DEMOGRAPHIC FACTORS OF THE FISH TRADERS THAT AFFECTS THE ENVIRONMENTAL SITUATION OF THE FISH MARKET

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Abstract

Purpose: The purpose of the study was to identify demographic factors of the fish traders affecting the environmental situation of the fish market.

Methodology: A descriptive survey design was used for the research.The target for the study was the fish traders of Gikomba fish market, Nairobi. Random sampling of fish traders was done from a register, using Fischer's formulae, to calculate the number of respondents. Data was collected through a structured questionnaire and was processed using EXCEL and SPSS software packages. Descriptive statistics (frequencies, percentages,) and inferential statistics (Chi square and Logistic Regression) were used to explain the variables. 54% of the respondents did not get piped water.

Results: Majority (60.5%) of the respondents noted that fish wastes had a negative effect on the environment.Chi squaretests results for fish operator practices in most attributes was statistically associated with environmental situation ($P < 0.05$).Logistic regression tests results proved that practices such as use of water, disposal of wastes, use of protective clothing and participation in cleanups had a statistically significant influence on the environmental situation ($P < 0.05$).

Unique contribution to theory, practice and policy: The research recommended that the Department of Fisheries needs to review the modalities for fish handling throughout the marketing chain. Emphasis should be put on disposal of fish wastes in the major fish markets, fish wastes recycling options, training of fish operators and capacity development of staff.

Key words: Demographic Factors, fish traders, market, environmental situation

1.0 INTRODUCTION

1.1 Background of the Study

The Kenya fisheries sub sector has significantly contributed to the nationaleconomy through employment creation, foreign exchange earnings, poverty reduction and food security support. Fish production data for the year 2012, shows that during the period,5126.23 MT of fresh water fish valued at 559,939,800 Kshs and 68.5 MT of marine fish valued at 18,829,000 Kshs was traded in Nairobi (Nairobi Province Fisheries Annual Report 2012). This is against a national production of 150,000MT (Fisheries Bulletin 2012). The report cites that fish market's poor sanitation and lack of physical facilities as some of the challenges experienced in the fish marketing outlets.

The Government has a responsibility of providing and servicing market facilities for fish sale, which meet acceptable hygiene standards. Lack of adequate, or improperly maintained physical marketing facilities can be a constraint to efficient marketing and utilization of fish (FAO, 2002). Fish handled in poor sanitary conditions may produce extra costs for the government in additional medical costs and lost man-hours. Abila (2003) noted that consumption of unwholesome fish and fishery products accounts for as much as 30 percent of the worldwide food-borne illnesses. The fact is that if less fish is wasted, there will be less fish requiring disposal into the environment and so the negative environmental impacts may be reduced. The market's sanitary standards are regulated by the Fisheries Act CAP 378 (*Safety of Fish, Fishery Products and Fish feed Regulations* (GOK, 2007) which complements thePublic Health Act (GOK, 1986) whose purpose is to secure and maintain public health.

One of the fisheries contributions to environmental degradation is mainly through discharge from post-harvest fish processing activities. The water that is used to wash the fish or clean the working environment picks up contamination that once released into natural water bodies affects the biological equilibrium. Such water may also contain cleaning chemicals that can pollute the environment. Cross contamination of the fish and fish products with this waste water is also possible where sanitation is not effective.

The other contribution to environmental degradation is the disposal of fish solid waste, mainly trimmings and fish frames from fish filleting, scales, discarded rotten fish and fish packaging materials. The solid wastes may also contain strong smells especially in dried and smoked fish. The problem of smells could apart from general nuisance and discomfort, also bring about flies, which can be a vector of human disease and potential fish contaminants. Solid waste and poorly maintained sanitation facilities are also possible breeding grounds for flies and cockroaches, which can contribute to the spread of faecal matter in the environment. Inadequate methods of handling, hygiene, sanitation and distribution may provide ideal conditions for pathogens to proliferate and reach infective levels (Wekell *et al*., 1994).Fish wastes disposal and management is therefore very necessary to reduce environmental pollution and reduce incidences of possible diseases from cross contamination of fish.

According to Ogunja and Okemwa (1992) solid fish wastes make up 30% to 40% of total production, depending on the species in fish being processed. Muniafu and Otiato (2010) further observed that lack of effective waste management systems in Nairobi leads to high possibilities of negative and short term impacts on human health and the environment in general. To overcome these, there are wide range of requirements and suggested solutions which include creation and enforcement of waste management policies as well as procedures, incentives,

community participation, education and awareness, proper waste disposal collection procedures and disposal sites among others. The sustainable management of waste is a major challenge for municipal authorities (UN-HABITAT, 2007). Waste is a product or material that does not have a value anymore for the first user and is therefore thrown away; however, it could have value for another person in a different circumstance or even in a different culture (Klundert & Anschutz, 2001). Many approaches to waste management exist. Generally, solid waste is managed through landfills, incineration and recycling or reuse. However, in developing countries, properly engineered landfills are not common while the cost of modern incineration is too expensive to sustain, hence the most common method of waste disposal is some form of landfill, including variants such as uncontrolled dumping in undefined areas, collection and disposal on unmanaged open dumps, collection/disposal on controlled dumpsites (UNEP, 2004).

1.2 Problem Statement

The current environmental situation in fish markets raises concerns on whether the level of awareness on government institutional sanitation guidelines, poor perception on sanitary management and deficient fish handling practices may be the contributing factors. Environmental management at Gikomba market is evidently constrained, primarily, by logistical factors, which presumably include inability and difficulties in waste collection by local authorities for transport to the disposal centers. Lack of basic facilities to handle fish in markets, ignorance on appropriate disposal of fish wastes or recycling for useful by-products are some of the identified challenges in fish markets. Generally, capacity among stakeholders (technocrats, extension agents, fish traders) in addressing sanitary situation issues are some of the factors that needed to be examined to understand how they relate with the environmental status in the market.

2.0 LITERATURE REVIEW

2.1 Theoretical Literature

The most common conceptual frameworks used, within the context of environmental assessments, in indicator based studies are the driving force-pressure-state-impact-response (DPSIR), pressure-state-response (PSR), or driving force-state-response (DSR) conceptual frameworks, which organize and structure indicators in the context of a so-called causal chain (Smeets and Weterings, 1999; Wascher, 2000). In the causal chain, social and economic developments are considered driving forces that exert pressure on the environment, leading to changes in the state of the environment. In turn, these changes lead to impacts on human health, ecological systems and materials that may elicit a societal response that feeds back on the driving forces, pressures, or on the state or impacts directly (Smeets & Weterings, 1999).

Based on these theories, the research conceptualized that fish trade in a market as an economic activity has a number of processes that exert pressure on the environment. Operational activities include fish processing, packaging and display. These operational activities are conducted by personnel (fish traders) and would also require facilities, infrastructure and equipment. The operational activities also produce fish wastes, mainly fish frames, visceral, packaging materials, oils, scales and trim offs. These by-products will affect drainage infrastructure, working surfaces and immediate surroundings in fish markets and hence the fish wastes disposal and management is necessary to reduce environmental pollution and incidences of possible diseases from cross contamination.

Research has shown that sanitary facilities and hygiene practices are key environmental risk factors which are increasingly shown to influence public health. The Government has strong regulatory controls in place to safeguard human and environmental health in public auction centers like fish markets. Once applied, it may result to raising awareness amongst the fish operators on available legislations and institutions and in turn influence the environmental situation in markets.

2.2 Empirical Literature

According to (Reij *et al.,*2003) unwanted microorganisms may access fish handling environments (outlets) through raw material, personnel or mobile equipment such as vehicles, through leakage and openings in buildings, or through pests and some pathogens may even become established in the work- surfaces and form niches where they can survive for long periods of time. Kenya is faced with great challenges in implementing stricter food safety measures set by different stakeholders. This is because of the small development budget. It therefore exports fish under huge costs (Abila, 2003). The stakeholders have both competing and complementary interests. However, their overall strategy is to target satisfaction of a specific consumer preference. Studies have shown significant faecal contamination and the presence of *Salmonella*, and antimicrobial resistant *E. coli* in *R. argentea* fish sold on markets in Kisumu (Sifuna, 2007). This possess a real health risk through consumption or directly through contact with the fish products including livestock that may feed on contaminated animal feeds produced from *R. argentea* (KEBS,1989). It is, therefore, important for public health workers to create awareness for the need to institute Good Handling Practices (GHP) and Hazard Analysis Critical Control Points (HACCP) as tools for ensuring that fish products are handled under hygienic conditions and that food safety measures are in place in fish handling outlets and premises.

Huss (2003) also noted that the highly nutritious properties of fish flesh provides an excellent substrate for the growth of most heterotrophic bacteria and the composition affects the bacterial growth and related biochemical activities. This can be inhibited by handling fish in low temperatures. It is therefore important to transport fish under adequate ice.

Ogunja (1992) notes that, in developing countries like Kenya, there is limited appropriate technologies and practices for fish waste management (innovative technologies, good practices along the waste management chain e.g. reduce volume of waste, recycling). This partly, may be due to inadequate or fragmented research and poor information flow among stakeholders to inform policy formulation. Recycling is something that Kenyans must come to terms with if we are to adopt an integrated solid waste management approach.

3.0 RESEARCH METHODOLOGY

A descriptive survey design was used for the research.The target for the study was the fish traders of Gikomba fish market, Nairobi. Random sampling of fish traders was done from a register, using Fischer's formulae, to calculate the number of respondents. Data was collected through a structured questionnaire and was processed using EXCEL and SPSS software packages. Descriptive statistics (frequencies, percentages,) and inferential statistics (Chi square and Logistic Regression) were used to explain the variables. 54% of the respondents did not get piped water.

4.0 RESULTS AND DISCUSSIONS

4.1 Demographic Information

4.1.1 Gender of the Respondents

According to Bene and Heck (2005) gender division of roles generally characterizes fish trade. Fishing is a preserve for men while women dominate marketing nodes in the value chain. Though this is slowly ebbing away, it can still be seen to be governing fish trade especially in the market. Generally, there are more women than men involved in the fish marketing.

Study results indicate that there were 63% females and 37% males operating in the market. Chi square results indicated that the relationship between gender of the operator and environmental situation was significant. This was supported by (χ^2, = 7.903, df (1), P=0.005).

The odd ratio regression for gender was statistically associated with environmental situation (P<0.05). As one moves from male to female the probability of being conscious about good environmental situation increases by 3.825. (Appendix II). Generally, it can be argued that women are more conscious on hygiene and environmental sanitation than men.

4.1.2 Age of the respondents

Thirty-five percent (35%) of the respondents indicated that they were between 41 to 50 years, 31% indicated that they were between 31 to 40 years, 27% were between 18 to 30 years and 7% were above 50 years. The findings implied that the respondents were mature and would give relevant information. It is also worthwhile to note that the youthful age of below 30 years' category, which is the most productive age, constitute a very small percentage which can be argued that this is the college schooling age.

The chi square analysis results also indicated that the relationship between age and environmental situation was significant. This was supported by (χ^2, = 33.252, df (1), P=0.001).

The odd ratio regression results proofed that age was statistically significant with environmental situation (P=0.003).
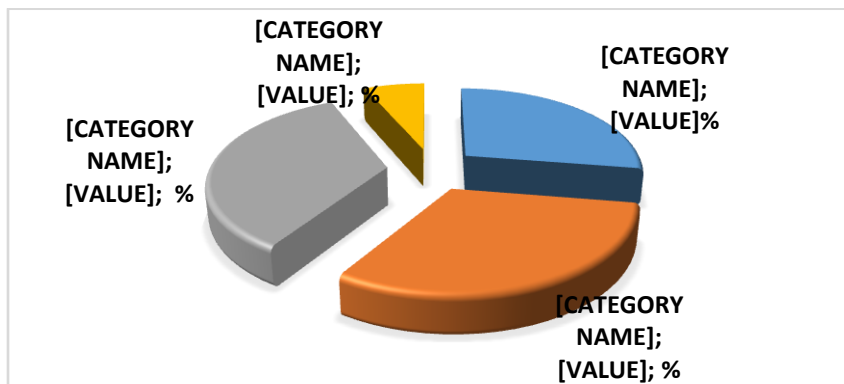

Figure 1: Age of the respondents

4.1.3 Marital Status of the Respondents

The respondents were asked to indicate their marital status. 57% were married, 23% were widowed and 20% were single. The findings implied that most of those working in the market were married.
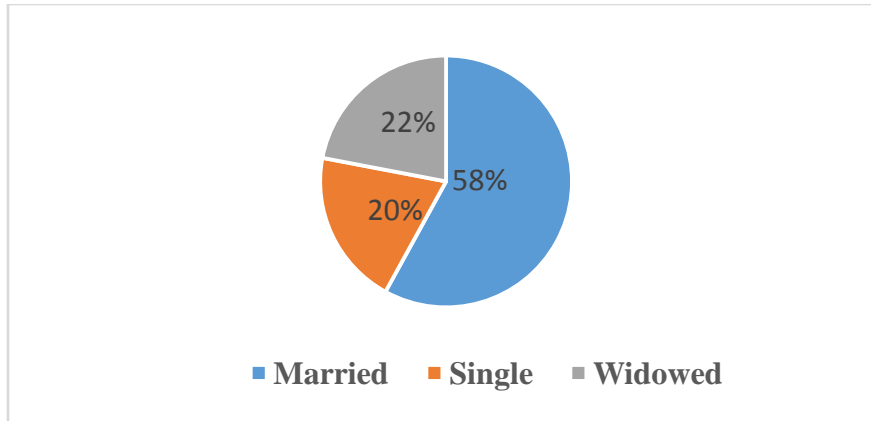
Figure 2: Marital Status of the Respondents

Marital status has implication on the choice of enterprise and extent to which women participate in entrepreneurship (Ngigi & Kamau, 2013). There is widespread belief that women who are divorced, widowed or single dominate fish trade. This is informed on the perception that they have limited options to support their livelihoods. The research noted on the contrary that most of the fish operators were married.

Chi square tests results showed that there is relationship between marital status and environmental situation (χ^2, = 38.573, P=0.001). Regression results indicated that the status of being married was statistically significant with the environmental situation (P< 0.05).

4.1.4 Working Experience of the Respondents

The respondents were also asked to indicate their working experience. 39% indicated that they had worked between 2 to 5 years, 24% had worked over 10years, 22% had worked between 6 to 10 years and 15% had worked for less than one year.

The chi square results indicated that the relationship between working experience and environmental situation was significant (χ^2, = 19.467, P=0.003). The findings implied that the respondents had enough working experience and were knowledgeable on the issues regarding the environmental situation.
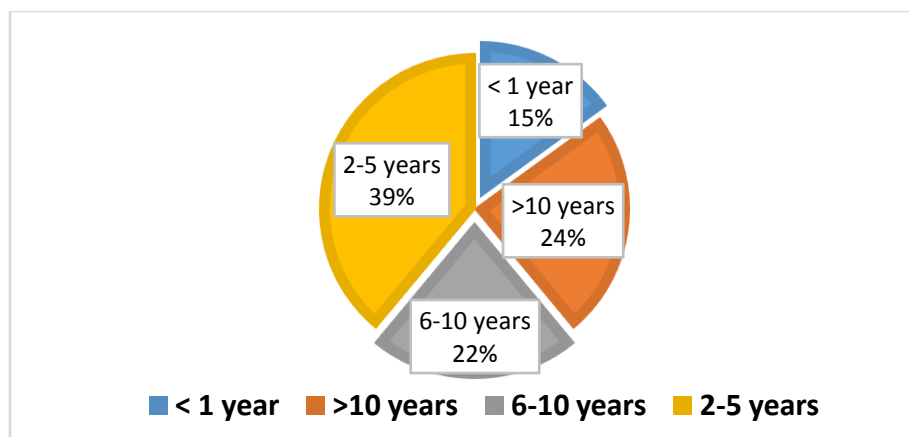
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Figure 3: Working Experience of the respondents

4.1.5 Education level of the respondents.

Majority of the operators had primary level of education (65%), while those with secondary school education were 30% and some college education were 5%.
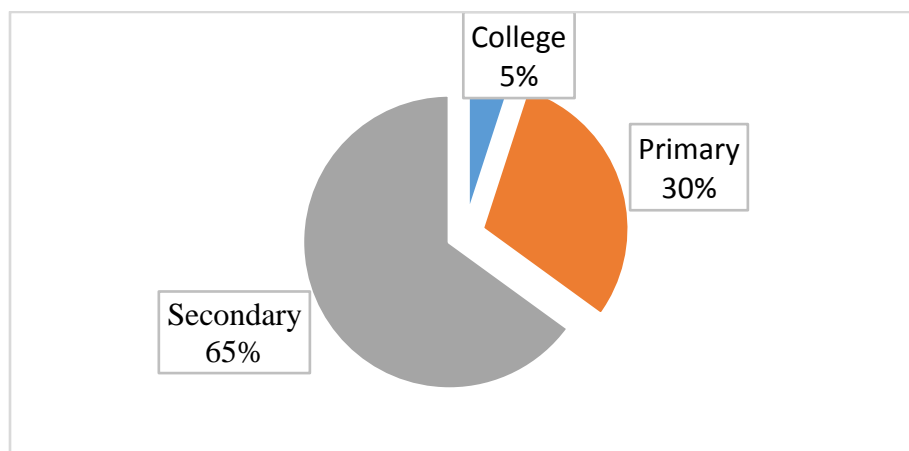

Fig 4: Level of education of the respondents.

4.1.6 Category of the operator

The fish traders in the market can be categorized as fish retailers (69.5%), fish wholesalers (17%) and fish processors (13.5%). The analysis showed a significant association between category of operator and environmental situation (χ^2, = 9.281, df (2), P=0.010).

Odd ratio regression shows the fish retail trader's category was statistically associated with environmental situation (P< 0.05).The category of the operator is important when studying the fish operator's fish handling practices. For example, operators who are involved in fish

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processing are more concerned with water availability, operating space, maintenance of drainage more than a fish retailer who are selling smoked fish.
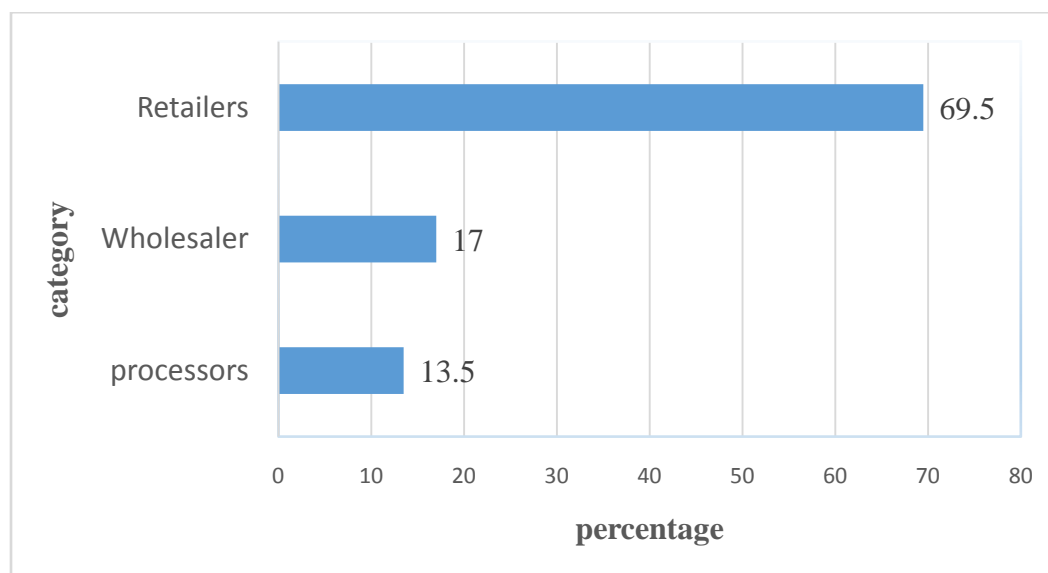

Figure 5 Category of fish operator

5.0 CONCLUSIONS AND RECOMMENDATIONS
5.1 Conclusions
The study concluded that gender and category of operator are important demographic factors that influenced the environmental situation. Interventions on addressing environmental deficit could, therefore, be more effective if it targeted women and retail fish traders. Improved water supply, disposal of wastes practices, use of protective clothing and regular cleanups are key practices whose improvement can lead to improved sanitary status in the market.

5.2 Recommendations
The Department of Fisheries should review the modalities on fish handling throughout the fish marketing chain. Emphasis should be given to provision of water, use of ice, proper disposal and re-use of fish wastes and cleanups in the fish markets.

Sensitizing fish traders and enforcement of basic environmental requirements on maintenance of drainage systems, use of protective clothing, confining the market to fish trade activities only and minimizing wastes generation.

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