

Full Length Research Paper

Women participation in fish processing and packaging in rural communities of Delta State, Nigeria

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The study investigated women participation in fish processing and packaging in Delta State, Nigeria. Multi stage sampling procedure was used in the selection of 180 respondents for the study. Data for the study was collected using structured questionnaire, focus group discussion and participatory observation. Data collected were analyzed using simple descriptive statistics, mean scores and inferential statistics. The result indicated that majority of the women were married (57%) and literate with few having non-formal education (38%). The result further indicated that the three major processing methods used by the women to include hot smoking (57%), air drying (25%), and salting (19.4%). Packaging methods include baskets (47.2%), paper cartons (37.2%), jute bags (46.0%) and palm rope (58.0%) used in tying staked fish. The probit regression analysis on socio-economic factors affecting participation of women in fish processing and packaging indicated that age (0.00642***), education (0.00256**), income (0.3609**), access to credit (0.00068**), household size (0.2475**) and access to market (0.03150**) are all positive and significantly related to participation of women in fish processing and packaging. The study recommends the formation of cooperative societies among themselves to ease off some of the problems they encountered in their enterprise.

Key words: Processing, packaging, women, rural communities.

INTRODUCTION

Nigeria is a maritime country where fishing plays an important role in the national economy and fish is an important and popular component of the diet. Nigeria consumes over 1.5 million tons of fish annually. Fish constitutes approximately half the animal protein in the typical Nigeria's diet. Fish is supplied by a variety of sources including imports, domestic capture (that is fish

caught from the various inland waters and coastal areas by artisanal fisher folks using boats and nets) and fish farming. Nigeria is a significant importer of frozen fish in Africa. Catfish is the predominant farmed fish in Nigeria and the fish farming sector is growing rapidly. Among the varieties of agricultural practices is fish farming which is predominant in the coastal states of Nigeria. Currently,

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there is observed increase in the population of fish farms and farmers. Feeding is no longer restricted to the wild alone; fish farms can be found around towns and villages even behind people homes. This is because information is the driving and sustaining force behind any development strategy.

Small-scale fish farming and artisanal fisheries make up to about 80% of fisheries sector, supplying roughly 82% of the country's domestic fish production. In Niger Delta, the fish farming sector is increasingly important with large numbers of new entrants over the last decade, particularly small-scale fish farmers.

In Delta state, and indeed the entire Niger Delta region, while artisanal fisheries is declining, aquaculture has witnessed rapid growth in the last 5 years due to a number of factors, including the low barrier to entry into business, improving access to technologies, availability of fingerlings and feed and technical advice. The fisheries sector is a source of fish food and livelihood for significant proportions of people living the coastal communities (Akinrotimi et al., 2007). Fish is the cheapest form of animal protein in the diet of coastal dwellers in Nigeria. Thus, the sector provides the nutritional needs as well as employment opportunities of the people because an entire family unit comprising men, women, and children find employment in the sector. The roles of women in the sector are diverse and according to Olufayo (2012) they take part specifically in fishing, processing, packaging and marketing.

The contribution of women is important in food production systems of agriculture and fisheries. The role of women differs across fishing communities, countries and regions. However, most women devote their efforts, talents and skills to the well-being of their families through their participation in fishing business. Their role in food production like coastal fishery has become more important as a way of escaping poverty to improve or enhance food security. Generally, women in fishing areas have been observed to participate significantly in fisheries and play essential role in enhancing livelihood of its families (Nwabueze et al., 2013).

However, fish production is customarily regarded as men's venture, women role in fish related activities though supportive, is imperative and indispensable (Akinrotimi et al, 2011). Tamale (2001) reported that the non-recognition of women contribution in production is enhanced by uneven allocation of resources. Therefore, lack of access and control over productive process is one major factor limiting women participation on economic activities such as coastal fishery practices (Acharya, 2003). Women in rural areas of Delta State participate actively in traditional fisheries sub-sector, either fully involved or play a complimentary role for men in provision for their families. Traditionally, the women in Delta state play a crucial role in post- harvest products. The role and contribution of women after fishing expeditions of men are enormous. They are primarily and, in most cases,

solely responsible for post-harvest production of fish brought in by their husband after each fishing trip and sometime they are bought from other fishers (Tonye and Francis, 2014).

Fish processing is the process associated with the fish and fish products between the time the fish are caught or harvested and the time the final product is delivered to the consumers. The processing and preservation of fish is of utmost important because it is susceptible to deterioration immediately after harvest and to present economic losses (Okonta and Ekelemu, 2005). If fish is not sold fresh, preservation methods should be applied to extend the shelf-life. These include freezing, smoking, drying and heat treatment. Lack of adequate fish handling, processing techniques and storage facilities constitutes significantly to the low supply of fish to poor rural communities. The long distance and distribution channels necessitated some processing and storage, small preservation through refrigeration is not readily available due to poor distribution of authority (Agbon et al., 2002). Efficient preservation of fish is important when top quality, maximum yield and highest possible profits are to be achieved (Davies and Davies, 2009).

The need for the development of fish preservation and processing methods and techniques for effective fish handling, harvesting, processing and storage can never be over-emphasized now that agricultural production is on the increase in Nigeria (Davies et al., 2008). Fishing has long been considered a male occupation in different states of Nigeria and women were thought to be involved in post-harvest activities. However, there is a growing recognition of women's contribution in capture fisheries in all activity or sphere. Delta State women play a significant role in the artisanal fisheries in particular in fish trade, processing and marketing of fishery products.

Fish packaging is the act of enclosing fish products for distribution, storage, sale and use. Packaging according to Abolagba and Akise (2011) can be described as the coordinated system of preparing goods for transport, warehousing, logistics, sale and use. Packaging of processed fish is important as it facilitates handling during storage and distribute within marketing chain. A little carelessness can cause damage and wastage. Therefore, packaging was found to have an effect on the storage life of the smoked products irrespective of the mode. This has led to lack of quality fish production and marketing in Nigerian markets today.

Currently, less effort is put into the mechanization of fish processing as traditional methods are commonly used and some of these traditional fish processing methods are associated with contaminations, which are mainly injurious to consumers (George et al., 2014). It is believed that if the fish losses from postharvest activities could be reduced to the barest minimum, the gap between demand and supply of fish could be closed implying that the impact of governments' efforts through programmes/projects aimed at increasing domestic fish

production could be meaningfully felt by the people especially the poor ones. To achieve this, effective and efficient management practices that could reduce postharvest fish losses has to be put in place. Bolorunduro et al. (2005) noted that post-harvest losses could be reduced by simply improving the handling and processing methods. Davies (2005) also submitted that the development of appropriate fish machinery and technologies that employ effective production, handling, harvesting, processing and storage cannot be over-emphasized, especially in the age when aquaculture development is fast gathering momentum in Nigeria. In line with this view, the federal government of Nigeria in collaboration with international agencies (such as WHO and FAO) as well as state governments has funded research institutes to invent and develop improved processing and preservation technologies. Extension agencies are also instituted to disseminate research outputs, usually improved fish processing and preservation technologies to the end users (fish processors). This, according to Bolorunduro and Adesehinwa (2007), is because the development of improved technologies must be backed up with efficient dissemination to enhance its adoption.

Several technologies developed by research institutes have been disseminated to fish processors and other fish handlers in the different fishing communities across the nation over the years. Delta State is one of the States that received most attention in terms of disseminating the improved fish postharvest technologies. Hence, it is as a result of the mentioned facts that this study seeks to examine the various fish processing and packaging methods practiced and materials used by women in Delta State, with the following specific objectives:

- (1) describe the socio-economic characteristics of the women;
- (2) identify the various fish processing methods used by the respondents in the study area;
- (3) identify the processing methods adopted by the women;
- (4) identify the processing equipment types used by the women;
- (5) identify the energy sources used by the women in fish processing;
- (6) identify the materials used in the packaging process in the study area; and

Hypothesis testing

There is no significant difference between participation of women in fish processing and packaging and their socio-economic characteristics in the study area.

METHODOLOGY

The study was conducted in Delta State. Delta State is an oil and

agricultural producing state of Nigeria with a population of 4,112,445 (males: 2,069,309; females: 2,043,136). The capital city is Asaba with an estimated area of 762 km² (294 sq. mi). The state has a total land area of 16,842 km² (6,503 sq. mi). The state covers a landmass of about 18,050 km² of which more than 60% is land. The state lies approximately between longitude 5°00 and 6°30' north. There are 25 Local Governments in the State. Delta state has 3 Agricultural zones comprising: Delta North Agricultural zone: Aniocha North, Aniocha South, Ika South, Ika North East, Ndokwa East, Ndokwa West, Oshimili North, Oshimili South, and Ukwuani. Delta Central Agricultural zone comprising: Ethiope East, Ethiope West, Okpe, Sapele, Udu, Ughelli North, Ughelli South, Uvwie. Delta South Agricultural zone: Bomadi, Burutu, Isoko North, Isoko South, Patani, Warri North, Warri South and Warri South West. Out of the twenty-five L.G.A in Delta state, six local government areas (Patani, Ndokwa West, Ethiope West and Oshimili North are in involved in active inland fishing in the state and that's the women source of fish for processing and sales (Figure 1). The fishing communities under study were visited between January and March, 2018. The parameters investigated included the fish processing methods, equipment and packaging materials and methods.

The population of the study consists of all the women involved in post-harvesting activities in the selected communities. Multi-stage sampling procedure was used in the selection of the sample size. In the first stage, the three agricultural zones were selected followed by selection of 3 blocks from each zone. Furthermore, twenty women fish processors were selected from each of the 3 blocks, bring the total to 180 women fish processor, selection was based on those women that were actively involved in the fish value chain activities. Data for the study were collected using structured questionnaire, Focus Group Discussion and Participatory Observation. Data collected were analyzed using descriptive statistics like frequency distribution, percentages and mean scores. Objective 1 – 4 were analyzed with descriptive statistics. While for objective 5, a 4-point Likert type scale of very serious (4), serious (3), not serious (2), not very serious (1) was used to generate the data and the mean scores were used to analyze the objective (Table 1).

Probit model of participation in fish processing and packaging

A woman's decision to participate in fish processing and packaging can be expressed as a dichotomous binary variable based on whether the individual invests in fish processing and packaging or not. The model assumes that operators' decisions are based on utility maximization, and that the individual decision to participate or not in fish processing and packaging depends on an unobservable utility index or a latent variable that is determined by the farm and processors' specific characteristics (Chukwuji, 2010). The choice of the probit model for this study was quite appropriate because the error term is assumed to have normal distribution (Gujarati and Porter, 2009). Therefore, the probit model of participation in fish processing and packaging is derived from an underlying latent variable model expressed as:

$$Y_i^* = \beta_0 + \beta_{ij}X_{ij} + e_i \quad (1)$$

where Y_i^* is an unobserved index reflecting the difference between the utility of participating or not participating in fish processing and packaging, β_0 is the intercept, β_{ij} is a vector of unknown parameters to be estimated; X_{ij} is a vector of operator's farm, location and socioeconomic characteristics, which are the independent variables that explain participation in fish processing and packaging, and e_i is the standard normally distributed error term that is independent of X_j and is symmetrically distributed around zero (Wooldridge, 2006; Greene, 2008). Following from



Figure 1. Map of Delta State showing the twenty-five local government areas.

Table 1. Schematic presentation of the sample procedure.

Zone	Blocks	No. of fish processors
Delta North	Oshimili South	20
	Oshimili North	20
	Aniocha South	20
Delta Central	Patani	20
	Ughelli North	20
	Isoko South	20
Delta South	Uvwie	20
	Sapele	20
	Ethiope West	20
Total		180

Equation 1, the model to estimate the probability of a farmer participating in fish processing and packaging can be stated as:

$$P(Y_i^* = 1|x) = F(\beta X) = \int_{-\infty}^{\beta X} \frac{1}{\sqrt{2\pi}} \exp(-Z^2/2) dz \quad (2)$$

where F is the standard normal cumulative distribution function that

ensures that the likelihood of participating in fish processing and packaging lies strictly between zero and one, and P is the probability that a farmer participates in fish processing and packaging or not. Thus, $Y_i = 1$ if $Y_i^* > 0$; $Y_i = 0$ if $Y_i^* \leq 0$; Z = the standard normal variable (Gujarati and Porter, 2009). Following on from the foregoing discussion, the empirical model for quantifying

Table 2. Socio-economic characteristics of the respondents in the study area.

Variable	Frequency	Percentage
Age		
25 - 30	62	34.4
35 - 40	47	26.1
45 - 50	65	36.1
55 - 60	6	3.3
Total	180	100
Marital status		
Married	102	57
Single	43	23.9
Ever married	35	19.4
Total	180	100
Educational level		
Non-formal	69	38.3
Primary	58	32.2
Secondary	34	19
Tertiary	19	11
Total	180	100
Farming experience		
2 - 4	36	20
6 - 8	84	47
10 - 12	60	33
Total	180	100
Cooperative society		
Belong to cooperatives	163	91
Does not belong cooperatives	17	9
Total	180	100

Source: Field survey (2018).

the factors which influence the participation in fish processing and packaging is explicitly specified as follows:

$$PATHSTD = \beta_0 + \beta_1 AGE + \beta_2 MRLSTA + \beta_3 YRSEDU + \beta_4 HHS + \beta_5 FISEXPR + \beta_6 ACCMRT + \beta_7 INC + \beta_8 ATDRSK + \beta_9 CREDITACES + \epsilon_i$$

Where *PATHSTD* (participation) = dependent variable; if participated 1, otherwise 0 and β_1 to β_9 = independent variable; β_0 = constant; $\beta_1 AGE$ = measured in years as supplied by the processors; $\beta_2 MRLSTA$ = marital status (dummy variable; married = 1, otherwise 0); $\beta_3 YRSEDU$ = level of education (number of years of formal schooling); $\beta_4 HHS$ = household size (number of people living together); $\beta_5 FISEXPR$ = fish processing experience (number of years each individual has been involved in the business); $\beta_6 ACCMRT$ = access to market (dummy variable; access 1, otherwise 0); $\beta_7 INC$ = measured in naira from major occupation; $\beta_8 ATDRSK$ = attitude towards risk (positive 1, otherwise 0); $\beta_9 CREDITACES$ = access to credit (access 1, otherwise 0); ϵ_i = error term

RESULTS AND DISCUSSION

Table 2 displays the socio-economic characteristics of the respondents. From the result, about 36.1% of the woman who were actively involved in fish processing and packaging fell within the age bracket of 45-50 years. The implication of the result is that the older the women, the less their participation in processing and packaging. Women with the age above 50 years were not actively involved in the activities (3.3%). According to Olapade and Sesay (2018), fisheries activities are certainly not for older folks due mainly to the fact that it is energy sapping. Older people had the responsibility to help the younger women with domestic chores. This implies that processing and marketing activities are carried out by very active individuals who have both strength and

Table 3. Preparatory processing operations adopted by the women.

Methods of processing	Frequency	Percentage
Sorting and grading	180	100
Scaling, gutting and sticking	92	96.0
Cutting and sticking	172	52.0
Scaling	98	54.4
All of the above	85	47.2

Multiple response.

Source: Field survey (2018).

Table 4. Percentage distribution of various fish processing methods adopted by the women.

Variable	Frequency	Percentage
Air drying	43	25
Hot smoking	102	56.6
Salting	35	19.4

Source: Field survey (2018).

reasonable level of maturity. The result is in line with Omoruyi et al. (2015) who revealed that majority of fish processors were 40 years and above.

The result further shows that about 57% of the women were married, 24% were single while 19% were never married in the study area. The situation probably accounted for the age group who were involved in fishery activities. This result is similar to findings of Abolagba and Chukwu (2008) which revealed that majority of the processors were married. High percentage of married women could be attributed to the fact that their husbands were fishermen and because of their status or responsibilities to shoulder, they had to render assistance to their husbands to enhance their livelihoods. Also, result on educational level indicated that 38.3% had no formal education, 32.2% and 19.0% had primary and secondary education respectively. Only about 11.0% had tertiary education. This result is not in agreement with Abolagba and Akise (2011) who stated majority of the processors in the study area had primary education. The reason being that most of them married early and do not have the opportunity to go beyond that. The young educated school leavers are more interested in white collar jobs, than staying back in their communities for agricultural purposes.

Also, the result further revealed that most of the respondents had been in the business for 6- 8 years (47%), 10-12 years (33%) and 2- 4 years (20%). Finally, the result indicated that 91% belongs to a cooperative society, while 9% did not belong to any cooperative society. According to the respondents, cooperative

societies have saved them from the activities of middle men's exploitation and promote their enterprise.

Olapade and Sesay (2015) noted that co-operatives in the small-scale fisheries sector has helped in maximizing long term community benefits to deal with the threats of fisheries mismanagement, livelihood, insecurity and poverty. Results on Table 3 indicated that all the women (100%) were involved in the preparatory processing operations of sorting and grading of fish, 96.0% were involved in scaling, gutting and sticking. While 52.0% of the women were involved in cutting and sticking, 54.4% of the women adopted scaling. About 47.2% of the women adopted all the processing operations. All the preparatory processing operations of washing, cutting, degutting, de-scaling and salting were performed manually. Salt processing method was applicable to selected species of fish, while a few species including bonga fish, rough head, sea catfish and halter fish could not withstand salt processing because of their natural high salt content. Cutting and sticking is commonly used because it allows heat pressure to penetrate easily and quick removal of water content from fish.

Results on Table 4 described fish processing methods adopted by the women in the study area. The result revealed that about 25% of the respondents used air drying, 57% uses hot smoking, while 19.4% of the respondents use salting. According to George et al. (2014), processing of fish either through smoking or drying is widely used in fish preservation. In all the process moisture content present in the fish are extracted through heating, thus inhibiting the action of micro-

Table 5. Fish processing equipment used by the respondents in the study area.

Variable	Frequency	Percentage
Extended drum oven	24	13.3
Galvanized iron sheet	31	17.2
Black clay oven	92	51.1
Red clay oven	55	31.0
Brick kiln	72	40.0

Multiple response
Source: Field survey (2018).

Table 6. Energy sources used by the women in fish smoking.

Variable	Frequency	Percentage
Coal	20	11.1
Wood	158	88.0
Electricity	2	1.1
Total	180	100

Source: Field survey (2018).

Table 7. Packaging methods and materials used by the respondents.

Variable	Frequency	Percentage
Basket and paper	172	95.6
Baskets only	85	47.2
Paper cartons	67	37.2
Basket and dry		
Plantain leaves	61	33.8
Jute bags	82	46.0
Palm rope in tying staked fish	104	58.0

Multiple response.
Field survey (2018).

organisms and prolong shelf life. Also, Madu et al. (2004) reported that the processing of fish by smoking or drying enhances nutritive value.

Results on Table 5 indicates five different processing equipment used in the fishing communities by the women. Most of the equipment was locally fabricated; others were built by the processors themselves. Major results indicated that about 13.3% of the respondents used extended drum oven, 17% galvanized iron sheet, 51% used black clay oven, 31% used red clay, 40% used brick kiln. This result is not in conformity with Adeyeye et al. (2005) who cited that majority of fish processors uses full drum in drying their fish.

Table 6 revealed sources of energy used by the women in smoking their fish in the study area. Majority of the respondents used wood as sources of fuel (88%), 11.1% uses coal, while 1.1% uses electricity. The most commonly

used wood was hardwood which varies in name according to each community. According to the respondents, fish dried with hard wood possessed good quality, taste, flavor and appearance. The result is in agreement with Davies et al. (2008) who revealed that majority of fish processors used firewood as their sources of energy. This could be attributed to the abundance of wood and high level of jerking activities in the area.

Results in Table 7 shows that 95.6% of the respondents packaged their fish by using basket and paper, 57% packaged using palm rope in tying staked, 47% used basket only, 46% used jute-bags, 37% used paper cartons, 33% used basket and dry leaves only. The result is contrary to Abolagba and Nuntah (2011) which cited that majority of fish processors used basket to package their fish for protection and preservation and the study also confirms the findings of Ayuba and Omeji (2006)

Table 8. Probit Regression Analysis on Socio-economic Factors Affecting Women's Participation in Fish Processing and Packaging.

Variable	Coefficient	Std. error	Z-statistics	P-value
Constant	-9.0467	1.5512	-5.6223	<0.001
Age	-0.0513	0.0181	2.6152	0.00642***
Marital status	0.5032	0.4221	1.2306	0.22156
Level of education	0.1251	0.0424	2.7817	0.00256**
Household size	0.4478	0.2067	2.2150	0.2475**
Fish processing experience	0.0776	0.870	0.8842	0.36122
Access to market	0.7432	0.3545	2.1465	0.03150**
Income	0.00003	0.00001	2.0957	0.3609**
Attitude to risk	-0.3453	0.3352	-1.0800	0.28013
Access to credit	1.2376	0.3631	3.4000	0.00068**
Number of cases predicted = 180				
R-Square = 0.64				
Log-likelihood = 35.37				
Test statistics: Chi-square (2) = 18.881 with P-value = 0.00008				

***significant at 1%, ** significant at 5%
Source: Computed from survey data, 2018.

who stated that packaging forms an important part of food processing because it facilitates handling during storage and distribute within the market chain. High percentage of processors used basket due to the fact that it was easy for transportation and light in weight. In Nigeria, basket is the dominant container used for fish handling and distribution throughout the value chain as stated by King (2001). According to the fish processors, jute-bags were also important because it protects their fish against rainfall. The use of palm rope in tying stake fish by processors was based on the fact it was free and always available, and according to them, it is easier to handle and do not cause fragmentation of the fish.

The result of the probit regression analysis of the socio-economic factors affecting the participation of women in fish processing and packaging are shown in Table 8. It shows that the model has a good fit with a R^2 of 0.64 and highly significant likelihood ratio (LR) test ($P < 0.01$) indicating that all the explanatory variables together have a significant effect on the probability of women processors participating in fish processing and packaging. Age (0.00642***) of the women had a positive and significant effect on participation of women in fish processing and participation. The effect of age comes from accumulated knowledge and experience (Tenge et al., 2004). The result is in line with Nkamleu and Manyong (2005) who reported that elderly people are more likely to participate in newly introduced innovations (technologies) because they have more years of processing experience and may likely adopt any new technology that might enhance their performance and improve sales.

The apathy towards women as equal partners in progress also contributed to the higher illiteracy level

among female fisher folks (Ovie and Ovie, 2010; Cliffe and Akinrotimi, 2015). Years of formal education (0.00256**) was positive and significantly related to participating decision. Individuals who spent more years in school acquiring formal education are more likely to participate in fish processing and packaging than their less educated counterparts. Education widens the horizon of an individual and it also aids them in rational reasoning. This result is similar to the findings of Nkamleu and Adesina (2000) and Adeogun et al. (2008).

Household size was positive and significantly related to women participation in fish processing and packaging. Women processors with large household size are more likely to engage in fish processing and packaging than those from household size with fewer adults. The implication of the result is that more people in a household increases participation as they act as sources of labor in the processing and packaging activities. Most fish processing operations require a great deal of human efforts and availability of adults in the household of the processors act as an incentive for participation. Thus, households with an increased labor supply are more likely to adopt and participate in new technologies than those with fewer adults (Nkamleu and Manyong, 2005; Amsalu and De Graaff, 2007). The result agrees with the works of Damisa and Yohanna (2007), Damisa et al. (2007) as well as Amsalu and de Graaff (2007).

Income was positive and significantly related to participation of women in fish processing and packaging, this is because processors with a high income can afford the cost of innovation and bear the associated risks. According to Rogers (2003), households with a high socio-economic status and with more capital can accept the risk of adopting new technologies more easily and

become innovators or early adopters.

Access to market was positive and significantly related to participation. The result implies that participation in fish processing by the women will be high if they have access to market. The creeks are not accessible to most transportation means, thereby making it difficult for the women to access the markets available (Wara et al. 2007; Adeleke, 2014).

Access to credit was also positive and significant to participation. The result shows that individuals who have access to loan have greater likelihood of participation than those who cannot afford access to loan easily. Generally, fisheries are considered as a 'no go area' by most financial institutions in Nigeria as confirmed by the farmers (Abbas et al., 2012; Olaoye et al., 2012). The low literacy level of women has always been a constraint to accessing funds from formalized sources. They have to depend on credit from friends and thrift to purchase fish inputs such as nets, boats, fertilizers, feed etc. at subsidized rates. The bureaucratic bottlenecks like collateral securities have further aggravated the situation, hence the need to train the women. Past works have confirmed women as being better managers of funds than their male counterparts. Women repay their loans faster than their male counterparts (most of whom divert loans to ostentatious transactions (Wara et al., 2007; Adebayo and Pitan, 2001; Alamu, 1998; Agbelege, 2007; Babale, 2003; FAO, 2012; Nwabueze et al., 2007).

Conclusion

The study investigated participation of women in fish processing and packaging in Delta State of Nigeria. From the results, it was observed that the women participated actively in fish processing using traditional methods like hot smoking, air drying and salting. Hot smoking was the most adopted method at 56.6%. The women used different packaging methods which includes basket and paper, (57%) packaged using palm rope in tying staked, (47%) basket only, (46%) jute-bags, (37%) paper cartons, 33% used basket and dry leaves only. The probit regression analysis on socio-economic factors affecting participation of women in fish processing and packaging indicated that age, education, income, access to credit, household size and access to market are all positive and significantly related to participation of women in fish processing and packaging; while marital status, fish processing experience and attitude to risk were also positive but not significantly related to participation.

Recommendations

Based on the findings of the study, the following recommendations were made:

(1) The women should be supported to form groups and

build their capacity especially on business management and enterprise development. Organization of training workshops will enhance access and sharing of information.

(2) Therefore, there is an urgent need by stakeholders in the fishery sector of the economy to ameliorate the constraints faced by the women because balance is better.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests

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