

Constraints Limiting the Effective Utilization of Low-Cost Fish Processing Technologies among Women in Selected Fishing Communities of Lagos State, Nigeria

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Abstract

Constraints limiting the effective utilization of low-cost fish processing technologies among women in selected fishing communities of Lagos State, Nigeria were examined in this study. Ninety-six fish processors were purposively selected as sample size for this study. Chi-square analysis was used for the hypothesis testing in this study to examine the association between constraints and utilization. The mean age of the respondents was 37.8 years, 49.0% had primary school education and 77.1% got skills from their parents. Majority of the respondents did not utilize galvanized smoking kiln (92.7%) and smoking chokor (69.8%). High cost of processing equipment (2.75), poor electricity supply (2.74), poor awareness creation and capacity building (2.72) and inadequate extension support (2.67) as the major problems limiting the utilization of low-cost fish processing technologies in the study area. Result of chi-square presented reveals that significant relationship existed between constraints and utilization of low-cost fish processing technologies at $p < 0.05$ level of significance. It is therefore recommended that effort should be geared towards awareness creation and public enlightenment to promote adoption of low-cost fish processing technologies in the study areas.

Keywords: Influence; Awareness; Utilization; Low-Cost Technologies; Fish processing; Women

Background of the Study

The demand for processed fish is ever increasing in Nigeria going by the rising population and need for nutritious quality fish consumption for protein in human diet. Since domestic fishing efforts cannot guarantee adequate support government resolved to import fish and fish products at high prices in order to bridge the supply gap and cater for the citizenry. According to Federal Department of Fisheries [1] fish supply in Africa has been declining while the demand has increased due to rise in population. Whereas, in many countries of Africa, the average diet contains less protein [2]. Yet, the contribution of local fish production to human's nutrition cannot be under-estimated. Fish is noted to be the cheapest and safest sources of calories, protein, fat, calcium, iron, vitamin and essential amino acids [3]. In typical fishing settlements, men are predominantly the harvester of wild fish species [4]. Women fisher-folks have thus developed skills and knowledge in performing transformation (i.e. processing and marketing) activities of unsold fresh fish catch and in carrying out the sales of processed fish in the market places [5]. Women are highly involved in every aspect of fish processing and marketing in the rural areas which contribute to their economic empowerment, food security and poverty reduction. These activities comprise of fish handling (sorting, dressing, cutting, eviscerating, skinning, pre-cooking, blending, filleting, salting and packing) and marketing of processed fish in form of frozen fish, salted

fish, smoked fish, dried fish, fish fillets, fish row, pre-cooked fish, fish oil, and fish meal. Fish harvesting, handling, processing and distribution have been reported to provide livelihood for millions of people as well as providing foreign exchange to many countries [6]. However, a lot of women in the fish processing found it difficult to break-even because of poor handling system due to lack of modern technologies. The women are constrained by limited access to current information as relating to their fish processing activities. Many times, they made losses due to rapid deterioration and spoilage of fish. Clucas et al. [7] contributed that fish is highly susceptible to deterioration without adequate preservative or processing measures. Before now, research focused has been on how to increase quantity of fish produced with little attention on processing, value addition, packaging, and sales to reduce economic wastages. It is necessary to disseminate correct information on the modern technologies to the fish processors if the meaningful impact is to be made on productivity and income of the women in fish processing sub-sector of fisheries in Nigeria. In recent time, research institutes introduced smoking chokor and smoke kiln as low-cost technologies in order to improve the quality of processed fish and reduce spoilage. The adoption and utilization of these technologies is however constrained by the poor public education and enlightenment on its merits. Bolorunduro and Adesehinwa [8] emphasized that the development of improved technologies must be backed up with efficient dissemination to enhance its adoption. Previous study by Bolorundo and Faleye [9] indicated that adoption of fisheries technologies has been relatively low when compared with other agricultural technologies. The causes of this discrepancies range

from technical to environmental and human factors. This study is very important to expound the influence of constraints on utilization of low-cost technologies being introduced among the women in selected fishing communities of Lagos State, Nigeria. Specific objectives are to:

- Describe personal characteristics of fish processors in the study areas.
- Assess the utilization of low-cost technologies among fish processors in the study areas.
- Identify major constraints limiting the effective utilization of low-cost fish processing technologies in the study areas.

Hypothesis of this study was stated in null form as

H_{01} : Constraints have no significant influence on the utilization of low-cost fish processing technologies.

Research Methodology

Description of the study area

This study was carried out in Eti-Osa and Ibeju-Lekki Local Government Areas of Lagos State, Nigeria. Lagos State is located in the southwest geopolitical zone of Nigeria. Lagos State is arguably the most economically important state of the country [10], the nation's largest urban area. The estimated population of Lagos State was 17,552,940 [11]. On the North and East it is bounded by Ogun State. In the West it shares boundaries with the Republic of Benin. Behind its southern borders lies the Atlantic Ocean, 22% of its 3,577 km² are lagoons and creeks. While the State is essentially a Yoruba-speaking environment, it is a socio-cultural melting point attracting both Nigerians and foreigners alike. Indigenous inhabitants include the Aworis and Eguns in Ikeja and Badagry Divisions respectively [12].

Eti-Osa Local Government Area lies on the narrow coastal lowland of the south eastern part of Lagos State. It is situated on about 129.5 square kilometres of landmass along the foreshores of featuring sandy beaches, swamps, mangroves and creeks. It is bounded in the north by the Lagos lagoon, in the south by the Atlantic Ocean while at its western and eastern boundaries are Ojo and Ibeju-Lekki Local Government Areas respectively with total population of 283,791 persons (158,858 males and 124,933 females). Eti-Osa LGA is rapidly urbanizing with diverse economic activities like banking, retail and wholesale trading, commercial transportation and monumental real estate development for both residential and commercial purposes [13].

Ibeju-Lekki LGA is bounded in the east by Epe LGA while its southern end joins the Atlantic Ocean. It is about 75 kilometres long and 20 kilometres at its widest point. According to the 2006 national population census, the total population of Ibeju-Lekki is 117,793 consisting of 60,729 males and 57,064 females [14]. Ibeju-Lekki is a rural community with eleven rural markets located at various villages and natural resource-based economic activities like fishing, agriculture, timber /saw-milling, mat/ raffia weaving, oil-palm processing and emerging eco-tourism.

Sampling procedure and sample size

Eti-Osa and Ibeju-Lekki Local Government Areas were purposively selected for this study based on a *priori* information of its river-rine nature. The predominant activities of the people living in the two selected LGAs are largely fisheries related, that is, fishing, processing and marketing of fish products. Four communities were purposively

selected from each of these communities making eight communities (Badore, Shangotedo, Ado and Ajah from Eti-Osa LGA while Ibeju, Orimedu, Imagbon and Orofun from Ibeju-Lekki LGA). Twelve fish processors were randomly selected from each of the selected community to make up 96 fish processors as sample size for this study.

Data collection method

The instrument used for the data collection was subjected to face and content validity by consulting experts in the field of Agricultural Extension and Rural Development. Items found ambiguous were removed. Test re-test was carried out with twenty fish processors who were not part of this study to ascertain the reliability of the instrument. The reliability coefficient of the instrument was 0.77. The instrument is adjudged to be reliable since the coefficient is above 0.75.

Measurement of variables

Age, household size, and years of experience in fish processing were measured at ratio level while sex, educational level, marital status, and sources of skill acquisition were nominally measured. Utilization of the technology was operationalized as Utilized (1) and Not utilized (0). Constraints to utilization of low-cost fish processing technologies were measured using 3-point rating scale of Extremely Serious (ES), Moderately Serious (MS) and Not Serious (NS) with corresponding scores of 1, 2 and 3 respectively. The mean score was estimated as the sum of the marks divided by 3 i.e. (1+2+3) divided by 3=2.0. Constraints were later ranked in respect to the magnitude of the mean scores.

Data analysis

Simple descriptive statistics such as percentage, mean and frequency were used to analyze the objectives while chi-square analysis was used for the hypothesis testing.

Results and Discussion

Personal characteristics of the respondents

The result in Table 1 shows that most (61.5%) of the respondents were between 31-40 years of age while 14.6% were between 41-50 years of age and 15.6% were less than 30 years of age. The mean age of the respondents was 37.8 years. Many of the respondents had primary school education (49.0%), secondary school education (35.4%) and tertiary education (6.2%). Only few (9.4%) did not have formal education. This shows that the fish processors are literate because they have some level of formal education. This result is in agreement with Asiabaka cited in Omoare et al. [15] that educational level is a very important determinant in adoption of innovation. Furthermore, the findings reveal that the average household size was 4 members. The household size of most (50.0%) of the respondents was less than 4 people while 37.5% had 5-9 people and 12.5% had more than 10 people. The result also shows that 62.5% of the respondents had spent less than 10 years in fish processing while 37.5% of the respondents had spent between 11-20 years. The mean year of experience was 9.3 years. This further shows that fish processors have been engaged in fishing processing activities for quite a long time in the study area. This is possible according to the result that most (77.1%) of the respondents inherited fish processing skills from their parents while 22.9% got the skill through training as apprenticeship.

Variable	Frequency	Percentage	Mean
Age (yrs)			
≤ 30	15	15.6	
31–40	59	61.5	37.8
41-50	14	14.6	
>50	8	8.3	
Marital status			
Single	6	6.2	
Married	76	79.2	
Separated	14	14.6	
Household size			
<4	48	50	
5–10	36	37.5	5
>10	12	12.5	
Educational status			
No formal education	9	9.4	
Primary school education	47	49	
Secondary school education	34	35.4	
Post-secondary education	6	6.2	
Source of fish processing skills			
Inherited from parents	74	77.1	
Through training as apprentice	22	22.9	
Fish processing experience (yrs.)<10			
11-20	36	37.5	9.3

Table 1: Distribution based on personal characteristics of the respondents (n=96). Source: Field survey, 2016.

Utilization of low-cost technologies

The development of appropriate fishing machinery and techniques that employed effective production, handling, harvesting, processing and storage is very crucial in the fisheries sector [16].

Low-cost technologies	Utilized		Not Utilized	
	Frequency	Percentage	Frequency	Percentage
Smoking kiln (Galvanized)	7	7.3	89	92.7
Smoking chokor	29	30.2	67	69.8

Table 2: Distribution based on utilization of low-cost technologies (n=96). Source: Field survey, 2016.

The benefits of these technologies are better processing and preservation of fish, improved quality and shelf-life, and increased

income of the fish processors. The result however reveals that majority of the respondents did not utilize galvanized smoking kiln (92.7%) and smoking chokor (69.8%), thus it has low adoption (Table 2).

Constraints to utilization of low-cost fish processing technologies

The result in Table 3 shows various problems undermining utilization of low-cost fish processing technologies. Majority of the respondents ranked high cost of processing equipment (2.75), poor electricity supply (2.74), poor awareness creation and capacity building (2.72) and inadequate extension support (2.67) as the major problems limiting the utilization of low-cost fish processing technologies in the study area. These findings concur with the assertion of Bolorundo and Faleye [9] that the low adoption of improved fishing technologies is due to high cost of the technology, complexity, lack of spare parts, lack of technical know-how, and low awareness. Also, Oyediran et al. [17] reported that inadequate training and capacity building affected catfish production among youth in Ogun State.

Constraints	Extremely Serious (%)	Very Serious (%)	Not Serious (%)	Mean	Rank
Technical factor					
High cost of processing equipment	78 (81.3)	12 (12.5)	06 (6.2)	2.75	1st
Poor electricity supply	71 (74.0)	25 (26.0)	0 (0.0)	2.74	2nd
Environmental factor					
Flooding	46 (47.9)	31 (32.3)	29 (30.2)	2.39	9th
Scarcity of fuel wood	58 (60.5)	22 (22.9)	16 (9.4)	2.44	8th
Human factor					
Lack of marketing linkages	64 (66.7)	20 (20.8)	12 (12.5)	2.54	7th
Inadequate Extension service support	74 (77.1)	13 (13.5)	08 (9.4)	2.67	4th
Non-availability of credit facility from banks	69 (71.9)	17 (17.7)	10 (10.4)	2.62	6th
Poor awareness creation and capacity building	73 (76.0)	19 (19.8)	04 (4.2)	2.72	3rd
Lack of technical support	67 (69.8)	22 (22.9)	07 (7.3)	2.63	5th

Table 3: Distribution based on the constraints to utilization of low-cost fish processing technologies (n=96). Source: Field survey, 2016.

There are other major problems that affected utilization of low-cost fish processing technologies which include lack of technical support (2.63), non-availability of credit facility from banks (2.62) and lack of marketing linkages (2.54). Lack of credit facility has been a major challenge to the development of agricultural sector in Nigeria. Scarcity of fuel wood (2.44) and flooding (2.39) also constituted limitation to utilization of low-cost fish processing technologies in the fishing communities.

Test of Hypothesis

Relationship between constraints and utilization of low-cost fish processing technologies

Result of chi-square presented in Table 4 reveals that significant relationship existed between constraints and utilization of low-cost fish processing technologies at $p < 0.05$ level of significance. That is, high cost of processing equipment ($\chi^2=32.49$, $df=2$, $p=0.04$), poor electricity supply ($\chi^2=24.12$, $df=2$, $p=0.01$), flooding ($\chi^2=26.17$, $df=2$, $p=0.02$), scarcity of fuel wood ($\chi^2=19.33$, $df=2$, $p=0.01$), lack of marketing linkages ($\chi^2=35.90$, $df=2$, $p=0.01$), inadequate extension service support ($\chi^2=28.51$, $df=2$, $p=0.03$), non-availability of credit facility from banks ($\chi^2=20.16$, $df=2$, $p=0.00$), poor awareness creation and capacity building ($\chi^2=27.83$, $df=2$, $p=0.00$) and lack of technical support ($\chi^2=22.21$, $df=2$, $p=0.01$) had significant relationship with utilization of low-cost fish processing technologies at $p < 0.05$ level of significance. This means that constraints limited the utilization of low-cost fish processing technologies among the fish processors in the study areas. Hence, these constraints should be urgently addressed to ensure utilization of low-cost fish processing technologies among the fish processors in the study areas going by its advantages to improve fish preservation, quality and economic value. Therefore, the null hypothesis that “constraints have no significant influence on the utilization of low-cost fish processing technologies” is rejected.

Variables	df	χ^2	p-value	Decision
High cost of processing equipment	2	32.49	0.04	S
Poor electricity supply	2	41.12	0.01	S
Flooding	2	26.17	0.02	S
Scarcity of fuel wood	2	19.33	0.01	S
Lack of marketing linkages	2	35.9	0.01	S
Inadequate Extension service support	2	28.51	0.03	S
Non-availability of credit facility from banks	2	20.16	0	S
Poor awareness creation and capacity building	2	37.83	0	S
Lack of technical support	2	22.21	0.01	S

Table 4: Relationship between constraints and utilization of low-cost fish processing technologies. Source: Field survey, 2016. S: Significant at $p < 0.05$ level of significance.

Conclusion

The study concludes that the fish processors are economically active, literate and experienced. The utilization of low-cost fish processing technologies was however very low. Constraints have strong influence

on utilization of low-cost fish processing technologies in the study areas.

Recommendations

The following recommendations are made on the basis of the findings above:

- Effort should be geared towards awareness creation and public enlightenment to promote adoption of low-cost fish processing technologies in the study areas;
- Affordable modern processing equipment should be made available to the fish processors at subsidized rate in the study areas;
- Training programme on improved fish processing practices should be introduced and carried out on regular base by the extension agents to ensure capacity building of the fish processors in the study areas;
- Provision of regular and steady power supply to the fishing communities should be given proper attention by the government in order to boost fish production and processing, preservative measures in the study areas;

Fish processors should be financially assisted by financial institutions in the study areas.

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