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The Role of Women Fish Mongers in the Commercialization of Perinwkle in Bonny Local Government Area of Rivers State, Nigeria

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***Abstract*—** *This study analyzed the role of women fish mongers in the commercialization of periwinkle in Bonny local government Area of River state Nigeria. Specifically, it identified the socio-economic characteristics of women fish mongers. Examined the profitability of periwinkle marketing identified the marketing channel and of the respondent in the commercialization of periwinkle. Plus, it identified the constraints facing the women fish mongers. Multi-stage random sampling technique was used to select 100 women fish mongers from whom date were elicited using questionnaires. Data were analyzed with descriptive statistics, farm budget technique and multiple regression technique. Result showed that, 37% of the respondents were mostly within the age range of 31 – 40, entries on the married: also, a 42% advantage. meanwhile, majority of 59% had a household size of 5-8, and the mean household size stood at 8. However, 62% of the respondent registered a startup capital ranging from 2.000 4.000. the study revealed that on the average, the women fish monger in Bonny local Government Area enjoyed a net farm income (NFI) of 226,395.00 per annum (i.e. an NFI 18866.25 of per annum. The OLS multiple regression result showed that only the ages and the years of periwinkle marketing in bonny local government/non-government organization should provide founds through formal financial institution and cooperative bodies to enable the women fish mongers have access to capital or affordable credit facilities readily*.

***Keywords*—** *Fish monger, Commercialization of Periwinkle*.

I. INTRODUCTION

Fisheries occupy a unique position in the agricultural sector of the Nigerian economy in terms of Gross Domestic Product (GDP), the fishery sub-sector has recorded the fastest growth rate in agriculture to the GDP (Kudi *et al.,* 2008). The contribution of the fishery sub-sector to the GDP rose from ₦ 76.76 billion in 2001 to ₦ 162.61 billion in 2005 Central Bank Nigeria (CBN, 2005) of all fisheries products shell fish have been noted to have a highest biological value in terms of high protein content in the body, low cholesterol content and higher assimilation (Amieghene, 2005; Akinrotimi *et al.,* 2009).

Periwinkle, *Tympanotanous fuscatus* is one of the fisheries products common to the coastal areas, of Nigeria, most especially Rivers State. They are found at the intertidal Zone of the brackish water, creeks, mangrove estuaries and lagoons in the Niger Delta area (Adebayo-Tayo et al., 2006; Akinrotimi et al., 2009). Genuses of other type of Periwinkle are *Pachymelania* and Mercenaries' but only the genus *Tympanotonous* and *Pachymelania* are found in the Niger Delta r of Nigeria (Emmanuel et al., 2016). Two varieties of T. fuscatus exists i.e. T. fuscatus var radula and T. Fuscatus var fuscatus, and both have economic value in the Niger Delta (Clinton et al., 2009). *Tympanotamus, fuscatus* is euryhaline, surviving in waters with wide range of salinities 0.1mg/l to 25mg/l. (Jamabo and Chindah, 2010). *Typanotamus Fuscatus* var fuscatus is bisexual and characterized by turreted, granular and spiny shells with tapering ends (Jamabo and Chinda, 2010; Jamabo and Alfred-Ockiya, 2015). Periwinkle crawls about under water but usually remain passive when left uncovered y the tide. They feed on microscopic algae, detritus (Ideriah et al., 2006). The flesh is widely used in the preparation of delicacies, while the shell has been widely employed in the construction work during building of houses and walk-ways in rural communities (Emmanuel et al., 2016). Considerable amounts of periwinkles are obtained daily for food. Periwinkles have been found to be rich in protein and carbohydrate (Ideriah et al., 2006). Gonmwam (1980) conducted a proximate analysis of *Tympanotanous* and estimated the crude protein content of Tympanotanous to be 21.04%. the muscle tissues also contain high concentration of arginine, aspartic acid and glutanic acid (Watt and Merril 1950; Jay 1978). *Tympanotanous* commonly called mangrove snail is harvested in the swamps by women and retailed by petty market traders who remove the meat from the shell for sale. The snail is very hardy, and is able to survive many days out of water, so it is easily transported to inland markets (Powell et al., 1985).

Statement of the Problem

Periwinkle is of economic importance as it serves as a source of protein to many Nigerians. It also serves as a source of income to the collectors, and markter. Thus, forming an important industry in the entire Niger Delta region of the entire country (Egonmwan, 2007).

Women make important contributions to the agricultural and rural economies of all regions of the world. Case studies suggest that women may comprise up to 30 percent of the total employment in fisheries, including primary and secondary (Statues of Forces Agreement SOFA) team and Cheryl, 2011). This would suggest that women have a poor stake and share in fishery industry. Furthermore, Fatigun (2010), added that it is a common assumption that contribution of women in economic development and food security of a nation is recognized. Therefore, it has become necessary to study the role women play particularly in the commercialization of periwinkle whose enormous economic value cannot be down-

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played. It is in the light of this, that this study shall provide answers to the following research questions; What is the socio-economic characteristics of the respondents in the study area? What is the profitability of periwinkle marketing in the study area? What are the marketing channels of periwinkle in the study area? What is the role of women fish mongers in the commercialization of periwinkle in the study area and finally what are the constraint faced by the respondents?

Objective of the Study

The broad objective of this study is to analyze the role of women fish mongers in the commercialization of periwinkle in Bony Local Government Area of Rivers State. The specific objective of the study are to:

1. Identify the socio-economic characteristics of women fish mongers in the study area;
2. Examine the profitability of periwinkle marketing in the study area;
3. Identify the marketing channel/distribution of periwinkle in the study area;
4. Identify the role of respondents in the commercialization of periwinkle; and
5. Identify the constraints facing respondents in the commercialization of periwinkle.

Hypothesis of the Study

The null hypothesis supporting the study is as follows:
$H0_1$: There is no significant relationship between the socio-economic characteristics of the respondents and the profitability of periwinkle marketing.

II. Materials and Methods

Bonny Local Government Area of Rivers State is situated in South Nigeria. It is on the Bight of Biafra within latitude $4^{0}26^{1}0^{11}$ N and Longitude $7^{0}10^{1}0^{11}$ E. It is approximately 56 km from upland Port Harcourt, the capital city of Rivers State Niger Delta (Abere & Opara, 2018). Boats are the main form of transport to and from the island. The local language spoken in Bonny Island and Bonny Town is Ibani, though many natives there also speak Igbo language. The community is subdivided into two main segments; the mainland and hinterland. The mainland comprises Bonny island and its segments namely the main island (Township), Sandfield, Iwoama, Orosikiri, Aganya, Ayambo, Akiama, Workers camp and some outlaying fishing settlements lying along, the Bonny coastalline. Finima is an aboriginal community predating Bonny (Okoloama) and situated along south of Bonny island. Bonny is one of the (23) Local Government Area of Rivers State, comprising of (l2) wards namely, ward l Oro-Igwe, ward 2 Court/Ada Allison, Ward 3 Dan Jumbo/Berisiri, ward 3 Orosikiri, Ward 4 New layout, ward 5 Finima, ward 6 Aba/Amable, ward 7 Dema Abbey, ward 9 Nanable, ward l0 Oloma Ayaminima, ward l1 Peterside, ward 12 Kalaibiama.

Sampling Procedure and Sample Size

Multistage sampling procedure was used in selecting the respondents. The first stage involved the purposive selection of five (5 markets where there is active commercialization of periwinkle by women fish mongers in the study area. The markets are namely: Bonny mainland market, Finima main market (Agajia market), Kalabiama market, Peterside market and Orosikiri market. Finally, simple random sampling technique was used to select respondents across the five markets in the following order; Bonny mainland market 20, Finima main market (Agajia market) 20, Kalaibiama market 20, Petersidemarket 20, and Orosikiri market 20 respondents respectively thus, making a total of one hundred and five (100) respondents.

TABLE 1: The Table below Shows the Markets and Number of Respondents Selected

S/N	Market	Number of respondents
1	Bonny mainland market	20
2	Finima main market (Agajia market)	20
3	Kalaibiama market	20
4	Peterside market	20
5	Orosikiri market	20
Total	**5**	**100**

Source: Field Survey, 2019

Method of Data Collection

The main tool for data collection was structured questionnaire. The questionnaire sought information on socio-economic characteristics of the respondents, the cost and return on periwinkle marketing, the role of the women fish mongers in the Commercialization of periwinkle, the marketing channels of periwinkle, and the constraints facing respondent in the commercialization of periwinkle in the study area.

Techniques for Data Analysis

The analytical tools that was used for this research are descriptive statistics, farm budge technique and regression analysis.

i. Objective one, three four were analyzed using descriptive statistics such as frequency and percentage.
ii. Objective two was analyzed using farm budget technique

Farm budget techniques

This is defined as the difference between gross income and total variable cost (Mshelia et al., 2005). The budgeting, techniques is aimed at determining the profitability of periwinkle marketing in the study area using the following equations.

$$GM = GR - TVC \quad (1)$$

Where GM = Gross margin (₦)
TVS = Total variable cost (₦)

GR which is also called total value of production is the physical product multiply by unit price of the product.

Net Farm Income Analysis

The net farm income was calculated mathematically as follows:

NFI – TR – TC OR NFI = GR – FC …….
Where; NFI = Net farm income (₦)
TR = Total revenue (₦)
TC = Total cost (₦)

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Total revenue includes revenue incurred from sales of eggs, birds, litters and empty bags of feeds. The total cost is made up of fixed and variable cost. (Olukosi and Erabhor, 1988). The fixed cost includes the cost of depreciation on equipment, building and interest paid on loan. The straight-line depreciation method was used for the fixed assets. The variable cost includes cost of bird's feeds, veterinary service, water, wages on labor, marketing and miscellaneous cost.

The net farm income could be positive on or negative depending on whether the total revenue exceeded the total cost. It was used to determine the profitability of the poultry enterprise.

Multiple regression analysis was used to analyses as well as the testing of hypothesis. The mathematical presentation of the explicit form of the model is as follows;

$Y = b_o + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + ei$

Where; Y=Gross Margin (N)

b_o = Intercept

$b_1 – b_7$ = parameter estimates

X_1=Start-up Capital (N)

X_2=Educational level (years)

X_3=Marital Status (dummy, 1=married, 0=otherwise)

X_4=Age (years)

X_5 = Sex (dummy, 1=male, 0 = otherwise)

X_6 = Household size (persons)

X_7 = Marketing experience (years)

ei = error term

III. Results and Discussion

Socio-Economic Characteristics of the Respondent

The result in Table 2 shows the various Socio-economic characteristics of the respondents in the study area

Socio-Economic Characteristics

Results in Table 2 shows that the mean age of periwinkle farmers was 45.5 years indicating that majority of the farmers were within the economically active age category (FAO, 1997; Yunusa, 1999). The age of the women who were actively involved in fisheries activities fell within the bracket of 20 to 40 years (68%). This age group agreed with what was reported by Obande *et al.,* (2004) on the role of women in artisanal fisheries along the lower Benue River. The result of this study is also in agreement with the work of Olowosegun *et al.,* (2004) who explained that women in this age bracket are active, agile and full of vigor. The age gap is an indication that a high proportion of the age group fell within the working class of able-bodied women, who are married, a fact that supports the notion that women have to work hard to support their husbands and or total cater to the welfare of their families. We observed that involvement of women in fish mongering in the study area waned as they advanced in age. Women with age above 50 years were not actively involved in fish mongering and this accounted for 32% of the sampled population.

Akinrotimi *et al.* (2011a) observed the same trend among women in some fishing communities in Niger Delta, Nigeria. Fisheries activities is certainly not for older folks due to mainly the fact that it is energing sapping. Older folks had the responsibility of helping the younger women with domestic chores as taking care of children.

TABLE 2: Frequency Distribution of Respondents According to their Socio-Economic Characteristics

Characteristics	Frequency	(%)	Mean (x)
Age range			
20 – 30	31	31	45.5 years
31 -40	37	37	
41 - 50	20	20	
51 - 60	9	9	
61 - 70	3	3	
Total	**100**	**100**	
Marital status			
Married	46	46	
Single	24	24	
Widow	13	13	
Divorced/Separated	17	17	
Total	**100**	**100**	
Educational level			
No formal Education	27	27	
Primary Education	50	50	
Secondary Education	20	20	
Tertiary Education	3	3	
Total	**100**	**100**	
Years of Experience			
1 - 5	13	13	
6 - 10	15	15	
11 - 15	20	20	13.5 years
16 - 20	42	42	
21 years and above	10	10	
Household Size			
1-4	12	12	
5-8	59	59	
9-12	26	26	8 household size
13 and above	3	3	
Total	**100**	**100**	
Start-up Capital (₦)			
2,000 – 4,000	65	65	
5,000 – 8,000	20	20	
9,000 – 12,000	10	10	₦8,500
13,000 - 16000	5	5	
Total	**100**	**100**	

Source: Field Survey, 2019

Marital Status

Table 2 shows that majority (46%) of the respondents were married while 24% were single followed by 13% who were widowed. Only 17% were divorced/separated. This result agrees with the findings of Nwabeze et al. (2013) in women participation in fisheries of Kainji Lake basin.

They attributed the dominance of married women in ensuring food security, generate income and reduced feminine vulnerability within the family.

Education level

The result in Table 2 shows that 27% of the farmers had no formal education, 50% had primary education, 20% had secondary education while 4% had tertiary education. The results of this study are however at variance with Williams (2006) who affirmed that women in fishing communities are usually not well read, with little or no education.

Years of Experience

Experience plays significant role in any enterprise. The results are presented in table 2. It indicated that 42% of the

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respondents had 16 – 20 years of experience while only 10% of the respondents had over 20 years of experience.

Household Size

The distribution of the respondents according to family size is presented in Table 2 Most of the respondents interviewed had a relatively large family size. Out of all the farmers sampled, 59 percent of the respondents had a family size of 6 – 10 persons. The mean household size is 8 persons. Family size has implication on the size of the hired labour employed because the higher the size of the family the lower the hired labour and vice versa.

Start-up Capital (₦)

Table 2 showed that majority (65%) of the respondents started with a start-up capital of ₦2,000 – ₦4,000. It also showed that 2067% of the respondents started with ₦5,000 – ₦8,000 and 10% of them started with ₦9,000 – ₦12,000 while only 5% started with 13,000 – 16,000. The mean start-up capital is N,8500.

Profitability of Periwinkle Marketing

The costs and returns analysis are presented in Table 3. The average total cost amounted to ₦173,605. Out of this amount, the total variable costs accounted for ₦100,040, leaving only ₦73,565 for the fixed cost items.

The respondents generated total revenue of ₦400,000 and a net farm income of ₦226,395 at the end of the year. Average quantity of periwinkle bought was 5 bags and, a bag of periwinkle was sold on the average for ₦8000.00. The profitability analysis showed that for every one naira invested in periwinkle business, there was a profit of ₦1.30.

TABLE 3: Average Costs and Returns of Periwinkle Marketing

Item		Cost (₦)
	Variable Costs	
Transportation		79,940
Commission or tax/levy		10,000
Needles		2,000
Labour		5,000
Miscellaneous		3,100
Total variable costs (TVC)		100,040
	Fixed Costs	
Cost of containers		14,565
Furniture		9,400
Cost of rent		49,600
Total fixed costs (TFC)		73,565
Total costs= (TVC+TFC)		173,605
	Revenue	
Average periwinkle quantity bought		50 bags
Average price of periwinkle per bag		8,000
Total revenue (TR)		400,000
	Net Farm Income (NFI)	
NFI = TR-TC		₦226,395
Returns/Naira invested (NFI/TC)		1.3

Source: Field Survey, 2019

Decision Rule for Test of Hypothesis

If the significant/probability value (PV) <0.05 (level of significance) = Reject the null and concluded significant difference

If the significant/probability value (PV) >0.05 (level of significance) = Accept the null and conclude

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HO_1: There is no significant relationship between the socio-economic characteristics of the respondents and the profitability of periwinkle marketing in the study area.

TABLE 4: Linear Regression of the socio-economic characteristics of the respondents was tested using Ordinary Least Square (OLS) Regression

Variables	Coef.	t-cal	Sig.t	R	R^2
(Constant)	1853.58	6.6.4	.000		
Age	-0.79	-2.28	.025**		
Marital status	0.38	1.32	.189		
Educational level	0.01	0.07	.940	0.350	0.523
Experience	0.27	1.20	.033**		
Household size	0.31	1.45	.148		
Start-up capital	0.20	-0.77	.442		

Age had relationship with profitability of periwinkle marketing at (PV = 0.025<0.05 level of significance). Hence the null hypothesis is rejected and it is consequently concluded that age had relationship with profitability of periwinkle marketing.

Marital status had no relationship with profitability or periwinkle marketing at (PV=0.189> 0.05 level of significance). Hence the null hypothesis is accepted and it is consequently concluded that marital status had no relationship with profitability of periwinkle marketing at (PV = 0.940>0.05 level of significance). Hence the null hypothesis is accepted and it is consequently concluded that education had no relationship with profitability of periwinkle marketing. Experience had relationship with profitability of periwinkle marketing at (PV=0.033<0.05 level of significance). Hence the null hypothesis is rejected and it is consequently concluded that experience had relationship with profitability of periwinkle marketing. Household size had no relationship with soil conservation practices at (PV=0.148<0.05 level of significance). Hence the null hypothesis is accepted and it is consequently concluded that household size had no relationship with profitability of periwinkle marketing. Start-up capital had no relationship with soil conservation practices at (PV=0.442<0.05 level of significance). Hence the null hypothesis is accepted and it is consequently concluded that start-up capital had no relationship with profitability of periwinkle.

The result above shows that the coefficient of determination (R^2) is 0.523 which is approximated to 0.52, indicating that 52% of the variations in periwinkle profitability is caused and explained by age, marital status, educational level, marketing experience, household size and start-up capital, while, the remaining 48 percent were not explained in the model but captured by the error term. This indicates a good fixing of the model.

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Marketing Channel of Periwinkle

Results in Table 5 shows that majority 39% of the respondents are retailers, 29% are producers, 23% are wholesalers and only 9% are processors in the channel of periwinkle commercialization. The study reveals that most of the respondents are retailers in the channel because it is more profitable.

TABLE 5: Frequency Distribution of marketing channel

Marketing channel	Frequency	Percentage
Producer	29	29
Processor	9	9
Wholesaler	23	23
Retailer	39	39
Total	100	100

Source: Field survey,2019

Respondents Role in the Commercialization of Periwinkle

Results in Table 6 shows that majority (50%) engaged in marketing of periwinkle, 30% engage in picking of periwinkle, 10% engage in provision of loan facilities to fellow periwinkle seller, 5% engage in employment generation, 3% engage in processing of periwinkle and only 2% engage in storage of periwinkle. This result is also in agreement with that of Odulate et al. (2011) who reported that women in the coastal wetland areas of Ogun state Nigeria participate more in fish marketing than other fishery activities.

TABLE 6: Frequency Distribution of Respondent's Role

Role	Frequency	Percentage
Processing of periwinkle	3	3
Employment generation	5	5
Storage of periwinkle	2	2
Picking of periwinkle	30	30
Packaging of periwinkle	-	-
Provision of loan	10	10
Provision of loan	10	10
Marketing of periwinkle	50	50
Total	**100**	**100**

Source: Field survey, 2019 Multiple Response

Entries in Table 7 shows that majority (30%) of the respondents accepted that poor access to capital is a constraint to periwinkle commercialization in the study area. Followed by the respondents that were of the view that it was Arm robbery attack (25%), price fluctuation (20%), poor road network (15%), storage facility (6%) and absence of cooperative society (4%).

TABLE 7: Constraints to Periwinkle Commercialization in the Study Area

Constraints	Frequency (n=100)	Percentage (%)
Storage problem	5	5
Poor road network	15	15
Price fluctuation	20	20
Arm robbery attack	25	25
Absence of cooperative societies	4	4
Poor access to capital	30	30

Source: Field survey, 2019 Multiple Response

Cliffe and Akinrotimi (2015) who mentioned lack of finance, poor transportation network, criminal activities, lack of fishing gears and lack of cooperative society as some of the problems faced by artisanal fisherwomen corroborated the findings of this study. Ben-Yami (2001) agreed that access to credit and insurance is very important for small-scale fisheries development.

IV. CONCLUSION

This study has showed that, periwinkle marketing (with a 50% rating), is the major role played by Bonny women fish mongers in the commercialization of periwinkle in the study area. In another, light the marketing of periwinkle was analysed to be profitable in the study area at a monthly of ₦ 18866.25.

Recommendation

In view of the result and conclusion from this study, it is imperative to make the following recommendations in order to improve on the role of women fish mongers on the commercialization of periwinkle in the study area.

1. Government/non-governmental organizations should provide funds through formal financial institutions and cooperative bodies to enable the women have access to capital or affordable credit facilities readily.
2. Government should ensure that road networks become efficient and pliable through the construction of new roads and rehabilitation of bad roads to better facilitate periwinkle commercialization
3. Government and relevant authorities should build the capacities of the women and organize them into effective cooperative groups which can further foster the commercialization of periwinkle.
4. Security should be adequately provided in the study area so that cases of robbery on the women fish mongers and markets will reduces.

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