Original Research Article

COMPARATIVE ASSESSMENT OF FISH PROCESSING, PACKAGING AND MARKETING ACTIVITIES IN IBENO AND IKOT-ABASI LOCAL GOVERNMENT AREAS OF AKWA-IBOM STATE, NIGERIA

ABSTRACT

The survey assessed fish production and marketing activities in Ibeno (IB) and Ikot-Abasi (IK) Local Government Areas of Akwa-Ibom State, Nigeria. A purposive sampling was used to select the two local government areas because of the presence of high fishing activities in the areas and random sampling method was also used to select two markets each in the both Local Government Areas. 180 fish processors were questioned. The study was conducted with the aid of well-structured questionnaires which were administered to 180 processors. The results obtained revealed that the fish processors in both local government areas were dominated with females (IB 78.6%, IK 66.7%) who were married (IB 60.0%, IK 43.3%) and Christians (IB 83.3%, IK 93.3%) with primary education (IB 27.6%, IK 33.3%). Majority of the respondents fell between the age range of 20-29 years (IB 36.7%, IK 33.3%) and got their source of finance from friends and relations (IB 43.3%) and personal savings (IK 6.4%). The processors got their source of fish for smoking from fishermen and women (IB 56.7%, IK 83.3%), had major occupation as fish marketing (IB 53.3%) and fish processing and marketing (IK 80.0%), used mud oven (IB 44.8%), half metal oil drum (IK 60.7%) and firewood (IB 44.6%, IK 46.4%) for their fish smoking. It was further revealed in this study that they processed fish at home (IB 75.9%, IK 100%), during the day (IB 37.9%, IK 86.7%) and had a major difficulty in controlling rodents, insects and breakage of fish during storage (IB 50.0%, IK 33.3%). Findings also showed that the processors used baskets (IB 36.7%) and plastic drums (IK 23.3%) to package their fishes and made highest sales and profit between October-December (IB 63.3%, IK 86.2%). However the large family size maintained by most of the fishermen and fish farmers adversely affected their economic growth and standard of living. Adequate provision of credit, social and fishing amenities including fish seeds and transport facilities in addition to keeping their family size small would enhance the socio-economic conditions of the fish processors in these areas. It is worthy to note that fish processing makes an important contribution to household food and financial security in all processing centres.

Key words: Fish processing, Packaging, marketing, Spoilage, Shelf life

INTRODUCTION

Fish is an important dietary component of the world and represents a relatively cheap and accessible source of high quality protein for poor households (Ikulegbe and Sikoki, 2014). Out of the total of 194,000 metric tons of dry fish produced in Nigeria, about 61% of it is smoked (Adeleye *et al.,* (2015). One of the major problems affecting the fishing industry all over the world is fish spoilage. In high ambient temperature of the tropics, fresh fish have a tendency to spoil within 12 to 20 hours (Clucas and Ward, 1996). Attempt has been made to reduce fish spoilage to the minimum through improved methods and to explore ways by which spoilage are stopped or slowed down to give product a longer shelf life. Fish is highly

susceptible to deterioration without preservative or processing methods (Okonta and Ekelemu, 2005).

Fish processing can be defined as a method applied to the fish from the time of harvest to the consumption period (Davies, 2005). In fish culture practices, processing of fish into different forms has been neglected, this may be due to high technology required in some of the processes and the fact that those involved in actual fish production are ignorant of the different processing methods (Ajah *et al*., (2008). In order to prevent fish deterioration, every fish processor must strive to employ the best method possible in handling fish to maximize returns on processing investment (Davies, 2005). If fish is not sold fresh, preservation methods should be applied to extent its shelf life. These include freezing, smoking, drying *and* heat treatment (sterilization, Pasteurization etc) (Adedeji, 2012). According to Davies *et al*., (2008), the processed fishery products were still stored using traditional processing and storage technologies, respectively. Lack of adequate fish handling, processing techniques and storage facilities contribute significantly to the low supply of fish to poor rural dwellers that form three quarters of the population in developing countries (Ayuba and Omeji, 2006). With improved techniques, fresh fish can be processed as wanted without any significant loss of quality. Processing of fish either through smoking or drying is widely used in fish preservation in the process, moisture content present in the fish is extracted through heating thus inhibiting the action of micro-organism and prolong shelf life (Clucas and Ward, 1996; Oyeleye, 2003; Amed *et al*., 2007). Many fish species have very good preservation qualities after salting, sun-drying and even smoking (Madu *et al*., 1984).

Post processing and handling of fish has an impact on the shelf life of the product and these include packaging techniques, storage condition and marketing techniques (Agbolagba, 2006). Packaging forms an important part of food processing because it facilitates handling during storage and distribution within the market chain (Kings, 2001). Effective packaging controls insect infestation of dried fish (Kings, 2001; Lawal *et al*., 1986). Sacks, paper cartons, wooden rackets and bamboo baskets are the most predominantly used artisanal packaging containers (Kings, 2001). The distribution of cured fish in Nigeria is largely by road transportation. This segment is a vital element in the distribution of fish from the processing village to wholesale markets and onward to retail outlets (Kings, 2001). Means of transportation range from wheel barrows, motorcycles, taxis, jeeps, [pick-up] vehicles, buses, trucks, lorries and so on. In Nigeria, women play a crucial role in fish production, processing, distribution and marketing. The notable fishing activity performed by women is processing right from the moment the boats and canoes land at sites. Women assist in emptying the nets, sorting, gutting and cleaning the catch. In most cases, their activities involved salting, smoking and drying using traditional techniques. Women also are involved in the storage and marketing both fresh and smoked fish.

Objective of the Study
The main objective of the study was to Comparatively Assess Fish Processing, packaging and marketing Activities in Ibeno and Ikot-Abasi Local Government Areas of Akwa-Ibom State, Nigeria.

MATERIALS AND METHODS

This study was carried out in Ibeno and Ikot-Abasi local government areas of Akwa-Ibom state. Akwa-Ibom state covers an area of 8,412 square kilometres. It is located on Latitude $4\ ^{0}32^{1}$ and $5\ ^{0}53^{1}$ North and Longitude $7\ ^{0}25^{1}$ and $8\ ^{0}25^{1}$ East. It has a population of

3.9 million people as at the 2006 Nigerian Census, with average population density of 463 inhabitants per square kilometre. The people of these two local government areas are mainly fishermen and women, fish traders and farmers.

Fish processors at their various fishing settlements and marketers, homes of respondents and processing sites were surveyed. The villages surveyed in this research are Iwuo-Achang village in Ibeno local government and Uta-Ewa village in Ikot-Abasi local government area. These villages are popular fishing communities in Akwa-Ibom state where both wholesalers and retailers all over the state purchase both smoked and dried fish.

Data Collection and Methods of Survey

The information used in this study was collected with the aid of well-structured questionnaire. A total of 180 questionnaires and 90 each were used to collect information from fish processors in both Ibeno and Ikot-Abasi Local Government areas. Information was also gotten through oral communication and interviews which were carried out mostly in Ibibio language because most of the people interviewed had no formal education.

Data Representation and Analysis

The data was analysed using statistical package for social science students (SPSS). The data were represented using descriptive statistical analysis. Tables, bar-chart and pie-chart were also used for data representation and analysis.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Respondents

Majority of fish processors (78.6%) in Ibeno Local government area were women. While the few men interviewed were artisanal fishermen (21.4%) who were also involved in fish processing. In Ikot-Abasi LGA, majority 66.7% were females and 33.3% were males. This confirms the findings of other authors who categorised processing of fish as female dominated business by economically active ages (Abolagba and Odiko, 2005; Lawal and Idega, 2004), and Abolagba and Nuntah, (2011) reported that disparity in gender disposition could be accounted for by occupational emphasis which in fisheries activities apparently restricts the females to processing while the male counterpart predominates in the catch. Findings also shows that majority of fish processors (36.7%) in Ibeno Local Government area fell between the age range of 20-29 years and also in Ikot-Abasi local government majority (33.3%) fell under 20-29 years This implies that the trade is managed by very active individuals who have both strength and reasonable level of maturity. Studies have also shown that this category of persons is the more preferred group for granting loans by informal and formal banking institutions (Onwumere, 2008). Majority of the processors (63.0%) in Ibeno LGA were traders followed 25.9% who were fishermen. While in Ikot-Abasi LGA, majority (80.0%) were traders, and only 10.0 % were fishermen. Majority (60.0%) of the processors in Ibeno LGA was married and also in Ikot-Abasi LGA, majority (43.3%) was married. This is in line with (Omoruyi *et al*., 2015) that this would imply that dry fish marketing may be a business for those who have the desire to provide some financial support towards the upkeep of their families. As much as 36% of the respondents in both markets were single suggesting that the financial gains from the trade are probably quite attractive for the yet unmarried women. In Ibeno LGA majority were married (100.0%) and they had 1 wife each. While in

146 Ikot-Abasi LGA majority were also married (100.0%) and each had just one wife. Majority
147 (52.2%) of respondents in Ibeno LGA had number of children fell under 3-4 children
148 followed by those (43.5%) that had number of children > 4 (more than four). Lastly (4.3%)
149 had number of children falling under 1-2 children while in Ikot-Abasi LGA majority (73.3%)
150 of the respondents had number of children had less than 4 children. In Ibeno LGA, majority
151 (83.3%) of the respondents were Christians, 16.7% were African traditionalists. In Ikot-Abasi
152 LGA majority (93.3%) of the respondents were Christians representing 6.9% were African
153 Traditionalists. This is in line with (Abolagba and Akise, 2012) who showed in their study
154 that majority of the fish processors were Christians. Majority (27.6%) of the respondents in
155 Ibeno LGA had primary education and also in Ikot-Abasi, majority (33.3%) of the
156 respondents had primary education. Adeyeye *et al*., (2015) reported that education is also
157 related to employment and income which influence access to household amenities and
158 facilities, including those related to fish hygiene and environmental health. Majority (44.8%)
159 of the respondents in Ibeno LGA had family size between 4-6 members, then those (37.9%)
160 who had family size of between 7-9 members, 10.3% had family size between 10-12 family
161 members, 6.7% between 1-3 members and lastly no respondent had family size of more than
162 12 family members respectively. While in Ikot-Abasi LGA majority (37.9%) of the
163 respondents had family size between 7-9 members, then those (31.0%) who had family size
164 between 1-3 members, 6.9% between 10-12 family members (6.9%) and lastly 3.4% had
165 family size of more than 12 family members representing (3.4%). Majority (53.3%) of the
166 respondents in Ibeno LGA engaged in fish marketing. Followed by 40.0%, who engaged in
167 fish processing and marketing, 3.3% engaged in processing only and same was for civil
168 service and marketing (3.3%), no respondent was engaged in civil service and marketing and
169 no respondent engaged in other occupations. While in Ikot-Abasi LGA majority (80.0%)
170 were engaged in fish processing and marketing. Followed by 9 respondents who engaged in
171 fish marketing only (10.0%). 3 respondent (3.3%) engaged in processing only, 3 respondent
172 (3.3%) were civil servants and processors. 3 respondent engaged in a civil service and
173 marketing (3.3%) and no respondent engaged in other occupations respectively.
174 **Table 1**

Socio-Economic Characteristics	Respondents			
	Processor (Ibeno)		Processor (Ikot-Abasi)	
	Count	Percentage	Count	Percentage
Sex				
Male	18	21.40	27	33.30
Female	66	78.60	54	66.70
Age (Years)				
20	9	10.00	3	3.330
20-29	33	36.70	30	33.30
30-39	30	33.30	30	33.30
40-49	18	20.00	21	23.30
>50	-	-	6	6.70
Occupation				
Trader	51	63.00	72	80.00
Fishermen/ Fisherwomen	21	25.90	30	10.00
Fishing and trading	9	3.70	-	-
Marital Status				
Single	27	30.00	30	33.30
Married	54	60.00	39	43.30
Widow	3	3.30	15	16.70
Widower	-	-	6	6.70
Divorced	3	3.30	-	-
Separated	3	3.30	-	-
Number of Children				
1-2	3	4.30	-	-

3-4	36	52.20		15	26.30
>4	39	43.50		42	73.30
Religion					
Christian	75	83.30		84	93.30
African traditional religion	15	16.70		6	6.70
Educational level					
No formal education	9	10.30		12	13.30
Primary Education	24	27.60		30	33.30
JSCE	18	20.70		12	13.30
OND/NCE	9	103		6	6.70
HND/University	6	6.90		6	6.70
Family Size					
1-3	6	6.90		18	20.70
4-6	39	44.80		27	31.00
7-9	33	37.90		33	37.90
10-12	10.3	10.30		6	6.70
Above	-	-		3	3.40
Major Occupation					
Fish Marketing	60	53.30		9	10.00
Fish processing and Marketing	30	40.00		66	80.00
Civil servant and processing	3	3.30		3	33.30
Civil servant and marketing	3	3.30		3	3.30
Processing	3	3.30		9	10.00

175 **Source: Field Survey, 2016**

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177 **Sources of finance of respondents**

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179 Majority (46.4%) of the respondents in Ibeno LGA got finance from personal savings.
180 About 43.3% of the respondents got it from friends and relations, 20.0% from co-operative
181 and Osusu and 16.7% from personal savings while in Ikot-Abasi majority (44.6%) received
182 finance from personal savings, about 20.0% got finance from friends and relations, only
183 16.7% got their source of finance from co-operative and Osusu, only 10.0% got finance from
184 Trade associations.

185

186 **Table 2: Sources of Finance**

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Location	Personal savings	Friends and relations	Cooperative and osusu	Trade unions	Banks	others
Ibeno	16.70	43.30	20.00	13.30	6.70	-
Ikot-Abasi	44.60	20.00	16.70	10.00	3.330	3.30

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189 **Source: Field Survey, 2016**

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192 **Source of fish for smoking**
193 Majority (56.7%) in Ibeno LGA had their source of fish for smoking from fishermen and
194 women followed by 23.3% which had their source of fish for smoking from markets while in
195 Ikot-Abasi, majority (83.3%) had their source of fish for smoking from fishermen and
196 fisherwomen followed by 10.0% which had their source of fish for smoking from markets.
197 (6.7%) had their source of fish for smoking from artisanal fisher folks who were also

involved in fish processing and no respondent had their source of fish for smoking from fish farms and other sources respectively. It could therefore be inferred that fish intended for smoking are gotten from the wild because majority of the population of the four villages surveyed were into fishing as these communities are blessed with numerous water bodies. (Omoruyi *et al*., 2015).
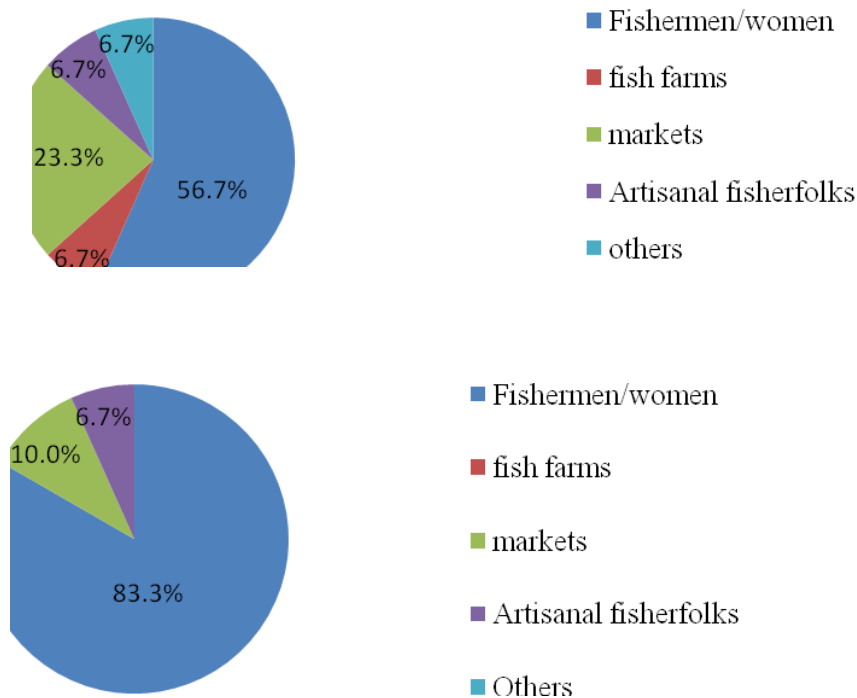

Figure 2: Source of fish for smoking in Ibeno (a) and Ikot-Abasi LGA (b)

Processing duration

Findings showed that majority (60.0%) of the respondents in Ibeno LGA processed their fishes above 6 hours followed by (20.0%) who had theirs between 2-3 hours while in Ikot-Abasi LGA, majority (90.0%) had their processing time above 6 hours and 6.7%) processed 2-3 hours. The reason for the variation in the duration of smoking was that the quantity and size of fish determines the time spent in processing when fish has been processed particularly if traditional methods are employed, the fish is still subjected to many forms of loss and spoilage (Abolagba and Enofe, 2003).
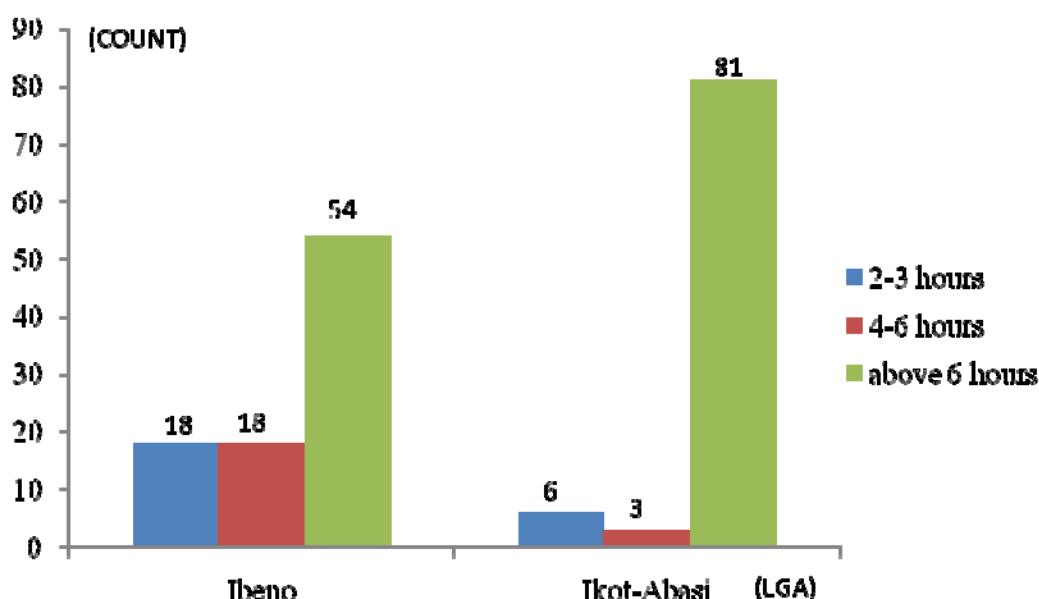
Figure 3: Processing duration of fish of respondents

Type of smoking kiln

In Ibeno LGA, majority (44.8%) of the respondents used the mud oven as their type of smoking kiln, 37.9% used half metal drum and only 17.2% used full metal oil drum. While in Ikot-Abasi, majority (60.7%) of the respondents used half metal oil drum as their smoking kiln , about 35.7% and only 3.6% used full metal oil drum. This is in agreement with Obasohan *et al*., (2012) that the major smoking kiln used in the study area is half metal drum.

Table 3: Distribution of type of smoking kiln

Location	full metal drum		half metal drum		mud oven	
	count	%	count	%	count	%
Ibeno	15	17.20	33	37.90	39	44.80
Ikot-Abasi	3	3.60	51	60.70	30	35.70

Source : Field Survey, 2016

Source of energy

The study showed that the sources of energy used by the respondents in Ibeno LGA range from fire wood (44.6%) charcoal (25.0%), wood shavings (17.9%) to gas (10.7%). While in Ikot-Abasi, 46.4% used firewood as their source of energy and about 40.0 % used charcoal. This could be attributed to the abundance of wood and high level of lumber jerking activities in the study area agreeing with Abolagba *et al*., (2002).
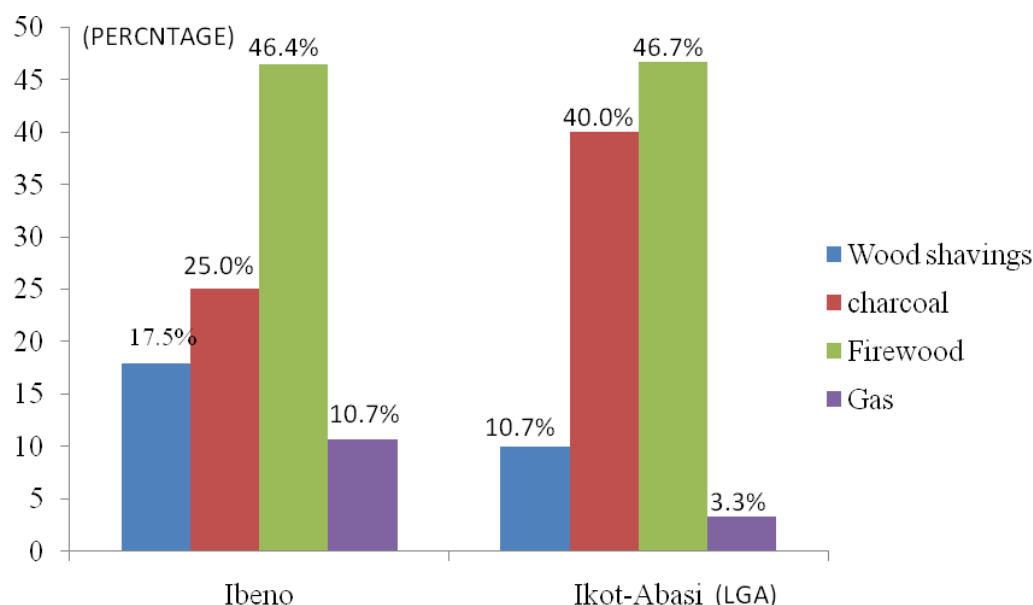
Figure 4: Source of energy

Treatment of fish before smoking them

In Ibeno LGA, majority (96.7%) of the respondents treated their fish before smoking and 3only 3.3% did not treat before smoking. While in Ikot-Abasi 93.3%treated their fish and 6.7% did not treat.

Table 4: Table showing choice of treatment of fish before smoking

Location	Those that treated their fish before smoking		Those that did not treat their fish before smoking	
	Count	%	count	%
Ibeno	87	96.70	3	3.30
Ikot-Abasi	84	93.30	6	6.70

Source: Field Survey, 2016

Type of treatment given to the fish before smoking

In Ibeno LGA, majority (56.7%) of the respondents used curing and gutting for their fish treatment about 43.3% used chemicals. While in Ikot-Abasi LGA, 86.7% used chemicals and 13.3% used curing and gutting for their fish treatment. Some respondents indicated that they gut the fish to preserve the fish and also to remove excess fat for fast drying this. This agrees with Tawari and Abowei, (2011) who reported that the removal of the gut implies that the storehouse of enzymes responsible for autholytic spoilage has been removed. Santiago and Maurizio, (2002) reported that Salting is a popular procedure for preserving fish.
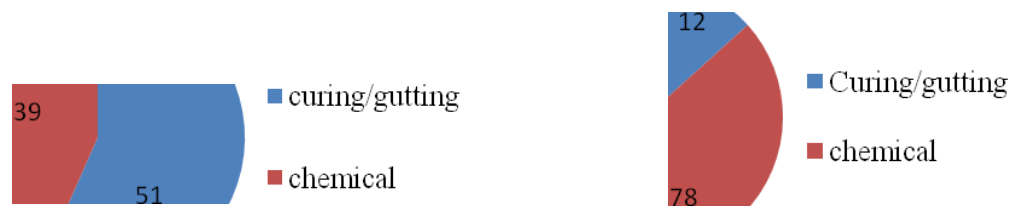
Figure 5: Treatment type for fish before smoking in Ibeno (a) and Ikot-Abasi (b) LGAs

Types of smoking

Majority (75.9%) of the respondents in Ibeno LGA used hot smoking as their type of smoking and about 24.1% used cold smoking. While in Ikot-Abasi LGA 90 respondents used hot smoking (100.0%) and no respondent used cold smoking. This is in agreement with Abolagba and Nuntah, (2011) which indicates that the major smoking kiln used in the study area is half metal drum.

Table 5: Types of smoking

| Location | Hot smoking | | cold smoking | |
	count	percentage	count	percentage
Ibeno	66	75.90	21	24.10
Ikot-Abasi	90	100.00	0	0.00

Source: Field survey, 2016

Points of smoking

Majority (75.9%) of the respondents in Ibeno LGA smoked their fish at home and 24.1% smoked theirs by the water side. While in Ikot-Abasi LGA, all the respondents smoked their fish at home and no respondent smoked their fish at the waterside. This is in agreement with the study of Omoruyi *et al*., (2015) that majority smoked their fish at home and this indicated that there is no fish processing factory in the villages surveyed, hence most of the respondents are into small scale fish processing. **(**Figure 6)
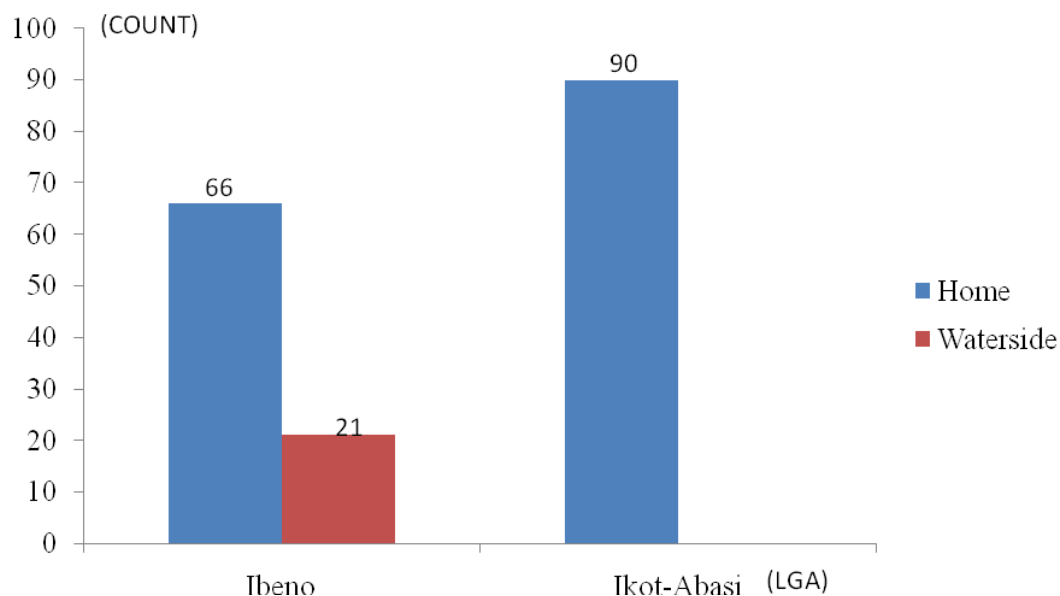
Figure 6: Points of smoking of fish

 Plate 1: Fish settlement where smoking and processing is done

Duration of keeping dead fish before smoking

Majority (82.8%) of the respondents in Ibeno LGA kept their fish for 0-1 hour before smoking them. Followed by 9 respondents (10.3%) who kept their fish for 1-3 hours and 6 respondents (6.9%) who kept their fish 3-6 hours at night. While in Ikot-Abasi, all (100%) of the respondents kept their fish for 0-1 hour, no respondent kept their fish for 1-3 hour or 3-6 hours.

Table 6: Duration of keeping dead fish before smoking

Location	0-1 hour		1-3 hours		3-6 hours at night	
	count	percentage	count	percentage	count	percentage
Ibeno	72	82.80	9	10.30	6	6.90
Ikot-Abasi	90	100.00	0	0.00	0	0.00

Source: Field Survey, 2016

Smoking time of fish

Majority (37.9%) of respondents in Ibeno LGA smoked their fish at day time about 34.5% smoked their fish over-night, only 17.2% smoked their fish in the evening and 10.4% combined all. While in Ikot-Abasi, majority (86.7%) of the respondents smoked their fish in the day time, 10.0 % smoked their fish over-night and only 4.3% combined day and evening. According to Abolagba and Chukwu, (2008) processing activities were carried out in the morning, the reason being that there is enough time and the works 6will not spill over.
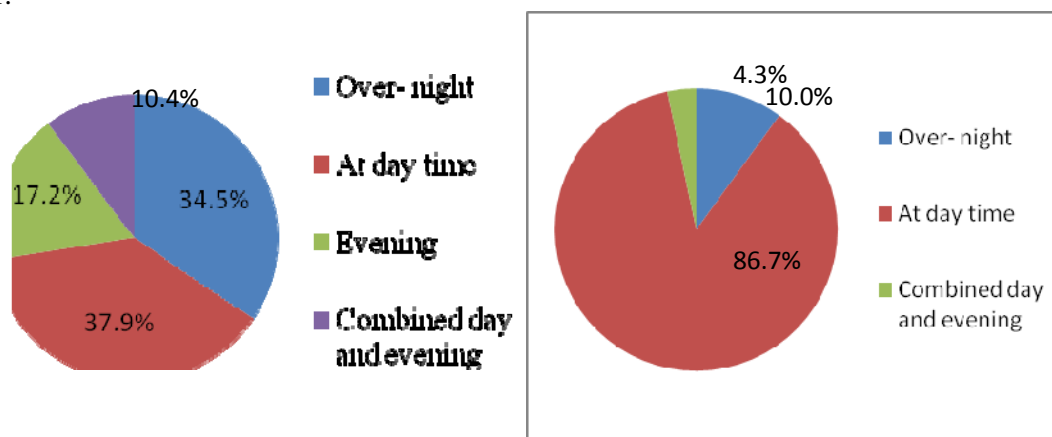

Figure 7: Smoking time of fish in Ibeno (a) Ibeno and Ikot-Abasi LGA (b)

Problems encountered in processing of smoked fish

The study showed that 30.0% of respondents in Ibeno LGA encountered breakage of smoked fish. Followed by 26.7% who encountered difficulty to control smoke and heat problem, 16.7% encountered problems with time of smoking while only 13.3% encountered problems with expensive smoking materials. While in Ikot-Abasi, majority (50.0%) of the respondents encountered problems with time of smoking, about 16.7% had other difficulties which were not specified.

Table 7

Location	Smoke and heat	breakage	Smoke, heat and breakage	Time of smoking	High cost of smoking materials	Others
Ibeno	26.70	30.00	10.00	16.70	13.30	3.30
Ikot-Abasi	10.00	10.00	-	50.00	13.30	16.70

Storage of smoked fish

Majority (60.0%) of respondents in Ibeno LGA stored their smoked fish in kitchen and smoke houses, followed by 23.3% who only stored smoked fish above smoke houses. While in Ikot-Abasi LGA, majority (56.7%) of the respondents stored fish above smoke houses followed by 30.0% who stored fish in kitchen only.
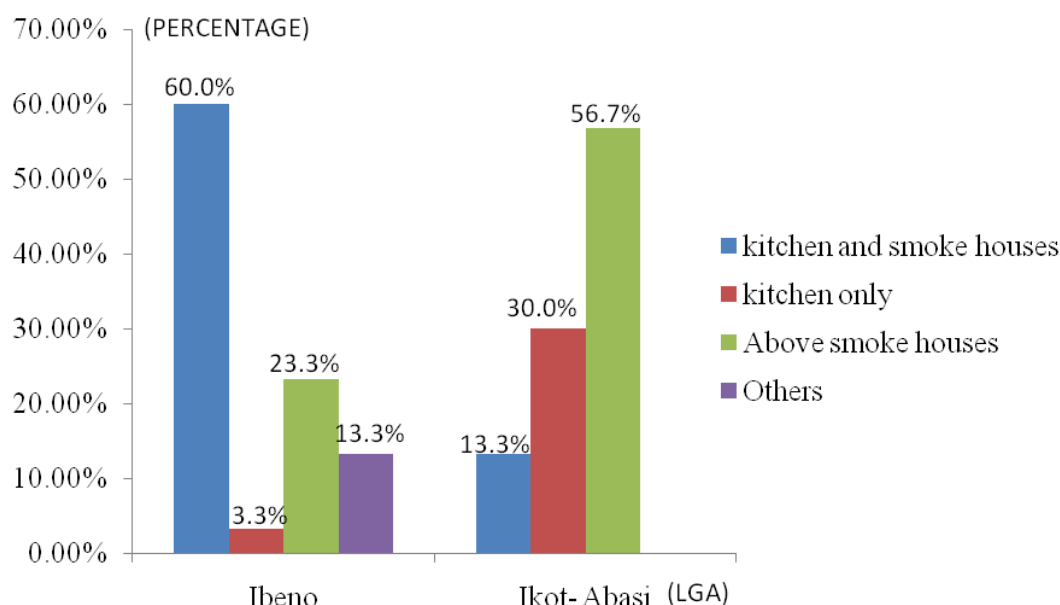

Figure 8: showing storage of smoked fish

Storage period of smoked fish before spoilage

In Ibeno LGA majority (63.3%) of the respondents stored smoke fish for 2-5 days before spoilage occurred and about 20.0% stored their smoked fish for 6-10 days While in Ikot-Abasi LGA majority (82.8%) of the respondents stored their smoked fish for 2-5days, and only 6.9% stored their smoked fish for 11-14 days. This is also in agreement with Omoruyi *et al*., (2015). This implies that smoking preserves fish, prevents spoilage and increase the shelf life of fish. This agrees with Nickleson *et al*., (2001) who reported that various food preservation techniques including smoking have been utilized to improve the microbial safety and extend the shelf life of fish in general.

Table 8: Table showing storage period of smoked fish before spoiling

Location	2-5 days		6-10 days		11-14 days		Others	
	Count	%	Count	%	Count	%	Count	%
Ibeno	57	63.30	18	20.00	9	10.00	6	6.70
Ikot-Abasi	72	82.80	6	6.90	9	10.0 0	0	0.00

Source: Field Survey, 2016

Storage problems of processed fish

Majority (50.0%) of respondents in Ibeno LGA had storage problems of rodents' attack, and about 20.0% encountered problems of breakage due to packaging and also encountered problems of insect, rodents attack, and breakage. While in Ikot-Abasi LGA

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majority (33.3%) of the respondents encountered problems of insect infestation, rodents attack and breakage of fish and by 30.0% who encountered problems of rodent attack and breakage. These losses result in the physical disintegration of the stored smoked fish leading to economic loss on the curer. However poorer sealing up of storage areas; use of domestic cats as predators to control rodents and the application of anti-coagulant rodenticides in accordance with manufacturers instruction would limit losses incurred during storage of cured fish. This is in line with the findings of Eyo, (2001).
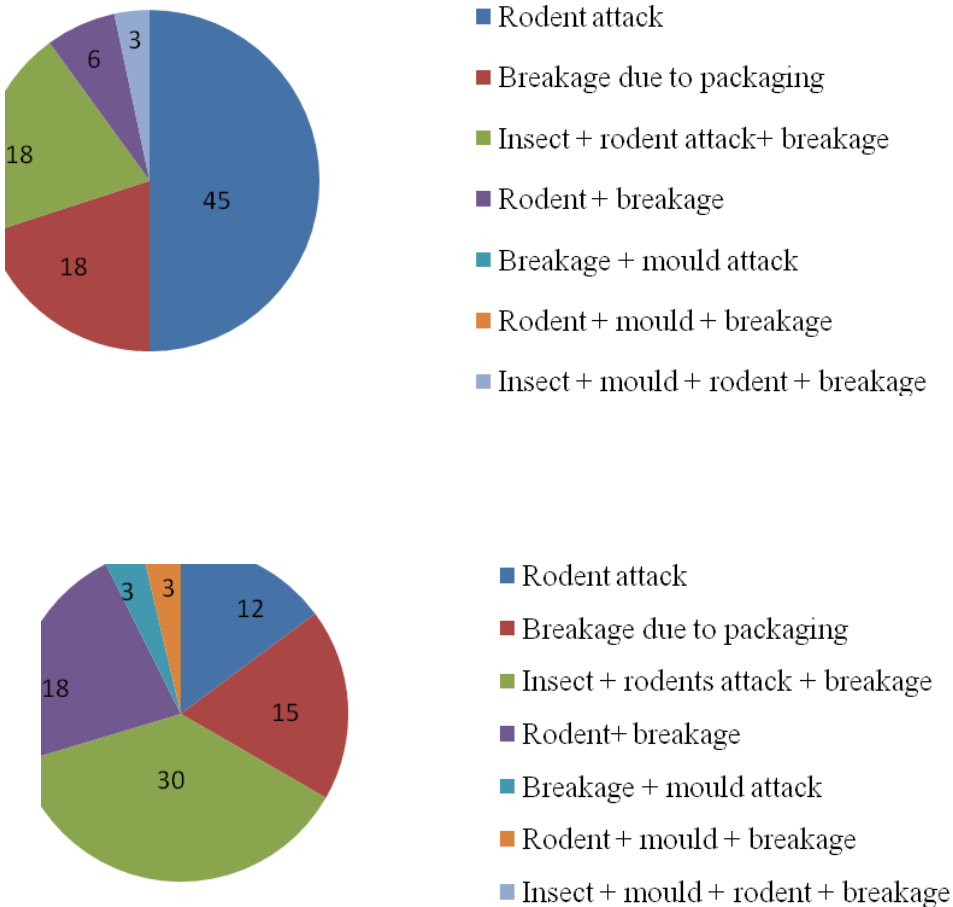

Figure 9: showing storage problems of processed fish in Ibeno (a) and Ikot-Abasi LGA (b)

Packaging materials of processed fish

Majority (36.7%) of respondents in Ibeno LGA used baskets to package their processed fish. About 30.0% used jute bags to package their processed fish and 20.0% used paper bags to pack their fish. No respondents used baskets and jute bags, and even baskets and plastic drums. While in Ikot-Abasi majority (23.3%) of the respondents used plastic drums, about 20.0% used baskets and jute bags. This is in agreement with Abolagba and Akise, (2011).

Table 10: Showing distribution of packing materials

Location	jute bags count %	paper bags count %	baskets count %	plastic drum count %	baskets jute bags count %	basket plastic drums count %	others count %
Ibeno	27 30.00	18 20.00	33 36.70	3 3.30	0 0.00	0 0.00	18 10.00
Ikot-Abasi	3 3.30	9 10.00	18 20.00	21 23.30	18 20.00	3 3.30	18 20.00

Source: Field Survey, 2016

Plate 2: Jute bags used in packaging processed fish in Ibeno LGA

Frequency distribution of smoked fish to marketers

The study showed that majority (50.0%) of the respondents in Ibeno LGA distributed their smoked fish occasionally to markets , about 33.3% distributed to daily markets and only 10.0% distributed to selected markets. While in Ikot-Abasi, majority (93.3%) distributed their fish to occasional markets and only 3.3% distributed to daily markets.
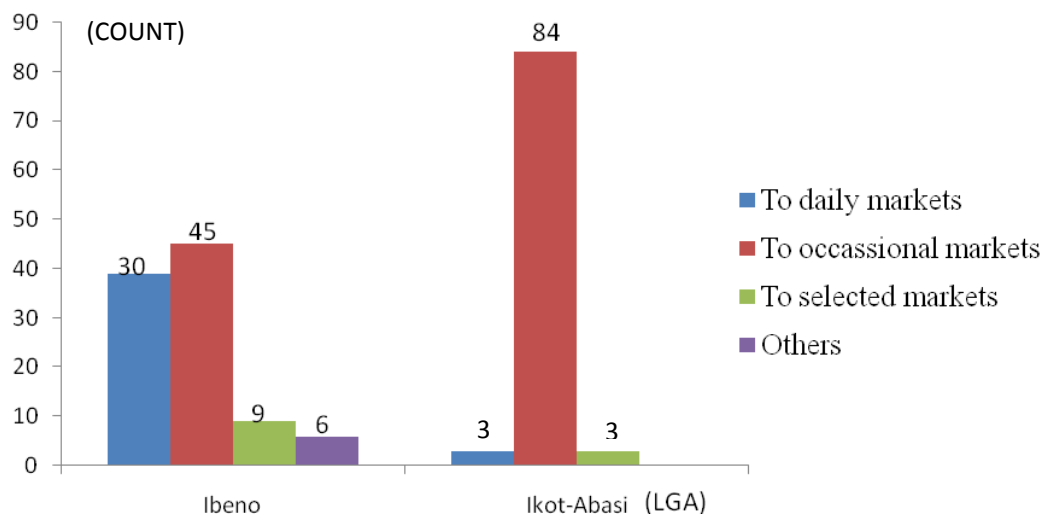

Figure 10: Frequency distribution of smoked fish

Transportation of Processed Fish

Majority (50.0%) in Ibeno LGA used private transport by 33.3% who used public transport. 10.0% moved on foot only 6.7%used other means of transportation which were not

specified. While in Ikot-Abasi majority (93.3%) representing 84 respondents used private transport followed by 3.3% who used public transport. Also 3.3% moved on foot but no respondent used other means of transportation. This agrees with kings, (2001) who reported that distribution of smoked fish in Nigeria was largely by road transportation.

Table 11: Table showing means of Transport used

Location	Public transport		Private transport		Movement on foot		Others	
	count	%	count	%	count	%	count	%
.Ibeno	30	33.30	45	50.00	9	10.00	6	6.70
Ikot-Abasi	3	3.30	84	93.30	3	3.30	0	0.00

Source: Field, Survey, 2016

Time taken to make sales of processed fish

The study showed that majority (94.4%) took 1-4 days to make sales of their processed fish. while in Ikot-Abasi (47.8%) took 5-8 days to sell their processed fish. This is in line with Abolagba and Nuntah, (2008) this means that there is ready market for processed fish as about many of the respondents sold their products within hours of smoked processing. Figure 11 shows the time taken to make sells of fish.
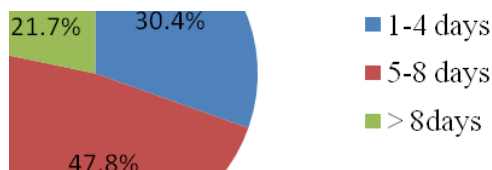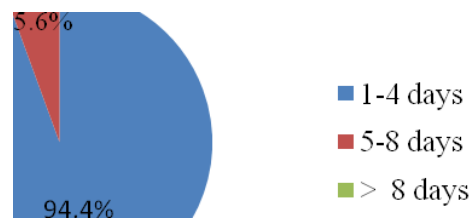

Figure 11: Time taken to make sells of fish in Ibeno (a) and Ikot-Abasi LGA (b)
Season of the year when the highest sales and profit is made
Majority (63.3%) in Ibeno LGA made the highest profit between October-December, about16.7%) made the highest profit between April-June while in Ikot-Abasi majority (86.2%) representing 75 respondents made the highest profit between October-December.

Though fishing is done on a continuous basis, a noticeable and significant bumper harvest occurs from July to September each year. Hence to ensure the availability of fish throughout the year, especially during the lean season, it is essential to process the fish to preserve it in appreciable quantities in good condition until its use is required. This is in agreement with Abolagba and Olabinitan, (2005). (Table 12)

Table 12: Season of the year when the highest profit was made

Location	January-March		April-June		July-September		October-December	
	count	%	count	%	count	%	count	%
.Ibeno	9	10.00	15	16.70	3	3.30	57	63.30
Ikot-Abasi	3	3.40	9	10.30	0	0.00	75	86.20

Source: Field Survey, 2016

Preservation of smoked fish

Majority (70.0%) in Ibeno LGA preserved their fish by hanging over fire, about 16.7% who sun-dry their fish to preserve them, and only 10.0% preserved their smoked fish by re-smoking. While in Ikot-Abasi LGA majority (90.0%) preserved their smoked fish by hanging over fire and only about 6.7% used re-smoking to preserve their smoked fish representing. Where the products are not sold immediately they may be re-smoked to further remove moisture and prevent bacteria decomposition and mould growth, this agrees with (Akande, 1998).
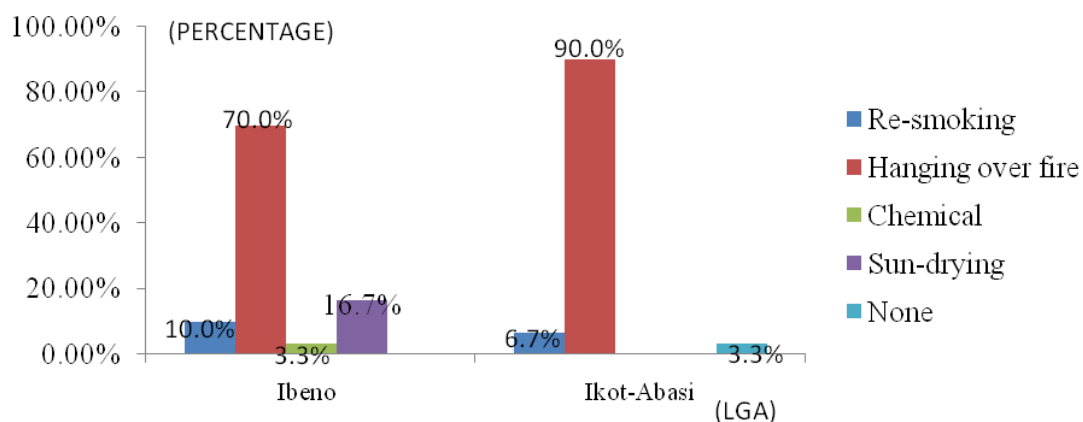

Figure 12: Preservation of smoked fish

CONCLUSION

This study has indicated that majority of the fish processors are females and married. Most of the processors are illiterates. Most processors carry out their activities for very long hours and this indicated that the business was very strenuous. It was also observed that fish processors in the study area have a very low standard of living and all their fishing materials are crude which gives little profit. However, fishing operations among artisanal fishing households are typically done by traditional means with primitive technologies and under diverse constraints. Major problems included inadequate storage facilities, lack of credit

454 facilities, and scarcity of fuel, marketing problems and high cost of fishing materials among
455 others.
456

RECOMMENDATIONS

458 Based on the findings and personal experience in the course of this study, I would hereby
459 recommend the following;

1. Government should engage in the rehabilitation of the access roads leading to the processing communities, so as to improve transportation system, reduce transportation cost and losses due to delays and fragmentation.
2. Provision of adequate extension services, education and credit facilities to fish processors in this area will help improve on their fishing profession. This will raise income and alleviate poverty among the teeming youths who are involved in business.
3. The agricultural extension arm of the state should also, improve the network for market and price information gathering and dissemination among participants (fishermen, processors and traders) to improve marketing efficiency.
4. The State Extension arm should empower fishermen, processors and traders with techniques and method of reducing fish post-harvest loss. The State government should provide the basic infrastructure (storage, communication, and transportation facilities) required for rapid and sustainable business development at important fishing and marketing centres in the local government.
5. The fishermen and fish farmers should be educated on the advantages and importance of family planning, so as to reduce the birth of children who will not have enough to eat because of the low standard of living.

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