bream) species while 23, 19 and 9% preferred Clarias, Mormyrid and Bagrus, respectively. According to the authors, the Tilapia and catfish species were in abundance, highly purchased and were offered at acceptable prices to consumers. Goksel *et al.* (2009) determined household preference for fish consumption with conjoint analysis in Hatay province urban. The results showed that variety, supply channel, price and production method were effective and significant in purchasing preference of the consumer at rates of 29.7, 28.0, 27.2 and 15.1%, respectively.

The current study further revealed that 62.5% of consumers purchased more of fresh fish, followed by 30% (sun-dried), 5% (dry-smoked) and the least was 3% for fresh gutted (Fig. 5).

The low demand for fresh gutted fish might be attributed to the fact that most Zambians prefer a whole fish. The consumers at the market ranked the taste of different forms of fish as shown in Fig. 6.

The results clearly showed that the fish that had a good taste or were very tasty was Bream (24%), followed by Kapenta (i.e., two species: *Limnothrissa miodon* (popularly known as Siavonga) and *Stolothrisssa tanganyicae* (large type) that comes from Mpulungu) (17%), then Mintesa (14%), Mbowa (11%), Mulonge and Buka buka (9%), Tiger fish, 5% Chisense and 4% Carp fish. Fresh Kariba bream was considered to be very tasty by most consumers. However, bream in dry form from Western Province, popularly known as Mongu fish was considered to be both tasty and more appealing to the eyes of the consumers. In this study, the fish with the least taste were Chisense and catfish. Reasons advanced for low taste had to do mostly with size and small stone grains in Chisense. Catfish was mostly disliked due to its appearance and religious beliefs. A
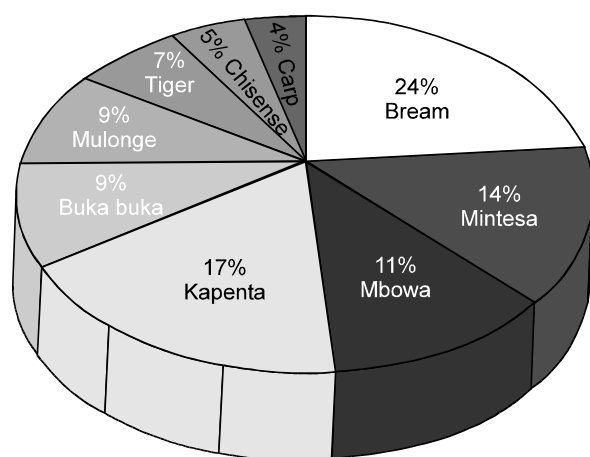
Fig. 6: Taste evaluation

Table 1: Factors affecting consumers preference and taste

Factors	VI (%)	SI (%)	NI (%)
Freshness	72.5	10.0	17.5
Fish size	67.5	27.5	5.0
Quality	87.5	12.5	0.0
Appearance	77.5	12.5	10.0
Type	72.5	22.5	7.5
Source	62.5	25.0	12.5

VI: Very important, SI: Some what important, NI: Not important

Fig. 7: The season for profit maximization

study by Kaunda *et al.* (2003) done to determine preference and acceptability of roasted, fried and boiled *Oreochromis* spp., (Chambo), *Rhamphochromis* spp. (Ncheni) and *Bagrus meridionalis* (Kampango). The results showed that Chambo was the most preferred species at the market, while the sensory evaluation revealed that most people (65 and 93%) ranked Ncheni as first choice for taste and preferences, respectively.

The correlation between taste and preference was statistically significant, meaning that preference goes with taste or preference was direct proportional to taste. At 95% level of confidence taste and preference were directly proportional but on the other hand, at 99% level of confidence taste was not linked to preference, in that case it could have been as a result of the following factors such as appearance, size, freshness, fish type and quality of the fish. These factors affected the consumer's preference. In this study, 88% of the consumers felt quality was an important factor to consider before purchasing fish, 78% appearance, 73% freshness/type and 63% considered source as important factor (Table 1).

This was in contrast with an "Assessment of Ethnic Market Opportunities for Indiana Farm-Raised Fish" (Kwamena *et al.*, 2008). The focus of the study was to assess the important factors managers considered when purchasing live fish. The most important factors when purchasing live fish that managers considered were overall quality, supply consistency, freshness, size, survival and price. Most managers did not consider origin as important. The most important factors to managers when purchasing live fish was supply consistency and overall quality. In another study, consumers were also asked to rank the importance of certain product attributes when making buying decisions regarding seafood products as Samuel and Cathy (2010) observed. In that study, these attributes were measured using a scale of 1 through 4, with 1 = Very Important up to 4 = No. The attribute that received the
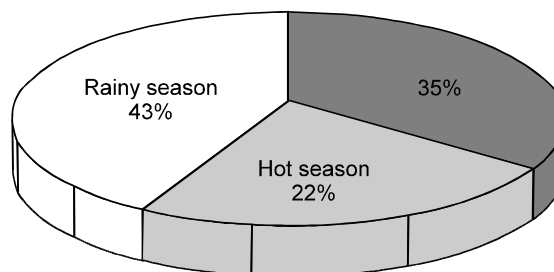
highest level of importance from respondents was "freshness" (mean = 1.05 an important attribute in influencing purchasing decisions of seafood and other food products, followed by "taste" (mean = 1.10) and "health/safety concerns" (mean = 1.36). The attributes "ease of preparation" (mean = 2.47) and "price" (mean = 2.01) received the lowest levels of importance. The findings indicated that while consumers still viewed these characteristics as maintaining importance, consumers perceive attributes such as "visual quality health benefits" and "environmental concerns" as having a greater influence on buying decisions.

This study has also shown that 42.5% of the traders maximized their profit in the rainy season, 35% in the cold season and 22.5% in summer or the hot season (Fig. 7).

The main reason why many fish traders maximized their profits during rainy season was because of the scarcity of fish on the market that was as a result of the closure of most fisheries that comes into effect on 1st December and goes on up to 1st March of the following year. When the fishing ban is in effect, the cost of fish becomes very high as the traders' main sources of fish were far flung open areas where they incurred a lot of costs to bring fish to the market. During the closed fishing season, 48% of the fish traders obtained their fish from Lake Kariba, 25% from Lake Tanganyika, 15% from Local fish suppliers and 12%, from fish farms (Fig. 8).

Both Kariba and Tanganyika were not affected by the closed fishing seasons because they were open access lakes which means fishing takes place throughout the year. However, a ban was practiced on Lake Tanganyika as a management measure to prevent over fishing. Most traders preferred getting fish from Kariba to Mpulungu in Lake Tanganyika because it was much cheaper there
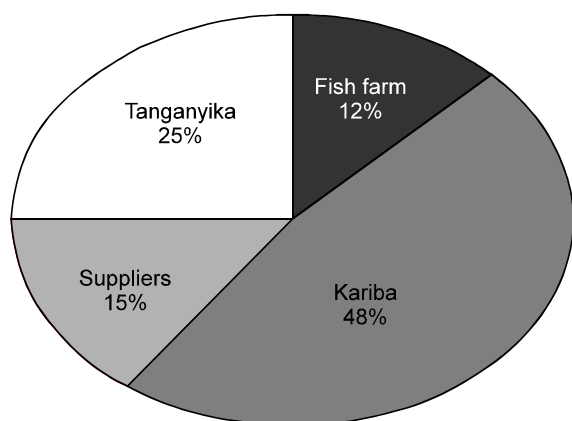
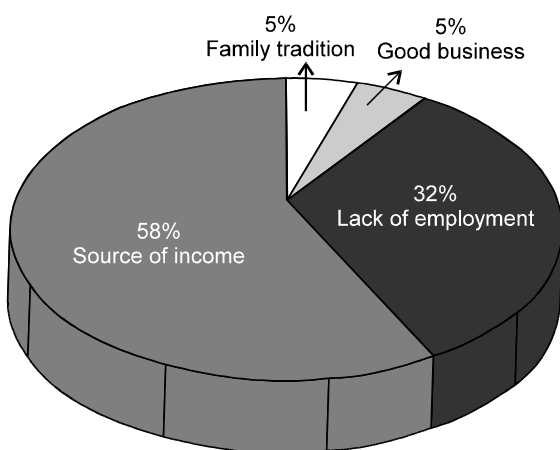Fig. 8: Sources of fish supply during the closed fishing season

Fig. 9: Various reasons given why people were involved in fish trading

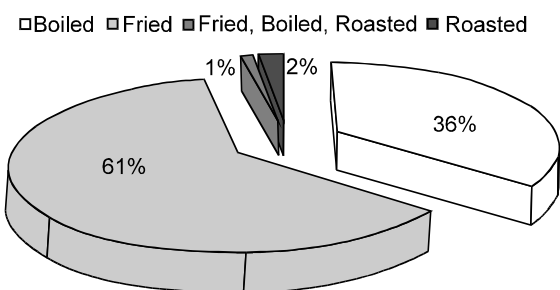□Boiled □Fried ■Fried, Boiled, Roasted ■ Roasted

Fig. 10: Method of preparation

and the transport cost was also lower. The results obtained also showed that few fish trader obtained their fish from fish farms (Aquaculture). This clearly indicates that aquaculture was contributing less to the amount of fish on the market, evidently from the few fish farms the province had.

Several reasons were advanced why most people were involved in fish trading; 58% went into the business to earn a living, 32% due to lack of formal employment, 5% due to family tradition and another 5% felt that it was good business (Fig. 9).

The age group for most consumers was as follows: 15-25 years (45.6%), followed by 26-36 years (33.3%), then those that were between 37 and 45 years (10%), while those above 50 years were being represented by 1.1%. One interesting observation coming out of this study was that consumers above fifty years preferred being at home or doing other things to going out to the market. The level of education among consumers was also very high compared to the fish traders. Fifty (50%) percent of consumers had secondary school level of education, 33.3% with college education and 16.7% were University graduates. On the other hand 25% of the traders had attained college education and 75% traders were without secondary school level of education.

On preparation method, results showed that 61% consumers prepared their fish by frying, 36% by boiling, 2% by roasting and 1.1% a combination of the above (Fig. 10).

Conclusion: From the result obtained, it was evident that the most preferred and tasty fish was bream. Thirty-seven percent (37%) consumers preferred bream and 24% consumers liked its taste. Bream was found to be sold by almost each fish trader on the markets, fish shops and shopping malls in town centres. According to consumer's responses, frying was considered as the best method of preparing fish and fresh fish form was mostly purchased.

REFERENCES

Ajana, A.M., 1999. Overview of highlight and problems of fisheries extension in Nigeria. Paper presentation in Ibadan, Niomer.

CSO (Central Statistics Office), 2010. Government of Zambia, 2010 Census, Government of Zambia, Lusaka.

DoF, 2010. National Aquaculture Development Plan. Overcoming the slow growth of Aquaculture in Zambia, 2010-2015.

Fox, K.A., 1992. Sructural Analysis and the measurement of Demand for farm products. Iowa State University Press, Iowa, USA, pp: 345.

Goksel Akpinar, M., Erdal Dagistan, Yavuz Mazlum, Mevlut Gul, Besir Koc and Yalcin Yilmaz, 2009. Determining household preferences for fish consumption with conjoint analysis in turkey. J. Anim. Vet. Adv., 8: 2215-2222. http://upload.wikimedia.org/commons/1/1a/copperbelt_districts.png. Visited on 12-09-1.

Kaunda, E., D. Maliro, M. Mphepo, S. Khaila, L. Kamanga, A. Mwangwela and O. Chapotoka, 2003. Chambo: is it taste or something else?: preference and acceptability of roasted, fried and boiled Oreochromis spp, (Chambo), Rhamphochromis spp (Ncheni) and Bagrus meridionalis (Kampango) from Lake Malawi. Aqua-Fish Technical Report (2). pp. 6-9. ISSN 1729-4177.

Kwamena, K. Quagrainie, Monique Fahie, Kevin Hughes, and Ai Xing. 2008. An Assessment of Ethnic Market Opportunities for Indiana Farm-Raised Fish. Final Report. southcenters. osu.edu/sites/southc/files/.../ISALive Fish Market Report.pdf.

Musa, D. and A.L. Ala, 2007. Fish Preference among Residents of Sokoto Metropolis, Sokoto State, Nigeria.

Mwango, J., M. Chilala and C. Bweupe, 1999. Analysis of Aquaculture Development in Zambia. MAFF, Lusaka Pages: 27.

Percy, D.R. and N. Hishamunda, 2001. Promotion of Sustainable Commercial Aquaculture in Sub-Saharan Africa, Volume 3: Legal, Regulatory and Institutional Framework. FAO Fisheries Technical paper, 408.

Samuel, G. and A.R. Cathy, 2010. URI Sustainable Seafood Fellow and M.S. Candidate, Department of Marine Affairs and Professor, Department of Environmental and Natural Resource Economics University of Rhode Island, USA.