ANALYSIS OF GENDER DIFFERENTIALS IN INCOME INEQUALITY AMONG CRAYFISH HARVESTING HOUSEHOLDS IN SELECTED STATES OF NIGER DELTA REGION OF NIGERIA

Etim, E. J., Baba, K. M., Ojo, M. A. and Ndanitsa, M. A.
Department of Agricultural Economics and Farm Management,
Federal University of Technology, Minna, Niger State, Nigeria.
Corresponding Authors' E-mail: ebenezeretim@yahoo.com **Tel.:** 08036033700

ABSTRACT
The study examined empirically gender differentials in income inequality, among crayfish harvesting households in some selected State of Niger Delta Region of Nigeria. A multi-stage and stratified random sampling techniques was employed in selecting a total of 409 (300 males and 109 females) crayfish harvesters. A structured questionnaire and interview schedule survey was used for the study. Descriptive statistical tools (percentages, frequencies and means) and inferential statistics (gini coefficient and Lorenz curve) were used to analyze the data of the study. The results revealed that income inequality of male crayfish harvesters (0.64) was higher than that of females (0.58). However, the pooled result showed that the level of income inequality among the crayfish harvesters in the areas was generally high (0.63). The study recommended that government should ensure gender equality and equity in the provision, allocation and distribution of productive (harvesting) resources and services, women should be given unrestricted access to productive resources, be made to have fair share in the family wealth, be integrated in policy formulation and implementation on community matters, and be given power to take decision in the sector among others.

Keywords: Crayfish Harvesting, Gender differentials, Households, Income inequality, Niger Delta Region.

INTRODUCTION
Globally, gender differentials in income inequality have become issue of great consideration as a result of it effects in productivity, economic growth, community development and general wellbeing of humanity (Etim *et al.*, 2019). Hence, a good understanding of the extent of this gender differentials gap on income distribution become imperative for the success of policy interventions aiming at empowering women and reducing or even closing the gap.

In the world today, regardless of one's socioeconomic class and status, there are systematic gender differences in material well-being and income inequality, though the degree varies across households or countries over time. These differences in income inequality have created an unfavourable environment for economic growth, development and general well-being of humanity. Gender differentials in income inequality is the unequal distribution of income to the advantage or disadvantage of one gender in a country, community or household base on the gender characteristics, roles and perceptions in the society. This has resulted in the creation of income differentials gap between one gender and another. The gap which refuses to close even in the developed countries has led to the life of one gender, especially women, to be affected by a countless of discriminatory traditional and socio-cultural practices that put them at disadvantage in a number of areas compared to men (British Council, 2012; and Busayo and Olufunmilayo, 2013).

According to Odozi (2012), gender differences in all socio economic attributes of income, wealth, and poverty widened in developing countries because women have limited access and control over resources, benefit from economic opportunities, and influence power in political arena. National Human Development Review for Nigeria (UNDP, 2016) reported 0.131 and 0.797 gender inequality index (GII) for female and male, respectively. Gender inequality index (GII) is the percentage of potential human development lost due to prevalence of gender inequalities. Similarly, the World Economic Forum (WEF, 2016) reported that there is wide variety of gender gap outcome in Sub-Sahara Africa and ranked Nigeria 118 among middle low income countries with global gender gap index of 0.643. This implies that there is high level of gender differentials across all indicators used for the measurement which includes economic participation and opportunities, educational attainment, health and survival, and political participation in the nation. Ajani (2008) as well as Agwu and Otteh (2014) asserted that this may have been as a result of discrimination, customs, beliefs and attitudes that confine women mostly to the domestic sphere. This however, makes women to be less valued economically. However, men experienced higher income benefits in access to productive resources, occupation and employment than women (Ajani, 2008; and Fapohunda, 2013). This has hindered productivity, induces inefficient allocation of resources and ultimately slows the rate of economic growth in the country.

Oyelere (2007) has reported 0.49 and 0.51 gini index in income inequality for men and women while Awotide *et al.* (2015) reported Gini index of 0.5469 and 0.3519 for male and female respectively in Oyo state. Women are the hardest hit by the current economic recession as most rural women are living below the poverty line and greater half of these under severe poverty (Oluwatayo, 2014). Available data from the NBS (2011) show that, the Nigerian population especially women and children live in severe social desperation, with many households being food insecure, with poor access to resources to meet basic needs, resulting in nutritional deficiencies. In order for women to salvage themselves from this predicament, they are often found involving in menial jobs, small scale and or petty trading, farming, raising of micro-livestock (e.g., snail, bees, rabbit, rodent and poultry), fishing and harvesting of other related fishery creatures such as periwinkle, lobsters, prawn and crayfish from the wild habitat.

Artisanal crayfish harvesting is one of the major business in the fishing sub-sectors of agriculture being practiced by both men and women households in the Niger Delta Region of Nigeria. It is an important profession which is capable of reducing poverty, ensuring human and livestock food security, creating employment by serving as a source of primary and secondary occupation, providing foreign exchange, enhancing earnings as a source of income, health and improving nutrition by increasing protein intake and other dietary vitamins in our daily food consumption. It is highly priced and demanded in both local and international markets. Nigeria is among tropical countries endowed with shrimp resources (crayfish) with a production capacity of 12,000 metric tons (MT) per year (Zabbey, 2010). Moses (1985) in Ele and Nkang (2014) reported crayfish as the second largest fishery in the marine/estuarine fisheries in the lower Cross River Basin. Crayfish is also reported to be generating about 20 million US dollars annually to the Nigerian economy (Falaye, 2008; and Etim *et al.*, 2015).

In spite of the benefits derived from crayfish harvesting, large percentage of the harvesters of this product especially women still live in poverty and cannot even afford to use the product they harvested for their household need. They are also confronted with income distribution problems resulting in very low per capita income and declining food consumption. Oghiagbephan (2016) observed that Niger Delta region though endowed with many natural resources is characterized by poverty. This may be due to various economic, social,

environmental and political factors operating within the region (Omuta, 2011). Therefore, closing gender gaps in income is necessary, not only because it improves the lives of women and tends to raise their relative status, but also because gender equity in income improves human and economic development.

Though, several empirical research works on gender differentials have previously been carried out in the area of farmers agricultural productivity and marketing on some crops, livestock and fishes in some State and Local Government Areas (LGAs) in Nigeria, but non to the best of the authors knowledge have been on artisanal crayfish harvesting and none of it were carried out in three State of Niger Delta region at a time. As a result, their studies were limited in geographic coverage and they used State or LGA unrepresentative household surveys, thereby casting doubts on their external validity. Owing not only to the contributing potentials of women in productivity growth in Niger Delta Region, high price level of crayfish both in the nation and abroad, high poverty level vis-à-vis high militant and kidnapping activities in the region but also to the amount of resources invested by both Nigerian governments and their development partners to rehabilitate the region, it is imperative to undertake a careful empirical analysis and revisit our understanding of gender differentials among crayfish harvesters and their drivers in light of the ongoing reconstruction and revitalization of agricultural landscape in the region in particular and nation in general. Analyzing the extent of these gaps across small scale crayfish harvesters and distinguishing between different sources of the observed gaps will be fundamental for the design of sound and empirically-driven policy instruments that will not only strengthen women empowerment in access to resources, technology, capital and removal of all barriers standing as impediment for women breakthrough in crayfish harvesting thereby ensuring gender parity, but will also guide and aid the fishery sub sector to achieve it productivity goals while sustaining environmental best crayfish harvesting practice. This will ensure sufficient availability of crayfish in a continuous basis all year round in the country.

In view of the above, the study was carried out to examine the analysis of gender differential in income inequality among crayfish harvesting households in Niger Delta region of Nigeria. The specific objectives of the study were to: describe the socio-economic characteristics of crayfish harvesting household heads in the region; compare the level of income inequality between male and female headed crayfish harvesters; and identify sources of gender differentials gap in the region and derive policy implications and recommendations.

The study would significantly play important role in contributing information to the existing literature on gender differentials in income inequality in Niger Delta Region in particular and Nigeria in general. However, through household survey, the result of the study provided evidence on the extent at which the observed socio-economic characteristics and institutional factors affect the overall gender differences in income inequality, among crayfish harvesters in the Niger Delta. The study further identified possible areas of policy intervention that could address the differential gaps. It would aid government agencies, research institutes, students, stakeholders and marketers in raising crayfish output in Nigeria in order to ensure their availability; enhance harvester's earning capacity and ensure equitable distribution of income among the harvesting households without gender bias.

MATERIALS AND METHODS
The Study Area

The study was conducted in selected State of Niger Delta Region. The Region consists of nine States (Abia, Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Imo, Ondo and Rivers)

and 185 local governments. It is situated between latitude 3°.00'N and 9°.00'N and longitude 4° 30'E and 7° 20'E with land area of 75,000km² (UNDP, 2006; Omuta, 2011). The population of the Region stood at 31,244,587 distributed among the constituent States and projected to be 42,637,086 by 2016 (NPC, 2006) with temperature range of 21°C to 33°C (Omuta, 2011) and mean annual rainfall varies from 4500mm to 2000mm.Three States was purposively selected for this study. They are Cross River, Akwa Ibom and Bayelsa State. The three states in the region were chosen because of their high level of crayfish harvesting activities and rich fishery potentials.

Sampling Techniques and Sample Size

The study employed multi-stage and stratified random sampling techniques. Firstly, three (3) States from the Niger Delta region where crayfish harvesting business are widely practiced was purposively selected. The States are Akwa Ibom, Cross River and Bayelsa. Secondly, three (3) Local Government Areas (LGAs) randomly selected among the crayfish harvesting LGAs from the selected States. Thirdly, four (4) communities from each of the selected LGAs were randomly selected making a total of 12) communities in each selected State. The fourth stage involved stratified random selection of male and female headed households. Yamane (1973) formula was used to estimate the sample size from the sampling frame in each State. The Yamane formula is given as:

$$n = \frac{N}{1+N(e)^2} \qquad \ldots (1)$$

Analytical Techniques

The data obtained was analyzed using descriptive statistics, Gini Coefficient and Lorenz curve. Descriptive statistics such as mean, tables, frequencies distribution and percentages was used to describe the socio-economic characteristics of the respondents while the estimation and comparison of the degree of income inequality between male and female headed household of the respondents in the study area was achieved using Gini-coefficient and Lorenz curve. The Gini-coefficient was computed following Rodrigue (2017) approach of the model.

$$G_I = 1 - \sum_{k=0}^{n}(X_k - X_{k-1})(Y_k - Y_{k-1}) \qquad \ldots (2)$$

The equ. 2 reduce to:

$$G_I = 1 - \sum XY \qquad \ldots (3)$$

where;

G_I = Gini coefficient

X = Proportion of the population of crayfish harvesters.

Y = Cumulated proportion of the income of crayfish harvesters.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Crayfish Harvesters

The socio-economic characteristics of the respondents considered in the study include gender, age, and marital status, level of education, household size, and crayfish harvesting experience among others.

The result presented in Table 1 under pooled showed that 73.35% of the harvesters were males while 26.65% were females. These findings showed that crayfish harvesters in the study area were dominated by male crayfish harvesters. The dominance nature of males in the profession implies that men played important role in the harvesting of this product. This may be due to the fact that society made women to be involve more in house care keeping (cooking, nurturing of children and washing of cloths), domestic work (general maintenance of compound cleaning, fetching of fire wood and water) and performance of other task (crop farming, micro-livestock production, mat making, brewing of local gin and casual labour

work). It might also be due to women being involve more in menial jobs within the natural fishery value chain environment such as food vending, fish/crayfish processing and marketing. This confirm the findings of Abah (2013) in Coastal Niger Delta Region, Okayi *et al.* (2013) in Benue State, Okeowo *et al.* (2015) in Badagry, Ogunsola and Folakee (2018) in Lagos and Shettima *et al.* (2014) in Borno State who reported that fishing and related fish creatures (seafood) harvesting are dominated by men. Although the results showed the dominance of the crayfish harvesting business by men, the contribution of the women folk in the active nature of the business cannot be undermined.

The results in Table 1 revealed that majority of the female respondents (33.03%) were between the ages of 31– 40 years while majority of the male respondents (36.33%) and pooled (34.23%) were between 41– 50 years of age. Their mean ages were 37.14, 39.72 and 39.03 years for female, male and pooled respectively. This is an indication that the crayfish harvesters were in their active and matured age. This is in line with the study of Okayi *et al.* (2013), Kwen *et al.* (2013), Abah (2013) and Awotide (2015) who reported that majority of rural populace that generates their income from fishing, agriculture and its related activities are in their economically efficient and productive age. This may be attributed to the fact that younger people are more enthusiastic in trying new practices in crayfish harvesting or seafood related fishing operations, mentally alert and have greater flexibility in accepting new ideas in harvesting gear development techniques. Hence, the age of an individual has implication on the experience and decision making ability. However, the female headed households were relatively younger than the males and are therefore expected to be more actively involved in harvesting activities that could enhance their income and reduce poverty.

Table 1 indicated that the married respondents (66.99%) were the highest seconded by widow/widower (14.91%) then single (13.45%) and divorced (4.65%), respectively, according to pooled result. The male respondents recorded majority of the married (79.00%) than the female's counterpart (33.94%) while the female respondents recorded more widows (43.12%) than the male with widowers (4.67%). The divorced recorded the lowest (3.00%), (9.17%), and (4.65%) for male, female and pooled, respectively. This findings indicated that majority of the crayfish harvesters in the study area were married which implies high level of responsibilities. This finding is in consonance with Akingba *et al.* (2016) who reported that majority of the fisher folks (59%) aged between 21 and 40 years in Ondo State were married and operated the nuclear family. In addition, the observed high number of married fishers in the area is similar to that of Olaoye *et al.* (2012) who reported that the artisanal sector is constituted majorly by married people fishers. The possible reason might be linked to the fact that married people have more pressing demands and problems at hand to solve than the singles and those that are divorced. More so, married household tend to have upper hands in terms of family right of access to productive tools and labour availability for harvesting, processing and marketing operation of crayfish and other seafood products.

Table 1: Socio-economic Characteristics of Crayfish Harvesters

Variable	Male (n = 300)	Female (n= 109)	Pooled (n = 409)
Age (years)			
20 – 30	60(20.00)	35(32.11)	95(23.23)
31 – 40	98(32.67)	36(33.03)	134(32.76)
41 – 50	109(36.33)	31(28.44)	140(34.23)
>50	33(11.oo)	7(6.42)	40(9.78)
Mean	39.72(9.39)*	37.14(8.92)*	39.03(9.33)*
Marital Status			
Married	237(79.00)	37(33.94)	274(66.99)
Single	40(13.33)	15(13.76)	55(13.45)
Widow/Widower	14(4.67)	47(43.12)	61(14.91)
Divorced	9(3.00)	10(9.17)	19(4.65)
Years spent on Formal Education			
1 – 6	15(52.33)	60(55.05)	217(53.06)
7 – 12	74(24.67)	35(32.11)	109(26.65)
>12	5(1.67)		5(1.22)
Mean	5.0(3.62)*	5.56(3.48)*	5.17(3.59)*
Educational Attainment			
Non formal	50(16.67)	11(10.09)	61(14.91)
Primary	166(55.33)	65(59.63)	231(56.48)
Secondary	79(26.33)	33(30.28)	112(27.38)
Tertiary	5(1.67)		5(1.23)
Primary Education Status			
Attempted	88(29.33)	36(33.03)	124(30.32)
Completed	74(24.67)	27(24.77)	101(24.69)
Ongoing	4(1.33)	2(0.92)	6(1.43)
Secondary Education Status			
Attempted	64(21.33)	20(18.35)	84(20.54)
Completed	15(5.00)	13(11.93)	27(6.60)
Tertiary Education Status			
Completed	5 (1.67)	0 (0.00)	5(1.22)
Household size (numbers)			
1 – 5	61(20.33)	24(22.02)	85(20.78)
6 – 10	171(57.00)	65(59.63)	236(57.70)
11 – 15	67(22.33)	20(18.25)	87(21.27)
>15	1(0.33)		1(0.24)
Mean	8.31(3.15)*	7.80(2.92)*	8.18(3.10)*
Primary Occupation			
Crayfish Harvesting	299 (99.67)	109(100.00)	408(99.76)
Fishing	1(0.33)		1(0.24)

Figure in parenthesis are percentages; and * are standard deviation.
Source: Computed from field survey data (2018)

Data on educational attainment in Table 1 revealed that, majority (85.09%) of the respondents from pooled result had formal education. Also larger proportion (89.91%) of female headed households had formal education while 83.33% of male headed households had formal education and 16.67% had no formal education. Out of this, female respondents had more of both primary and secondary attainment with 59.63% and 30.28% than male respondents with 55.33% and 26.33%. Consequently, the pooled result had 56.48% primary

and 27.38% secondary attainment. The male respondents had the highest tertiary attainment (1.67%) followed by the pooled (1.23%); while the female had none (0.00%). The result also shows that an average period of formal education stood at 5.03%, 5.56% and 5.17% with a standard deviation of 3.62, 3.48 and 3.59 for male, female and pooled results respectively. This result indicates that the educational attainment of crayfish harvesters in the area was high contrary to the widely held assumption that the standard of education could be low in most fishing settlement. At least more than 25% of both male and female crayfish harvesters' in the area acquired the secondary education. The relative high level of education of crayfish harvesters could give such households the capacity to successfully implement income diversification strategies to cope with income fluctuations, income failure and poverty as well as going along way to enhance extension services vis-à-vis new techniques with less difficult. The finding is in agreement with Kwen *et al.* (2013) and Bassey *et al.* (2014).

The result in Table 1 showed that most of the male (57.00%), female (59.63%) and pooled (57.70%) respondents had household size of about 6-10 persons. Hence, they all had a dominant household size of 6 – 10 persons with equal mean of 8 persons. Considering the small scale nature of their harvesting business, this household size is relatively large. Although a large household size could also implies that they have adequate costless labour for their crayfish harvesting activities but large household size could have a negative effect on household well-being. The result satisfies the priori expectation; because increase in household size is directly associated to increase in household expenditure. Akpan *et al.* (2016) asserted that increase in household size portrays increase in non-farm budgetary allocation and perhaps reduction in farm investment. The author also added that an increase in household size is also associated with increase in family responsibility and reduction in per capita household income. This invariably means that crayfish harvesters' with high household size will likely have income below the poverty line income thus increasing the number of poor people in the community *vis-à-vis* income inequality. This result confirm previous findings by Olatunji and Olah, (2012) who reported household size of 6 –10 for artisanal fishers in Cross River State and stressed that large household size offers free and cheap labor for the fishing households in the area. The result also agrees with Adetayo (2014), Awotide *et al.* (2015) and Akpan *et al.* (2016).

In term of experience, Table 1 indicated that majority of male (40.67%), female (37.61%) and pooled (39.85%) had their experience ranging between 11 – 20 years. The average years of experience were 20.97%, 18.70%, and 20.36% for male, female and pooled, respectively, which correspond to the range of years (11 – 20) with highest experience. These findings implied that the respondents from both gender have sound knowledge and skills on crayfish harvesting business. However, male headed households (87.01%) with experience of 11 – 50 years were higher than female headed households (73.39%) with the same years of experience. This depicts that the male respondents in the study area were more rooted in crayfish harvesting earlier in their lives than the female counterparts.

Table 1: Socio-economic Characteristics of Crayfish Harvesters **Cont'd.**

Variable	Male (n = 300)	Female (n= 109)	Pooled (n = 409)
Experience (years)			
<10	39(13.00)	29(26.61)	68(16.33)
11 – 20	122(40.67)	41(37.61)	163(39.85)
21 – 30	105(35.00)	26(23.85)	131(32.03)
31 – 40	32 10.67)	12(11.01)	44(10.76)
41 – 50	2 (0.67)	1(0.92)	6 (0.73)
Mean	20.97(8.16)*	18.70(9.15)*	20.36 (8.49)*
Level of involvement (dummy)			
Full time	294(98.00)	109(100.00)	403(98.53)
Part time	6(2.00)		6(1.47)
Number of labour used			
1 – 4	248(82.67)	96(88.07)	344(84.31)
5 – 8	51(17.00)	13(11.93)	64(15.69)
>8	1(0.33)		
Mean	3.94(1.25)*	3.52(1.32)*	3.47(1.68)*
No of Permanent labour (male) used	199(86.15)	65(84.42)	264(85.71)
No of Permanent labour (female) used	32(13.85)	12(15.58)	44(14.29)
No of Family labour (male) used	274(56.49)	92(50.27)	366(54.79)
No of Family labour (female) used	211(43.51)	91(49.73)	302(45.21)
Annual income of crayfish harvesting (₦)			
1 – 500000	24(8.00)	12(11.01)	36(8.80)
500001 – 1000000	35(11.67)	13(11.93)	48(11.74)
1000001 - 1500000	45(15.00)	11(10.09)	56(13.69)
1500001 – 2000000	36(12.00)	13(11.93)	49(11.98)
2000001 and above	160(53.33)	60(55.05)	220(53.79)
Mean	254,9403 (1977885)*	198,6244 (1063807)*	239,9319 (179,6835)*
Annual income of other sources (₦)			
1 – 50000	4(1.33)	7(6.42)	11(2.69)
50001 – 100000	46(15.33)	28(25.69)	74(18.09)
100001 - 150000	45(15.00)	16(14.68)	61(14.91)
150001 – 200000	13(4.33)	1(0.92)	14(3.42)
200001 and above	8(2.67)	3(2.75)	11(2.69)
None	184(61.33)	54(49.54)	238(58.19)
Mean	44,865.34 (66856.48)*	45,644.04 (56900.54)	45,072.87 (64286.89)*

Figure in parenthesis are percentages; and * are standard deviation.
Source: Computed from field survey data (2018)

The years of experience in artisanal crayfish harvesting can enhance harvester's knowledge in understanding the feeding habit and movement of crayfish in line with sea or river weather, depth and direction of water flow thus increasing their efficiency, output and income. This findings support the earlier findings by Kwen *et al.* (2013) who reported that majority of fishers in Niger Delta creek have fishing experience of 11 years and above.

Institutional Factors of the Crayfish Harvesters

The analysis for extension visits in Table 2 showed that 76.33%, 70.64% and 74.82% of male, female and pooled respondents, respectively, had no extension visit. Furthermore, 23.67% and 32.36% of the male and female crayfish harvesters had 1 – 2 number of extension visits in a year. This predict that harvesters in the study area are liable to have a negative effect on awareness and adoption of new technologies that will enhance effective crayfish harvesting as they have little or no extension contact with extension agents. Extension contact is a potent viable factor that can enhance the adoption of new harvesting strategies among small scale fisher folk. This finding is in support of the previous empirical study of Kwen *et al.* (2013), Awotide *et al.* (2015) and Akpan *et al.* (2016).

The frequency on membership of association in Table 2 revealed that 18.00%, 32.36% and 21.08% of male, female and pooled respondents belong to association while 82.00%, 77.64% and 78.02% of same did not belong. This implies that the number of harvesters belonging to association in the area was generally low and it could affect their production negatively, although, percentage of female respondents was relatively higher than their male colleague. Membership of association increase farmers' access to timely, speedy and genuine access to market information and innovation that will enhance their income and livelihood. It will also grant farmers access to soft loan that can increase their production. This finding is similar to that of Kwen *et al.* (2013). According to Agbontale (2009), income of fishers to a great extent determines their ability to purchase improved fishing gears and improved fish processing equipment.

Distance to market refers to the distance between farmers' farm or production site and market (place) where sales of the product(s) take place. Table 2 indicated that the mean distance to market for male, female and pooled stood at 60.54 km, 60.27 km and 60.47 km, respectively. However, 56.67% of male respondents, 61.47% of female respondents and 50.94% of pooled respondents had distance of 61km and above. The lowest kilometers (≤ 20 km) was recorded by 18.67%, 16.51% and 18.09% of male, female and pooled respondents, respectively. This implies that majority of respondents from both gender have to embark on long journey to transport their produce from harvesting area to market before they can sale at reasonable price. Embarking on long journey between harvesting area and market can result to losses which can negatively affect crayfish harvesters' income and livelihood apart from exposing them to high environmental hazards and risk. This finding disagreed with Agwu *et al.* (2013) who stressed that most of the smallholder farmers in Nigeria did not embark on long journey to the market to sale their produce.

The distribution of the respondents on the basis of access to credit facilities revealed that 91.67%, 91.74% and 91.69% of male, female and pooled respondents had no access to credit facility, while 8.33%, 8.26% and 8.31 of the same had access to credit facility, meaning female were the most disfavoured in credit accessibility. This implies that agricultural loans were not easily accessible to farmers in the study area among other factors. This may be due to low level of education, lack of credit institution in the area and lack of collateral especially among farming house-holds. It is expected that low access to agricultural loans will adversely affect in domestic food production and other agro-processing enterprises resulting in food insufficiency, decreased incomes, and lack of sustainable rural household food security as well as reduced quality of life. Access to credit is also an important factor that can influence the likelihood of adoption of new technologies and expansion of crayfish harvesting business vis-à-vis attainment of food security and reduction of poverty. Farm credit is widely recognized as one of the intermediating factors between adoptions of farm technologies and increase in farm

income among rural farmers in Nigeria (Akpan *et al.*, 2013); hence crayfish harvesters in the study area may lack the ability to expand their production activities due to limitation to finance. This finding is in agreement with Ahmed *et al.* (2015), Awotide *et al.* (2015) and Haddabi *et al.* (2019).

Table 2: Institutional Factors of the Crayfish Harvesters

Variable	Male (n = 300)	Female (n = 109)	Pooled (n = 409)
Extension visits (dummy)			
Yes	71(23.67)	32(29.36)	103(25.18)
No	229(76.33)	77(70.64)	306(74.82)
Number of visits/year			
2 and above	6(2.00)	4(3.67)	10(2.44)
1	65(21.67)	28(28.69)	93(22.74)
0	229(76.33)	77(70.64)	306(74.82)
Distance to market			
< 21	56(18.67)	18(16.51)	74(18.09)
21 – 40	18(6.00)	7(6.42)	25(6.11)
41 – 60	56(18.67)	17(15.60)	73(17.85)
61 – 80	86(28.67)	39(35.78)	125(30.56)
81 – 100	60(20.00)	23(21.10)	83(20.29)
>100	24(8.00)	5(4.49)	29(7.09)
Mean	60.54 (32.65)*	60.27 (29.82)*	60.47 (31.88)*
Membership of Association (dummy)			
Yes	54(18.00)	32(29.36)	86(21.08)
No	246(82.00)	77(70.64)	322(78.02)
Access to Credit (dummy)			
Yes	25(8.33)	9(8.26)	34(8.31)
No	275(91.67)	100(91.74)	375(91.69)
Sources of credit			
Commercial bank	5(1.67)		5(1.22)
Microfinance bank	9(3.00)	4(3.67)	13(3.18)
Cooperative	4(1.33)	3(2.75)	7(1.71)
Personal saving	2(0.67)		2(0.49)
Agricultural lending agency	1(0.33)		1(0.24)
Money Lenders	3(1.00)	1(0.92)	3(0.73)
Government	2(0.67)		3(0.73)
None	295 (91.67)	101(92.66)	375(91.69)
Amount of credit accessed			
1 – 300000	11(55.00)	4(44.44)	15(51.72)
300001 – 600000	3(15.00)	2(22.22)	5(17.24)
600001 – 900000	2(10.00)	1(11.11)	3(10.34)
> 900000	4(20.00)	2(22.22)	6(20.69)
Mean	30,700 (143248.90)*	41,284.40 (16447.50)*	33,520.78 (149047.10)*

Figure in parenthesis are percentages; and * are standard deviation.
Source: Computed from field survey data (2018)

Agricultural credit is an effective instrument for improving agricultural productivity and encourages the expansion of agricultural business. The Table 2 revealed that 3%, 3.67%,

3.18 male, female and pooled respondents obtained credit from microfinance bank to finance their crayfish harvesting business. This appears to be the one with highest patronage. It was closely followed by cooperative, commercial bank, money lenders, government, personal saving and agricultural lending agency. However, majority 91.67%, 92.66% and 91.69% of the male, female and pooled respondents did not use any of above credit sources for their advantage. This may be due to high interest rate charged by money lenders and credit institutions, poor access to agricultural credit facilities and lack of awareness of it. According to Ajagbe (2012), poor access to agricultural credit which is a characteristics feature of peasant agriculture. This result support earlier findings of Haddabi *et al.* (2019).

Level of Income Inequality of Crayfish Harvesters by Gender in Niger Delta Region

The result of the Gini coefficient in Table 3 showed that income inequality of 0.64 for the male respondents was higher than 0.58 of the female counterparts. The pooled gini coefficient of 0.63 showed that income inequality among crayfish harvesters is obvious in the region. This implies that income is more evenly distributed among the female respondents than the male counterparts. It further depicts that male respondents contribute more to overall income inequality in the sampled population than the females. The result also revealed that the mean per capita income for female respondents (271795.20) was lower than that of the males (338775.78) and the pooled (320925.21). Population and income share was as well higher for males (0.7335, 0.7696) than females (0.2665, and 0.2303). This may be due to women having limited access to resources, restricted decision-making power, low labour force and putting in few hours of time for crayfish harvesting compared to their male counterparts. This has resulted in the creation of this income differential gap among the crayfish harvesters. Oxfam (2017) ascribed income inequality to imperfection in the employment markets, social values and prejudices, differences in skill and regional differences in resource endowment and resource utilization. This apparent existence of income inequality in the region predicts existence of poverty, food insecurity and negative social vices inimical to national security of the country. This finding is in agreement with Akpan *et al.* (2016) who study the level of income inequality and determinants of poverty incidence among Youth Farmers in Akwa Ibom State, Awotide *et al.* (2015) on Gender analysis of income inequality and poverty among rural households in Nigeria with particular reference to Akinyele LGA of Oyo State. Notwithstanding, the result disagrees with Usman *et al.* (2016) who reported that the female household heads contributed more to maximum income inequality than the male in his study of 'the dynamics of income inequality in rural areas of Nigeria'.

Table 3: Level of Income Inequality of Crayfish Harvesters

Gender	Gini coefficient	Mean per capita income	Population share	Income share
Male	0.64	338775.78	0.7335	0.7696
Female	0.58	271795.20	0.2665	0.2303
Pooled	0.63	320925.21	1	1

Source: Computed from field survey data (2018)

Lorenz curve

The "Lorenz curve" is a common graphical method of representing the degree of income inequality in a community, region, state or country. It plots the cumulative share of income y earned by the poorest x of the population, for all possible values of x. The 45-degree line

represents the line of equality, when income is shared equally among all individuals. Lorenz curves typically lie below the 45-degree line. Moreover, the further away the Lorenz curve is from the equality line, the more unequal the income distribution. Figure 1, 2, and 3 shows the Lorenz curve of income inequality level for male, female and pooled data of crayfish harvesting households in Niger Delta Region in Nigeria. The generalized Lorenz curve of crayfish harvesters in Niger Delta region is also presented in Figure 4. Comparing the three figures (Lorenz Curves), it depicts that female harvesters with the lowest inequality index (58.30%) was closer to the arbitrary 45° line. It was seconded by that of the pooled (63.20%), while that of the males was the farthest (63.78). Therefore, the male harvesters were the major cause of inequality in the region as earlier pointed out. Looking at the pooled result, the level of income inequality among the crayfish harvesters in the area is generally high (0.6320). Economies with Gini values above 0.5 are considered very unequal (Ayinde, 2012; and Rodrigue, 2017). This finding depicted the possible impact of rural areas multifunctional activities on income distribution and equality assessment among the crayfish harvesters.
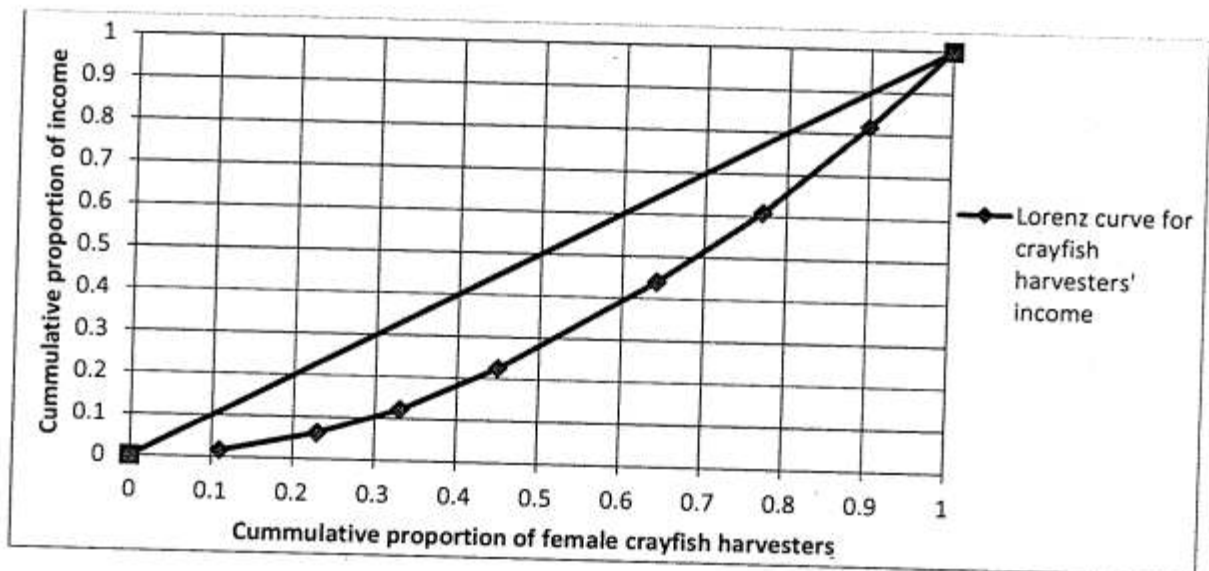

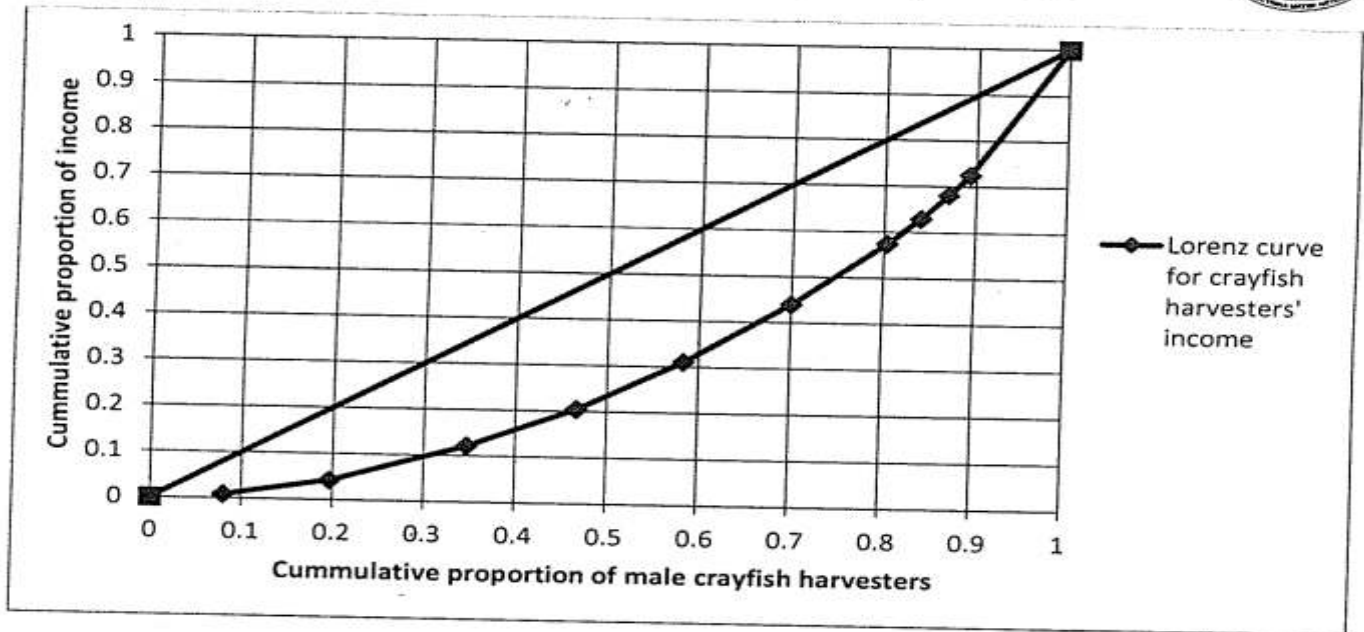Figure 1: *Lorenz curve of female headed household of crayfish harvesters*

Figure 2: *Lorenz curve of male headed household of crayfish harvesters*
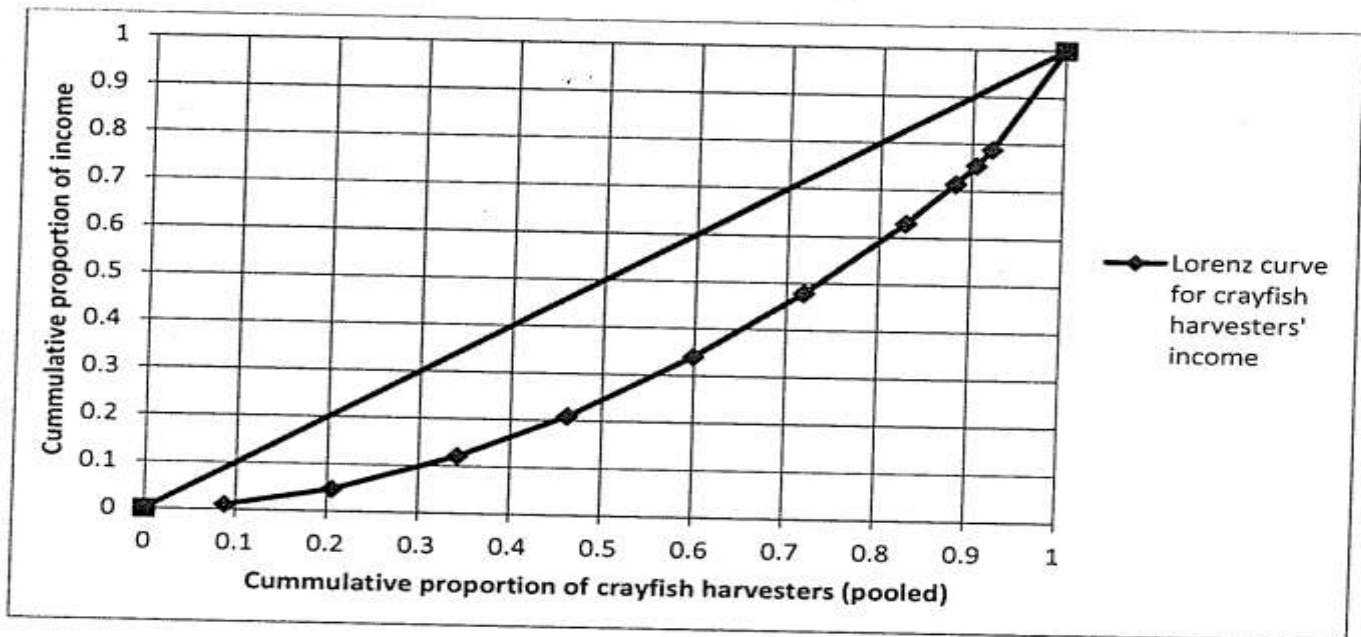

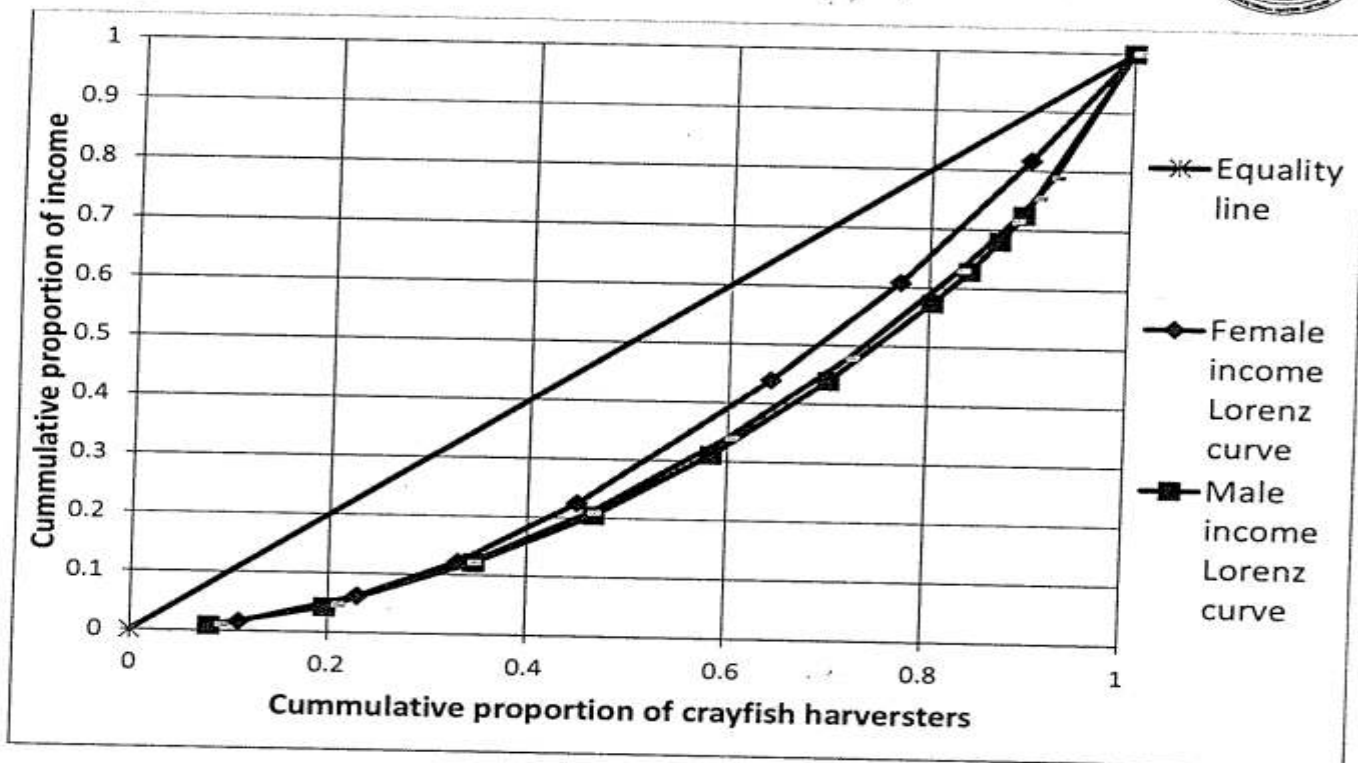Figure 3: *Lorenz curve of pooled crayfish harvesters in Niger Delta Region*

Figure 4: *Generalized Lorenz curve of crayfish harvesters in Niger Delta Region*

CONCLUSION AND RECOMMENDATIONS

Gender differentials in income inequality, poverty and food security has serious issues in global perspective as a result of it effects in productivity, economic growth, community development and general wellbeing of humanity. These have created a gap between one gender and another. The gap which refuses to close even in the developed countries has led to the life of one gender, especially women, to be affected by a countless of discriminatory traditional and socio-cultural practices that put them at disadvantage in a number of areas compared to men. The study therefore, recommended as follows:

1. To reduce this gap and achieve gender parity, there is need for women to be given unrestricted access to productive tools in the crayfish harvesting business.
2. The crayfish harvesters in the Niger Delta regions of Nigeria should be made to have fair share in the family resources involved in policies making and implementation on issues concerning their profession.
3. Women should be given power to take decision in the sector.

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