

**PROCESSING AND MARKETING OF WHITE SHRIMPS
(*Nematopalaemon hastatus*) IN THE COASTAL AREA OF ONDO
STATE, NIGERIA**

By

**ADENIJI, MICHAEL SEGUN
*FAQ/11/0026***

**A PROJECT REPORT SUBMITTED TO THE
DEPARTMENT OF FISHERIES AND AQUACULTURE
IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR
AWARD OF BACHELOR'S DEGREE IN FISHERIES &
AQUACULTURE (B. FISH)**

**IN THE FACULTY OF AGRICULTURE
FEDERAL UNIVERSITY OYE-EKITI, EKITI STATE, NIGERIA**


SEPTEMBER, 2016

CERTIFICATION

This is to certify that this work was conducted and presented by:

MR. ADENIJI, MICHAEL SEGUN

The report has been read and approved having met the requirements of the Department of Fisheries and Aquaculture, Faculty of Agriculture, Federal University Oye-Ekiti, for the award of Bachelor of Fisheries and Aquaculture degree (B. Fish and Aquaculture).


.....
MR.B.P. OMOBEPADE
PROJECT SUPERVISOR

21ST OCTOBER, 2016
.....
DATE

.....
DR. T.O. BABALOLA
HEAD OF DEPARTMENT

.....
DATE

.....
EXTERNAL EXAMINER

.....
DATE

DEDICATION

This research work is dedicated to Almighty God and my beloved Family

ACKNOWLEDGEMENT

To God be the glory for his love and kindness towards me before, during and after this project work. I wish to sincerely and gratefully appreciate my loving, caring and wonderful supervisor: Mr. B.P. Omobepade of the Department of Fisheries and Aquaculture for his true words, moral and financial support, also for his encouragement throughout the period of this project work, I pray God will continue to strengthen you the more and grant all your heart desires speedily.

My profound gratitude goes to all the of the Department of Fisheries and Aquaculture especially to the Head of Department Dr. T.O. Babalola, Dr.J.B. Olasunkanmi, Dr.(Mrs). Ariyomo, Dr. Akinsorotan, Dr. (Mrs.) Okeke , Mrs.F.E. Elesho, Mr. Oyawoye, Mrs Joy, they have all impacted in one way or the other in my academic carrier through their teachings.

I want to appreciate the good gesture of my colleagues: (Yemi,Sanmi,Saheed,Victor, Treasure, Doyin,Titi,Funmi,) it's my pleasure knowing you all and may our light never go deem. I also appreciate my friend Falabake Michael,Adetoyi Promise,Ogundeji Tunde,Popoola Toba,Obisesan Taiwo. May we continue to grow in wisdom and Knowledge. I appreciate Mr. Kolawole Family, Mr. Shedrach Family may God continue to strengthens you. I also appreciate all the stakeholders and Students in Nigeria Association of Agricultural Students (FUOYE CHAPTER). I also acknowledge the church of God, The Apostolic Church Express road Assembly (Ibadan) and Asin Assembly (Ikole-Ekiti)

Furthermore, I sincerely appreciate my siblings (Femi, Seun and Esther Adeniji), My wonderful Uncle, Mr. T.S. Adeniji, you will move from Glory to Glory. I cannot complete this acknowledgement without giving kudos to my benefactor (Prof.Falaye,Prof.Ajayi,Overseer Oni, Overseer Bolaji, P.Elder Babatunde) and my Parents Mr. and Mrs. John Adeniji, you will both live long in good health and eat the fruit of your labour. And to all my friends and well-wishers, it's my prayer that we all find favour in the hands of God. I love you all.

TABLE OF CONTENTS

| Title | Page |
|---|----------|
| Certification..... | iii |
| Acknowledgement..... | iv |
| Table Of Contents..... | v |
| Abstract..... | viii |
| List Of Tables..... | ix |
| List Of Figures..... | x |
| List Of Appendices..... | xi |
| Chapter One | 1 |
| 1.0 Introduction..... | 1 |
| 1.1 Justification..... | 2 |
| 1.3 Research Objectives..... | 4 |
| 1.4 Hypotheses..... | 4 |
| | 6 |
| Chapter Two | 6 |
| 2.0 Literature Review..... | 6 |
| 2.1 Biology of White Shrimp..... | 7 |
| 2.2 Nigeria Shrimp Production..... | 8 |
| 2.3 Health Benefit of White Shrimp..... | 8 |
| 2.3.1 Low in Calories..... | 8 |
| 2.3.2 Protein-rich..... | 9 |
| 2.3.3 Macronutrients..... | 9 |
| 2.3.4 Common Allergen..... | 9 |
| 2.3.5 Weight Loss..... | 10 |
| 2.3.6 Anti-Aging Properties..... | 10 |
| 2.3.7 Age-Related Macular Degeneration..... | 10 |
| 2.3.8 Hair Loss..... | 11 |
| 2.3.9 Cardiovascular Disease..... | 11 |
| 2.3.10 Brain Health..... | 12 |
| 2.3.11 Anti-Cancer Activity..... | 12 |
| 2.3.12 Decreases Menstrual Pain..... | 12 |
| 2.4 Health Risk of Shrimps..... | 12 |
| 2.4.1 Mercury..... | 12 |

| | |
|---|-----------|
| 2.4.2 Purines..... | 13 |
| 2.4.3 Food allergies..... | 13 |
| 2.5 Economic Benefit of Fish Processing And Marketing..... | 13 |
| Chapter Three..... | 14 |
| 3.0 Research Methodology..... | 14 |
| 3.1 Study Area..... | 14 |
| 3.2 Materials Used..... | 16 |
| 3.3 Preliminary Survey..... | 16 |
| 3.4 Sampling Techniques..... | 16 |
| 3.5 Methods of Data Analysis..... | 16 |
| Chapter Four..... | 17 |
| 4.0 Results..... | 17 |
| 4.1 Respondents Interviewed..... | 17 |
| 4.2 Socioeconomic Characteristics of White Shrimp Processors and Marketers..... | 18 |
| 4.2.1 Distribution of in the White Shrimp Processors and Marketers Gender..... | 18 |
| 4.2.2 Distribution of Processors by Age, Number of Children, Household size and Year of Processing | 19 |
| 4.2.3 Distribution of Marketers by Age, Numbers of Children, Household Size and Years of Experience..... | 21 |
| 4.2.4 Distribution of Respondents by Marital Status..... | 22 |
| 4.2.5 Distribution of Participants in <i>N. hastatus</i> Value Chain by Level of Education..... | 23 |
| 4.3 Processing Information..... | 24 |
| 4.3.1 Distribution of White Shrimp Processors by Weight of By-Catch..... | 24 |
| 4.3.2 Distribution of by Months of Peak and off Peak Season..... | 25 |
| 4.3.3 Distribution of Processor by Perception on washing shrimp before processing, stress of processing, Numbers of processing hours and shelf life of product in storage..... | 26 |
| 4.3.4 Information on How Often Marketers Patronized Processors and Frequency of Patronage..... | 28 |
| 4.3.5 Distribution of Processors by Type of Value Added and Material Used in Packaging Processed Shrimp for Marketers..... | 29 |
| 4.3.6 Processors' Perception on Cleaning Processing House, Processing Materials and Product Standardization..... | 30 |
| 4.3.7 Distribution of processors by Number of Fresh Shrimp Purchased, Price per kg of Processed Shrimp and Area of Tray in Meter Square..... | 32 |
| 4.3.8 Distribution of Processors by processing hours, Frequency patronage by Marketers, Number of Strands of Wood Used per Batch, Years of Mat Usage and Processing Frequency per Week... | 34 |
| 4.3.9 Distribution of Processors by Cost of Fresh Shrimp, Processing Cost and Profitability..... | 36 |

| | |
|--|----|
| 4.3.10 Distribution of White Shrimp Processors by Source of Income and Profitability of Enterprise..... | 39 |
| 4.4 Marketing Information..... | 40 |
| 4.4.1 Distribution of Marketers by Number of Visits to Processor, Medium of Transportation, Product Label, Value Added, Packaging materials and Measure for Selling..... | 40 |
| 4.4.2 Source (s) of Processed (Dried) White Shrimp..... | 42 |
| 4.4.3 Distribution of Marketers by Perception on Peak and Off Peak Season..... | 43 |
| 4.4.4 Distribution of White Shrimp Marketers by Tax payment and Membership of Trade Union.... | 44 |
| 4.4.5 Nature of Marketing Enterprise..... | 45 |
| 4.4.6 Frequency of Shrimp Marketing Within and Outside Ondo State, Nigeria..... | 46 |
| 4.4.7 Distribution of Marketers by price per kg of dried Shrimp, Number of Baskets sold per month, Weight of Dried Shrimp and Daily Weight of Dried Shrimp..... | 48 |
| 4.4.8 Distribution of marketers by weekly marketing cost, monthly marketing cost, Amount paid for rent and transportation cost..... | 50 |
| 4.4.9 Distribution of marketers by income per week, income per month and the profit..... | 51 |
| 4.5 Cost and Return Analysis of Shrimp Processing..... | 52 |
| 4.6 Cost and Return Analysis of White Shrimp Marketing..... | 54 |
| 4.7.0 SWOT analysis of white shrimp processors and marketers..... | 56 |
| 4.7.1 Strength of white shrimp Processors and Marketers are..... | 56 |
| 4.7.2. Weakness' of white shrimp Processors and Marketers are..... | 56 |
| 4.7.3 Opportunities of white shrimp Processors and Marketers are..... | 57 |
| 4.7.4 Threat of white shrimp Processors and Marketers are..... | 58 |
| 4.8 Constraints of white shrimp processing..... | 58 |
| Chapter Five | 59 |
| 5.0 Discussion and Conclusion..... | 59 |
| 5.1 Discussion..... | 59 |
| 5.1.1 Socio-economic characteristics of Shrimp processors and Marketers by the distribution of Participants in the value chain..... | 59 |
| 5.1.2 Processing and Marketing Information..... | 61 |
| 5.1.3 Budgeting Analysis of Shrimp Processing and Marketing..... | 67 |
| 5.1.4 Strength, Weakness, Opportunities and Threat..... | 69 |
| 5.1.5 Conclusion..... | 69 |
| References | 70 |

Abstract

The study assessed the processing and marketing of white shrimp in the coastal areas of Ondo State, Nigeria. A multistage sampling technique was used for the selection of the respondents. The first stage was done by purposively selecting four towns prominent in fish processing and marketing. The communities selected were Ayetoro, Bijimi, Igbokoda and Obi. In the second stage, twenty (20) respondents each were selected from Ayetoro and Bijinmi (processors) through chain referral techniques while twenty (20) respondents each were selected randomly from Igbokoda and Obi through a list from the marketing association in the study area. In all, eighty (80) respondents were interviewed between April and May, 2016. Socioeconomic data were subjected to descriptive statistical analysis using frequency percentage, charts and tables. Profitability of N. hastatus processing and marketing was determined using gross margin, benefit-cost ratio and percentage profitability while the strength, weakness, opportunities and challenges were identified. Result indicated that majority (80%) of processors added no value to shrimp while 20% added pepper to increase its shelf life. 65.5% of processors packaged processed shrimps in nylon before marketing. 37.5% of marketers sourced shrimps from Ayetoro and Bijimi and 60% of them were whole sales. Equally 65% of processors said they were not aware of the regulatory roles of the National Agency for Food Administration and Control on food products. It could be concluded that processors and marketers were found to be profitable in the study area considering the fact they were able to cover their operating expenses shown their gross margin (₦160,536.59, ₦66,375.00), benefit-cost ratio (1.16, 1.12), return on investment (0.16, 0.12) and percentage profitability (16%, 12.22%). The degree of profitability recorded could still be improved through value addition, while inability of processors and marketers to attain the peak of their enterprise frontier could also be attributed to some problems such as inadequate capital, health hazards, undried wood etc. The strength, weakness, opportunities and threat identified are the variables needed by policy makers to further enhance the contributions of shrimp processing and marketing to coastal livelihood. Hence, more emphasis should be placed on value addition, products development, standardization, establishment of mechanized Processing and developed marketing centres.

Keywords: White shrimp, coastal area, processing, marketing, socio-economic value addition, profitability, strength, weakness, opportunities and threat.

LIST OF TABLES

| Title | Page |
|--|------|
| Table 1: Distribution of Respondents Interviewed in the Value Chain..... | 17 |
| Table 2: Distribution of in the White Shrimp Processors and Marketers by Gender..... | 18 |
| Table 3: The distribution of processors age, number of children, house hold size and year of processing experience..... | 20 |
| Table 4: Distribution of Processors and Marketers by Level of Education..... | 23 |
| Table 5: Distribution of Processor by Perception on washing shrimp before processing, stress of processing, numbers of processing hours and shelf life of white shrimp in storage..... | 27 |
| Table 6: Shrimp Processors' Perception on Cleaning of Processing House and Product Standardization..... | 31 |
| Table 7: Distribution of processors by number of basket bought per day and per month, Price per kg of processed shrimp and area of tray in meter square..... | 33 |
| Table 8: Distribution of Processors by processing hours, Frequency patronage by Marketers, Number of Strands of Wood Used per Batch, Years of Mat Usage and Processing Frequency per Week..... | 35 |
| Table 9a: Distribution of Processors by Cost of Fresh Shrimp, Processing Cost and Profitability.. | 37 |
| Table 9b: Distribution of Processors by Cost of Fresh Shrimp, Processing Cost and Profitability.. | 38 |
| Table 10: Distribution of Marketers by Number of Visits to Processor, Medium of Transportation, Value Added, Product label, Packaging materials and Measure for Selling..... | 41 |
| Table 11: Distribution of Marketers by Perception on Peak and Off Peak Season..... | 43 |
| Table 12: Cost and Return Analysis of Shrimp Processing..... | 53 |
| Table 13: Cost and Return Analysis of White Shrimp Marketing..... | 55 |
| Table 14: Constraints of white shrimp processing..... | 58 |

LIST OF FIGURES

| Title | Page |
|--|------|
| Figure 1 Map of Ondo state | 15 |
| Figure 2: Distribution of Marketers by age of marketers, number of children, house hold size and Marketing Experience..... | 21 |
| Figure3: Distribution of Respondents by Marital Status..... | 22 |
| Figure 4: Distribution of Processors by By-Catch..... | 24 |
| Figure 5: Marketers Patronage of Processors per Month..... | 28 |
| Figure 6: Distribution of Processors by Perception on Value Added and Material used in Packaging Processed Shrimps for Marketers..... | 29 |
| Figure 7: Distribution of White Shrimp Processors by Source of Income and Profitability of Enterprise..... | 39 |
| Figure 8: Source (s) of White Shrimp for Marketing..... | 42 |
| Figure 9: Distribution of White Shrimp Marketers by Tax payment and Membership of Trade Union..... | 44 |
| Figure 10: Nature of Enterprise..... | 45 |
| Figure 11: Shrimp Marketing Within and Outside Ondo State, Nigeria..... | 47 |
| Figure 12: Distribution of marketers by price per kg of dried shrimp, number of baskets sold per Month, weight of dried shrimp and daily weight of dried shrimp..... | 49 |
| Figure 13: Distribution of marketers by weekly marketing cost, monthly marketing cost, Amount Paid for rent and transportation cost..... | 50 |
| Figure 14: Distribution of marketers by income per week, income per month and the profit..... | 51 |

LIST OF APPENDICES

| Title | Page |
|---|-------------|
| Plate 1: Typical White Shrimp..... | 6 |
| Plate 2: External Features of White Shrimp..... | 6 |
| Questionnaire..... | 73 |

Chapter One

1.0 Introduction

Fish and fish product are known worldwide as very important diet because of their high nutritional value and significance in improving human health. Fish is a highly available, healthy and high quality source of cheap animal protein (Public Health Agency of Canada, 2008). The per capita consumption of animal protein in Nigeria is only 9.3g/day as against 34g/day recommended by the Food and Agriculture Organization (FAO) to be the minimum requirement for the growth and development.

Shrimps are highly priced seafood harvested from coastal tropical throughout the world and they support commercially valuable fisheries in many areas of the world (Ajani *et al.*, 2013). White shrimps (*Nematopalaemon hastatus*) belonging to the family *Palaemonidae*, is exploited in shallow areas by artisanal fishermen for economic benefit from the over 180 km long coastline (longest in Nigeria) of Ondo State, (Bayode *et al.*, 2011). They are highly demanded especially by European countries and local markets (Food and Agricultural Organization, 2014). Therefore, a study into their processing and preserving techniques, transport market facilities and traders packaging and distribution will further enhance their economic use and contributions to coastal livelihood (Ajani *et al.*, 2013)

Marketing is a management process responsible for anticipating, identifying and then satisfying consumer wants and needs with a view of making profit. Furthermore, there are some services essential and must be carried out efficiently for marketing functions to be accomplished (Oparinde and Ojo, 2014). These services are called marketing services and they include transportation, storage, grading and standardization, packaging, bringing sellers and buyers together, financing and risk bearing. Marketing channel as path between production and consumption. It is also classified as either centralized or decentralized. Value addition helps processors and marketers to earn more money compare to products that lack value addition. Value addition creates employment and increase profitability of processors and marketers in the study areas (Thyresson *et al.*, 2013).

1.1 Justification

Fish value chain in Nigeria are not yet developed to meet international market requirements as limited value addition is done in the industry, with the result that market for fish and fish products are limited to domestic markets (Investopedia, 2011). Over the past decade, development practitioners have increasingly shifted their attention from farming systems to targeting agricultural value chains and fisheries by extension, to improve small holder production and participation in markets (Rota and Sperandini, 2010). This is because small scale producers are often unable to increase production by adopting productivity-enhancing technologies unless the value chains for their products are sufficiently developed and become dynamic.

Thyresson *et al.*, (2013) reported that value addition must be introduced into fish processing activities by using improved equipment such as advanced oven, proper handling to avoid breakage of those products in the processing site. Fish processing plants typically generate strong odour and, depending on the location of the facility, odour can be a significant nuisance issue for neighboring facilities and residential areas.

As with any fish processing activity, the potential exists for impact to the consumer as a result of contamination of the foodstuff either at source or during processing. Common potential contaminants include micro-organisms, heavy metals, organic compounds and foreign objects. Contamination from a fish processing source may affect consumability and result in associated liabilities. Lifting, repetitive work and posture injuries occur as a result of working in the fish processing industry (e.g. lifting boxes of fishes and repetitive cutting operations). Good and proper processing activities should be introduced and implemented to avoid processing hazards. A situation where by fish smokers are unable to purchase equipment's that will make work more hazards free; government should come into place to support the people in the study area.

The dominance of white shrimp (*Nematopalaemon hastatus*) in the coastal waters of Ondo and Cross River States (Solomon *et al.*, 2013). This provides major source of both direct and indirect employment in the area of capture/production, processing for local and export markets. However, the shrimp subsector as not been able to contribute maximally to the Nigerian economy due to inadequate value addition in the processing and marketing stages of the shrimp value chain (USAID, 2009). Increased shrimp and prawns production, value addition in processing and marketing stages of can boost domestic sales and exports as well as fast track the development of networks and linkages to shrimp

SWOT analysis is an acronym for strengths, weaknesses, opportunities and threats. It is a tool to analyze fish in the study area internal and external environment in order to design strategy by building on strengths, minimizing weaknesses, using opportunities and opposing threats Ghazinoory *et al.*, (2011)

Little or no research is available on the assessment of the processing and marketing of white shrimp in the study area. However, empirical literature indicated that Adewuyi *et al.* (2013) reported profit efficiency in fish smoking in Ilaje Local Government of Ondo State, Nigeria; Oparinde and Ojo (2014) evaluated the structural performance of artisanal fish market marketing in Ondo State, Nigeria; Abulude *et al.* (2006) studied the chemical composition and functional properties of some prawns from the coastal areas of Ondo State, Nigeria; Akinwumi *et al.* (2011) characterized the artisanal fishery in coastal areas of Ondo State, Nigeria; Adeparusi *et al.* (2003) reported the smoke curing of fish by artisanal fisher folk in Ilaje Local Government of Ondo State, Nigeria; Olawusi-Peters *et al.* (2014) evaluated the length-weight relationship and condition factor of some shrimps in the coastal areas of Ondo State, Nigeria; Agbo and Usoroh (2015) surveyed marketing of estuarine shrimps in Akwa Ibom State; and Okayi *et al.* (2013) reported the indigenous knowledge of shrimps and prawn in Rivers Niger and Benue.

Therefore, for the Federal and State Governments to produce more white shrimps, process it, create jobs crucial for national security and to contribute to the socio-economic development of fish processors, retailers and exporters, there is need for an assessment of the present state of participant in the shrimp value chain (National Mirror, 2014).

1.3 Research Objectives

The general objective of this research is to assess the processing and marketing of white shrimp (*N.hastatus*) in the coastal areas of Ondo State, Nigeria. Towards this, the specific objectives are to:

- i. describe the socio economic of *N. hastatus* processors and markers in the study area ;
- ii. identify the value added at the processing and marketing stages of *N. hastatus* in the study area;
- iii. evaluate the profitability of processors and marketers ; and
- iv. describe the strength, weakness, opportunities and threat of processing and marketing of *N. hastatus* in the study area.

1.4 Hypotheses

a. Ho1: No differences between socio economic characteristics of white shrimps processors and Marketers;

HA1: There are differences between in the socio economic characteristics of white shrimps processors and Marketers;

b. Ho2: No value is added to *N. hastatus* at the processing and marketing stages

HA2: Value is added to *N. hastatus* at the processing and marketing stages

c. Ho3: profitability of *N. hastatus* marketers and processors differs and

HA3: profitability of *N. hastatus* marketers and processors does not differs

d. H_{04} : there are no strengths, weaknesses, opportunities and threats in the marketing and processing stages of white shrimp

H_{A4} : there are strength, weaknesses, opportunities and threats in the marketing and processing stages of white shrimp

Chapter Two

2.0 Literature Review

2.1 Biology of White Shrimp

White shrimp is a species of prawn that was the first commercially important shrimp in the United States. Their bodies are bluish-white in color with slightly pink sides and tail flippers that are black near the base with green and yellow margins. They have long antennae and a long, toothed rostrum (a long extension out in front of the eyes). They have 10 walking legs and 10 swimming legs that they use to swim, burrow and crawl. They are typically about 7-8 inches in length, and females are slightly larger than males. The antennae of Atlantic white shrimp can be up to 3 times the length of their body.



Plate 1: Typical White Shrimp

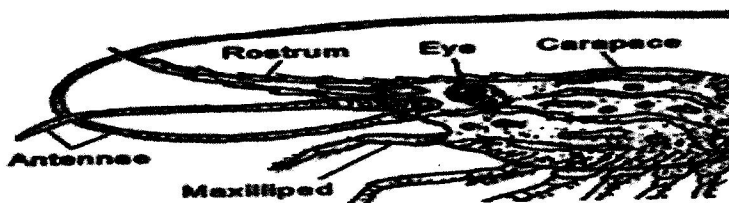


Plate 2: External Features of White Shrimp

Shrimp feeds on most any organic material they come across at the bottom of a body of water. Prey include plankton, amphipods, nematodes, isopods, copepods, small fishes, crabs and water boatmen, grass

shrimp, sheepshead minnows, killifish and blue crabs feed on larval and post-larval shrimp. A variety of fish feed on juvenile and adult shrimp. White shrimp rarely live longer than two years and most die before they reach eight to nine months. Atlantic white shrimp prefer shallow, warm, low salinity waters to about 90 feet deep with organic-rich, muddy bottoms. They actually require water temperatures above 37 °Fahrenheit to survive. White shrimp spawn in the spring along the coast from the beach to several miles offshore. A single female produces between 500,000 and 1,000,000 eggs. The male transfers a packet of sperm called a spermatophore to the female and it is attached to her underside. Eggs are ejected by the female and fertilized as they pass the spermatophore. The eggs sink to the floor of the ocean, where they hatch within 24 hours. The larvae go through about 10 different phases before they start to look like adult shrimp. They move into estuaries where they inhabit sea grass beds, tidal marshes and creeks as they continue to mature. After about two to three months they will reach adult size and move gradually towards to the ocean. White shrimp can jump from the water to evade predators with a rapid tail flex –a snap to the tail that propels them backwards. They are currently not being overfished. There is some concern about the health of shrimp following the deep water horizon.

2.2 Nigeria Shrimp Production

Nigerian shrimp has been considered of the best in the global market. Presently, the nation generates foreign exchange worth over \$65m annually, making it one of the strong contributors to the Nigerian foreign exchange (National Mirror , 2014) .

Shrimp product one of the most valued resources after crude oil. He said Nigerian shrimp is largely produced in the Niger Delta, which is reputed as the second largest brackish habitat in the world. Potential of Nigeria's fisheries resources has been estimated at over three million metric tons per annum and if properly harnessed is capable of meeting the local fish demand and of generating surplus for export

(National Mirror , 2014) “The fishery resources of the nation comprise of a rich diversity of finfish and shellfish found in the territorial waters, the EEZ and the Inland waters. The drive therefore is to ensure we unlock the potential using artisanal, inland, industrial fisheries and aquaculture to increase local fish production to bridge the gap between demand and supply and to complement importation substitution drive of the Federal Government.

2.3 Health Benefit of White Shrimp

2.3.1 Low in Calories

One medium shrimp provides about 7 calories, which means a dozen add up to less than 85 calories—roughly 15 less than a 3-ounce chicken breast (about the size of a deck of cards in thickness and width). One jumbo shrimp, the type often served in shrimp cocktail, contains about 14 calories, and a teaspoon of cocktail sauce provides 5, so three jumbo shrimp, each with a teaspoon of cocktail sauce as an appetizer, adds up to less than 60 calories, about 10 less than just one pig in a blanket, and 20 less than two mini empanadas or two mini quiche (Cynthia , 2014).

2.3.2 Protein-rich

In addition to their water content, shrimp are primarily made of protein. Three ounces of baked or broiled shrimp provides about 20 grams of protein, just a few grams less than that a 3-ounce chicken breast. Each jumbo shrimp provides about 3 grams, and contains very little fat and carbohydrate. (Cynthia, 2014).

2.3.3 Macronutrients

Aside from protein, shrimp provide a pretty impressive array of nutrients. Four ounces steamed **contains** over 100% of the Daily Value for selenium, over 75% for vitamin B12, over 50% for phosphorous **and** over 30% for choline, copper, and iodine. And while we don't typically think of animal proteins as **sources** of antioxidants, shrimp contain two types. In addition to being a mineral that plays a role in immunity and

thyroid function, selenium is an important antioxidant that helps fight **damaging particles called free radicals**, which damage cell membranes and DNA, leading to **premature aging and disease**. Another antioxidant, called astaxanthin, which provides the primary color pigment in shrimp, has been shown to help reduce inflammation, a known trigger of aging and disease (Cynthia and Sass14), and 2014).

2.3.4 Common Allergen

As a member of the shellfish family, shrimp are among the top allergens, which in addition to shellfish include milk, eggs, fish, tree nuts, peanuts, wheat, and soy. Exposure to shrimp by those who are allergic to shellfish can cause a severe reaction, including life threatening anaphylaxis. More mild reactions may include a stuffy nose, sneezing, itchy skin, hives, tingling in the mouth, abdominal pain, and nausea. A food allergy can develop at any age. If you think you may be allergic to shrimp, or any other food, see an allergist for testing right away Cynthia (2014).

2.3.5 Weight Loss

Shrimp is a great source of protein and vitamin D, without adding carbohydrates to your daily intake, so for people determined to lose weight, this simple form of seafood is a popular option. The high levels of zinc are also beneficial, since zinc is one way to increase leptin levels in the body. Leptin is a hormone and is an integral part in the body's regulation of fat storage, appetite, and overall energy use in the body. By increasing the levels of leptin in the body, people can avoid common issues like overeating, inexplicable cravings for food after being "full", and similar problem for weight-conscious individuals. It also has high levels of iodine, which help to control how much energy is expended when your body is at rest. It interacts with the thyroid gland to speed up thyroid activity, helping in people's efforts to lose weight, or at least to prevent additional weight gain.

2.3.6 Anti-Aging Properties

Sunlight is one of the major causes that promote skin aging. Without protection, even a few minutes of exposure to sunlight and UVA may lead to wrinkles, spots, or sunburn. By adding shrimp to your diet or weekly diet, people can greatly improve their chances of beautifying their skin and shedding years from time-worn faces. It contains high levels of a certain carotenoid called astaxanthin, which is a powerful antioxidant that can greatly reduce the signs of aging in the skin related to UVA and sunlight. Therefore, for individuals obsessed with spots and wrinkling skin, add a shrimp cocktail to your diet a few times a week to slow those inevitable effects.

2.3.7 Age-Related Macular Degeneration

Studies suggest that shrimp contain a heparin-like compound that may help in treating neovascular AMD. The astaxanthin found in shrimp also relieves eye fatigue, especially for those who use computers for long durations in their personal or professional lives.

2.3.8 Hair Loss

The minerals found in shrimp also contribute to the health of our hair. A deficiency of zinc may cause hair loss. Zinc plays a key role in maintaining and creating new cells, including hair and skin cells, so for those who are beginning to lose their hair, or at least are seeing a decrease in hair growth, it can work against that embarrassing reality, keeping you looking younger for longer.

2.3.9 Cardiovascular Disease

Fermented shrimp paste, which is a popular manipulation of the food, contains a fibrinolytic enzyme that can be used for thrombolytic therapy. Thrombolytic therapy is a way of breaking up dangerous blood clots within a person's blood vessels. This enzyme found in shrimp paste can be a powerful tool against the dangers of cardiovascular disease, which afflicts so many people throughout the world. Also, the high

levels of omega-3 fatty acid found in it eliminate damaging cholesterol in the bloodstream, which further reduces the chance of heart attacks and strokes. Protein and various vitamins, such as calcium phosphorus and magnesium, found in shrimp can effectively aid in the fight against bone degeneration. A deficiency in dietary proteins and vitamins can cause the deterioration of bone quality, bone mass, strength, and overall mass, which are the main symptoms of osteoporosis. Adding it to your daily or weekly regimen of food can slow the effects of aging bones to keep you stronger for longer.

2.3.10 Brain Health

Shrimp have high levels of iron, which is a key mineral component in the bonding process with oxygen in hemoglobin. With additional iron in the system, increased oxygen flow can occur to the muscles, providing strength and endurance, while also increasing oxygen flow to the brain, which is shown to improve comprehension, memory, and concentration. Studies suggest that astaxanthin found in shrimp may help in improving memory performance, survival of brain cells, and reducing risk of brain inflammatory diseases. Also, it is a good source of iodine, which helps the human body make thyroid hormones. The thyroid hormones, in turn, are needed for the development of the brain during infancy and pregnancy. Basically, you can raise your test scores and improve your workout regimen at the same time by including shrimp in your diet

2.3.11 Anti-Cancer Activity

Shrimp contains carotenoids, such as astaxanthin, which may help in reducing the risk of various types of cancer. It also contains selenium, which is a “trace mineral”, and has been connected to lower levels of cancer, including prostate and lung cancer.

Selenium is a key component of antioxidant enzymes (like glutathione peroxidase), which fights against the presence and destructive effects of free radicals that can cause cancer. Also, selenium slows down

tumor growth by providing a boost to the immune system and inhibiting the creation of blood vessels that lead to tumors that help them grow or metastasize. Cancer is thereby battled on two fronts with this powerful little mineral, which is a prominent component in the organic structure of shrimp.

Also, studies have shown that in areas of the world where selenium is more prominent in the soil, and subsequently in the agricultural products, cancer levels in local people were significantly lower.

2.3.12 Decreases Menstrual Pain

Not all cholesterol is created equally, and shrimp is a source of the beneficial type of cholesterol, omega-3 fatty acids. These will balance out the well-studied negative effects of omega-6 fatty acids, and aid in the alleviation of menstrual cramps for women, as well as promote healthier blood flow to the reproductive organs by reducing other damaging forms of cholesterol in the blood stream.

2.4 Health Risk of Shrimps

2.4.1 Mercury

Like many forms of seafood, shrimp do contain trace amounts of mercury, which is hazardous to human health and can lead to mercury poisoning, vision problems, and reduced fetal health. However, these health concerns stem from an abundance of mercury in your diet, so as long as you balance your diet with controlled amounts of shrimp, you can avoid the dangers of mercury poisoning.

2.4.2 Purines

Although purines are a naturally occurring and necessary element of our body chemistry, excessive levels can be dangerous, particularly in people who already have conditions like gout purines break down into uric acid when cells die and the kidney then manages and directs the flow of uric acid around or out of

the body. Shrimps have moderately high levels of purines, which is fine for most people, but if you already suffer from gout, a condition caused by high levels of uric acid, too much shrimp may exacerbate that issue.

2.4.3 Food allergies

Various types of seafood, such as shrimp, may create allergic reactions. Be careful whenever you try new types of fish, or when you drastically increase the levels of seafood in your diet, as you might experience an unexpected allergic reaction.

2.5 Economic Benefit of Fish Processing And Marketing

- Employment Generation through the value chain of processing and marketing
- Exportation: quality processed fish with international standard can be exported, generating revenue for the government.
- Income generation: local fish processors and marketers have source of income through this enterprise.
- Value addition: this also increase the income generate.

the body. Shrimps have moderately high levels of purines, which is fine for most people, but if you already suffer from gout, a condition caused by high levels of uric acid, too much shrimp may exacerbate that issue.

2.4.3 Food allergies

Various types of seafood, such as shrimp, may create allergic reactions. Be careful whenever you try new types of fish, or when you drastically increase the levels of seafood in your diet, as you might experience an unexpected allergic reaction.

2.5 Economic Benefit of Fish Processing And Marketing

- Employment Generation through the value chain of processing and marketing
- Exportation: quality processed fish with international standard can be exported, generating revenue for the government.
- Income generation: local fish processors and marketers have source of income through this enterprise.
- Value addition: this also increase the income generate.

Chapter Three

3.0 Research Methodology

3.1 Study Area

This study was carried out in the coastal area of Ondo State, Nigeria. The study area was at the extreme southern part of Ondo state. It consists of over five hundred settlements spreading over 3,000 km². For this study, Ayetoro, Bijinmi, Igbokoda and Obi in Ilaje Local Government area were purposely selected based on the predominance of processing and marketing activities in the towns and their accessibility

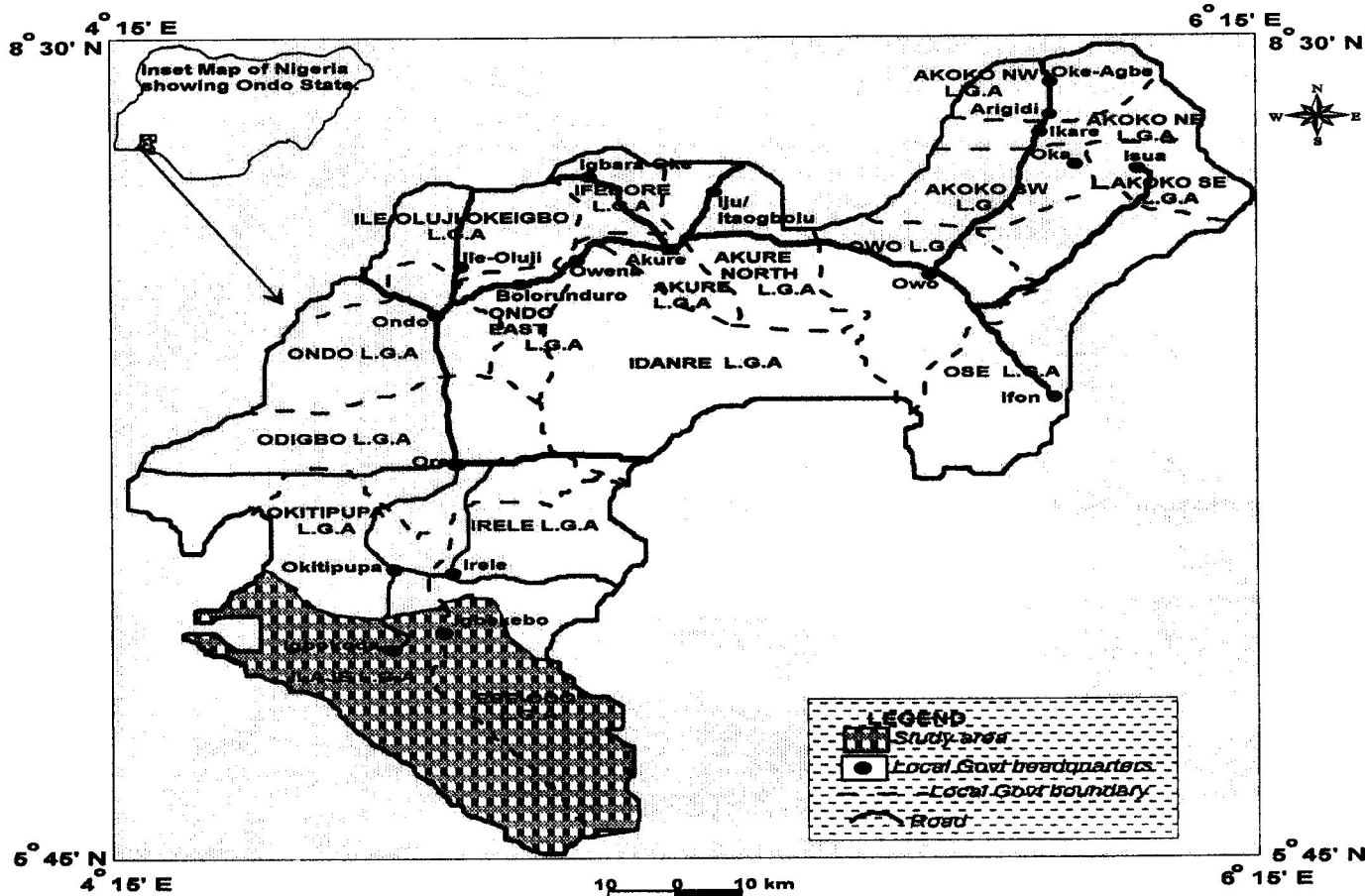


Fig. Map of Ondo State showing the study area.
 Figure 1 Map of Ondo state

3.2 Materials Used

- Camera (Cannon 5D Mark 2, 21.1 megapixels)
- Weighing balance
- Structured questionnaire.

3.3 Preliminary Survey

This was done to get familiarized with study area, processing centres, its market and the business environment it operates; and to identify sources of additional information to be included in the primary research. An initial data collection and survey was pre-tested and subsequently refined for the primary research phase.

3.4 Sampling Techniques

A multistage sampling technique was used for the selection of the respondents. The first stage was done by purposively selecting four towns prominent in fish processing and marketing in the study area. The communities under consideration are Ayetoro, Bijimi, Igbokoda and Obi.

In the second stage, twenty (20) respondents each were selected from Ayetoro and Bijinmi (processors) through chain referral techniques while twenty (20) respondents each were selected randomly from Igbokoda and Obi through a list from the marketing association in the study area. In all, eighty (80) respondents were interviewed between April and May, 2016.

3.5 Methods of Data Analysis

Socioeconomic data were subjected to descriptive statistical analysis using frequency percentage, charts and tables. Profitability of *N. hastatus* processors and marketers was determined using gross margin, benefit-cost ratio and percentage profitability according to methods described by Omobepade *et al.*, (2015) while the SWOT were identified.

Chapter Four

4.0 Results

4.1 Respondents Interviewed

Numbers of processors and marketers interviewed in the white shrimp value chain in the coast of Ondo State, Nigeria are presented on Table 1. Forty white shrimp processors were interviewed in Ayetoro and Bijimi while 40 respondents in the marketing stage of *Nematopalaemon hastatus* were interviewed in Igbokoda and Obi.

Table 1: Distribution of Respondents Interviewed in the Value Chain

| Processors | | |
|-------------------|------------------|-------------------|
| | Frequency | Percentage |
| Ayetoro | 20 | 50 |
| Bijimi | 20 | 50 |
| Total | 40 | 100 |
| Marketers | | |
| | Frequency | Percentage |
| Igbokoda | 20 | 50 |
| Obi | 20 | 50 |
| Total | 40 | 100 |

Source: Field Survey, 2016.

4.2 Socioeconomic Characteristics of White Shrimp Processors and Marketers
4.2.1 Distribution of in the White Shrimp Processors and Marketers Gender

Participants' distribution by gender is presented on Table 2. Females dominated the processing (100 percent) and marketing (100 percent) stages of *N. hastatus* value chain in the study area.

Table 2: Distribution of in the White Shrimp Processors and Marketers by Gender

| | Female | Male |
|------------------|--------|------|
| Processor | 100 | 0 |
| Marketers | 100 | 0 |

Source: Field Survey, 2016.

4.2.2 Distribution of Processors by Age, Number of Children, Household size and Year of Processing Experience

Table 3 shows the distribution of processors age, number of children, house hold size and year of processing experience. Forty five of shrimp processors were between 10 and 29 years, 47% were between 30 and 39 years, five percent of processors were between 40 and 49 while one respondent aged between 45 and above. Forty percent of processors had less than 5 numbers of children, majority (57%) had between 5 and 10 children whereas 2.50% of the respondents had between 10 and above.

Descriptive statistics further revealed that 60% of processors had household size less than 5, 42.5% had between 5 and 9 while 2.50% had between 10 and above respectively. Five percent of processors had less than 10 years of processing experience, 10% of them have been in the business between 10 and 14 years, 47% of respondents had between 15 and 19 years e while 12.50% of processors in the study area had between 25 and above years of experience respectively.

Table 3: The distribution of processors age, number of children, house hold size and year of processing Experience

| Age | Frequency | Percent | Mean |
|----------------------------|------------------|----------------|-------------|
| 10-29 | 9.2 | 23.00 | 40.50±1.32 |
| 30-39 | 27.8 | 69.50 | |
| 40-49 | 2 | 5.00 | |
| > 45 | 1 | 2.50 | |
| Total | 40 | 100.00 | |
| Number of children | | | |
| < 5 | 16 | 40.00 | 5.03±0.30 |
| 5-9 | 23 | 57.50 | |
| 10 and Above | 1 | 2.50 | |
| Total | 40 | 100.00 | |
| Household size | | | |
| < 5 | 24 | 55.00 | 7.13±0.30 |
| 5-9 | 15 | 42.50 | |
| 10 and Above | 1 | 2.50 | |
| Total | 40 | 100.00 | |
| Years of experience | | | |
| < 10 | 2 | 5.00 | 21.58±1.47 |
| 10 – 14 | 4 | 10.00 | |
| 15 – 19 | 19 | 47.50 | |
| 20 – 24 | 10 | 25.00 | |
| 25 and Above | 5 | 12.50 | |
| Total | 40 | 100.00 | |

Source: Field Survey, 2016.

4.2.3 Distribution of Marketers by Age, Numbers of Children, Household Size and Years of Experience

Figure 2 presents information on the age, numbers of children, household size and years of marketing experience. 2.5 % of processors were less than 30 years; majorities (70%) of marketers were between 31 to 40 years, 25 % between 41 to 50 years and 2.5% between 51 to 60 years. Thirty percent had less than five (5) children, 67.5% had between five children to seven while 2.5% had more than 10 children. Equally, the house hold size revealed that 2.5% had less than five houses hold size, 92.5% had between five (5) to nine (9) family size and 5% had more than 10 house hold size. Numbers of years of Marketing experience indicated that 12.5% had experience between 10 to 19 years, 50% had between 20 to 29 years, 32.5% had 30 to 39 years and 5 % had between 40 years and above marketing experience.

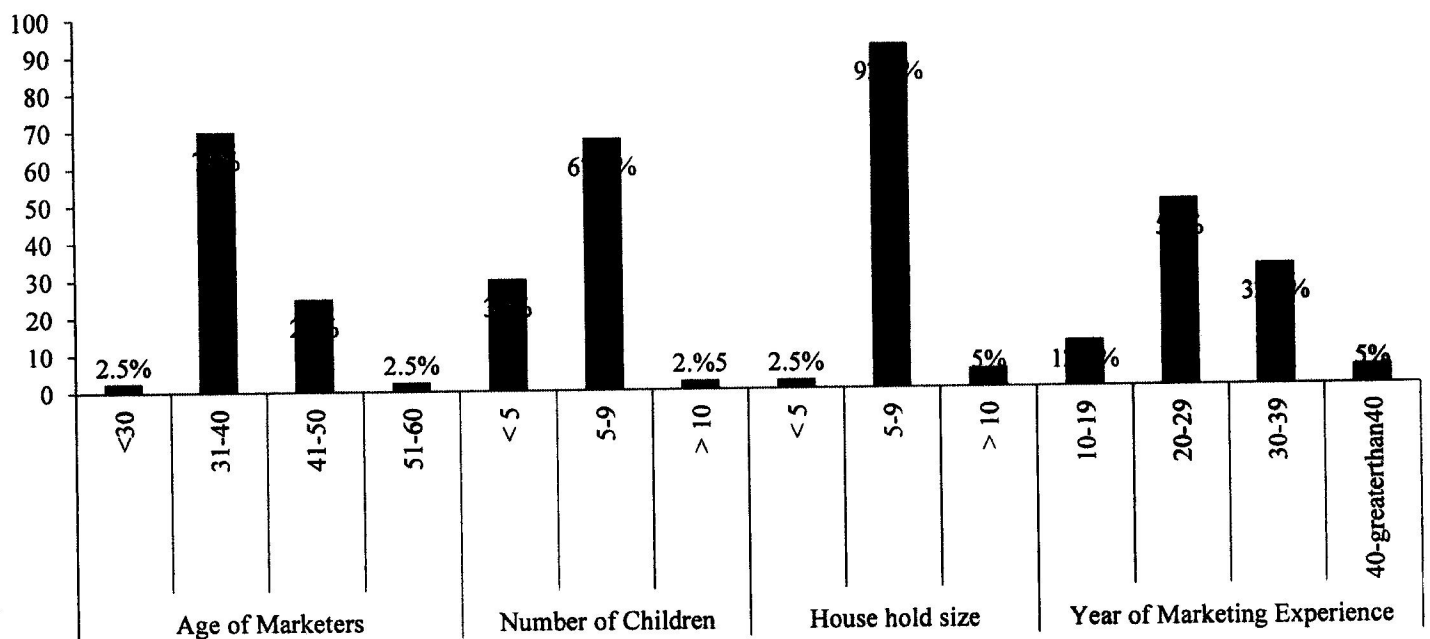


Figure 2: Distribution of Marketers by age of marketers, number of children, house hold size and Marketing Experience

Source: Field Survey, 2016

4.2.4 Distribution of Respondents by Marital Status

Marital status of participants in the white shrimp value chain is presented in figure 3. 82.90 percent of processors were married while majority (87.5 percent) of *N. hastatus* marketers were married. Results equally show one (2.5 percent) processor was single while none of the shrimp marketers interviewed was single. Equally, 14.6 percent of the processors were separated while three respondents (7.5 percent) interviewed in the marketing stage of the shrimp species were separated. In other category, five (5) percent belonged to this in the marketing stage while none of the respondents in the processing stage was widowed.

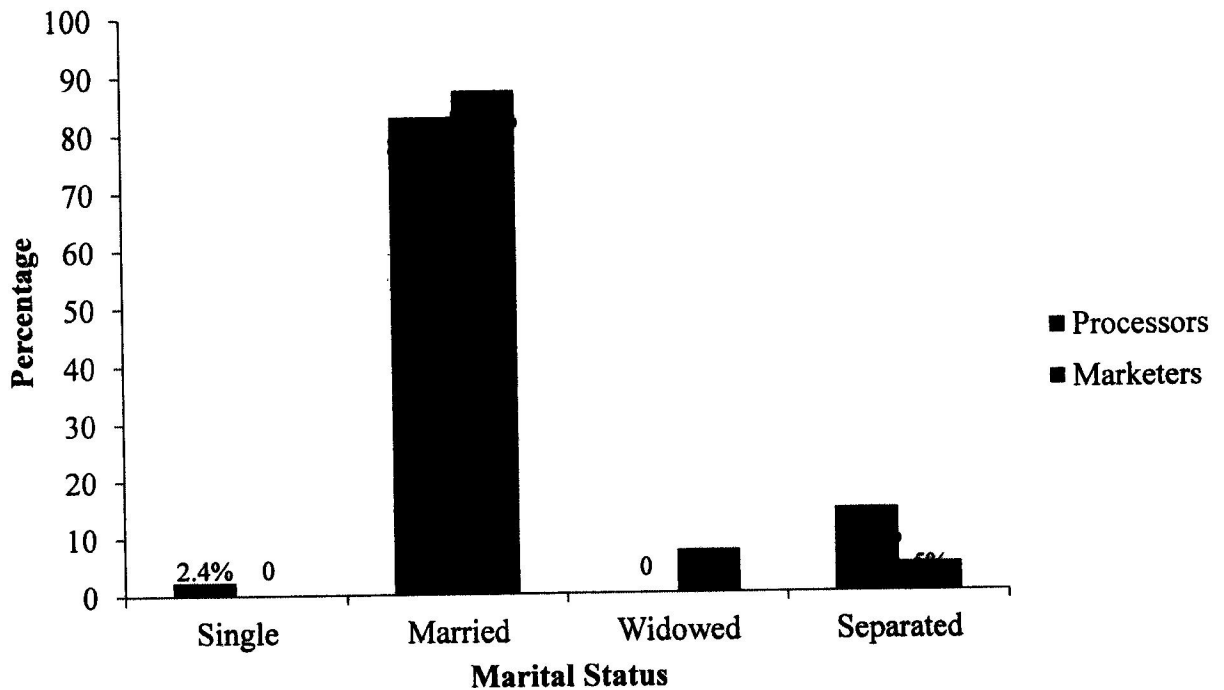


Figure 3: Distribution of Respondents by Marital Status

Source: Field Survey, 2016.

4.2.5 Distribution of Participants in *N. hastatus* Value Chain by Level of Education

Table 4 presents the distribution of participants in the white shrimp value chain by level of education. 3.75 percent of fishermen interviewed had no formal education. Majority (62.50 percent) of shrimp processors had no education while 47.50 percent of shrimp marketers interviewed had no formal education. Thirty (37.50 percent) fishermen in the shrimp value chain had primary school education compared with 27.50 percent and 35.00 percent of *N. hastatus* processors and marketers had primary school education respectively. Majority (42.15 percent) of fishermen had secondary education which was higher than respondents in the processing (10 percent) and marketing (17.50 percent) stages that had secondary education. Fourteen respondents in the fishing stage of the value chain had tertiary education while none of the processors or marketers had tertiary education respectively.

Table 4: Distribution of Processors and Marketers by Level of Education

| Parameters | Processors | | Marketers | |
|------------|------------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| No Formal | 25 | 62.50 | 19 | 47.50 |
| Primary | 11 | 27.50 | 14 | 35.00 |
| Secondary | 4 | 10.00 | 7 | 17.50 |
| Tertiary | 0 | 0.00 | 0 | 0.00 |
| Total | 40 | 100.00 | 40 | 100.00 |

Source: Field Survey, 2016.

4.3 Processing Information

4.3.1 Distribution of White Shrimp Processors by Weight of By-Catch

Distribution of processors by weight of by-catch in fresh shrimp is presented in figure 4. Majority (70.00 percent) of processors in the study area had about 12.00 -13.90 kg of by-catch made of different species of fin fishes, lobsters, marine snails, octopus, lagoons (marine giant shrimps) and bivalves. 17.50 percent of respondents who shrimp were measure contained less than 12.00 kg by-catches while 12.50 percent contained above 14.00 kg of other marine organisms.

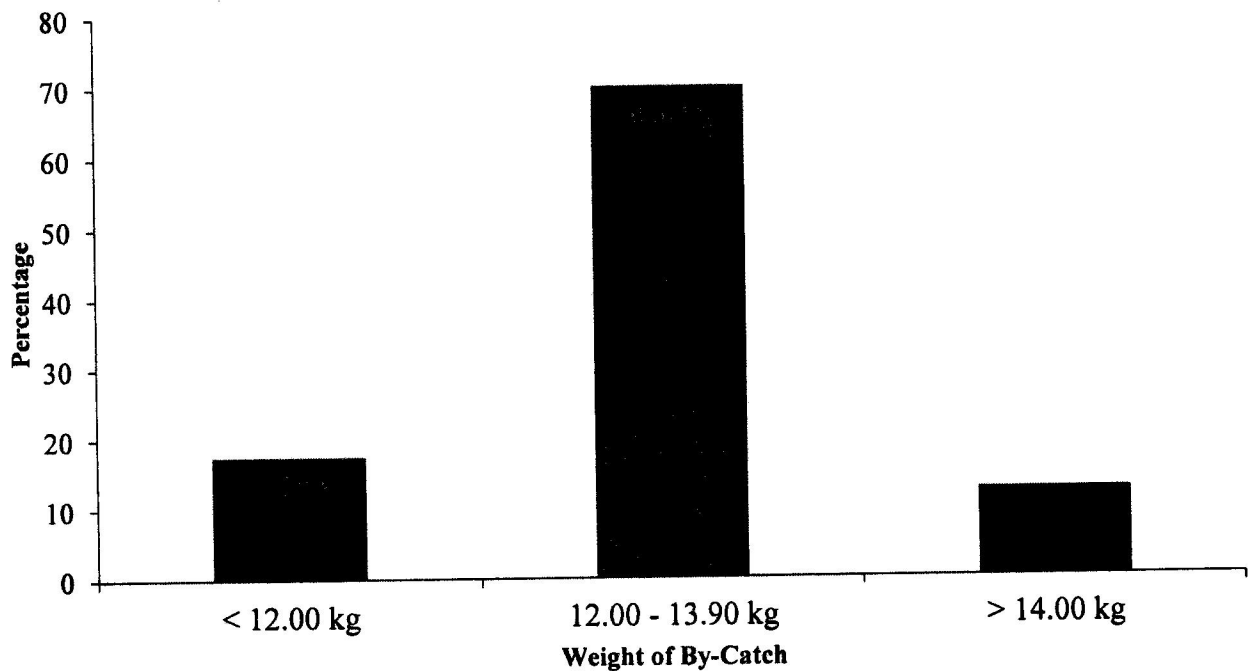


Figure 4: Distribution of Processors by By-Catch

Source: Field Survey, 2016.

4.3.2 Distribution of by Months of Peak and off Peak Season

Figure 5 presents information on the distribution of white shrimp processors by peak and off peak months.

It revealed that 61 percent of respondents at this stage of value chain processed more shrimps between June and October, 39 percent said they processed large quantities of the shrimp species between June and September. On the other hand, majority (51 percent) of processors said they processed lesser quantities of *N. hastatus* between January and May while off peak months fell between January and March for 48 percent of the respondents

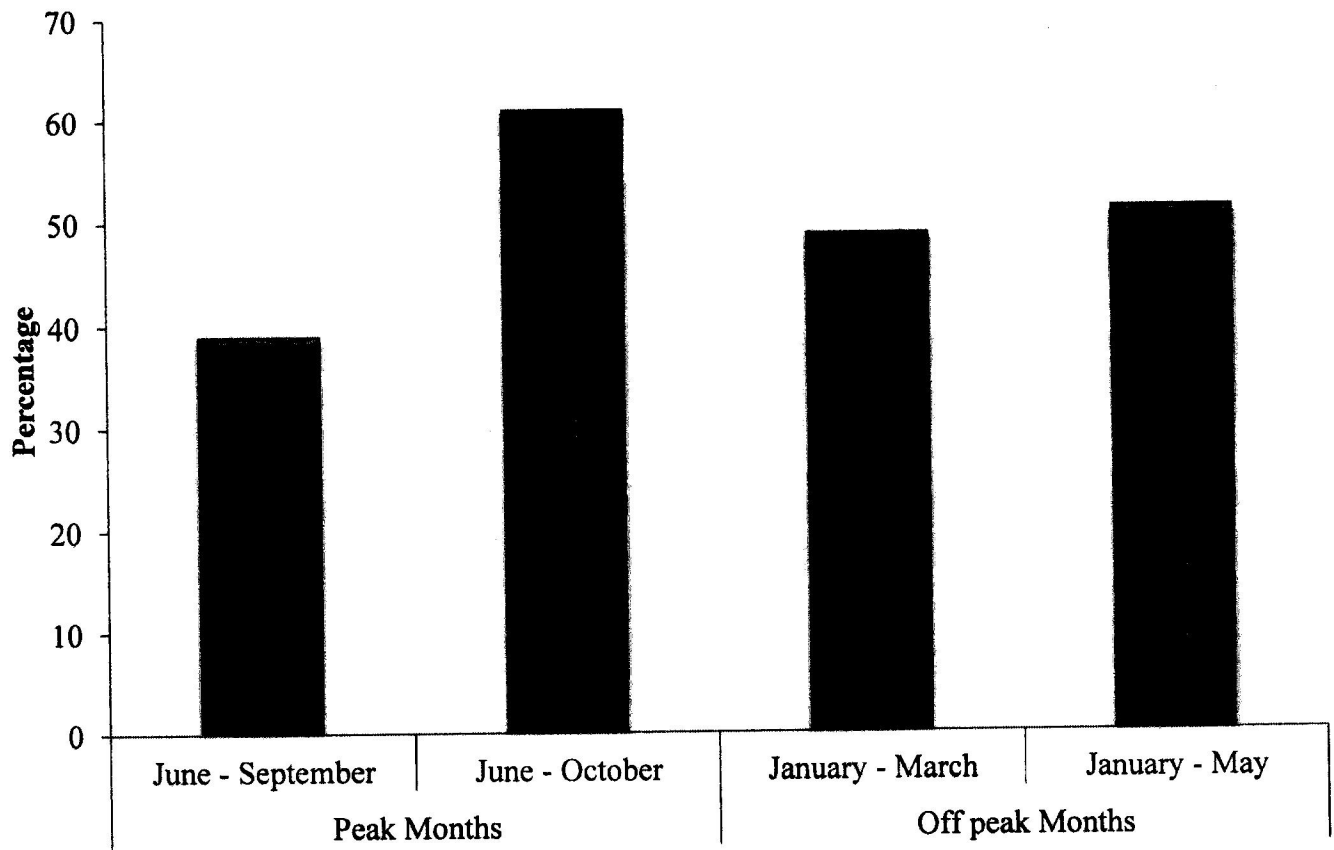


Figure 5: Distribution of Shrimp Processors by Months of Peak and off peak Season

Source: Field Survey, 2016.

4.3.3 Distribution of Processor by Perception on washing shrimp before processing, stress of processing, Numbers of processing hours and shelf life of product in storage

Distribution of processors by perception on washing shrimp before processing, stress of processing, numbers of processing hours and shelf life of product in storage is presented on Table 5. It revealed that majority (82.50 percent) do not wash the shrimps before processing while 17.50 percent did. 100% of the respondents process through smoke drying. 92.50 percent said the procedures were stressful while 7.5 percent submitted that shrimp processing were not stressful. Majority (75 percent) of processors interviewed processed white shrimps between 6 and 7 hours, 25 percent processed it above 7 hours while 5 percent did it for less than 6 hours. Eighty percent of respondents in the processing stage of *N. hastatus* value chain said processed product could stay between 80 and 120 days in storage without changes, 12 percent said it could last for less than 80 days while 7.5 percent believed the product could last above 120 days in storage.

Table 5: Distribution of Processor by Perception on washing shrimp before processing, stress of processing, numbers of processing hours and shelf life of white shrimp in storage

| Washing Before Processing | Frequency | Percentage |
|-----------------------------|-----------|------------|
| No | 33 | 82.50 |
| Total | 40 | 100.00 |
| Method of processing | | |
| Smoked-drying | 40 | 100.00 |
| Total | 40 | 100.00 |
| Stress of Processing | | |
| Yes | 37 | 92.50 |
| Total | 40 | 100.00 |
| Number of hours | | |
| < 6 | 2 | 5.00 |
| 6 - 7 | 28 | 70.00 |
| > 7 | 10 | 25.00 |
| Shelf life (Days) | | |
| 80 - 120 | 32 | 80.00 |
| Total | 40 | 100.00 |

Source: Field Survey, 2016.

4.3.4 Information on How Often Marketers Patronized Processors and Frequency of Patronage

Information on patronage of processors by shrimp marketers and frequency of patronage per month This is presented in figure 5. 55 percent said they are often patronized by marketers while 45 percent were not often patronized. 12.5 percent said marketers patronized them above 10 times per month, processors who were patronized between 5 and 10 times represented 65 percent while 22.50 percent of them were visited by marketers for less than five times per month.

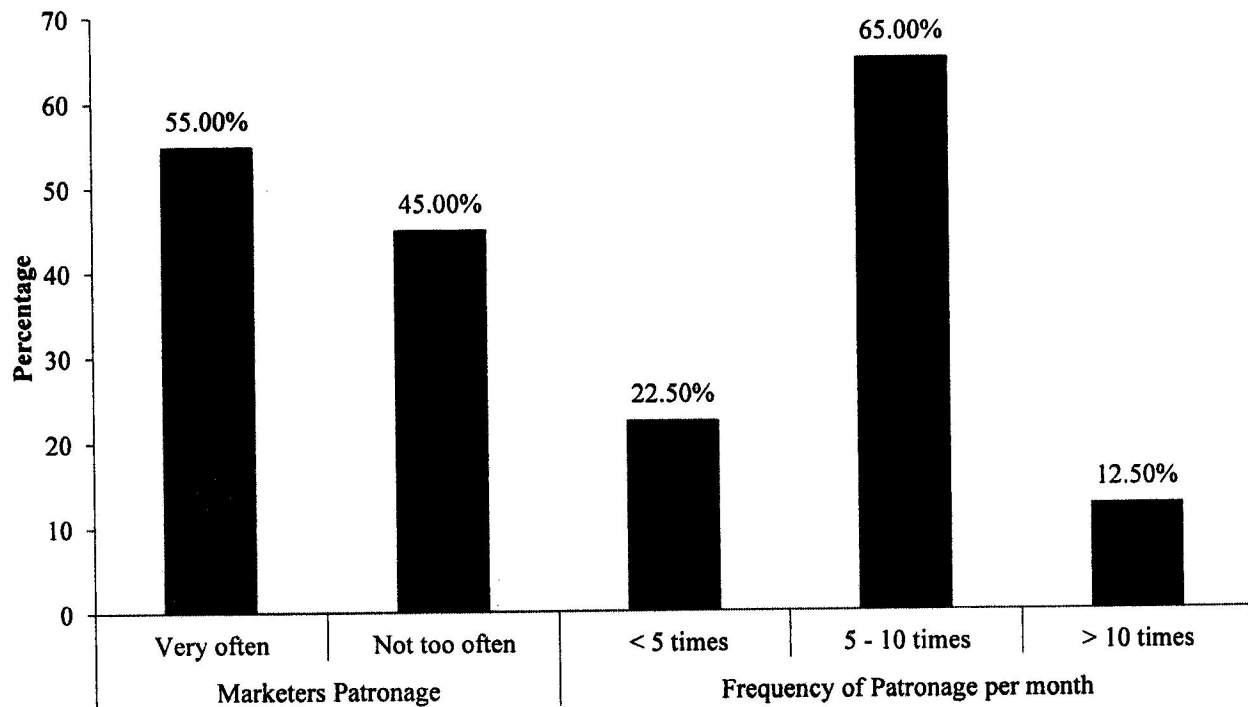


Figure 6: Marketers Patronage of Processors per Month

Source: Field Survey, 2016.

4.3.5 Distribution of Processors by Type of Value Added and Material Used in Packaging Processed Shrimp for Marketers
 Distribution of processors by type of value added and material used in packaging processed shrimps for marketers are presented in figure 7. Twenty percent of the respondents added pepper as additive during processing to increase its shelf life while majority (80 percent) of the respondents does not add any additive. 63 percent of processors interviewed used nylon in packaging shrimps sold to marketers, 9.8 percent used drum while 26.8 percent used nylon and jute bag.

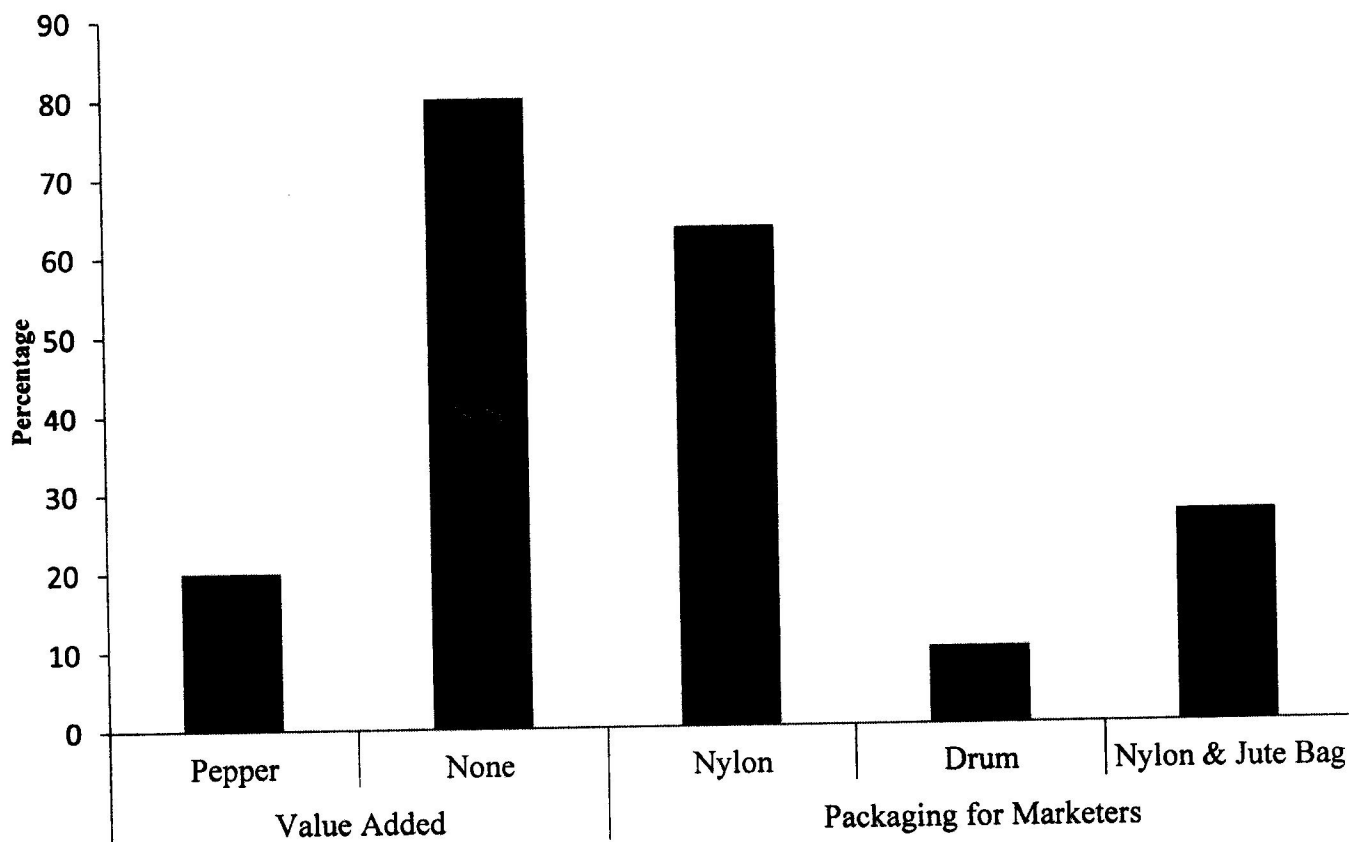


Figure 7: Distribution of Processors by Perception on Value Added and Material used in Packaging Processed Shrimps for Marketers

Source: Field Survey, 2016.

4.3.6 Processors' Perception on Cleaning Processing House, Processing Materials and Product Standardization

Table 6 presents information on processors' perception on cleaning processing house, processing materials and product standardization. Majority (62.5 percent) cleaned their processing house and materials weekly while 35.5 percent maintained sanitary conditions fortnightly. Majority (65 percent) of processors interviewed said they were not aware of any organization that standardizes food products while 35 percent they are aware of such organizations as most of them recognized the National Food Policy Administration and Control (NAFDAC) as a major food product regulating body. Majority (65 percent) said they cannot pay for product standardization while 15 percent said they can pay for it if it will increase their profit. On the amount respondents could afford per month for standardization, majority (77.50 percent) said they could afford less than N2000 per month, 15 percent could afford between N2000 and N2900 while respondents who could afford above N3000 represented 7.5 percent of processors interviewed. All the respondents presented in Figure 16 do not pay tax to government nor belonged to trade union, hence does not pay union dues.

Table 6: Shrimp Processors' Perception on Cleaning of Processing House and Product Standardization

| Processing House & Equipment Cleaning | Frequency | Percentage |
|---------------------------------------|-----------|------------|
| Weekly | 25 | 62.50 |
| Fortnightly | 15 | 35.50 |
| Total | 40 | 100.00 |
| Standard Information | | |
| Yes | 14 | 35.00 |
| No | 26 | 65.00 |
| Total | 40 | 100.00 |
| Pay for standardization | | |
| Yes | 15 | 35.00 |
| No | 25 | 65.00 |
| Total | 40 | 100.00 |
| Afford for Standardization | | |
| < ₦2000 | 31 | 77.50 |
| ₦2000 – ₦2900 | 6 | 15.00 |
| > ₦3000 | 3 | 7.50 |
| Total | 40 | 100.00 |

Source: Field Survey, 2016.

4.3.7 Distribution of processors by Number of Fresh Shrimp Purchased, Price per kg of Processed Shrimp and Area of Tray in Meter Square

Table 7 reveals the distribution of processors by number of basket bought per day and per month, price per kg of processed shrimp and area of tray in meter square. It reveals that 12.50% of processors bought below 3 baskets per day, 15% of them bought between 3 and 5.9 baskets, 47% purchased between 6 and 8.9 baskets per day while 25% bought between 9 and above baskets from fishermen. On a monthly basis, thirty five percent bought below 30 baskets per month, majority (60%) bought between 30 and 59 baskets while 10% of the processors bought between 60 and above numbers of baskets from fishers per month. The table further revealed that 2.50% of processors sold dried shrimp between ₦500 and ₦549 per kg, 10% sold it to marketers at a price between ₦550 and ₦599 per kg while majority (87.5%) sold to marketers between ₦ 600 and above per kg. Descriptive statistics further revealed that 42.5% of processors used smoking mat with a surface area between 100 m² and 139.99m² while majority (57.5%) used a mat with a surface area that ranged between 140 m² and above.

Table 7: Distribution of processors by number of basket bought per day and per month, Price per kg of processed shrimp and area of tray in meter square

| Basket bought per day | Frequency | Percentage | Mean |
|--------------------------------|------------------|-------------------|-------------|
| < 3 | 5 | 12.50 | 3.35±0.21 |
| 3 - 5.9 | 6 | 15.00 | |
| 6 - 8.9 | 19 | 47.50 | |
| 9 and above | 10 | 25.00 | |
| Total | 40 | 100.00 | |
| Basket bought per month | | | |
| < 30 | 14 | 35.00 | 58.56±3.56 |
| 30 – 59 | 24 | 60.00 | |
| 60 and above | 2 | 5.00 | |
| Total | 40 | 100.00 | |
| Price per kg | | | |
| 500- 549 | 1 | 2.50 | 6.18±2.66 |
| 550- 599 | 4 | 10.00 | |
| 600 and above | 35 | 87.50 | |
| Total | 40 | 100.00 | |
| Area of Tray | | | |
| 100 - 139.99m ² | 17 | 42.50 | 1.34±4.36 |
| 140 - 140m ² | 23 | 57.50 | |
| Total | 40 | 100.00 | |

Source: Field Survey, 2016.

4.3.8 Distribution of Processors by processing hours, Frequency patronage by Marketers, Number of Strands of Wood Used per Batch, Years of Mat Usage and Processing Frequency per Week

Distribution of processors by processing hours, Number of times marketers patronize them, number of strands of wood used to process per batch, years of usage of mat and processing frequency per week is presented on Table 8. Majority(57.5%) of the processors in the study areas used between 5hours and 6.9 hours to process per batch of fresh shrimp, 40% of the respondents used between 7hours and 8.9hours, while 2.5% of the respondents used between 9hours and above to process each basket of fresh shrimp. The table further revealed that 32.5% of the respondents used between 5 and 7 strands of wood to process each basket of fresh white shrimp, 60% used between 8 and 10 strands of wood while 7.5% used above 10 strands of wood to processing each basket of white fresh shrimp. The table equally shows the number of years processing tray or mat has been used, 25% of the processors said they have used the tray for less than a year while 75% said they used it between 1 and 3 years for processing white shrimp. Processing frequency revealed that 2.5% of respondents processed shrimp less than two times in a week, 50% of processed between 2 and 3 times in a week and 48% of the processed above 3 times per week.

Table 8: Distribution of Processors by processing hours, Frequency patronage by Marketers,

Number of Strands of Wood Used per Batch, Years of Mat Usage and Processing Frequency per Week

| Processing hours per batch of fresh shrimp | Frequency | Percentage | Mean |
|---|------------------|-------------------|-------------|
| 5 - 6.9hours | 23 | 57.50 | 6.70±0.16 |
| 7 - 8.9 hours | 16 | 40.00 | |
| 9hours and Above | 1 | 2.50 | |
| Total | 40 | 100.00 | |
| Frequency of Patronage | | | |
| 2 - 4 times | 9 | 22.50 | 6.28±0.29 |
| 5 - 6 times | 6 | 15.00 | |
| 6 times and above | 25 | 62.50 | |
| Total | 40 | 100.00 | |
| Number of strands of wood used | | | |
| 5 - 7 | 13 | 32.50 | 8.38±0.33 |
| 8 - 10 | 24 | 60.00 | |
| > 10 | 3 | 7.50 | |
| Total | 40 | 100.00 | |
| year processing tray/mat has been used | | | |
| < 1 year | 15 | 25.00 | 2.60±0.18 |
| 1 - 3 years | 25 | 75.00 | |
| Total | 40 | 100.00 | |
| Processing frequency per week | | | |
| < 2 times | 1 | 2.50 | 2.05±0.16 |
| 2 - 3 times | 20 | 50.00 | |
| > 3 times | 19 | 47.50 | |
| Total | 40 | 100.00 | |

Source: Field Survey, 2016.

4.3.9 Distribution of Processors by Cost of Fresh Shrimp, Processing Cost and Profitability

Table 9 and b reveals the distribution processors processing cost and profitability. 22.5% of respondents bought fresh shrimp worth between ₦ 200,000 and ₦ 499,999, 42.5% purchased between ₦ 500,000 and ₦799, 999 while 35% of processors bought between ₦ 800,000 and above from fishermen per month. The table further reveals that 7.5% of the spent less than ₦ 30,000 on firewood per month, majority (80%) expended between ₦30, 000 and ₦59,999 while 12.50% purchased firewood that cost between ₦ 60,000 and above per month. 2.5% of the respondents bought fuel worth between ₦ 500 and ₦ 999.99, 22.5% of the purchased between ₦1000 and ₦1,999 while the majority (75%) of the respondents cost of fuel per monthly was between ₦ 15,000 and above.

Cost of tray also shows in that 72.5% spent between ₦300 and ₦599.99 monthly, 22.5% spent between ₦600 and ₦ 899.99 while 5% spent between ₦ 900 and above. Seventy percent of the processors bought additives worth between ₦ 500 and ₦ 799.99 monthly while 30% of the processors spent between ₦ 800 and above on additives. On packaging materials, 45% of the respondents spent between ₦ 1000 and ₦1, 999.99 while 55% spent between ₦ 2000 and ₦ 2,999.99. Thirty percent of spent between ₦ 20,000 and ₦ 49,999.99 on processing, 42.5% spent between ₦ 50,000 and ₦ 79,999.99 while 27.5% spent between 80,000 and above on shrimp processing on a monthly basis. Total monthly cost which included cost of processing and fresh white shrimp cost is indicated that 15% spent between ₦ 200,000 and ₦ 499,999.99, 47.5% spent between ₦ 500,000 and ₦799,999.99 while 37.5% spend between ₦ 800,000 and above monthly. Profitability of processing enterprise revealed that 25% gained between ₦ 10,000 and ₦ 49,999.99 monthly, majority (65%) earned a profit between ₦ 50,000 and ₦89, 999.99 while 10% gained between ₦ 90,000 and above on monthly basis.

Table 9a: Distribution of Processors by Cost of Fresh Shrimp, Processing Cost and Profitability

| Cost of Shrimp | Frequency | Percentage | Mean |
|--------------------------|------------------|-------------------|--------------------|
| 200,000 - 499,999 | 9 | 22.5 | 642,146.32 ± 42500 |
| 500,00- 799,999 | 17 | 42.5 | |
| 800,000 and above | 14 | 35 | |
| Total | 40 | 100 | |
| Cost of Firewood | | | |
| < 30,000 | 3 | 7.5 | 46,165.00 ± 2598 |
| 30,000 - 59,999 | 32 | 80 | |
| 60,000 and Above | 5 | 12.5 | |
| Total | 40 | 100 | |
| Cost of Fuel | | | |
| 500 - 999.99 | 1 | 2.5 | 1670.00 ± 61.8 |
| 1000 - 1,999.99 | 9 | 22.5 | |
| 1500 and Above | 30 | 75 | |
| Total | 40 | 100 | |
| Cost of Tray | | | |
| 300 - 599.99 | 29 | 72.5 | 530.00 ± 24.00 |
| 600 - 899.99 | 9 | 22.5 | |
| 900 and Above | 2 | 5 | |
| Total | 40 | 100 | |
| Cost of Additives | | | |
| 500 - 799.99 | 28 | 70 | 112 ± 42.39 |
| 800 and Above | 12 | 30 | |
| Total | 40 | 100 | |

Source: Field Survey, 2016.

Table 9b: Distribution of Processors by Cost of Fresh Shrimp, Processing Cost and Profitability

| Monthly cost of packaging materials | Frequency | Percentage | Mean |
|--|-----------|------------|----------------------|
| 1000 - 1999.99 | 18 | 45 | 2452.00 ± 158.00 |
| 2000 - 2999.99 | 22 | 55 | |
| Total | 40 | 100 | |
| Monthly Total Processing Cost | | | |
| 20,000 - 49,999.99 | 12 | 30 | 50,931.00 ± 2137 |
| 50,000 - 79,999.99 | 17 | 42.5 | |
| 80,000 and Above | 11 | 27.5 | |
| Total | 40 | 100 | |
| Monthly Total cost (Processing and Shrimp cost) | | | |
| 200,000 - 499,999.99 | 6 | 15 | 693,077.51 ± 5054.00 |
| 500,000 - 799,999.99 | 19 | 47.5 | |
| 800,000 and above | 15 | 37.5 | |
| Total | 40 | 100 | |
| Profit (Monthly) | | | |
| 10,000 - 49,999.99 | 10 | 25 | 109,605.41 ± 4227.00 |
| 50,000 - 89,999.99 | 26 | 65 | |
| 90,000 and Above | 4 | 10 | |
| Total | 40 | 100 | |

Source: Field Survey, 2016.

4.3.10 Distribution of White Shrimp Processors by Source of Income and Profitability of Enterprise

Distribution of white shrimp processors by source of income and profitability of enterprise is presented in figure 8. 47.5 percent said processing white shrimp was their only source of income while majority (52.5 percent) said shrimp processing was not their only source of income. 77.5 percent of respondents who had other sources of income were involved in smoking fin fishes, 12.5 percent sold smoked fish while 10 percent were involved in trading goods popularly known as provision. 52.5 percent of participants at this stage of the value chain said shrimp processing as an enterprise was profitable, 25 percent perceived it has been averagely profitable, 12.5 percent saw it as less profitable while 10 percent said the enterprise was highly profitable.

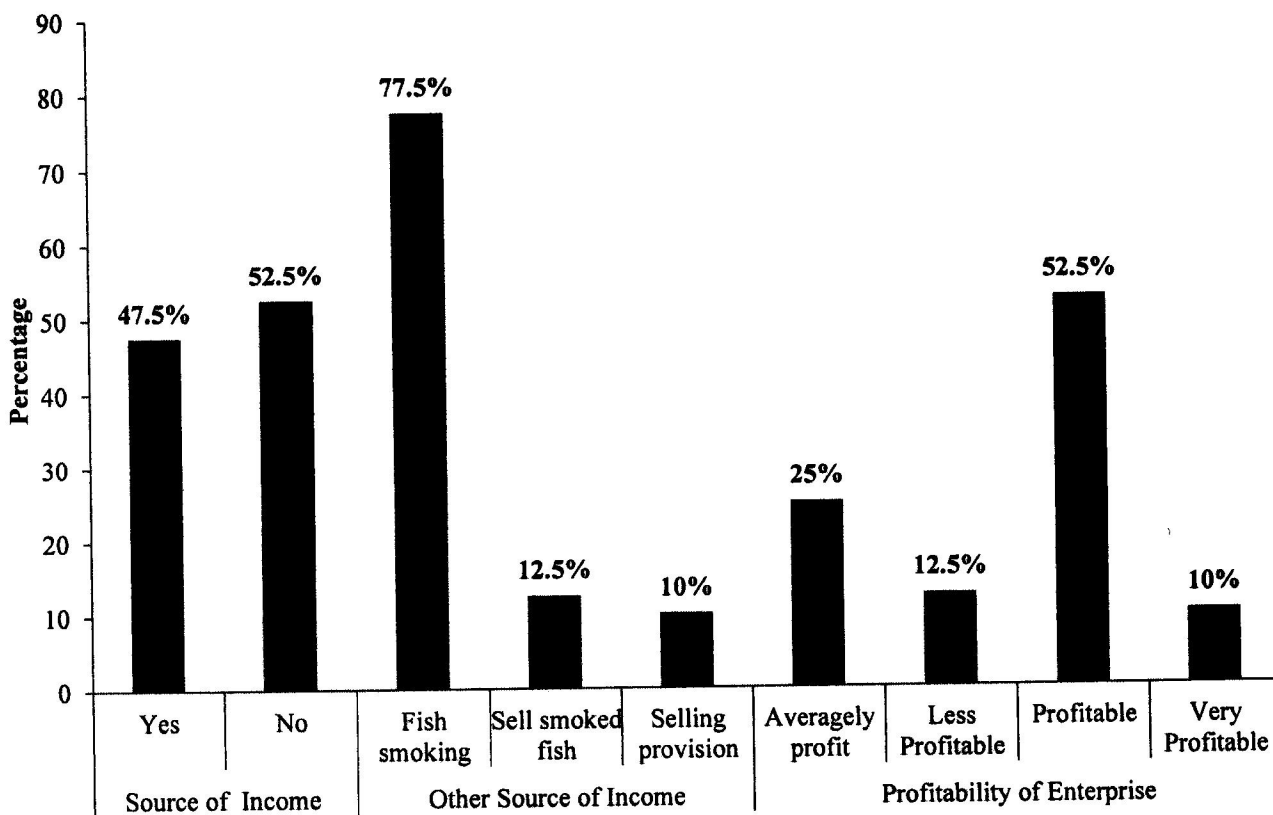


Figure 8: Distribution of White Shrimp Processors by Source of Income and Profitability of Enterprise

Source: Field Survey, 2016.

4.4 Marketing Information

4.4.1 Distribution of Marketers by Number of Visits to Processor, Medium of Transportation, Product Label, Value Added, Packaging materials and Measure for Selling

Table 10 shows the number of times shrimp marketers visit shrimp processors. 65% of marketers visited processors once in a week while 35% visit processors twice in a week. The table further show number of visit by marketers to processors per month, 72.5% visit processors thrice in a month while 27.5% visit processors twice in a month. The means of transportation to market is also shown in the table, 50% represent marketers that uses vehicle to transport shrimp from processors to market and 50% represent marketers that uses boat to transport shrimp to the market. The 50% use boat from processing site to Igbokoda market while 50% of shrimp marketers also uses boat to transport shrimp to obi market. 100% of respondents do not add value to shrimp and 100% of marketers don't label the shrimp when selling. This table present information on whether marketer add value to shrimp and do they label the shrimp when about to sell. The table below presents the medium of packaging. 53% represent marketers using nylon to package their shrimp before selling, 40% uses jute bag to package their shrimp before selling while 7% uses plastic to package their shrimp. Table 9 represents what marketers use to see shrimp to customer. 47.50% use bowl to sell shrimp to customer, 50 % sell shrimp with basket while 2.50% use nylon to sell shrimp to customer.

Table 10: Distribution of Marketers by Number of Visits to Processor, Medium of Transportation, Value Added, Product label, Packaging materials and Measure for Selling

| Marketers Visit/Week | Frequency | Percentage |
|---------------------------------------|------------------|-------------------|
| Once | 26 | 65.00 |
| Twice | 14 | 35.00 |
| Total | 40 | 100.00 |
| Marketers Visit/Month | | |
| Twice | 11 | 27.50 |
| Thrice | 29 | 72.50 |
| Total | 40 | 100.00 |
| Medium of Transportation | | |
| Vehicle | 20 | 50.00 |
| Boat | 20 | 50.00 |
| Total | 40 | 100.00 |
| Value Added | | |
| None | 40 | 100.00 |
| Total | 40 | 100.00 |
| Product Labeling | | |
| No | 40 | 100.00 |
| Packaging Materials | | |
| Jute | 16 | 40.00 |
| Nylon | 21 | 53.00 |
| Plastic | 3 | 7.00 |
| Total | 40 | 100.00 |
| Marketers' Measure for Selling | | |
| Bowl | 19 | 47.50 |
| Basket | 20 | 50.00 |
| Nylon | 1 | 2.50 |
| Total | 40 | 100.00 |

Source: Field Survey, 2016.

4.4.2 Source (s) of Processed (Dried) White Shrimp

Figure 9 shows the source (s) of shrimp for marketers. Ten percent sourced processed shrimp from Abereke, 22.5% got it from Ayetoro, 5% from Mese, 7.5% sourced from Odo-fado. Equally 5% visited Aberewoye and Gara respectively, 15% visits Bijinmi, 10% visits Abereke, Ayetoro and Awoye for processed *N. hastatus* shrimp. Only one respondent 2.5% visited Abereke, Mese and Odo-Fado, 7.50 sourced from both Ayetoro and Bijinmi, 2.5% go to awoye, Odo-fado and Gara for the processed shrimp while 7.5% sourced processed shrimp at Ayetoro, Awoye and Odo-fado.

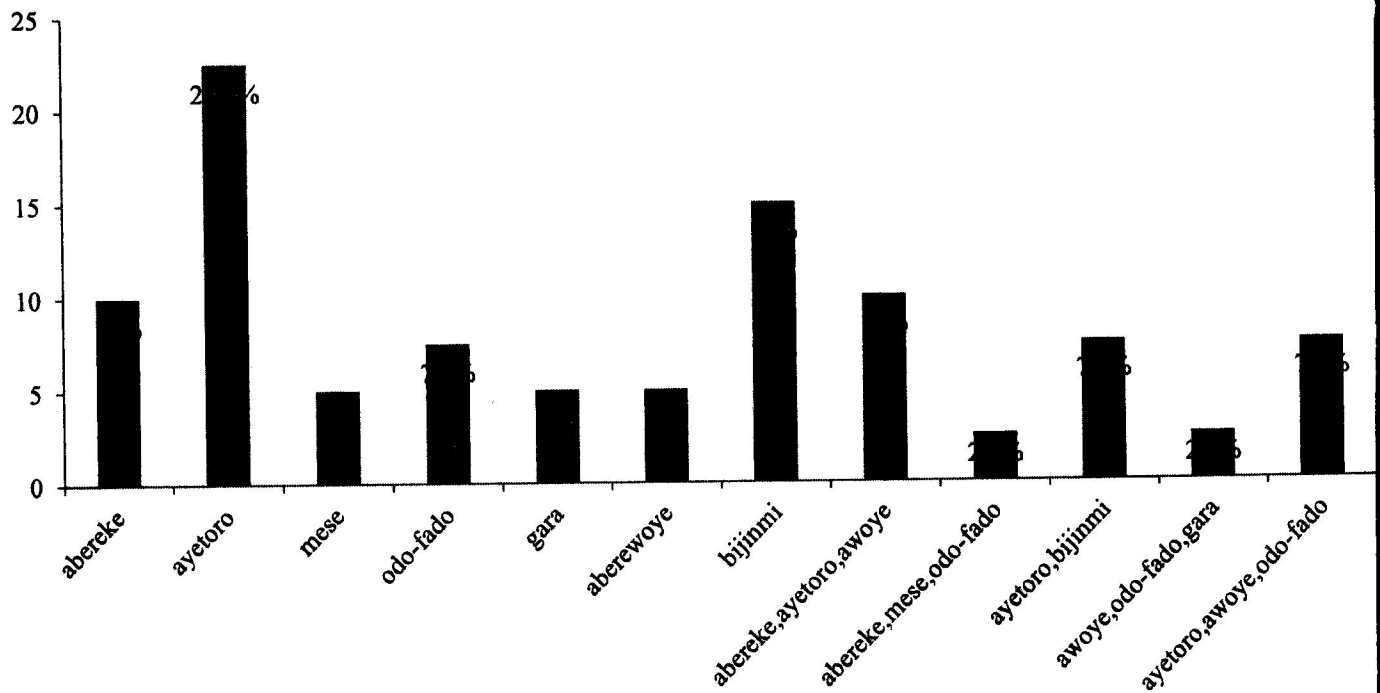


Figure 9: Source (s) of White Shrimp for Marketing

Source: Field Survey, 2016

4.4.3 Distribution of Marketers by Perception on Peak and Off Peak Season

All shrimp marketers agreed that they had peak season and it's usually during the raining season (Table 9). 37.5% said peak season was between June and August; majority (50%) picked June to September while 12.5% picked June to October. 25% agreed off peak months are from November to May while majority said the off peak month was between January and March.

Table 9: Distribution of Marketers by Perception on Peak and Off Peak Season

| Do you have peak season | Frequency | Percentage |
|---------------------------------|------------------|-------------------|
| Yes | 40 | 100.00 |
| Total | 40 | 100.00 |
| Time of Peak Season | | |
| Rainy Season | 40 | 100.00 |
| Total | 40 | 100.00 |
| Months of Peak season | | |
| June- August | 15 | 37.50 |
| June-September | 20 | 50.00 |
| June-October | 5 | 12.50 |
| Total | 40 | 100.00 |
| Time of off season | | |
| Dry Season | 40 | 100.00 |
| Total | 100 | 100.00 |
| Month of Off Peak Season | | |
| January-March | 30 | 75.00 |
| November-May | 10 | 25.00 |
| Total | 40 | 100.00 |

Source: *Field Survey, 2016.*

4.4.4 Distribution of White Shrimp Marketers by Tax payment and Membership of Trade Union

All the respondents in the marketing stage of *N. hastatus* value chain do not pay tax (Figure 9). 92.5% pay rent and 7.5% do not pay rent. Respondents that paid rent paid between ₦18, 000 and 24,000 naira per year (1,500 to 2,000 naira per month). 20% belonged to trade union while 80% of the respondents do not belong to any trade union. Also it was only 20% that belonged to trade union pay and they paid between ₦ 2,000 and ₦3,000 as dues monthly

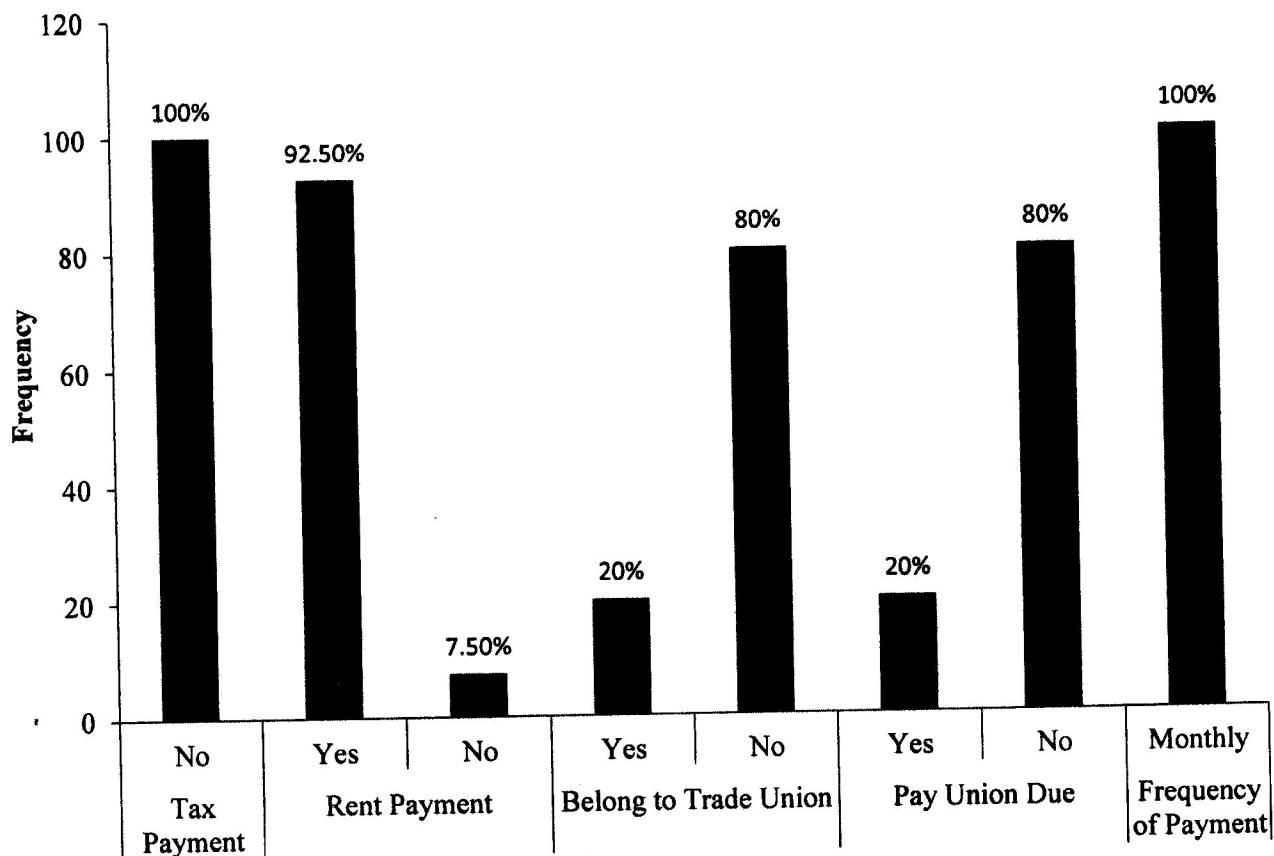


Figure 10: Distribution of White Shrimp Marketers by Tax payment and Membership of Trade Union

Source: Field Survey, 2016.

4.4.5 Nature of Marketing Enterprise

Figure 11 provides information on the nature of the enterprise. 60% of marketers are wholesaler, 20% are roadside marketer and wholesaler, 7.5% are retailer and wholesalers also 12.5% were roadside marketer and retailer.

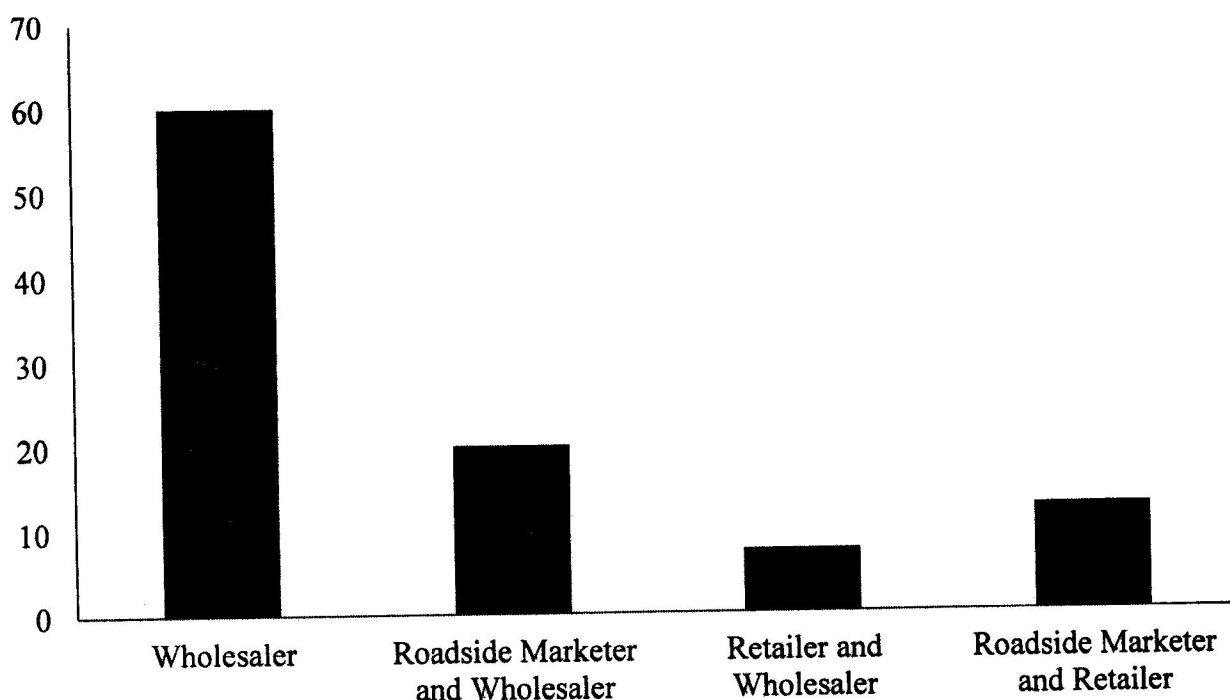


Figure 11: Nature of Enterprise

Source: Field Survey, 2016.

4.4.6 Frequency of Shrimp Marketing Within and Outside Ondo State, Nigeria

Figure 12 provides information on frequency of marketing and marketing within and outside the study area. All the respondents interviewed markets within the states; they equally do not market processed shrimp every day. Shrimp were marketed within the state at Obi and Igbokoda every nine- nine days. 52.5% marketed their products at Igbokoda and 42.5% market their product at Obi. The table further gives information about the states where whole sale marketers come from. 32.5% of wholesale buyers were from owerri, 15% from Onitsha, 7.5% from Benin-city, 12.5% from Lagos, 5% were from Enugu, 5% from Ibadan, 2.5% from Akure, 5% were from Owerri and Onitsha, 5% from Owerri, Onitsha and Benin-city, 5% from Lagos, Ibadan and Akure, 2.5% were from Owerri, Lagos, Enugu and Ibadan. Also 2.5% are from Enugu, Ibadan and Akure.

4.4.7 Distribution of Marketers by price per kg of dried Shrimp, Number of Baskets sold per month, Weight of Dried Shrimp and Daily Weight of Dried Shrimp

Figure 13 presents information on the price per kg of shrimp marketed in the study area. Five percent of respondents sold between ₦600 and ₦649, per kg, 40 % sold to consumers and other marketers in the value chain between ₦650 and ₦699 while other respondents sold between ₦700 and ₦799. The number of basket sold per market day revealed that 35% of respondents sold between 5 to 7.99 baskets, 42.5% sold between 8 and 10.99 baskets, 17.5% sold between 11 and 13.99 baskets while 5% of white shrimp marketers sold more than 14 baskets per day. Ten percent of the marketers sold a basket of dried shrimp sold in the market weighed between 20 and 20.9kg, majority (80%) had a basket that weighed between 21 and 22.9kg while 10% of weighed 23kg and above. Five percent of marketers sold shrimps that weighed less than 1000kg, 12.5% sold between 1000kg to 4,999kg, 25% sold between 5000kg to 9999kg, 10% of sold between 10,000kg and 15,000kg while 2.5% sold shrimp that weighed over 15,000kg.

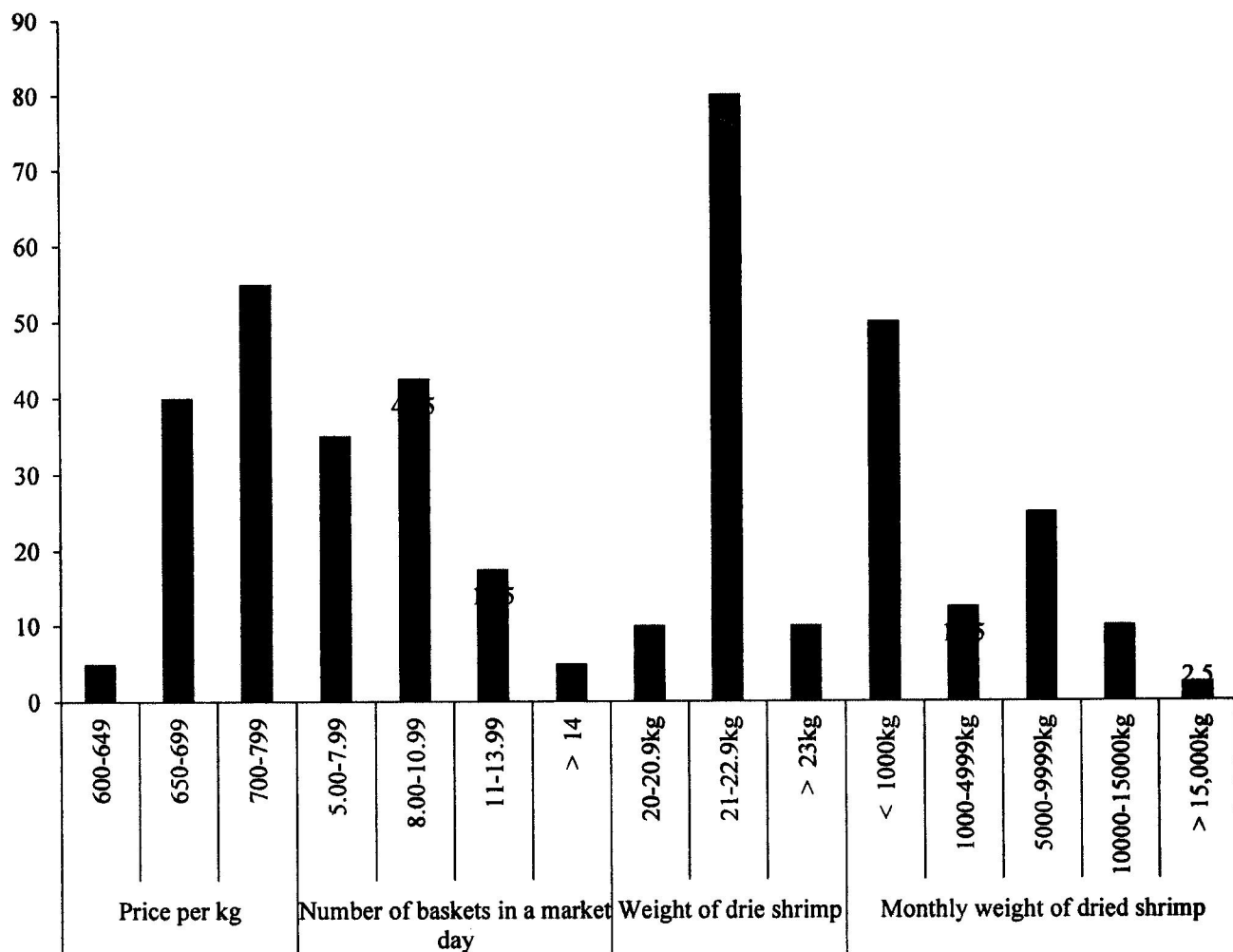


Figure 13: Distribution of marketers by price per kg of dried shrimp, number of baskets sold per Month, weight of dried shrimp and daily weight of dried shrimp.

Source: Field Survey, 2016.

4.4.8 Distribution of marketers by weekly marketing cost, monthly marketing cost, Amount paid for rent and transportation cost

Figure 14 provides information on the cost of marketing services, amount paid for rent and transportation cost. 27.5% spent less than ₦ 1000 for weekly marketing cost, 65% spent between ₦1000 and ₦ 2999 weekly while 7.5% spent between ₦ 3000 and ₦ 4999 weekly on white shrimp marketing. On a monthly basis, 47.5% spent less than ₦ 5000 monthly on marketing, 50% spent between ₦5000 and ₦9,999 while 2.5% spent between ₦ 10,000 and ₦ 14,999 monthly on marketing.

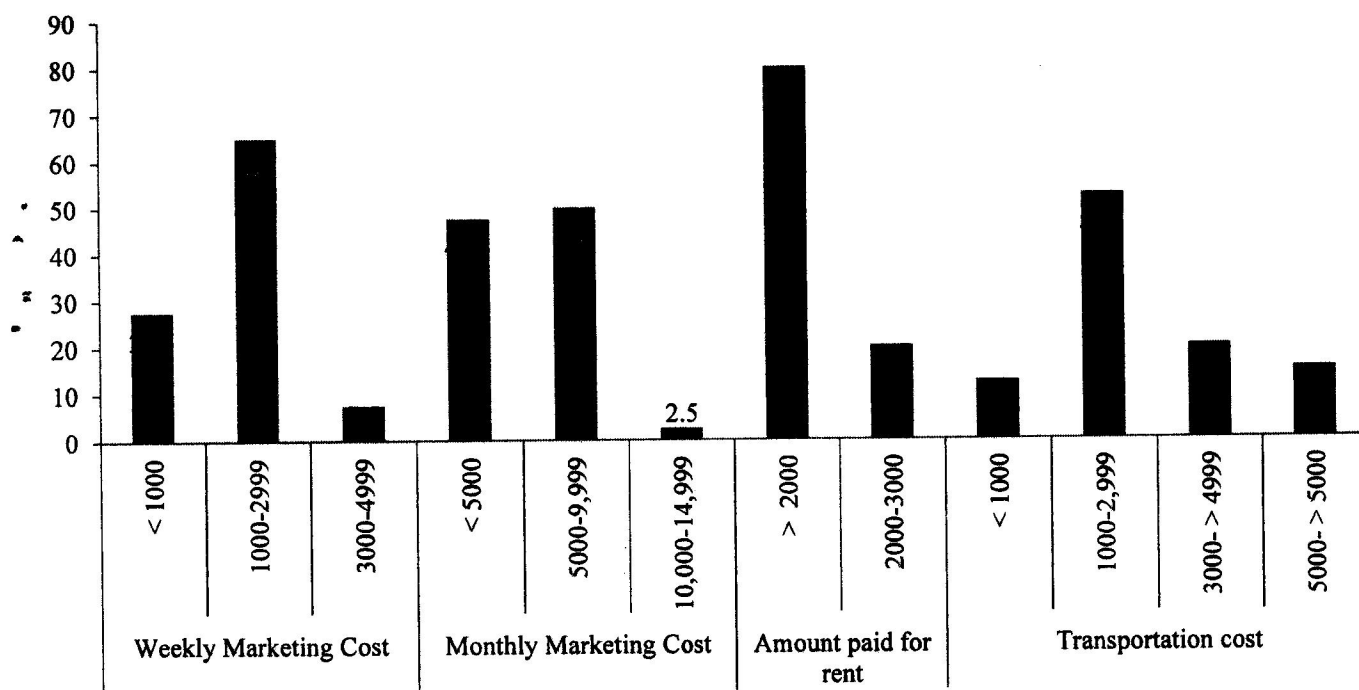


Figure 14: Distribution of marketers by weekly marketing cost, monthly marketing cost, Amount paid for rent and transportation cost.

Source: Field Survey, 2016.

4.4.9 Distribution of marketers by income per week, income per month and the profit

Figure 15 provides information the distribution of marketers by income per week, per month and the profit. Twenty percent of marketers earned between ₦ 100,000 and 149,000 per week from shrimp sales, 67.5% got between 150,000 and ₦ 199,999 weekly while 12.5% earned ₦200,000 and above. Five percent respondents had profit less than ₦ 10,000 monthly, 7 % had between ₦ 10,000 and ₦ 11,999, 22.5 had between ₦ 12,000 and ₦ 13,999 on monthly basis while majority (65 %) of white shrimp marketers had a profit of ₦ 14,000 and above on monthly basis.

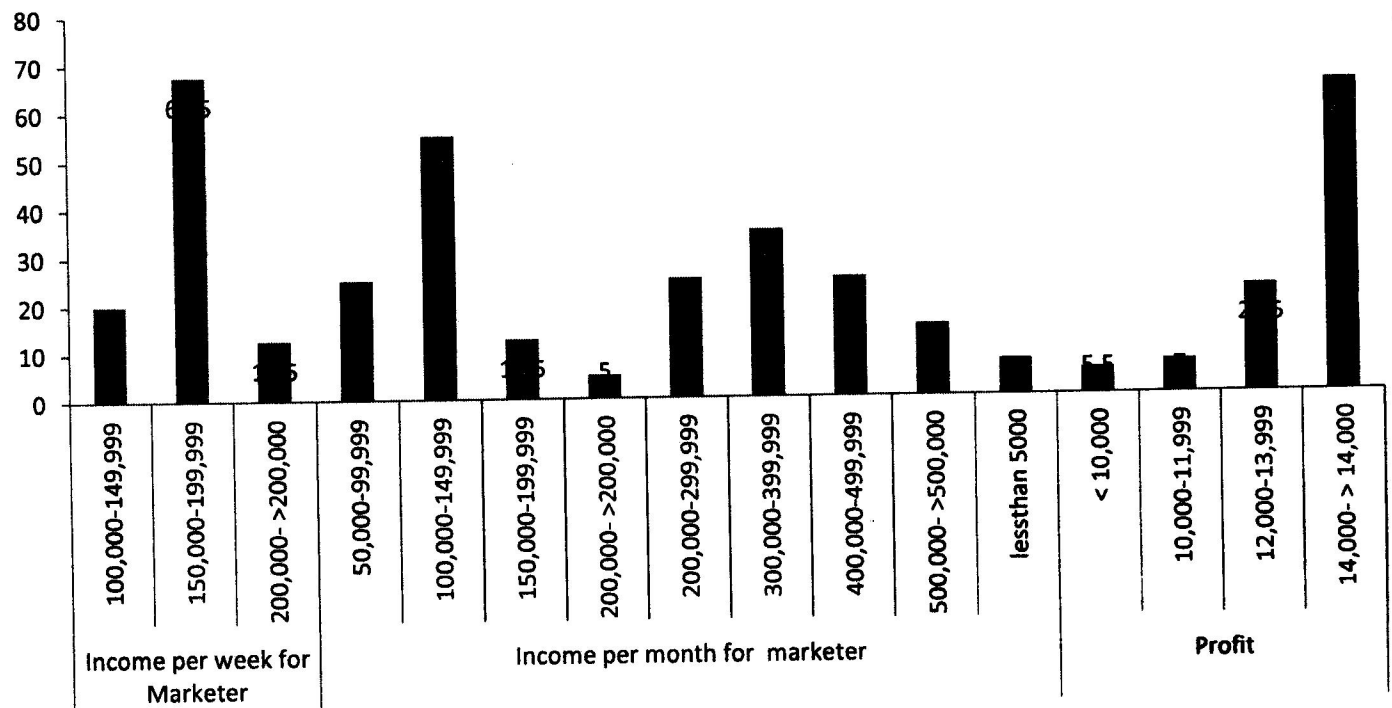


Figure 15: Distribution of marketers by income per week, income per month and the profit.

Table 11: Cost and Return Analysis of Shrimp Processing

| Variables | Mean |
|-----------------------------------|-------------|
| Price per measure fresh | 12000.00 |
| Price per kg | 230.77 |
| Dried shrimp cost (FSC) | 15000.00 |
| Price shrimps per kg of Processed | 666.67 |
| Firewood | 46165.85 |
| Fuel | 1670.00 |
| Monthly total Shrimp Cost | 642146.34 |
| Processing mat | 530.00 |
| Additives | 112.82 |
| Packaging Materials | 2452.50 |
| Total processing cost(TPC) | 693077.51 |
| Price to marketers per kg | 688.75 |
| Revenue® | 802682.93 |
| Gross margin = R – FSC | 160536.59 |
| Profit = R – TPC | 109605.41 |
| Benefit Cost Ratio | 1.16 |
| Return on Investment | 0.16 |
| Percentage Profit | 16.00 |

Source: Field Survey, 2016.

4.6 Cost and Return Analysis of White Shrimp Marketing

Budgeting analysis of white shrimp marketers is presented on Table 12. A basket of dried white shrimp in Igbokoda and Obi market weighed an average of 22.50 kg. Average marketing cost in the study area was ₦414, 017.53 (made up of transportation cost, market due/rent, shrimp cost, cost of other materials and cost of marketing services). Marketers sold an average of 199.13kg of *N. hastatus* per market day and 597.38 kg per month. Market price averaged at ₦ 777.78 per kg of the dried shrimp. It reveals that a typical shrimp marketer in the study area sold an average of 8.85 baskets of dried shrimp per market day baskets sold per market day and 26.55 baskets per month. A typical marketer sold a basket of dried shrimp to consumers and whole sale marketers at an average market price of ₦ 17,500.00 which was bought from the processor at an average price of w ₦ 15,000.00. Marketers had average total revenue of ₦ 464,625.00 per month. The profitability analysis indicated that a typical shrimp marketer in the study areas had an average positive gross margin (GM) of N66, 375.00, benefit- cost ratio (BCR) of 1.12, return on investment (RI) of 0.12 and a percentage profitability of 12.22.

Table 12: Cost and Return Analysis of White Shrimp Marketing

| Variables | Mean Value (₦) |
|--------------------------------------|----------------|
| Number of Baskets sold / Market Day | 8.85 |
| Number of Baskets sold/Month | 26.55 |
| Marketer price (₦) | 17500.00 |
| Processor price (₦) | 15000.00 |
| Weight of dried shrimp (kg) | 22.50 |
| Daily weight of dried Shrimp (kg) | 199.13 |
| Monthly weight of dried shrimp (kg) | 597.38 |
| Market price per kg (₦) | 777.78 |
| transportation cost (₦) | 816.28 |
| Market due/rent (₦) | 1762.50 |
| Shrimp cost(SC) per month (₦) | 398250.00 |
| cost of other materials (₦) | 7850.00 |
| Cost of Marketing Services (CMS) (₦) | 15767.53 |
| Total Marketing Cost (TMC) (₦) | 414017.53 |
| Shrimp sales per month (SS) | 464625.00 |
| Gross margin=SS-SC | 66375.00 |
| Profit =(SS-TMC) | 50607.47 |
| Benefit Cost Ratio | 1.12 |
| Return on Investment | 0.12 |
| Percentage Profitability | 12.22 |

Source: Field Survey, 2016.

4.7.0 SWOT analysis of white shrimp processors and marketers

4.7.1 Strength of white shrimp Processors and Marketers are;

The strength identified in the processing and marketing stages of white shrimp were:

- Large family labour due to large household size;
- High production by fishers in the landing sites and species availability;
- Women dominance;
- Shelf life of processed shrimps between 80 and 120 days without spoilage;
- Additives such as pepper has a capacity to increase the shelf life of the species;
- Cleaning the kitchen and its environment weekly enhance the hygienic nature of processing enterprise which consumers can rely on for their consumption safety;
- 47.5% of processors depend solely on shrimp processing for their livelihood
- The enterprise is averagely profitable
- Processed white shrimps are more available at Bijinmi and Ayetoro for marketers preference
- Shrimp marketing provides job opportunities for various categories of marketers such as wholesaler, retailer, road side marketers etc.
- There is positive gross margin and profitability in the processing and marketing of white shrimp in the study areas
- Year of experience in the processing and marketing of White Shrimp in the study area is a sign of adaptability to the business

4.7.2. Weakness' of white shrimp Processors and Marketers are;

- Capital
- Seasonality
- Inadequate artisanal skill

- Rudimentary technology
- Poor processing method
- Amount of by catch in fresh shrimp bought from fishers is very high which may reduce the quantity of shrimps available for processing
- Majority do not add value meaning most of the products will not be marketable internationally since the global market by value added product
- Majority do not belong to trade union which implies that they might not be able to benefit from the dividend of being a member

4.7.3 Opportunities of white shrimp Processors and Marketers are;

- Organisations such as NAFDAC and SON can expand their tentacles of operation to the study area for food product standardization for local and international markets
- Value addition can increase their income and the product become unique in the market
- Trade union
- Improved white shrimp processing methods
- Advancement in development of gears that will target mainly white shrimp thereby reducing quantity of by catch
- Post-harvest processing such as freezing, cold blasting could increase the acceptability of white shrimp from the study area in the international global shrimp market
- Government can broaden their tax net by including shrimp processors through payment of highly affordable rate
- Processors should form cooperative organ to assess government and NGO interventions
- Large scale export for European Countries

- Processors should get involved in other business during the off peak month so as to complement their source of income
- Establishment of mechanized Processing centres
- Value addition should be encouraged in the marketing stage of White Shrimp to consumer's acceptability due to variation in taste and income. It will also increase marketers income
- Products development

4.7.4 Threat of white shrimp Processors and Marketers are;

- Too much of by-catch
- Seasonality of shrimp catch
- Health hazards
- Undried wood leading to increase in processing hours
- Effect of Polycyclic Aromatic Hydrocarbon from wood
- Inadequate gain
- Major area for wood source is very far
- The number of times marketers patronize processors could increase the pressure on fishermen capturing white shrimp which may reduce Maximum sustainable yield

4.8 Constraints of white shrimp processing

Table 13: Constraints of white shrimp processing

| Variables | Rank |
|---|-------------|
| Smoke | 1st |
| Stress | 2nd |
| Undried wood | 3rd |
| Health(redness of eyes, cough, catarrh) | 4th |
| Capital | 5th |
| Inadequate gain | 6th |

Chapter Five

5.0 Discussion and Conclusion

5.1 Discussion

5.1.1 Socio-economic characteristics of Shrimp processors and Marketers by the distribution of Participants in the value chain.

The distribution of processors and marketers by gender showed that both enterprises were dominated by females. This result corroborated that of Odulate *et al.* (2011) who reported a similar trend in the coastal wetland areas of Ogun state, Nigeria, This is equally similar with the work of Fagbohun (2012) who documented that majority of processors and marketers in the captured fishery of Ogun Waterside Local Government in Ogun state were females. Nwabeze *et al.* (2013) and Dambatta (2015) equally revealed the dominance of women in the processing and marketing stages of captured fishery in Kainji Lake basin, Niger and Kano States, Nigeria respectively.

Majority of shrimp processors and marketers were married. Therefore, it is expected that there should be strong ties between family and the enterprise as decision related to shrimp processing and marketing can be jointly taken together. This is in support of Fagbohun (2012) who revealed that majority of captured fishery processors and marketers in Ogun waterside Local Government in Ogun state were married. Cliffe *et al.* (2015) equally documented the dominance of married women in fishery activities in Rivers states. The distribution of participants in *N. hastatus* value chain by level of education is another critical socio-economic factor that affects shrimp processors and marketers. Majority of these processors and marketers had no formal school which is in line with Williams (2006) that fish processors and marketers in Rivers states are not well-read, with little or no education. Eyo (2006) also reported generally low level of education among artisanal processors and marketers in Akwa Ibom State, Nigeria. This finding supported previous findings that most processors and marketers in coastal areas of Nigeria had no formal education

(Olubanjo *et al.* (2007). However, Adeokun *et al.* (2006) and cliff *et al.* (2015) described that majority of processors and marketers in the coastal areas of Ogun and Rivers States, Nigeria had primary and secondary school respectively. Nwabeze *et al.* (2006) documented that majority of the processors and marketers had no formal education in Lake Kainji which may reduce positive responses towards improved techniques. This assertion is supported by Dogondaji and Baba (2010) who opined that high literacy level could have positive impact on the adoption of technologies. Education creates favourable mental attitude for acceptance of new practices especially of information and management intensive practices. The implication is that the educated processors and marketer are in better position for better investment and rational decision for increased income compared to uneducated ones. Information on respondent's household size is of great importance to particularly processors as it serves as an indication to the level of their contribution to shrimp processing because of the stressful nature of the enterprise. Large house hold sizes are expected to enhance labour availability especially where the household members are of labour age. The processors and marketer saves the money which could have been paid to hired labour while such liquidity is ploughed into the enterprise as to further enhance family income and profitability.

Majority of the white shrimp processors are within productive age and they can do a lot of work if given necessary incentives. Therefore it can be concluded that shrimp processing and marketing in the study areas were in the hands of respondents in the age bracket 30 and 39 years and 31 and 40 years respectively. This finding is in agreement with Cliffe *et al.*(2015) who put majority of captured fish processors and marketers in Rivers State, Nigeria within the age bracket of 31 and 40 years. George *et al.* (2010) described a positive correlation of age with productivity. Hence, there exist greater potentials of improving white shrimp processing and marketing in the study area if necessary incentives are provided

at the right time. Incentives can be in form of modern technologies behind processing and how to add value to their processed white shrimp.

Equally, the number of children and the household size serves as an indication to the level of their contribution to white shrimp processing and marketing. On the other hand, may lead to an increase in the total weight of fish consumed by family leading to decreased processors and marketers' income.

Processors and marketers in the study areas had an average of 21.50 and 25.80 years of experience respectively. This indicated that they are adapted to and old in the enterprise, the older an individual get in the enterprise, the more they get to understand the management practices of the enterprise, this is also in assertion agrees with Ekanem (2012) who said that experience matters in adoption of recommended packages of innovations and modern processing technologies. Iheke (2009) equally opined that the number of years of experience show the adaptability and profitability of an enterprise. Marketing experience was found to be positively related to income of captured fish processors and marketers which allowed them to effectively managed their processing and marketing activities and risk as well as make sound decision to enhance their performance in Ogun Water Side, Nigeria.

5.1.2 Processing and Marketing Information

Shrimp processing is stressful requiring re labour contribution from processors families particularly during smoking, packaging into nylon and packaging before sales to customer in the market respectively. So because of these ancillary roles undertaken by women and other household members, many processors and marketers tends to have large families that can contribute positively to their livelihood.

The distribution of white shrimp by-catch revealed that fishers catch other aquatic organism apart from the shrimp itself. This by-catch can serves as fish soups, fish biscuits and sold by processors to fish feed manufacturer there by generating income for them. This is in line with Kumolu-Johnson (2011) who opined that by the time the by-catch is taken to the landing site, it may be fit only for use as fish meal,

which is used in animal feed. On the other hand this is here by contributing to the extinction of such species in the aquatic environment and reduces the quantity of shrimp available for processors which may affect their profitability.

The distribution of white shrimp processors and marketers by peak and off peak season is of great importance to production as it depicts the availability of the white shrimp both fresh and dried (processed). The abundance of the white shrimp is therefore aligned with season. So it is therefore expected to preserve the shrimp during rainy season for the time it will be costly during the dry season. Adewale and Ikeola (2005) revealed that the volume of fish products in the market and income generated depends on seasonality of trade which also depends on seasonality of production; respondent agreed that processed and marketed captured fish is more abundant in rainy season which implies more trade and more income at that time.

Majority of processors do not wash their shrimp before processing due to the fact that it does not usually have dirt except the by-catch. The processing method used in the study area was smoking. This was equally established by cliff (2015) that captured processing method in Rivers State, Nigeria was smoking. The stressful nature of the processing enterprise starts from the time of spreading the fresh white shrimp on the smoking mat, undried wood which takes processing longer time as well as smoke that affects the eye. *N. hastatus* processing hours is an indicator for the shelf life of processed shrimp. The shrimp must be processed to dryness, thereby reducing the moisture level to minimum to avoid spoilage. When shrimp is processed very well, shelf life is increased. The processing hours should not be high to prevent the denaturing of protein content in the shrimp because shrimp is a source of protein, minerals and vitamins such as calcium, Iron, Zinc. Yanar and Celik (2006) concluded that white shrimp is an excellent source of protein and essential high-unsaturated fatty acids, minerals and vitamins such as calcium, iron which may be affected by high heat. Mgawe, (2008) also opined that captured fishery subjected to high

smoking heat results in damage to the nutritional value of fish protein, with losses in availability of Lysine and other essential amino acid.

Information on how often marketers patronized processors and frequency of patronage is important because it makes production cycle to continue. Marketers' patronage shows the demand of the products in the different areas marketers come from. Majority of marketers outside the Ondo State are from different States in the Southern part of Nigeria which indicates the demand spread of the white shrimp products.

From the study, it was revealed that majority of them do not add value to the dried shrimp in order to increase its shelf life and this may be due to the fact processed shrimp do not take longer time before it is being bought by marketers. However, despite our progress in the captured shrimp production, the subsector is still characterized by low processing technology which has reduced the maximum economic benefit from the subsector. Products exported internationally are sent as relatively unprocessed commodities while further processing occurs in Europe thus benefitting the Europeans in terms of jobs and greater profit (Odebiyi *et al.*, 2010). As production from the captured fisheries increases through proactive management as well as the increased production of aquaculture products through investment, there is need for adequate planning for products availability at desirable level. This desirability as envisaged by numerous factors such as price, income, income distribution, substitutes, tastes and fashion, advertising and expectations of the consumers affects the demand function of fish and fishery products. These factors make the changes along the demand curve and demographic characters lead to changing position of the demand curve, upward or down ward shifting of the curve. Hence, to achieve maximum and sustainable economic efficiency in shrimp fishery, product promotion and sales must be tailored towards meeting the desirability of consumers.

any trade union, they based their inability to pay due to inadequate infrastructural in fishing communities and Government has not provided anything that could boost their businesses. However, for Government to expand their tax net towards this area, more emphasis should be placed on infrastructural provision and other support services that could enhance their profitability which may affect their willingness to pay tax. Trade union could help in supporting the members by borrowing themselves money to support the business or even in case of unforeseen situation that might occur they tends to help themselves. This is in line with Odebiyi (2010) who submitted that cooperative groups ensure that their members derive benefits from the groups such as they could not derive individually.

Okeowo *et al.* (2015) however described membership of cooperative society was dominating and beneficial in Epe and Badagry, Nigeria respectively. Trade union was positively related to income of the fish marketers in Epe and Badagry, Nigeria. Members of marketing organisation had access to agricultural information, training, credit and other marketing inputs as well as enhanced abilities to adopt innovations (Okeowo *et al.*, 2015). None participation unions might lead to undulating price regime in communities and even the unity to ask for Government support may not be there. Government or donors agencies will not even know how to get contact with processors and marketers for support.

Processors' income and profitability of enterprise is an important to pointer to prospective investors and livelihood managers. Processors agreed that the enterprise is profitable. Profitability indices such as a positive benefit cost ratio, rate of investment and 16% percentage profitability indicated that the processing enterprise is profitable. Other alternative sources of income for shrimp processors in the study area are fin fish smoking and local goods trading. However, Ogunremi (2016) said other source of income for processors in the artisanal fisheries of Ondo State, Nigeria was farming.

Number of times marketers' visits processor determines affects resource extraction and product supply in the value chain Thyresson *et al.* (2013). The frequency of patronage calls for more proactive policy

measures for fishing input control to maintain the maximum biological yield of *N. hastatus* in the study area. Marketers transported shrimps through vehicle and boats which should be cheap and effective. This is in line with Falodun (2011) who revealed that processed captured fish was transported to market through road (vehicle) and water (boat) in Ogun Water Side, Nigeria.

Most processors do not label their packaged shrimp. Value could be added by sealing shrimps in measure quantity in nylon and then labeling it. This could make their product unique in the market and even increases their income. The processed shrimp were package in nylon, jute bag and even plastic bowl before is sold to marketers. The few that add value use dried pepper to increase shelf life of processed shrimp even to the consumer.

The source of processed white shrimp for marketers is very important. Results indicated that processed shrimps are abundantly available for marketers at Bijimi and Ayetoro. Marketers must know where there is abundance of processed white shrimp in order not to disappoint the consumers. Majority of processors and marketers interviewed were wholesalers. They also sell to retailers and even to consumers whereas Falodun (2011) said that most processors in Ogun Water Side Nigeria distributed their smoked captured fish directly to consumer.

The dominance of the marketing of white shrimp within Ondo states are mainly done in Igbokoda and Obi which may due to the fact that the two markets are large and easily accessible by Marketers(wholesaler, retailers) and consumers particularly Igbokoda Market. *N.hastatus* marketers outside Ondo states are from South East particularly Owerri which depicts the demand spread of the products in these areas.

Size of labour force of processors is an important part of production function. The reason for the use of family labour could be informed by high cost of labour and the profit they make is not much, they tends not to increase the labour force because they cannot afford it. So, majority of them use family labour

force, since the household size is large because of their number of children, this help in the high production. The use of unskilled labour force because there is no availability of skilled labour force and even if there is presence of skilled labour, processors might not be able to employ them. Processors do not run shift duty, they only process after they might come from the landing sites. They process for like 6 to 9 hours to drying of the white shrimp then go back to their house.

5.1.3 Budgeting Analysis of Shrimp Processing and Marketing

The cost return and profitability of processors and marketers shows that white shrimp processing and marketing is profitable. . This indicated by the profitability indices of processors such as positive net income (₦160536.59), benefit- cost ratio (1.16), return on investment (0.16) and percentage profitability (16.00 percent) respectively .

Marketing cost involve the cost of transportation and other materials such as packaging materials (Nylon, Baskets, Bowls etc.). Rent or dues paid every market day which is usually every nine days or even the union dues paid by those who belong to trade union. Shrimp marketing was profitable by the magnitude of positive net income (₦66375.00), benefit-cost ratio (1.12), return on Investment (0.12) and percentage profitability (12.22). This is similar with Oparinde *et al*, (2014) who evaluated a positive gross margin and rate of investment for fish marketing in coastal area of Ondo state, Nigeria. However, profitability could be increased if value is added to these products there by attracting more revenue for the marketers and opening it to international marketers.

White shrimp is processed in other to preserve and increase its shelf life. Majority of consumers have preference for dried shrimps, therefore smoking is applied on it by processors before they are sold to marketers. The shrimp must be processed to reduce moisture content to the bearest minimum. The efficiency of the wood determines the number of strands to process a batch of white shrimp. Most of the

processors keep the wood they use for processing outside, when rain fall on it or it might be wet from the Ijaws. It makes it difficult to ignite when using it for processing Processing mat is very important in shrimp processing, it is on processing mat fresh shrimp is spread on during processing. The heat first gets to it before the shrimp. Some processors use it more than a year in which it is not really idea. By this time, it would have turned to black even contaminating the shrimp. Number of times fresh white shrimp are processed depends on how many baskets and cost of fresh shrimp. Processing cost should be able to get efficient processing equipment like wood, fuel, packaging materials, additives etc.

Inadequate capital was one of the major constraints for shrimp processing and marketing in the study area. This is also in line with of Fagbohun (2012) which stated that majority of processors and marketers in Ogun Water Side, Nigeria do not have access to capital which indicates their low level of access to productive resource. This is in conformity with Odulate *et al.* (2011) who revealed that capital is inadequate for processors and marketers in coastal areas of Ogun State, Nigeria. Majority of the processors said shrimp smoking is stressful due to the amount of smoke generated in the process. The smoke affects their health of processors which may lead to redness and swelling of the eyes, catarrh and cough. This is similar with Odulate *et al.* (2011) who said that smoke affects the roles of women in in coastal wetland Areas of Ogun State, Southwest Nigeria. Fagbohun (2012) opined that majority of the processors face series of occupational hazards that discourage them from the business, having problem with redness and swelling of the eyes in Ogun waterside Local Government in Ogun state. Most white shrimp processors used firewood as source of smoking fuel which is efficient in the processing method. This is similar with Adeyeye *et al.* (2015) who revealed that that majority of captured fish processors in Lagos state used firewood as a major source of fuel.

5.1.4 Strength, Weakness, Opportunities and Threat

5.1.5 Conclusion

The degree of profitability recorded from this analysis revealed that profitability could still be improved through value addition, while inability of processors and marketers to attain the peak of their enterprise frontier could also be attributed to some problems such as inadequate capital, health hazards, undried wood etc. It can be concluded that Processors and Marketers was found to be profitable in the study area considering the fact that processors and Marketers were able to cover their operating expenses shown by magnitude of the Gross -Margin obtained, Benefit-Cost Ratio, Return on Investment and Percentage Profitability.

More emphasis should therefore be placed on value addition, products development and standardization, large scale exports, establishment of mechanized Processing and developed Marketing centers.

References

- Abulude, F.O., Lawal, L.O., Ehikhamen, G., Adesanya, W.O. and Ashafa, S.L., (2006): "Chemical Composition and Functional Properties of Some prawns from the Coastal Area of Ondo State, Nigeria". *Electron. J. Environ. Agric. Food Chem.* 5 (1), 1235-1240.
- Adeokun, O. A., F. O. Adereti and A. I. Opele, (2006): Factors influencing adoption of fisheries innovations by artisanal fishermen in coastal areas of Ogun State, Nigeria. *Journal of Applied Sciences Research*, 2 (11): 966-971.
- Adeparusi, E. O., Ajibefun A. I., Akeremale E. O. (2003): Smoke-Curing of Fish by Artisanal Fisherfolks in Ilaje, Ondo State, Nigeria, *International J. of Agriculture, Science and Environmental Technology*, 3 (4):101-109
- Adewale, J.G., Ikeola, R.F. (2005): "Resettlement Coping Strategies of Women Settlers Around Dams In Nigeria: A Case Study of Erelu Dam In Oyo, Oyo State, Nigeria." *Journal of Human Ecology* 17(3): 177-181
- Adewuyi, S. A. Phillip, B. B. Ayinde, I. A. and Akerele, D. (2010): Analysis of Profitability of Fish Farming in Ogun State, Nigeria *J. Hum Ecol*, 31(3): 179-184.
- Adeyeye, S.A.O. Oyewole, O.B. Obadina, A.O. Omemu, A.M. Oyedele, H.A and Adeogun, S.O. (2014): A survey on traditional fish smoking in Lagos State, Nigeria, *Africa Journal of Food and Science*, 9 59-64
- Adeyeye S.A.O., Oyewole O.B., Obadina A.O., Omemu A.M., Oyedele H.A., and Adeogun S.O., (2015), Socio-Economic Characteristics of Traditional Fish Processors in Lagos State, Nigeria, *International Journal of Aquaculture*, 5(37): 1-6
- Agbo F.U. Usoroh B.B. (2015): Marketing of Estuarine Shrimps in Akwa Ibom State, Nigeria, *Journal of Marketing and Consumer Research*, 15: 63-70
- Akinrotimi, O.A., Owhonda, K.N. and Ibemere, I.F (2006): Brackish water fish farming a viable option for poverty alleviation in the coastal areas of Niger Delta. *Proceedings of the 20th Annual Conference of the Fisheries Society of Nigeria*, November 14-18.
- Akinwumi, F. O. Akinwumi, I. O. and Ogundahunsi, O. A. 2011 Characterization of Artisanal Fishery in the Coastal Area of Ondo State, Nigeria. *International Research Journal of Agricultural Science and Soil Science Vol. 1(3) pp. 083-089.*
- Bayode, O.J., Adewunmi E.A. and Odunwole, S. (2011): Environmental implications of oil exploration and exploitation in the coastal region of Ondo State, Nigeria: A regional planning appraisal. *Journal of Geography and Regional Planning* 4(3): 110-121.

- Cliffe, P.T. and Akinrotimi, O.A. (2015): Role of Women in Fishery Activities in Some Coastal Communities of Rivers State, Nigeria. *International Journal of Agricultural Research*, 10: 24-32.
- Cynthia S. (2014) Nutritional Benefit of Shrimp www.wikipedia.com accessed on 14th August, 2016.
- Dambatta, M.A, Dr. Sogbesan, Olukayode Amos (2015): Socio-Economic and Profitability of Fisheries Enterprises in Kano State, Nigeria. *International Journal of Novel Research in Humanity and Social Sciences* 2 (1): 72-83.
- Dongondaji, S. D and K.M. Baba (2010): Income distribution in large scale irrigation projects: A case study of Dry season rice farmers at the Bakolori irrigation project, Zamfara state, Nigeria. *Proceedings of the 24th Annual National Conference of the Farm Management of Nigeria* held at the Adamawa State University, Mubi 11th- 14th October, 2010. 2005, Port Harcourt, Rivers State, Nigeria, pp: 120-125.
- Eyo, E. O., (2006): Strategy for resilience of micro finance schemes serving the artisanal fishing sub-sector in Akwa Ibom State, Nigeria. *Journal of Food, Agriculture and Environment*, 4(2):261–264.
- Ekanem E, Damian A, Gr Etim(2012) Socioeconomic Analysis of Fish Farming in Cross River State, Nigeria: Implication for Food Security Tropentag, G"ottingen Resilience of agricultural systems against crisis, Nigeria. *African Journal of Agricultural Research* 3:246-254
- Fagbohun, A.E. (2012): Socio-economic analysis of fish processing and marketing in ogun waterside local government, ogun state Nigeria, B.Sc thesis Submitted to the Department of Fisheries and Aquaculture, Federal University of Agriculture, Abeokuta.
- Falodun O.M. (2011): Analysis of marketing channels and efficiency of marketing system for smoked fish market in water side of Ogun state, Nigeria. B.Sc thesis Submitted to the Department of Fisheries and Aquaculture, Federal University of Agriculture, Abeokuta.
- Food and Agricultural Organization (2015): Capture production 1950–2013 and aquaculture production (quantities and values) 1950–2013. *FAO Fish Statistics J. In FAO Fisheries and Aquaculture Department*
- George F.O.A., Olaoye, O.J., Akande, O.P. and Oghobase, R.R. (2010): Determinants of Aquaculture Fish Seed Production and Development in Ogun State, Nigeria. *Journal of Sustainable Development in Africa*, 12 (3): 223-227
- Ghazinoory, S., Abdi, M. and Azadegan-Mehr, M. (2011): SWOT methodology: A state-of-the-art review for the past, a framework for the future. *Journal of Business Economics and Management*, 12(1): 24-48.

- Iheke, O.R. (2009). Economics of homestead vegetable production in Abia State of Nigeria. 43rd Annual Conference of Agricultural Society of Nigeria, Abuja, pp. 305 – 307.
- Investopedia (2011): <http://www.investopedia.com/terms/v/valuechain.asp>, Access date: May 16, 2011.
- Kumolu-Johnson, C.A. and Ndimele, P.E. (2011): A Review on Post-Harvest Losses in Artisanal Fisheries of Some African Countries. *Journal of Fisheries and Aquatic Science*, 6: 365-378.
- Mgawe, I.Y. and Mondoka, E. M. (2008): Post-Harvest Fish Loss Assessment on Lake Victoria Sardine Fishery in Tanzania – *Rastrineobola Argentea*. In *Report Presented at the FAO Second Workshop On Fish Technology, Utilization and Quality Assurance in Africa*, Agadir, Morocco, p. 24–28.
- National Mirror (2014): Nigeria makes \$65m annually from shrimp exports www.nationalmirror.com, accessed 14th July, 2016.
- Nwabeze, G.O, Ifejika, P.I. Tafida, A.A. Ayanda, J.O. Erie, A.P. and Belonwu, N.E. (2013): Gender and fisheries of Lake Kainji, Nigeria: A review. *J. Fish. Aquatic Sci.*, 8: 9-13.
- Nwabeze, G.O, Tafida, A.A. and Ayanda, J.O. (2006): Impact of aquaculture technology on income of homestead fish farmers around Kainji Lake Basin. *Afr. J. Gen. Agric.*, 2: 45-50.
- Odebiyi O.C. (2010): Impact of microfinance bank loan on aquaculture development in Ogun state, Nigeria. A Master project report submitted to the Department of Aquaculture and Fisheries management, Federal University of Agriculture Abeokuta.
- Odulate D. O., George F. O. A. and Idowu, A. A., (2011): Role of Women in Fisheries in Coastal Wetland Areas of Ogun State, Southwest Nigeria. *Proceedings of the Environmental Management Conference*, September 12-15, 2011, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria.
- Ogunremi, J. B., (2016): Strategies for meeting the fishing input requirements of artisanal fisheries in coastal areas of Ondo State, Nigeria. *Bulg. J. Agric. Sci.*, 22: 543–547.
- Okayi, R. G, Solomon .S.G, Ataguba .A.G, Chukwudi .O.P. and Mbata .F.U. (2013) Indigenous knowledge of shrimps and prawn species and fishing of the Benue and Niger river (middle – belt savannah) – Nigeria, *Agriculture and Biology Journal of North America* 221-226.
- Okeowo T. A, Bolarinwa J.B. Dauda Ibrahim (2015): Socioeconomic Analysis of Artisanal Fishing and Dominant Fish Species in Lagoon Waters of EPE and Badagry Areas of Lagos State.
- Olawusi-Peters Olamide O, Ajibare Adefemi O and Bello-Olusoji Oluayo A (2014): Length-weight relationship and condition factor of shrimps in coastal waters of Ondo state, South West Nigeria, *International Journal of Fisheries and Aquatic Studies* 2014; 1(3): 137-142

- Olubanjo, O.O., Akinleye, S.O. and Balogun, M.A.(2007): Occupational characteristics, technology use and output determinants among fisher-folks in Ogun Waterside Area, Ogun State. *FAMAN (Farm Management Association of Nigeria) Journal*, 8 (2): 19-27
- Omobepade, B.P., Adebayo, O.T., Amos, T.T. and Adedokun, B.C.(2015) :Profitability Analysis of Aquaculture in Ekiti State, Nigeria. “*Nigeria Journal of Agriculture Food and Environment*” 11: 114-119.
- Oparinde, L.M., Ojo, S.O (2014): Structural Performance of Artisanal Fish Marketing in Ondo State, Nigeria, Proceedings of the International Institute of Fisheries Economics and Trade, Tanzania, pp 1-13.
- Public Health Agency of Canada, (2008): Fish Value Addition www.wikipedia.com, accessed on 4th July, 2015.
- Thyresson M., Crona B., Nystrom M., DelaTorre-Castro M., Jiddawi N., (2013): Tracing value chains to understand effects of trade on coral reef fish in Zanzibar, Tanzania, *Elsevier Journal of Marine Policy*,38(2013):246–256.
- United State Agency for International Development (2009): “Global food security response Nigeria (rice study)”, Attachment IV to the Global food security response West Africa (Rice Value Chain Analysis), United State Agency for International Development.
- Vinuya, F.D. (2007): Testing for market integration and the law of one price in world shrimp markets. *Aquaculture Economics & Management*, 11(3): 243–265.
- Williams, S.B.,(2006): The socio-economic potentials of women in riverine small-scale fisheries in Nigeria. Department of Agricultural Economics, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria.
- Wikipedia (2016): Health Benefit of Shrimp, accessed 16th September, 2016.
- Yanar Y, Celik M (2006). Seasonal amino acid profiles and mineral content of green tiger shrimp (*Penaeus semisulcatus*, De Haan, 1844) and speckled shrimp (*Metapenaeus monoceros*, Fabricius 1789) from the Eastern Mediterranean sea. *Food Chem.* 94:33-36

White shrimp processors and Marketers questionnaire

White shrimp processor Questionnaire

**THE FEDERAL UNIVERSITY OF OYE-EKITI, EKITI STATE, NIGERIA
FACULTY OF AGRICULTURE,
DEPARTMENT OF FISHERIES AND AQUACULTURE**

Dear Sir/Ma,

PROCESSOR'S QUESTIONNAIRE

This questionnaire has been drawn to investigate the processing of white shrimp in coastal areas of Ondo State, Nigeria. The information so gathered will be used strictly for academic purpose and treated with utmost confidentiality.

Your co-operation in completing this questionnaire will be highly appreciated.

Thank you.

Michael Adeniji

Coordinates: North.....

East.....

QUESTIONS

(A) GENERAL INFORMATION

1. Name of Town/Village
2. LGA:.....
3. Age.....
4. Sex : Male []; Female []
5. Marital Status: Single (); Married (); Widowed (); Separated ()
6. Number of wives..... Number of children.....
7. Level of Education: No formal education (); Primary School education (); Secondary School education (); Tertiary education (); Non-formal education (); others (specify).....
8. Years of Processing Experience.....

(B) NATURE AND FUNCTION OF PROCESSING ENTERPRISE

1. How many baskets of *N. hastatus* do you buy from fishermen per day.....(convert to kg).....
2. How many number of days does it take you to process shrimp bought from fishermen per batch.....
3. How long does it take you from landing site to the processing site..... (minutes)
4. What method do you in processing/preserving your catch before selling to marketers

Oven drying Sun drying Smoke drying others specify

.....

5. How often do you wash the shrimp before smoking None twice above two
6. Quantity of shrimp processed per smoking tray.....
7. Fresh weight of shrimp purchased from fishermen (shrimp + by catch).....
8. Weight of by-catch.....
9. Area of smoking Tray(m)
10. How do you package the shrimp after processing nylon toon bag
11. What months of the year is your peak season.....
12. What months of the year is your off-peak season.....
13. How stressful is the processing method very stressful y stressful stressful
14. How many hours do you process per batch of *N. hastatus*
15. How many days or weeks the processed *N. hastatus* last before setting to spoilage.....
16. How often do marketers patronize you very often too often etimes
17. How many days in a month do marketers patronize you
18. What is the size of your labour force? Numbers of skilled labour Unskilled
19. Do you use family labour? Yes No
20. Year the processing house (kitchen) was built.....
21. Do you run shift duty? Yes No
22. How do you measure shrimps for sales to marketers: using basket jute bag bucket bowl
23. Price (naira) per measuring materials basket Jute.....
 Bucket..... Bowl.....
24. Weight per basket of processed shrimp
25. Quantity of shrimp sold to marketers per week (in basket).....

(C) PROCESSING MATERIALS

1. What types of wood do use in processing
2. Where do you get the wood from sellers from fores
3. Locations of wood sellers.....
4. How mush do you buy a strand of the wood
5. How many strand of wood do you use for processing per batch of shrimps.....
6. Do you add kerosene to your wood before it could ignite Yes No
7. How far is the source of your wood to the processing site very far not far quite far
8. How long have you been using your processing tray 3 years 5 years more than 5 years

9. What constraints do you face in processing and distribution of the shrimp products

10. Frequency of processing shrimps daily [] weekly [] biweekly []
11. Cost of processing per day/weekly

| Items | Cost/unit | Total cost |
|---------------------|-----------|------------|
| Firewood | | |
| Oven | | |
| Fuel | | |
| Tray | | |
| Additives (if any) | | |
| Packaging materials | | |

12. Other information on shrimp processing
-

White shrimp Marketer's Questionnaire
THE FEDERAL UNIVERSITY OF OYE-EKITI, EKITI STATE, NIGERIA
FACULTY OF AGRICULTURE,
DEPARTMENT OF FISHERIES AND AQUACULTURE

Dear Sir/Ma,

MARKETER'S QUESTIONNAIRE

This questionnaire has been drawn to investigate the marketing of white shrimp in coastal areas of Ondo State, Nigeria. The information so gathered will be used strictly for academic purpose and treated with utmost confidentiality.

Your co-operation in completing this questionnaire will be highly appreciated.

Thank you.

Michael Adeniji

QUESTIONS

(A) GENERAL INFORMATION

- 9. Name of Town/Village
- 10. LGA:.....
- 11. Sex : Male []; Female []
- 12. Marital Status: Single (); Married (); Widowed (); Separated ()
- 13. Number of wives..... Number of children.....
- 14. Level of Education: No formal education (); Primary School education (); Secondary School education (); Tertiary education (); Non-formal education (); others (specify).....

(B) NATURE AND FUNCTION OF MARKETING ENTERPRISE

- 1. How do you transport the shrimp from processing site to the markets vehicle?
Motorcycle trekking
- 2. How do you add value to the shrimp before getting to the markets sealing canning others specify.....
.....
.....
- 3. What is the market price of *N. hastatus*
- 4. What is the weight of *N. hastatus* that is one basket
- 7. What materials do you use to package your products before selling to the consumer nylon
- 8. Does your product have label Yes No
- 8. How much do you realized from the sales in a day.....
- 9. How much do you realized from the sales in a week.....
- 10. How much do you realized from the sales in a month.....
- 11. Numbers of days you do visit the processors per week.....
- 12. Numbers of days you visit the market in a month.....
- 13. Where do you source your shrimp products.....
.....
- 14. Do you go to processors to buy your products Yes
- 15. Where do you market your shrimp products.....
- 16. How long have you started shrimp marketing business?
.....

18. What is nature of enterprise Roadside marketer Retailer Wholesale / major distributor
19. Nature of shrimps products marketed (tick as appropriate) Smoked-dried fish Sun-dried Fresh shrimp others (Please specify).....
20. Do you package your product before selling? Yes No
21. If yes what is the medium for packaging the fish product Plastic Nylon Jute other medium.....
22. what do you use to sell your product to your buyer bowl basket
23. How do you measure what you use to sell to your buyers scale Basket others specify.....
24. What is the size of your labour force
25. Numbers of skilled labour Numbers Unskilled labour
26. Do you use family labour? Yes No
27. Do you run shift duty? Yes No

(C) MARKETING AND DISTRIBUTION INFORMATION

1. Mode of sale measurement by size by weight by numbers others specify
 2. Quantity of shrimps product sold per day
 3. Price of quantity sold.....
 4. Where do you get the shrimp you market? Landing site Town market processor
 5. Where do you market your product: Within the state Yes No
 6. Within and outside the state: Yes No
 7. In which other states of the federation are your products marketed?
.....
- Do you market every day of the week? Yes () No ()
8. Do you have peak seasons and off peak seasons? Yes () No ()
 9. When do you have off peak and on seasons and how does this seasonality affect the demand for and price of your product?
.....
.....

(D) COST AND RETURNS

13. Do you advertise your product? Yes () No ()
14. What mode of advertisement do you employ?
.....
15. How easy was it getting registered with the government?
.....
16. Do you pay taxes to the Government as a result of this enterprise? Yes () No ()
17. How much do you pay?
 - a. Per month
 - b. Per year.....
 - c. Other period (please specify).....
18. Do you belong to any trade union as a result of this business? Yes () No ()
19. If yes to above, do you pay any monthly or yearly due as a result of this?
Yes () No ()

18. What is nature of enterprise Roadside marketer Retailer Wholesale / major distributor
19. Nature of shrimps products marketed (tick as appropriate) Smoked-dried fish Sun-dried Fresh shrimp others (Please specify).....
20. Do you package your product before selling? Yes No
21. If yes what is the medium for packaging the fish product Plastic Nylon Jute other medium.....
22. what do you use to sell your product to your buyer bowl basket
23. How do you measure what you use to sell to your buyers scale Basket others specify.....
24. What is the size of your labour force
25. Numbers of skilled labour Numbers Unskilled labour
26. Do you use family labour? Yes No
27. Do you run shift duty? Yes No

(C) MARKETING AND DISTRIBUTION INFORMATION

1. Mode of sale measurement by size by weight by numbers others specify
2. Quantity of shrimps product sold per day
3. Price of quantity sold.....
4. Where do you get the shrimp you market? Landing site Town market processor
5. Where do you market your product: Within the state Yes No
6. Within and outside the state: Yes No
7. In which other states of the federation are your products marketed?
.....
- Do you market every day of the week? Yes () No ()
8. Do you have peak seasons and off peak seasons? Yes () No ()
9. When do you have off peak and on seasons and how does this seasonality affect the demand for and price of your product?
.....
.....

(D) COST AND RETURNS

13. Do you advertise your product? Yes () No ()
14. What mode of advertisement do you employ?
.....
15. How easy was it getting registered with the government?
.....
.....
16. Do you pay taxes to the Government as a result of this enterprise? Yes () No ()
17. How much do you pay?
 a. Per month
- b. Per year.....
- c. Other period (please specify).....
18. Do you belong to any trade union as a result of this business? Yes () No ()
19. If yes to above, do you pay any monthly or yearly due as a result of this?
 Yes () No ()

- 20. If yes to above, how much do you pay? (please specify the time period)
.....
- 21. Is this enterprise the only source of income? Yes () No ()
- 22. What other sources of income do you have?
.....
.....
.....
- 23. How profitable is the fish marketing business in your own estimation?
.....
.....
- 24. What constraints do you face in marketing and distribution of the shrimp products?
.....
.....
.....
- 25. Quantity of shrimp marketed per day.....
- 26. Other information on shrimp Marketing.....
.....
.....
.....