ASSESSMENT OF WOMEN'S PARTICIPATION IN FISH PROCESSING IN EKITI STATE NIGERIA

Abstract

This study assessed women's participation multi-stage in fish processing in Ekiti state, Nigeria. A multi-stage sampling procedure was employed to select a total of ninety (90) women fish processors using a primary data obtained through a well- Structured interview schedule. Data collected were analysed using descriptive statistics such as frequency. Counts, percentage, mean, charts while prosit regression analysis was employed to estimate the socio-economic factors influencing women's participation in fish processing in the study area. The results the revealed that the mean age of women. Participated in fish processing was 38.5% years, 57 percent were married, 28.4% percent were single, Majority (61.7%) had formal education, almost (91%) of the respondents belonged to cooperative societies. Women fish processors participated more in Scaling, gutting and sticking (87%), 60 percent employed hot smoking method of processing. Most processing equipment used were fabricated as indicated by 15 percent of the respondents who used drum ouen, 25 percent employed in a sheet, 45 percent used clay oven while kiln was used by 40 percent of the processors. Majority (85%) used firewood fuel source, 89 percent packaged their fishes using basket and paper The probit regression analysis on the socio-economic factors affecting participation of women in fish processing indicated that age (0.003), Education (0.054) access to credit (0.063) and access to market (0.032) were all positively significantly related to women's participation in fish processing while marital Status (0.343) and fish processing experience (0.345) were also positive but not significantly related to participation. The study conclusively showed that women who participated in fish processing employed different processing methods, equipment and energy sources. Based on the findings, the following recommendations were made\ women should be assisted to form cooperative Societies through which their capacities on business management could be built, government should give women priority in credit and loan accessibility. Government should also stabilize price of fish products to prevent business failure and risk among women processors.

***Keywords**: Assessment, Women participation, Processing, Preservation*

Introduction

Nigeria is a maritime nation, where fishing plays an important role in the national economy, making fish an important and popular part of the diet (FAO, 2018). Nigeria consumes over 1.5 million tons of fish annually. Fish makes up about half of the animal protein in a typical Nigerian diet. Fish can be sourced from a variety of sources, including imported fish, domestic fish, and fish farms.Among the diverse agricultural practices is aquaculture, which is widespread andthe cheapest animal protein in the diet in Nigeria's coastal states. Small-scale fish farming and artisanal fisheries make up about 80% of the fishing sector and supply about 82% of the country's fish production.

Aquaculture has grown rapidly in the last five years in Nigeria due to several factors such as low barriers to entry, improved access to technology, availability of technical advice among others. The sector therefore meets the nutritional needs and employment opportunities of the people as entire family units consisting of men, women and children can find work in the sector. Women's roles in this sector are diverse, particularly in the areas of fishing, processing, packaging and marketing, according to Olufayo (2012).

Women's contribution is important in food production systems such as agriculture and fisheries. Women's roles vary by fishing community, country and region. However, by working in the fishing industry, most women dedicate their efforts, talents and skills to the well-being of their families. Their role in food production, such as coastal fisheries, is gaining traction as a way out of poverty and improving food security. It has been observed that women in fishing areas generally contribute to the fishing industry and play an important role in improving the livelihoods of their families (Nwabueze and Erie, 2017).

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*., 2012). 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 capturing fisheries in all activities or spheres. Fish packaging is the act of enclosing fish products for distribution, storage, sale, and use. Packaging according to Abolagba and Akise (2015) 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 distributes within marketing chain. A little carelessness can cause damage and wastage. Therefore, packaging was found to influence 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*., 2018).

Statement of theproblem

Fish production is traditionally viewed as a man's job, and the role of women in fish-related activities is supportive, yet vital and essential (Akinrotimi*et. al*., 2018). Tamale (2015) reported that the under recognition of women's contributions in manufacturing is exacerbated by unequal resource allocation. Lack of access and control over production processes is therefore a major factor limiting women's participation in economic activities such as coastal fisheries (Acharya, 2013). Women in rural Ekiti province are actively involved in the traditional fishing subsector, either fully involved with or complementary to men in providing for their families. Traditionally, women in the fish value chain have played a key role in post-harvest products. The role and contribution of women following men's fishing is very large. They are mostly solely responsible for post-harvest production of the fish that their husbands bring back after they go fishing, most of the time, and sometimes other fishermen buy the fish (Tonye and Francis, 2018).

Processing and preservation of fish is of utmost importance, as fish are prone to spoilage immediately after harvesting and can cause economic losses (Okonta and Ekelemu, 2015). If the fish is not sold raw, storage methods should be used to extend the shelf life of the fish. These include freezing, smoking, drying and heat treating. Lack of proper fish handling, processing techniques and storage facilities are the main reasons for the low supply of fish to poor rural areas. Long distances and distribution channels necessitate several processing and storage steps, and poor allocation of authority makes low-level preservation by refrigeration not readily possible (Agbon et. al., 2012). Efficient fish conservation is critical to achieving the highest quality, maximum yield and maximum profit (Davies and Davies, 2009).Based on the above mentioned problems associated with fish processing, the study attempts to proffer solutions to the following research questions:

Research Questions

(1) What are the socio-economic characteristics of women fish processors in the study area?;
(2) What are the various fish processing methods used by the respondents?:
(3) What are the equipment types and fuel sources adopted by the women fish processors?;
(4) What are the materials used in the packaging processed fish in the study area?;

Objectives of the Study

The main objective of the study is to assess women's participation in fish processing in Ekiti state Nigeria. Specifically, this study aims at:
i. describing the socio-economic characteristics of the respondents;
ii. identifying the various fish processing methods used by the respondents in the study area;
iii. identifying the equipment types and fuel sources adopted by the women processors;
iv. identifying the materials used in fish packaging process in the study area.

Hypothesis testing

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

Methodology

This study was carried out in Ekiti State, in Southwest Nigeria. A multistage sampling technique was used in the selection of the sample size. In the first stage, the three Senatorial districts were selected, followed the selection of 2 Local Government Area from each district. Furthermore, fifteen (15) women fish processors were purposively selected from the Agricultural Development Program (ADP) in each LGA based on those women that were actively involved in the fish value chain activities. A total of sixty (90) women fish processor were sampled from the study area.Primary data was collected with the aid of a well-structured questionnaire and interview schedule. The data were analyzed using descriptive statistics (mean, frequency, percentages, table and charts) and Probit regression model was used to test the hypothesis.
The specification of the model is as follows:

$$Y * i = \beta 0 + \beta ijXij + ei \quad (1)$$

Y = Dependent variable (participation in fish processing) if participated 1, otherwise 0
X1 = Age (years)
X2 = Marital status (married = 1, otherwise = 0)
X3 = Education (years)
X4 = Household size (number)
X5 = Fish processing experience (years)
X6 = Income (Naira)
X7 = Access to credit (yes = 1, no = 0)
X8 = Access to market (yes = 1, no = 0)
a = Constant or intercept term
b1, b2, b3, b4, b5, b6, b7, b8, are coefficients of the respective independent variable to be estimated and ui=error term

Results and Discussion

Socio-economic Characteristics of Respondents

The result in Table 1 shows the age distribution of women in the study area. From the result, about 36.1% of the woman who were actively involved in fish processing and packaging were within the age bracket of 45 to 54 years.Women with the age above 54 years(3.3%) were not actively involved in the activities.The mean age of the fish processors was 38.5. This implies that young women were engaged in the processing and preservation of the fish

products. The results is similar to the findings of Oyinbo and Reknot (2013), Esiobu et al, (2014), that this age group constitutes the major productive workforce and that young individuals have more potentials to withstand stress and risk and have more strength to face tedious tasks associated with fish marketing.

The result in Figure 1 shows that about 57% of the women were married, 23.4% were single while 19.4% were either widow(er) or separated 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 (2018) 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.

The 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 (Figure 2). This result is not in agreement with Abolagba and Chukwu (2018) who stated that 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 level of education. The young educated school leavers are more interested in white collar jobs, than staying back in their communities for agricultural purposes.

The result in Figure 3 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%).

The result in Figure 4 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.

Results in Figure 5 indicated that all the women were involved in the preparatory processing operations of sorting and grading of fish, 87.0% were involved in scaling, gutting and sticking. Half(50%) of the women were involved in cutting and sticking, 55% of the women adopted scaling. 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 spices including catfish and tilapia 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 in Figure 6 described fish processing methods adopted by the women in the study area. The result revealed that about 30% of the respondents used air drying, 60% uses hot smoking, while 10% of the respondents use salting. According to George et. al. (2018), processing of fish either through smoking or drying is widely used in fish preservation. In all the processes, moisture content present in the fish are extracted through heating, thus inhibiting the action of micro- organisms and prolong shelf life. Results in figure 7 indicates five different processing equipment used in the fishing communities by the women. Most of the equipment were locally fabricated; others were built by the processors themselves. Major results indicated that about 15% of the respondents used drum oven, 25% employed iron sheet, 45% used clay oven, while 40% used kiln. This result is in conformity with Akinrotimi et al. (2018) who cited that fish processors use different equipment in drying their fish.

Results in Figure 8 revealed the sources of energy used by the women in smoking their fish in the study area. Majority of the respondents used firewood as sources of fuel (85%), 13% used charcoal, while 2% adopted other sources of energy like gas and electricity. According to the respondents, fish dried with firewood possessed good quality, taste, flavor and appearance. The result is in agreement with Davies et al. (2018) 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 Figure 9 shows that 89% of the respondents packaged their fish by using basket and paper, 60% packaged their fish using rope in tying staked, 45% used basket only, 45% used jute-bags, 35% used paper, 30% used basket and dry leaves only. The result is contrary to Acharya (2013) who cited that majority of fish processors used basket to package their fish for protection and preservation. High percentage of processors used basket due to the fact that it was easy for transportation and light in weight. 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 2. It shows that the model has a good fit with a R^2 of 0.65 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 (0.003***) of the women had a positive and significant effect on participation of women in fish processing and packaging. The effect of age comes from accumulated knowledge and experience (Toye and Francis, 2018).The apathy towards women as equal partners in progress also contributed to the higher illiteracy level among female fisher folks (Akinrotimi et al, 2018). Years of formal education (0.054**) 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 Davies et al. (2018) 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 labour supply are more likely to adopt and participate in new technologies than those with fewer adults (Abolagba and Chukwu, 2018)). The result agrees with the works of Davies andDavies(2009). 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 Tamale (2015), 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 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 (Okonta and Ekelemu,2015). Table 2 shows that low literacy level of women and non government assistance have always been constraints to fish processing and preservation of fish products most especially in 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.Other major constraints encountered by these processors were price fluctuation, inconsistency of government policies, and poor processing and packaging facilities. 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 (Nwabueze andErie 2017).

Conclusion and Recommendations

The study investigated participation of women in fish processing and packaging in Ekiti 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. Smoking was the most adopted method by60% processors. The women used different packaging methods which includes basket and paper (89%), (60%) packaged using rope in tying staked, (45%) basket only, (45%) jute-bags, (35%) paper, 30% 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, and household size are all positive and significantly related to participation of women in fish processing and packaging; while marital status and fish processing experience were also positive but not significantly related to participation.

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

(1) The women should be supported to form a cooperative society 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.

(3) The government at all levels should give women priority in credit and loan access for their business to enhance their productivity.

(4) Through guarantee minimum pricing, the Federal government should fix the price of fish products for price stability and prevention of business losses or risk among women.

References

Abolagba O.J, Chukwu T (2015). Socio-economic status of fish processors in Benin City Metropolis, Nigeria.Aquafield 4:33-41.

Acharya M (2013). Efforts at promotion of women in Nepal, Kathamandu, Tanker-Prasad Acharya Foundation.

Akinrotimi A.O, Onukwo D.N, Anyanwu P.E (2018).The role of fish in nutrition and livelihoods of families in Niger Delta, Nigeria. International Journal of Tropical Agriculture and Food Systems 1:344-351.

Davies R.M, Davies O.A (2009). Traditional and improved fish processing technologies in Bayelsa State, Nigeria. European Journal of Science Research 26:539-548.

Esiobu, N.S., Onubuogu, G.C and Okoli, V.B.N. (2014). Determinants of Income from Poultry Egg Production in Imo State, Nigeria: An Econometric Model Approach; Global Advanced Res. *J. Agric.l Sci*.3(7): 186-199

George F.O, Ogbolo A.O, Olaoye O.J, Obasa S.O, Idowu A.A, Odulate D.O (2018). Fish processing technologies in Nigeria: A case study of Ibeju-Lekki Local Government Area, Lagos State. American Journal of food Technology 9(6):302-310.

Nwabueze G.O, Erie A P (2017). Artisanal Fishers' use of sustainable fisheries management practices in Jebba Lake Basin, Nigeria. Journal of Agricultural Extension 17:123-134.

Okonta A.A, Ekelemu J.K (2015). A preliminary study of micro-organisms associated with fish spoilage in Asaba, Southern Nigeria. Proceedings 20th FISON Annual conference, Port Harcourt, November 14 - 18. pp. 557-560.

Olufayo M,O (2012). The gender roles of women in aquaculture and food security in Nigeria.In Proceedings of the 16th International Institute of Fisheries Economic and Trade Conference pp. 18-23.

Oyinbo, O. and Rekwot, G.C. (2013). Fishery Production and Economic Growth in Nigeria: Pathway for Sustainable Economic Development; *J. Sustainable Develop. African*

Tamale S (2015). Gender Trauma in Africa: Enhancing women's likely to resources. Journal of Africa Law 48(1):50-61

Tonye IA, Francis A (2018), Women and Post-harvest Production in the Niger Delta Area. Journal of Agriculture and Veterinary Services 7(3):78-82.

Table 1: Age Distribution of Women

Age (years)	Frequency	Percentage	mean
<35	31	34.4	
35-44	23	26.1	38.5
45-54	33	36.1	
>54	3	3.3	
Total	90	100.0	

Source: Field Survey, 2023

Table 2: Distribution of the respondents based on the constraints encountered

Constraints	**VS**	**S**	**M**	**NS**	**MEAN**	**RANK**

Poor access to capital	40	24	18	8	2.1	7th
The cost of processing the fish is high	50	26	14	0	2.4	2nd
No processing\ packaging facilities	42	38	8	2	2.3	3rd
Poor patronage (low demand)	26	12	6	46	1.2	8th
Inadequate transport means	48	23	12	7	2.3	3rd
No Government assistance	62	19	6	3	2.5	1st
Inconsistence/Inadequate Government policy	47	24	18	1	2.3	3rd
Frequent fluctuation in price	48	25	14	3	2.3	3rd
Low literacy level	56	21	11	2	2.5	1st
	130	152	198	16	2	498	3.6	13th

Source: Field Survey, 2023

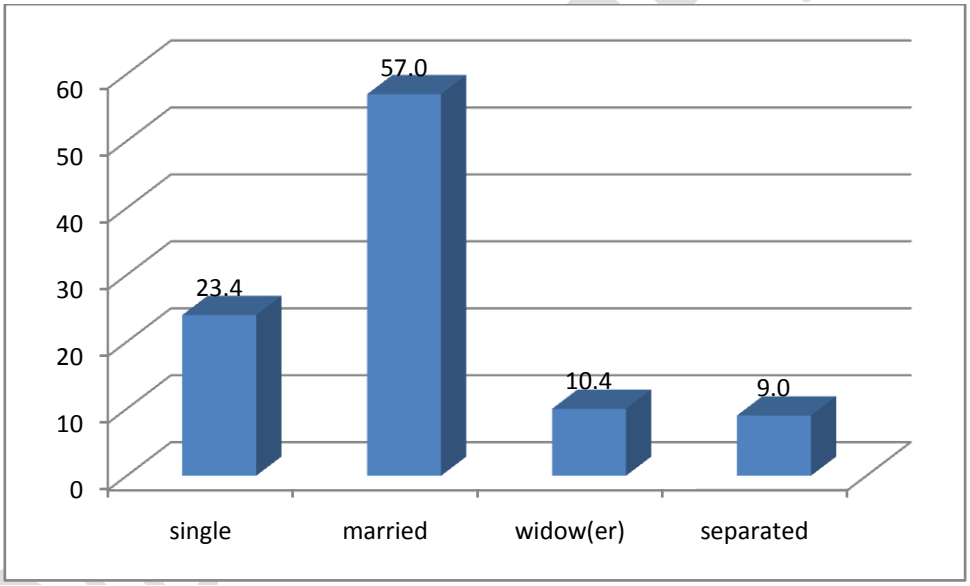

Figure 1: Marital Status of Women

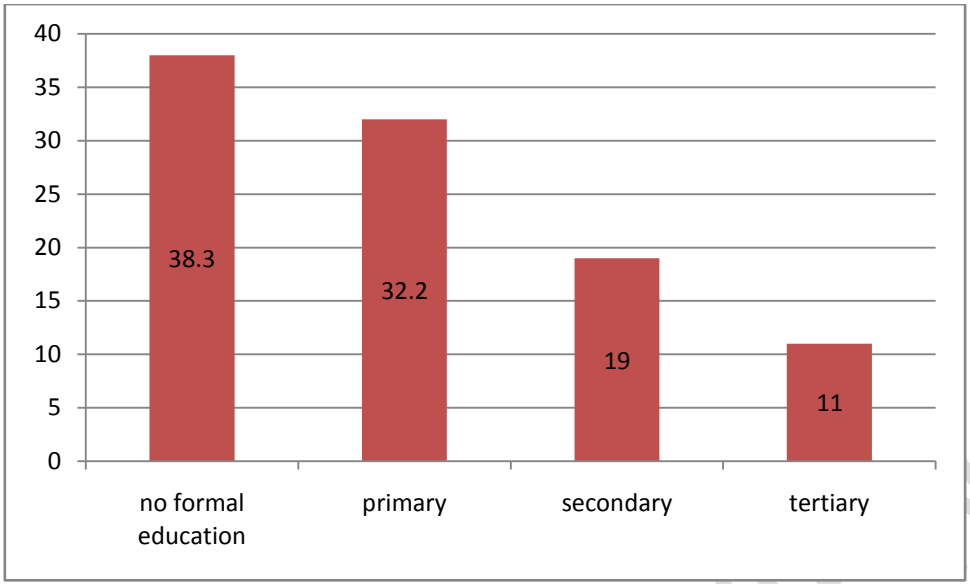

Figure 2: Marital Status of Women

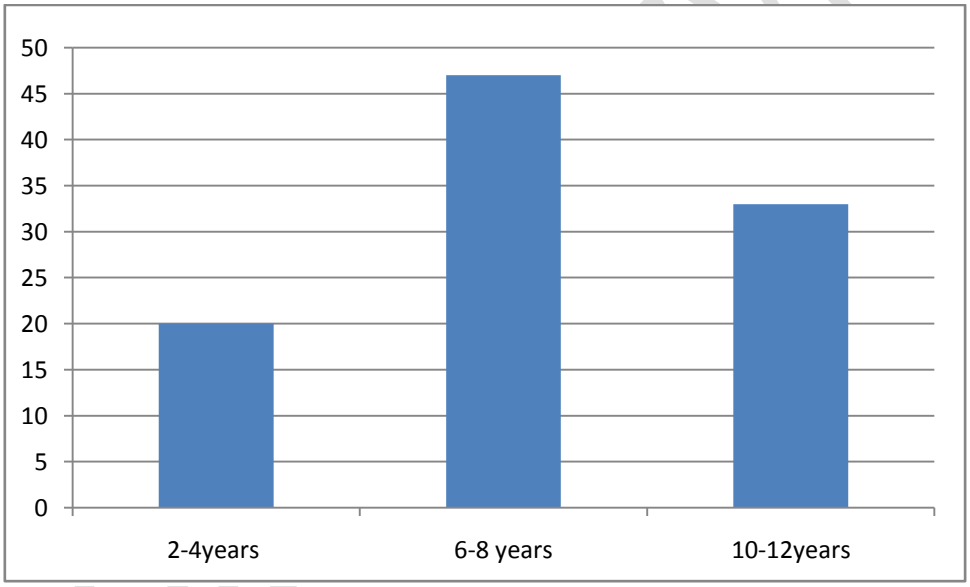

Figure 3: Farming Experience of Respondents

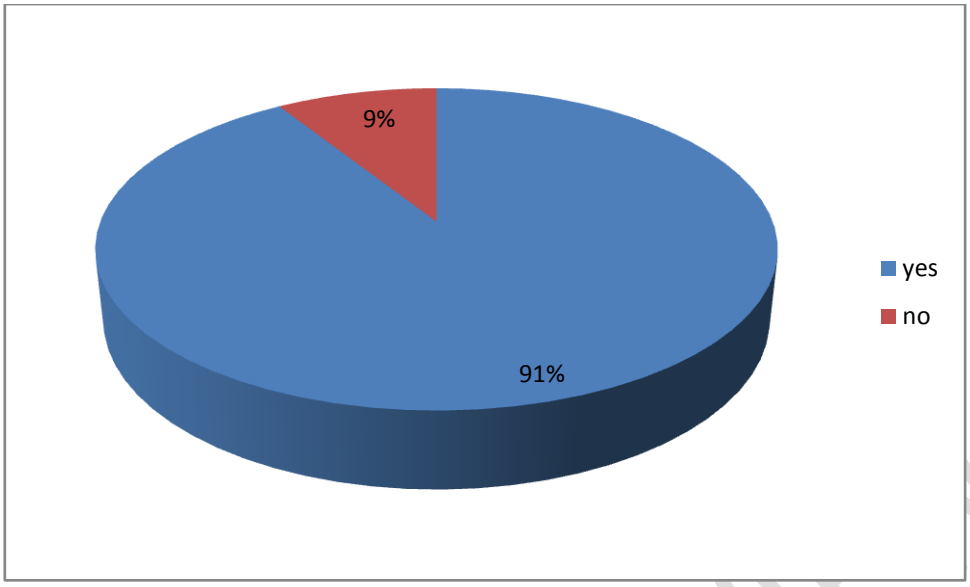

Figure 4: Cooperative Membership Status of Respondents

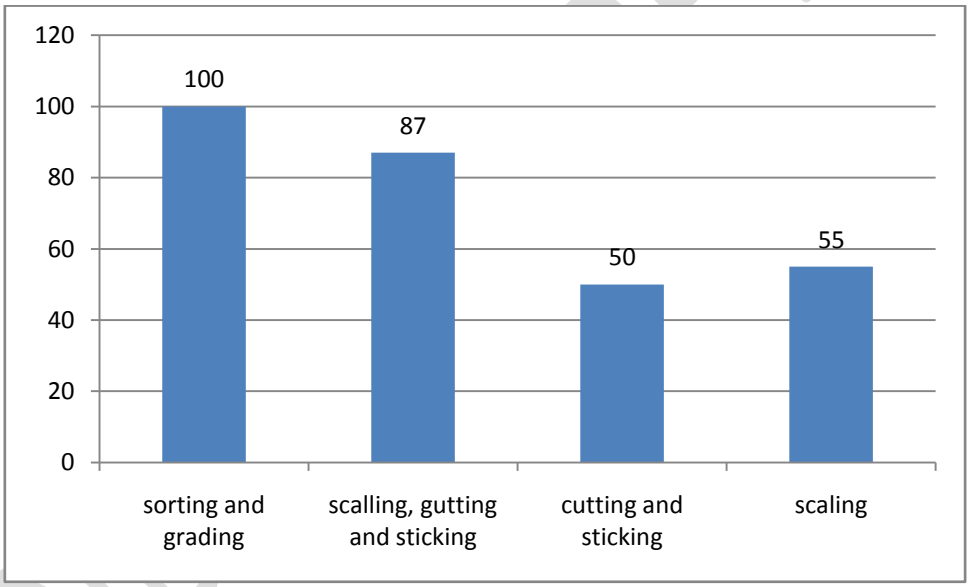

Figure 5: Preparatory Processing Operation Adopted by Women

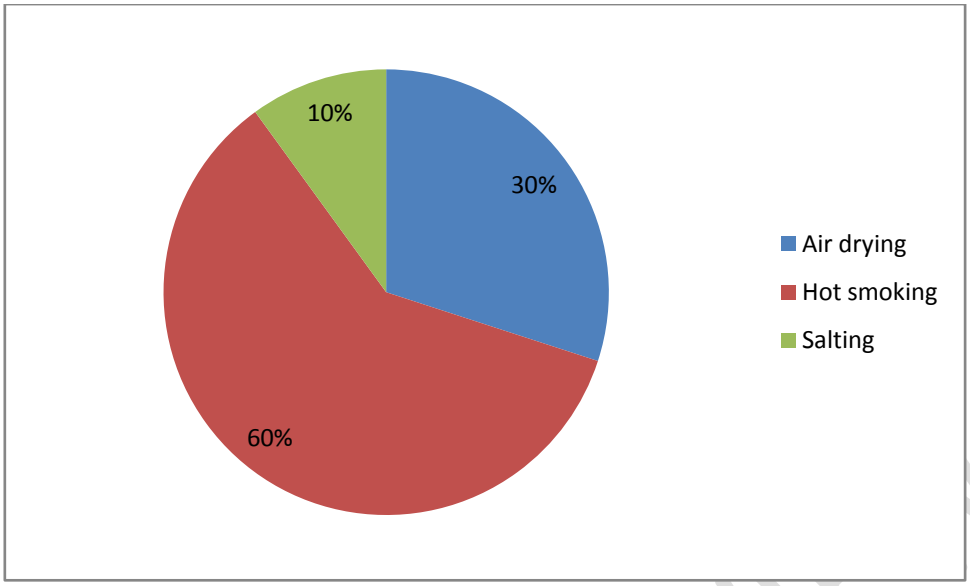

Figure 6: Fish Processing Methods Adopted by Women

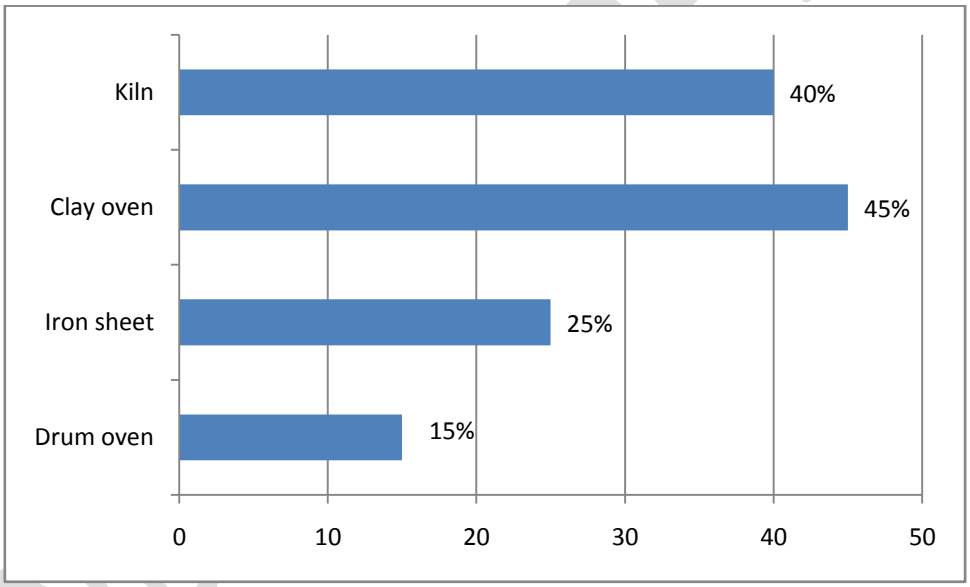

Figure 7: Fish Processing Equipment Used by Women

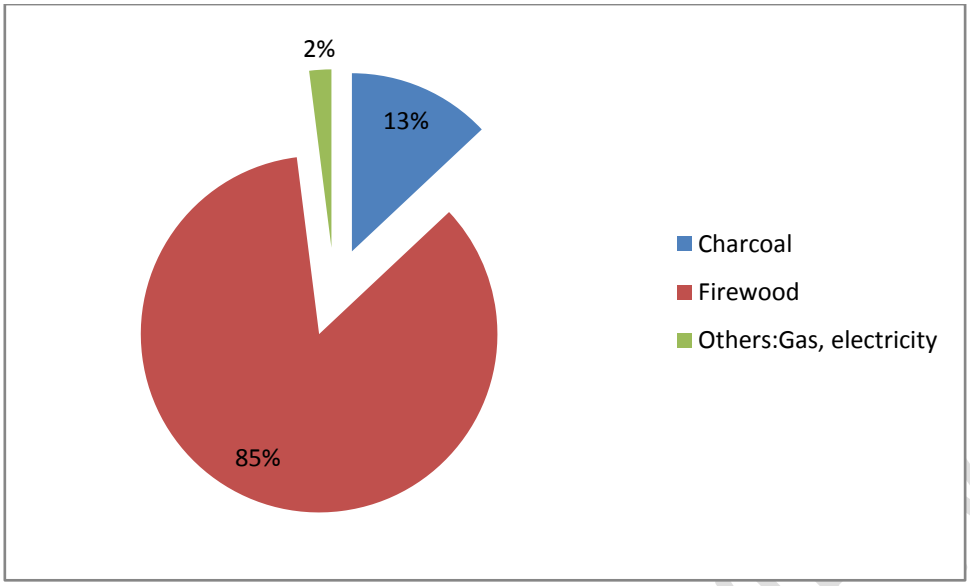

Figure 8: Sources of Energy for Processing

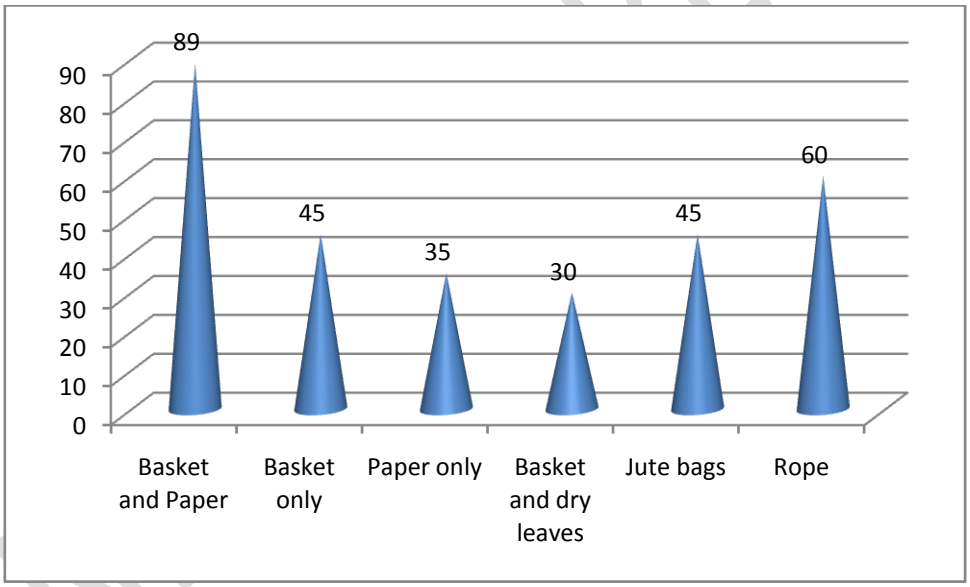

Figure 9: Packaging Methods and Materials

Table 3: Probit Regression Estimates of the socio-economic factors influencing Women participation in Fish Processing and Packaging

Variables	coef.	std. error	P-value
Constant	-4.52335	.7756	0.001
Age (X1)	-.02565	.00905	0.003***
Marital Status (X2)	.2516	.21105	0.343 (ns)
Education (X3)	.06255	.0212	0.054**
Household Size (X4)	.2239	.10335	0.223 (ns)
Fish Processing Experience (X5)	.0388	.4350	0.345 (ns)
Income (X6)	.000015	.000005	0.382 (ns)
Access to credit (X7)	.6188	.18155	0.063**
Access to market (X8)	.3716	0.17725	0.032**
No. of observations	90		
Log-likelihood	43.37		
R-Square	0.65		
Chi-Square2	19.811		
Prob>F	0.0007		

Source: Field Survey, 2023
** represent 5% level of significant
*** represents 1% level of significant