

## EVALUATION OF DETERMINANTS OF PERIWINKLE (*TYMPANOTONUS FUSCATUS*) SUPPLY IN DEGEMA LOCAL GOVERNMENT AREA OF RIVERS STATE

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### Abstract

The study described the determinants of periwinkle supply in Degema LGA of Rivers State. Primary source of data was used with the aid of a well-structured questionnaire. Simple random sampling technique was used to select (60) sixty periwinkle suppliers. Descriptive statistic (frequency), graphic trend and multiple regression model were used for the data analysis. The results revealed that bunkering activities have inverse relationship with supply of periwinkle, while increase in tide and rainfall increased supply of periwinkle in the study area. The study concluded that bunkery had negative influence on the supply of periwinkle. Therefore, adequate marine security measures be put in place to erode bunkery activities in the area to enhance supply of periwinkle.

**Keywords:-**Evaluation, Bunkery, Supply, Influence, Periwinkle

### Introduction

Periwinkle (*Tympanotonus fuscatus*) is an aquatic organism that belong to the family of mollus. It is a marine shellfish that is exploited from the mangrove swamps in the Niger Delta (Powell *et al.*, 1985). Adebayo – Tayo *et al.*, (2006) confirmed that periwinkle habitat in the inter – tidal zones of brackish creeks, estuaries and lagoons, they are handpicked (harvested) for the littoral region of the sea during low tide. The two common species of periwinkle are *tympanotonus fuscatus* and *tympanotonus fuscatis* which is distinguished from the latter by its turreted granular and spiny shells.

Moisey (1971) confirmed that periwinkle is a primary consumer food chain. They tend to concentrate under the roots and decay red and white mangrove trees in a low tidal environment. The population distribution of periwinkle is as a result of search for blue-green algae for food and shelter particularly during low tide as well as high temperature exerted on the soil surface in the dry season.

Akinrotimi *et al* (2019) reported that every part of periwinkle is economically viable as the flesh is a good source of protein that is cheaper than the protein from animals. It contains omega fatty acid, essential amino acid, vitamin, mineral required, iodine (Ekanem and Otti, 1997). Adebayo – Tayo *et al.*, 2006; and Oriahu and Ilori 1992 established that periwinkles are considered a delicacy in African and Asian cuisines; the calcium, phosphate and iron content are also recommended for pregnant women. The shell is used for construction, decoration, fertilizer, animal feed when grounded into powder form. Periwinkle can be used as bait by other fisher folks.

Bunkering activities are illicit refining of crude oil into different oil products like kerosene, petrol diesel, etc by traditional and unscientific approach leaving the environment polluted with oil and gas substance. Niger Delta region of Nigeria has over 1000 producing oil wells and over 47,000km of oil and gas flow lines (Ngbobiriet *et al.*, 2001). The toxicity of crude oil or petroleum products varies widely depending on their composition, concentration, environments factors and on the biological state of the organisms at the time of contamination (Obire and Ayanwu 2009). Human and food security in the in the oil producing area of the Niger Delta area has gradually become the most significantly impacted of the environmental degradation leaving negative experience like destruction of wild life, loss of soil fertility, water air pollution and damage to the ecosystem of the host communities (Aghalino 200).

It has been observed that molluscs especially periwinkles are vanishing or diminishing in their supply making their prices to be high. This situation is a serious concern to researchers to develop this study on the evaluation of determinants of periwinkle supply in Degema L.G.A, Rivers State with the objectives to:

- i. describe the social-economic characteristics of the respondents

- ii. discuss the trend of quantity supply of periwinkle in the study area.
- iii. evaluate the determinants of periwinkle supply in the study area
- iv. determine periwinkle supply and price relationship.

### **Methodology**

The study was carried out in Degema Local Government Area of Rivers State. The entire local government area is naturally located on island with muddy soil type and mangrove vegetation. It is an aquatic environmental ecosystem that naturally breed periwinkle and other sea food in good quantity. The major occupation of the people is fishing.

Purposive and simple random sampling techniques were used to select the periwinkle pickers (harvesters). First, purposive sampling was used select fishing settlements used for the study. They are Asarama, Orukiri and Ekwebokor fishing settlements, because bunkery activities are dominantly practised in their environment. Simple random sampling was also used to choose 20 respondents from each of the three fishing settlements. A total of 60 respondents were interviewed with structured questionnaire. Data collected were analyzed using descriptive statistics (objective 1), graphic trend method (objective 2), Multiple regression model for objective 3 and simple regression model for objective 4.

### **Model specification**

This model is built is to ascertain the determinants of supply of periwinkle in the study area.

$$Ps = b_0 + b_1 T_1 + b_2 R_2 + b_3 B_3 + b_4 S_4 + \dots + ut$$

Ps is Periwinkle Supply

T<sub>1</sub> is Tidal flow

R<sub>2</sub> is Rainfall (season)

B<sub>3</sub> is Bunkeryy activities

S<sub>4</sub> is soil type

Ut is Error term

### **A prior expectation**

It is expected that  $T_1$  and  $R_2$  will have moderate influence on the supply of periwinkle with positive (+) with the  $B_2$  and  $S_4$  will have exerted influence on the supply of periwinkle with negative (-).

$$P_s = b_0 + b_1 + PR + u_t$$

$P_s$  is Periwinkle Supply

$PR$  is Price/bag

$U_t$  is Error term

$P$  &  $S$  has inverse relationship

Bunkery &  $SS$  has inverse relationship

## **Results and Discussion**

### ***Socio-economic characteristics of respondents***

The socio-economic characteristics of periwinkle suppliers are presented in Table 1. The result on sex of respondents showed that 85 percent of the respondents were females while 15 percent were males. It means that the supply of periwinkle is dominated by female. This result is similar to Okidim & Okuduwor (2019), OkpekuNodu, Essien and Forkorighe (2013) establishing that more female are involved in the supply business of fresh fish and periwinkle.

The age distribution of the respondents revealed that people within the age range of 26yrs to 30yrs were 31.7% and 36yrs to 40yrs were 25.0% and they dominated the periwinkle supply business for economic growth. This finding is similar to (Yohanes 2015).

Result on marital status showed that 48.3% of respondents were married, 26.7% single, 11.7% divorced, 10% separated and 2.33% widowed. The finding revealed that family owners depend on the business for their income and livelihood, it could also be relied on to start family life. The study is consistent with Ocholi (2017) confirming more married people involving in potato marketing in Benue State.

The study indicated that 28 respondents attended primary school, 17 attended secondary school, 13 not educated and 2 attended tertiary institution representing 46.7%, 28.3%, 21.7% and 3.3% for primary, secondary, not educated and tertiary respectively. This



revealed that majority of periwinkle suppliers are educated with the exception of 21.7% who had no form of formal education. Akpokodje *et al.*, 2003, had similar finding.

The result of years of business experience showed 38.3% of respondents had experience of 6 years to 10 years, 35% of respondents had experience of 11 to 15 years, 18.3% had experience of 1 to 5 years. It shows that periwinkle supply is a sustaining business that

**Table 1: Socio-economic characteristic of periwinkle suppliers (respondents)**

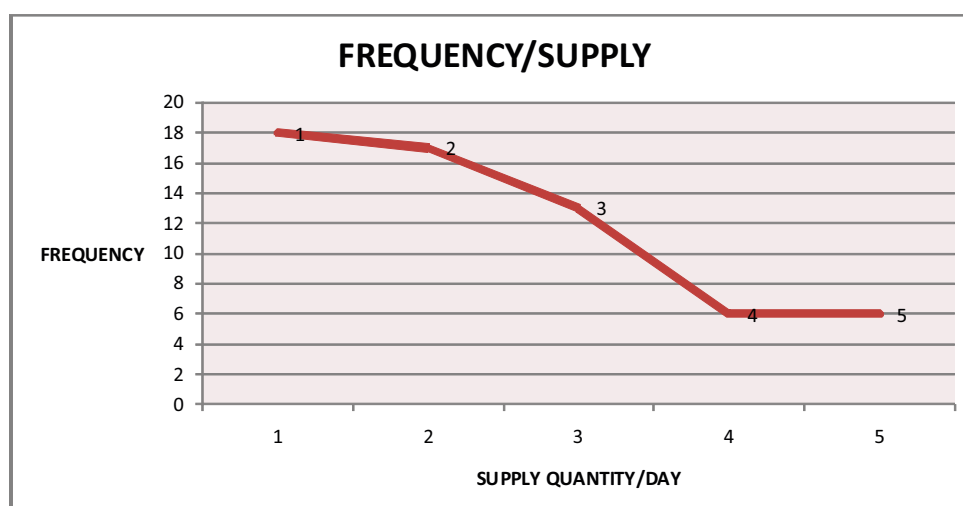
<b>GENDER</b>	<b>FREQUENCY</b>	<b>PERCENTAGE</b>
Male	9	15
Female	51	85
<b>AGE</b>		
16 years – 20 years	11	18.3
21 years – 25 years	12	20.0
26 years – 30 years	19	31.7
36 years -40 years	15	25.0
41 and above	3	5.0
<b>MARITAL STATUS</b>		
Single	16	26.7
Married	29	48.3
Divorced	7	11.7
Separated	6	10.0
Widowed	2	2.33
<b>EDUCATIONAL STATUS</b>		
Tertiary	2	3.3
Secondary	17	28.3
Primary	28	46.7
Not educated	13	21.7
<b>BUSINESS EXPERIENCE</b>		
1 year – 5 years	11	18.3
6 years – 10 years	23	38.3
11 years – 15 years	21	35.0
16 years and above	5	8.30

***Frequency of periwinkle supply***

The result of frequency of periwinkle supply is showed in Table 2 and figure 1. The result showed that, 30% of respondents supplied one bag per day, 28.3% supplied 2 bags per day, 21.7% supplied 3 bags per day while 10% supplied 4 and 5 bags each per day.

**Table 2: Frequency of Periwinkle Supply**

SUPPLY/BAG/DAY	FREQUENCY	PERCENTAGE
1	18	30.0
2	17	28.3
3	13	21.7
4	6	10
5	6	10
Total 60	100.0	



**Fig. 1: Supply of Periwinkle in bags per day**

### ***Determinants of periwinkle supply***

The result of the multiple regression analysis revealed on Table 3 that bunkery activities, tide and soil type were the significant factors determining periwinkle supply. The bunkery activities (-0.419) showed a significant inverse relationship with the supply of periwinkle at 5%. This implies that if the bunkery activities is reduced, the supply of periwinkle will increase and vice versa. The tide and rainfall had direct influence on periwinkle supply. This implies that increase in ocean tide and rainfall increase the supply of periwinkle in the study area. This finding is consistent with agricultural products which are seasonal in their productivity and supply.

**Table 3: Regression analysis for determinants of periwinkle supply in the study area**

Variable	Regression Coefficient	T	Signi
Supply (constant)	1.649	1.408	.165
Bunkeryy	-0.419	2.149**	0.036
Tide	0.132	2.021**	0.048
Rainfall	-0.168	1.038	0.138
Soil type	0.571	2.065**	0.043
F	3.510***		
R. square	0.52		
Adjusted R <sup>2</sup>	-0.016		

### Conclusion and Recommendation

The study concluded that bunkery activities influenced periwinkle supply negatively, this subsequently resulted to high price of periwinkle. It was recommended that serious security measures should be put in place to get rid of the bunkery activities to enhance higher supply of periwinkle.

### References

- Obiri O. E & Anyanwu C (2009) Impact of various concentrations of crude oil on fungal population of soil. *International Journal of environmental science and technology* 6(2), 211-218.
- Aghalino S. O (2000) Petroleum exploration and the agitation for compensation by oil mineral producing communities in Nigeria. *Journal of Environmental Policy issues Vol:11 analysis*, p2.
- Powell, C. B. Hart A. I & Deekae S. (1985) Market survey of periwinkle, *tympanotonus fuscatus* in Rivers State: size, prices, trade routes and exploitation levels in: Ha E. O., Ajayi T. O Ezenwa B. Olamiawo, A. Audolisa REK and P. A. Taggart (eds). *Proceeding of the 4<sup>th</sup> Annual Conference of the Fisheries Society of Nigeria (FISON) Port Harcourt, Nigeria 26<sup>th</sup> – 29<sup>th</sup> November*, 51 – 62.
- Adebayo – Tayo B.C Omilade A. AOjunjobi A.A & Adiboye D. O (2006). Bacteriological and proximate analysis of periwinkle from two different creeks in Nigeria. *World Applied Science Journal* (2) 87-91.
- Oriahu C. C. and Ilori M. O. (1992). Use of periwinkle sources of dietary protein: The nutritional, toxicological, processing and policy implications. *Food Review international* 8(2). 223-233.
- Ekanem E. O & BN Otti (1997). Total plate count and coliform levels in Nigeria periwinkle from fresh and brackish water. *Food control* 8. 87 – 89.

- OkidimA. I. &Okuduwor A. A (2019) comparative analysis of cost and returns on fresh fish marketing in Andoni and Port Harcourt LGAs of Rivers State. *Journal of Agricultural Economics, Extension and science* 5(2) 139– 149.
- Yahanes M. (2015) Performance and challenges of vegetable market the case of kombolcha District. East Harerghe Zone – Oromia National Regional State Ethiopia. M.Sc thesis, school of Agricultural Economics and Agribusiness Hamaraya University, Ethiopia.
- Ocholi A, Zacharias, T. N &Udeli M. (2007) Economic analysis of sweet potato marketing in Benue State, Nigeria. *Journal of Research in Business and management* 5(7), 41-47.
- Akpokodje G, Lancon F, Erenstein O. (2001). Nigeria's Rice Economy State of Art. Paper presented at the Nigerian Institute for social and Economic Research (NISER). West African Rice development Association (WARDA). Nigeria rice economy stakeholders workshop Ibadan 55.