Chapter 16
Analysis of Technical Efficiency and Effect of Climate Change on Periwinkle Harvesters in South Nigeria

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ABSTRACT

This study examines the analysis of technical efficiency and effect of climate change on periwinkle harvesters in Akwa Ibom State. The objectives were to assess the socioeconomic characteristics of the periwinkle harvesters, determine technical efficiency of periwinkle harvesters, determine the effect of climate change on periwinkle harvesters. Purposive sampling technique was used to sample eight fishing communities from four local government areas of Oron, Mbo, Udung Uko, and Urue Offong/Oruko. Snowballing technique was used to select 10 respondents from each community, giving a total sampling size of 80. Analytical methods used included descriptive statistics, four-point Likert scale, and multiple regression. The results showed that majority of periwinkle harvesters were female (63%), 46.30% of the respondents were married, 42.59% were single, and 11.30% were divorced.

INTRODUCTION

Background of the Study

Agriculture is at the center of the economy, providing the main source of livelihood for the majority of Nigerians. Agriculture in Nigeria is the foundation of the economy as it keeps the people stable in what they do (Megan, 2018). According to CIA (2012) Agriculture contribute 40% of the Gross domestic

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product (GDP) and employs about 70% of the working population in Nigeria. Agriculture is also the largest economic activity in the rural area where almost 50% of the population lives.

Fisheries is an important sector of agriculture that contributes about 3.00-5.00% to the agriculture share of the Gross domestic product. Nigeria is a Maritime nation with a vast population of over 160 million people and a coastline measuring approximately 853 kilometers. Fish production as an enterprise in this country possesses the capacity to contribute significantly to the agricultural sector (Osagie, 2012). Therefore, the maintenance and sustainability of the life process of these aquatic organisms is undoubtedly important due to their economic role in the society of all fisheries products, shellfish has been noted to have a highest biological value in terms of high protein in the body, low cholesterol content and higher protein assimilation (Amieghene, 2005). Periwinkle, botanically called *Tympanotonus fuscatus* is one of the fisheries products common to the coastal areas of Nigeria, most especially Rivers State. They are found at the inter-tidal zone of brackish water, creeks, estuaries and lagoons in the Niger Delta area (Adebayo-Tayo, *et. al.,* 2006). It is of economic importance as it serves as a source of protein to many Nigerians. It also serves as a source of income to the collectors and marketers, thus forming an important industry in the entire Niger Delta region of the country (Egonmwan, 2007). Furthermore, the shells of these periwinkles are used in place of gravels in the building industry, as decorative arts and in the production of animal feed (Akinrotimi, 2009). The genus *Tympanotonus* commonly known as periwinkle is a single specie of the phylum mollusca, family potomidea and class gastropoda, in this paper periwinkle will be commonly referred to as molluscs or gastropod. It has two varieties namely *Tympanotonus fuscatus var fuscatus and Tympanotonus fuscatus var radula.* The output of this specie has been greatly impeded by factors of climate change (Bob, 2012), because of a decline in the harvest, also periwinkle population is sensitive to changes in climate condition of their habitat.

Periwinkle shell fish contribute significantly to food security and livelihoods. It's provides essential nutrition for people and some percentage of animal protein and minerals to people from the poorest countries (World Fish Center, 2008). This food security is threatened by climate change and the increasing world population. Climate change changes several parameters of the fishing population: availability, stability, access, and utilization. According to Garcia (2010), the specific effects of climate change on these parameters will vary widely depending on the characteristics of the area, with some areas benefiting from the shift in trends and some areas being harmed based on the factors of exposure, sensitivity, and ability to respond to said changes. The lack of oxygen in warmer waters will possibly lead to the extinction of aquatic animals.

The effect of climate change on the output of periwinkle, directly has socio economic impact on the harvesters and buyers of Periwinkle shell fish and on the community at large. Having known the important role played by the abundance of this gastropod in terms of nutrient availability (protein) source of income and purchase power, to mention but a few, it is without doubt that the gradual decline in the abundance and functionality of this specie induced by changes in climate has detrimental effect on the artisanal farmers and the coastal communities (Kawarazuku & Bene, 2012).

Periwinkle production is the process of harvesting Periwinkle from their natural habitat by periwinkle Farmers, and selling same to marketers and then to the final consumers. Over the years, there has been an extensive research on the beneficial effect of periwinkle shell fish to the Society, and it's been discovered that periwinkle is a good source of protein, vitamins and minerals (Jamabo & Chinda, 2010). Periwinkles have a very high protein content of 102mg/ml. according to (Akwuri & Archibong, 2011; Bob, 2012) it is revealed that the organism is very medicinal for cases like endormic goiter due to its iodine calcium phosphate and iron content. Their shell is used as powder for pimples, vim for cleansing,