



FSN-FM 0006

BIO - ECONOMIC ASSESSMENT OF A PURSE SEINING AT ORIMEDU FISHING SETTLEMENT OFF LEKKI, LAGOS STATE

*ABASS, M. A¹., FAKOYA, K.A.,² AKINWALE M.¹

1. Nigerian Institute for Oceanography and Marine Research, Victoria Island, Lagos State, Nigeria.

2. Department of Fisheries, Faculty of Science, Lagos State University, Ojo, Lagos State, Nigeria.

Copyright 2010, Fisheries Society of Nigeria.

This paper was prepared for presentation at the 25th Annual International Conference and Exhibition in Administrative Staff College of Nigeria (ASCON), Topo-Badagry, Lagos, Nigeria, 25th – 29th October, 2010.

This paper was selected for presentation by an FISON Program Committee following review of information contained in an abstract submitted by the author(s). Contents of the paper, as presented, have not been reviewed by the Fisheries Society of Nigeria and are subject to correction by the author(s). The material, as presented, does not necessarily reflect any position of the Fisheries Society of Nigeria, its officers, or members. Papers presented at FISON meetings are subject to publication review by Editorial Committees of the Fisheries Society of Nigeria. Electronic reproduction, distribution, or storage of any part of this paper for commercial purposes without the written consent of the Fisheries Society of Nigeria is prohibited. Permission to reproduce in print is restricted to an abstract of not more than 300 words; illustrations may not be copied. The abstract must contain conspicuous acknowledgement of where and by whom the paper was presented. Write Librarian, Fisheries Society of Nigeria (FISON), P. O. Box 2607 Apapa, Lagos.

ABSTRACT

A bio- economic assessment based on the Return On Investment (ROI) of a single purse seiner was done from August 2007 to February 2008 at Orimedu. Catch composition in terms of relative abundance of species and their sizes were also assessed. Total Income was derived from the product of average selling price for a basin of fish, average number of fish basins sampled from a purse seiner, number of fishing trips of a purse seiner per month and the total number of months. Total costs were derived from the sum of capital costs, operational costs, depreciation costs, maintenance cost and labor cost which was estimated as 1/3 rd of total income. Fish catch was dominated by mature fish consisting of over 90 % clupeids and measured in heaps of 200 pieces in basins. On the average, there were 17 basins of fish from a purse seiner. Each basin was valued at N8000 and the average number of fishing trips in a month was 9. The calculated ROI was 30.96% indicating that the fishing method was lucrative. The study showed that purse seining is both biologically and economically sustainable with great

potentials to alleviate poverty if adopted by the local Nigerian fisherfolks.

Keywords: bio – economic, returns on investment, purse seine, catch composition,

INTRODUCTION

Lagos State has a coastland of 80,000km² out of a total land mass of 927,762km² in the Federal Republic of Nigeria (Amadi, 1991). It is blessed with a 180km shoreline which is about 1/5th of the 750km Nigerian coastline (Awosika, 2008).

Various types of small - scale fishing gears are being operated in Lagos State for fish production. These include bottom drift nets, set gillnets, purse seine nets, beach seine nets, castnets, hooks and lines and various types of traps. The purse seine net or “WATSA” and craft are indigenous to Ghana. Unlike the other small- scale fishing gears, purse seine nets are solely operated at Orimedu, Magbon Alade and Eleko all along the East mole of Lagos State by the migrant Ghanaian fishermen only. The purse seine is the largest of all the fishing gears used in Lagos State possessing the highest number of bundles per set of net and the largest sizes of fishing crafts (Abass *et al.*, 2010). Though its operation is highly technocratic and it ranks next to the coastal beach seine in terms of labor intensity.

Protein of animal origin is in short supply in Lagos State. This is largely due to increase in population from influx of people from other states of the Federation

and neighboring West African States. Fish is the cheapest source of animal protein and serves as an alternative to animal protein. However, there has been a relative decline in local fish production for close to 20 years owing to over fishing, degradation of essential fish habitats and weak control over fisheries resources.

Therefore, this study is actually based on the field investigation provided by Abass *et al.*, (2010) and highlights the bio-economic potentials of the purse seine fishery at Orimedu as a possible model to ensure sustainable exploitation, management and conservation of commercial fish stocks.

MATERIALS AND METHODS

Detailed descriptions of the study area, design characteristics and operation of the purse seine fishery have been discussed by Abass *et al.*, (2010). Similarly, species composition both by number and weight as well as modal sizes of each fish species sampled were also reported.

For the economic assessment of the purse seine fishery, the activities of 3 purse seiners were closely monitored at Orimedu for the sampling period to estimate the number of fishing trips and fish harvest per month. An

economic analysis based on Returns On Investment (ROI) of a single purse seiner was used to assess the economic viability of the purse seine fishery at Orimedu.

RESULTS

Orimedu, lying eastwards of the Lagos harbor is characterized by a fairly stable sandy beach serving as both landing and marketing site for fish harvested. Purse seining is a mechanized form of fishing.

The purse seine net is a modified type of the encircling gillnet while a typical purse seine craft or 'Ghana dug – out' is a large canoe propelled by powerful outboard engine (40 – 50 hp) and manned by 8 – 9 able Ghanaian fishermen.

A total of 3071 fish specimens were sampled from the purse seine fishery from August 2007 to February 2008. 10 fish species belonging to 5 families were frequently encountered during the survey as illustrated in (Table 1). Major target species were clupeids which accounted for over 90 % of the total fish sampled. Other fish species represented by- catch. Almost all identified fish species sampled were also dominated by mature / adult individuals.

Table 1: Species composition, relative abundance and modal sizes of fishes from Purse Seine Fishery at Orimedu.

Family	Species	Common names	Range in TL (cm)	% by No.
Clupeidae	<i>Ethmalosa fimbriata</i>	Bonga fish	23-31	53.10
//	<i>Sardinella madarensis</i>	Sardines.	17-31	40.79
Carangidae	<i>Chloscombrus chrysurus</i>	Bumper fish	13—19	1.0
//	<i>Caranx hippo</i>	Caranx	45—69	1.2
//	<i>Alectis alexandrines</i>	Alexandrinus	45—66	0.40
Scombridae	<i>Thunnus albacores</i>	Yellowfin tuna	65-73	1.00
//	<i>Thunnus obesus</i>	Big – eye tuna	123-155	0.51
Scomberomorus trit	<i>Scomberomorus tritor</i>	Mackerel fish	52—83	2.3
Carcharhidae	<i>Carcharhinus spp.</i>	Sharks	175	0.01
Sphyrnidae	<i>Sphyrna couardi</i>	Hammerhead shark	113-115	0.09

Source: Abass *et al.*, (2010)

Calculation of Return On Investment (ROI) was based on the costs and income of a typical purse seiner at Orimedu. An average of 9 fishing trips was observed for the purse seiner per month for the 7 sampling months. The average number of fish basins sampled from a fishing trip was 17. There were 200 pieces of bonga\sardines per basin sold at N 8000.00.

Total Income is the product of the average selling price x average number of fish basins per purse seiner x number of fishing trips x number of sampling months.

$N8,000 \times 17 \text{ basins} \times 9 \text{ fishing trips} \times 7 \text{ months} = N8,568,000$

Labor was calculated as one –third of Total Income. Depreciation costs comprised that of canoe or Ghana ‘dug-out’ was estimated at N 170,000 spread over 5 years; that of the purse seine net at N500,000 for a period of 3 years and outboard engine (OBE) at N 9,000 also for a period of 3 years.

Return On Investment (ROI) of 30.96 % can be interpreted as high indicating that the fishing method is very profitable.

Table 2: Return On Investment (ROI) of a Purse Seiner at Orimedu.

ITEM	N	:	K
A. Capital Cost			
Canoe	850,000		
Purse seine net	1,500,000		
Outboard Engine (OBE)	450,000		
Sub-Total	2,800,000		
B. Operational Cost			
Fuelling (35 l/ trip @ N 65 /l of petrol x 9 trips x 7 months)	143,325		
C. Maintenance Cost			
Canoe repair	14,000		
Gear repair	50,000		
Sub –Total	64,000		
D. Labor Cost			
	2,856,000		
E. Depreciation Cost			
Canoe (5 years)	170,000		
Net (3 years)	500,000		
Outboard Engine (3 years)	9,000		
Sub – Total	679,000		
Total Costs (A – E)	6,542,325		
Gain (Total Income – Total Cost)	8,568,000 - 6,542,325		
Return On Investment (Gain/ Total Costs x 100)	2,025675 / 6,542,325 x 100= 30.96%		

DISCUSSIONS

Purse seining did not cause overfishing at Orimedu and is thus biologically sustainable. However, it was highly selective as indicated by the dominance of clupeids over other species. Fisheries targeted at low – trophic level species such as the clupeids are highly productive per unit area providing more animal protein for human consumption than carnivorous fishes or fishes feeding at high – trophic level. The fishery is also proven to be economically profitable and can provide gainful employment to many coastal dwellers. In order to encourage uptake of purse seining among local Nigerian fisherfolk, training, technology – transfer and intervention in the acquisition of the nets, boats and outboard engines will be required to reduce aversion to this fishing method.

CONCLUSIONS

Adoption of purse seining in the coastal villages of Lagos State can go a long way in alleviating poverty in the communities.

REFERENCES

- Abass, M.A., Kumolu-Johnson, C.A., Fakoya, K.A. (2010). A bio-technical assessment of the artisanal purse seine fishery at Orimedu Coastal Village in Lagos State. **In Press**. Nigerian Journal of Fisheries 7 (1 & 2)
- Amadi A.A (1991): The coastal and marine environment of Nigeria-Aspects of Ecology and management. NIOMR Tech pap. No 76.
- Awosika, L.F. (2008): 3D Bathymetric model of Avon Canyon in the Western Nigeria Continental Shelf and resulting wave refraction patterns. Technical Publication of NIOMR 1: 60- 74.
- Schneider, W. (1990): Field guide to commercial marine resources of the Gulf of Guinea
Guinea. FAO Tech. Pap. RAFRIF902. 268p.