

LIVELIHOOD RESPONSES TO CLIMATE CHANGE IN THE NIGER-DELTA: IMPLICATIONS FOR FOOD SECURITY IN NIGERIA

ONWUEMELE Andrew

Nigerian Institute of Social And Economic Research (NISER)

Social and Governance Policy Research Department

Tel: 234-08028935767; 08130569041

Email: inofitshout@yahoo.com

Abstract

The Niger Delta produces the oil wealth that accounts for the bulk of Nigeria's foreign earnings. Before the 1950, agriculture was the main source of livelihoods. Today, climatic changes coupled with oil exploration activities in the region have negatively impacted on the environment. This has resulted in the alteration of habitats, biodiversity loss and pollution of water bodies. This paper assesses livelihood responses of local people to climate change and the implications for food security. The survey research design was adopted. The study covers nineteen randomly selected rural communities in Delta state. Both primary and secondary sources of data were utilized. The systematic sampling was used in selecting the final respondents who are basically household heads. The instruments of data collection were questionnaires and focus group guide. The results indicate that more than 80% of the households have diversified their livelihoods into the non-farm sector with serious implications for food security. The paper calls for support for local farmers to enhance their capacity to adapt to climate change to improve their agricultural practices.

Keywords: Livelihoods, Climate Change, Niger-Delta, Implication, Food Security

Introduction

Climate change poses one of the greatest environmental challenges to mankind in the current century. The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report in early 2007 confirmed that the global climate change is already happening. The report found that communities who live in marginal lands and whose livelihoods are highly dependent on natural resources are among the most vulnerable to climate change (IPCC, 2007). Key economic sectors such as agriculture, water, energy, health, wildlife and tourism are most vulnerable. Preliminary studies on the vulnerability of various sectors of the Nigerian economy to climate change were conducted by Nigerian Environmental Study/Action Team (NEST) in the year 2004 and the study established that virtually all sectors analyzed manifested some evidence of vulnerability to climate change (NEST, 2004).

The Niger-Delta region where this study is based is highly affected due to its geographic attributes. Its characteristic flat topography that is criss-crossed by a plethora of river distributaries coupled with its location at the Atlantic coast makes the region to be highly vulnerable to flooding, sea level rise and salt water intrusion. Before 1950, agriculture (farming and fishing) was the main source of livelihood and the exploitation of natural resources was sustainable. About 65 per cent of the population of the region depends on the natural environment for their livelihoods while the other 35% depends on remittance (CASS, 2003; Daniel Omoweh, 2005; Onakuse et al., 2007). Today, the Niger Delta environment has changed. The global changes in climatic condition have exacerbated the condition of the

physical environment. Today, coaster flooding, sea level rise, salt water intrusions are common features in most communities. This has resulted in the alteration of habitats, biodiversity loss and pollution of water bodies and land which are the most important livelihood assets of the people. In local communities, hundreds of thousands of people are affected, particularly the poorest and those who rely on traditional livelihoods such as fishing and crop farming (Amnesty International, 2009).

Previous studies in the region have focused on the analysis of climatic change, the adaptation and mitigation measures and the factors precipitating livelihood insecurity in the region (see ; Uyigue and Agho, 2007; Onakuse and Lenihan, 2008; Onwuemele and Olorumfemi, 2010). However, little or no study has examined the livelihood responses of the people to climate change and the implication of this on food security in the region. The need to fill this research gap is the *raison de etre* for this paper.

Conceptual Framework

A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living (Chambers and Conway, 1992). Building on this definition, Ellis (2000) defines livelihoods as comprising of the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the standard of living gained by the individual or household. The combination of different assets by households yields different types of livelihood strategies. Climate change impacts on these assets negatively reducing their quality and this affect livelihood pattern of households in affected communities. The United Nations Framework Convention on Climate Change (UNFCCC) on the other hand defines climate change as a change of climate which is attributable directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over a comparable time periods (IPCC, 2001). Food security is a flexible concept and exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within households as the focus of concern. Food insecurity exists when people do not have adequate physical, social or economic access to food. From the above definitions, it is clear that there are complex and strong linkages between people's livelihoods and the socio-economic, political and environmental conditions. Climate change impacts on these assets negatively reducing their quality and this affect livelihood pattern of households in affected communities.

Materials and Methods

The paper utilized the survey research design. The study employed the multi-stage sampling design. The first stage was the purposive selection of state. One state out of the nine states (Delta state) in the Niger-Delta region was purposively selected for the study. The next stage was the listing of rural Local Government Areas (LGAs) in the state that are located in coaster area which serves as the sampling frame. The selection of these LGAs was based on their vulnerability to flooding and sea level rise which is a major threat to livelihood activities in the communities. Two LGAs were randomly selected from the frame. They are Isoko North and Isoko South. From the two LGAs, nineteen rural communities were selected from the two LGAs. Both primary and secondary sources of data were utilized. The systematic sampling with a random start and a sampling interval of five was used in selecting the final respondents. Respondents are basically household heads. The main instrument of data collection was a questionnaire. Also, Focus Group Discussion was conducted for selected

leaders of the various communities. Data collected were analysed using descriptive statistics such as tables, frequency, charts and percentages.

Results and Discussion

Out of the 265 respondents used for the study, majority (67.7%) were males. Also, the majority (54.3%) of the respondents are above 40 years old. This is due to the fact that the paper focussed mainly on household heads. Also, the majority (51.2%) had secondary education as their highest level of educational qualification while about 15.4% had no formal education. Income is generally low as 57.5% earn about N10, 000 per month. Further analysis of data also shows average household size of 6.7. The implication of the above analysis becomes clearer when this average household size is compared with the monthly income. Thus, with an average monthly income of ₦10, 000 per month, it is obvious that the majority of the respondents will be living below the poverty line. If poverty is defined globally as living below the equivalent of \$1.00 per capita / day, then given an average household size of 6.7, the average family will need to earn about ₦ 30, 150 to live above the poverty line. The implication of this is that the people in the study area are living below the poverty line.

Table 1 shows a subjective assessment of level of environmental degradation in the region.

Table 1: Subjective Assessment of Level of Environmental Degradation and extreme Weather Events

Level of Forest Loss	No. of Respondents	% of Respondents
Very high	120	62.2
High	63	23.8
Fairly high	41	7.9
Low	10	3.8
Very low	6	2.3
Total	265	100.0
Level of Temperature	No. of Respondents	% of Respondents
Very high	133	50.4
High	55	20.7
Fairly high	29	10.8
Low	23	8.7
Very low	25	9.4
Total	265	100.0
Level of Drought	No. of Respondents	% of Respondents
Very high	32	12.0
High	22	8.1
Fairly high	28	10.7
Low	15	5.7
Very low	168	63.5
Total	265	100.0
Level of Flooding in the Community	No. of Respondents	% of Respondents
Very high	145	58.1
High	55	26.0
Fairly high	10	3.8
Low	7	6.4

Very low	8	5.7
Total	265	100.0
Level of Soil Erosion	No. of Respondents	% of Respondents
Very high	101	38.0
High	32	12.2
Fairly high	32	12.2
Low	64	24.2
Very low	36	13.4
Total	265	100.0

Source: Fieldwork, 2014

Table 1 shows that about 62 per cent of the respondents stated that there is high level of forest loss in their community. Another 23.8 per cent of the respondents stated that the rate of forest loss is high. Again, from the Table, majority (50.4%) of the respondents maintained temperature level in their community is very high. Expectedly, majority (63.5%) of the respondents stated that the level of drought is very low in their respective communities. The very low level of drought in this region is due to the rainfall pattern which occurs throughout the year in the region. With respect to flooding, about 58.1 per cent of the respondents stated that the incidence of flooding is very high in their communities. One obvious observation during the field study is that some of the communities especially those located in Isoko South such as Umeh and Erohwa communities were more prone to flooding due to their proximity to the Atlantic Ocean. This phenomenon has very serious implication on the livelihood of the people in the affected communities. For example, respondents in the perennially flooded areas complained that their cassava farms only last for 6 months before harvest instead of the normal 10 months. Failure to harvest within 6 months means that the farmer would lose the entire farmland to the flood. Similarly, the artificial fishpond (Aquaculture) owners also complained of the negative impact of flooding on their livelihood activities. Expectedly, areas that were prone to flooding were equally prone to high erosion activities. About 38 per cent of the respondent stated that the rate of erosion is very high in their communities. Another 12.2 per cent of the respondents stated that the rate of erosion is high and fairly high respectively while 24.2 per cent and 13.4 per cent stated that the rate of erosion is low and very low respectively in their communities. The focus group discussants maintained that the pattern of rainfall has changed considerably in their community. According to one of the discussants

It is now absolutely difficult to predict the onset of rainy and dry season often resulting to delay in the planting season. One of the discussants noted that about two years ago, all his crops could not germinate and the few ones that germinated died due to delay in the onset of rainy season (Irri Men FGD)

Other discussants noted that even after the onset of the rainy season, the temperature is abnormally too high and when it was time for the rain, the situation is also the same often washing away their crops. Generally, the respondents agreed that there is a general change in the weather elements such as rainfall and temperature, though they could not explain the factors behind the changes.

Assessment of Farm Yield and Fish Catch in the Last Five Years

We reiterate that the most common occupation in the area of study is farming and fishing and also confirmed by the present study. Hence, the study attempted to assess the level of yield in the last five years for respondents engaged in the two occupations. Table 2 shows the assessment of farm yield and fish catch in the last five years.

Table 2: Assessment of Farm Yield and Fish Catch in the Last Five Years

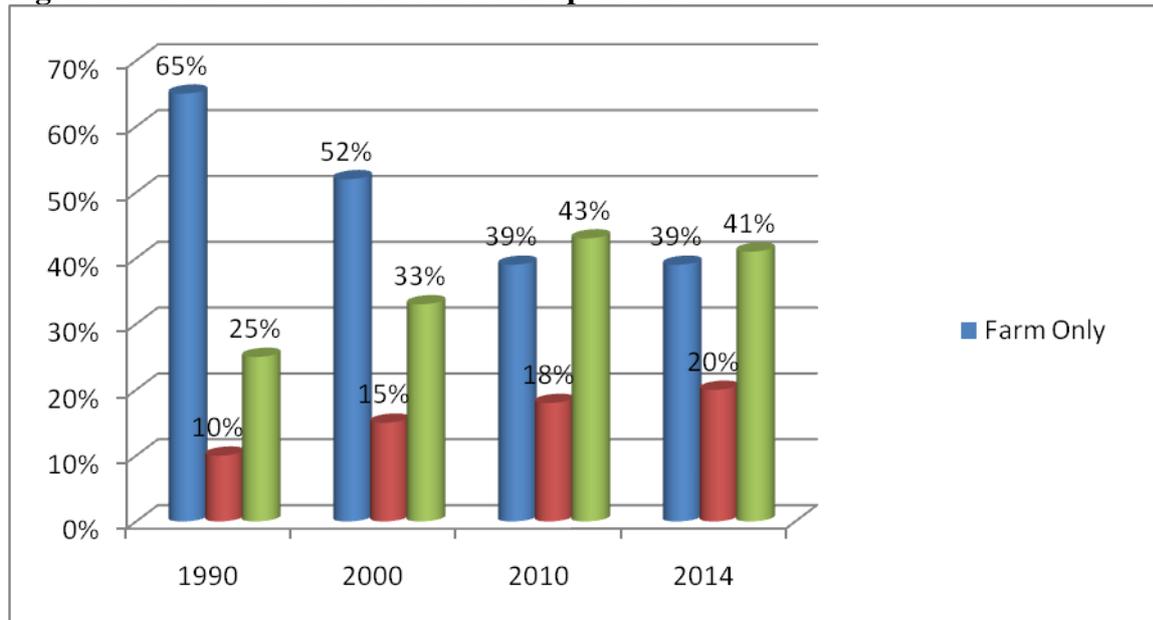
Farm Yield	No. of Respondents	Percentage
Increase slightly	28	10.5
Declined rapidly	149	56.2
Decline slightly	70	26.3
Increased rapidly	18	7.0
Total	265	100.0
Fish Catch	No of Respondents	Percentage
Increase slightly	7	2.6
Declined rapidly	174	65.8
Declined slightly	70	26.3
Increase rapidly	14	5.3
Total	265	100.0

Source: Fieldwork, 2014

Table 2 shows the level of productivity of respondents who are engaged in farming and fishing. From the respondents who are farmers, the majority (56.1%) stated that their farm yield in the last years had declined rapidly. Another 26.3 per cent of the respondents stated that it has declined slightly. However, only 7.0 per cent and 10.5 per cent of the respondents stated that farm yields had increased rapidly and slightly respectively. Also, the majority (65.7%) of the respondents maintained that fish catch declined rapidly since the last five years. Another 26.3 per cent of them stated that their catch has declined slightly since the last five years. Also, only 2.6 per cent and 5.3 per cent respectively stated that their catch has increased slightly and rapidly. The respondents attributed the declining trends to the rising incident of flooding and salt water intrusion.

In the light of the impact of climate change and other environmental degradation on livelihoods assets, this paper examined the main sources of income of the people. Figure 1 shows the main sources of income by sector in the area of study.

Figure 1: Main Sources of Income of Respondents



Source: Fieldwork, 2014

As noted earlier in this paper, crop farming and fishing provide the main sources of income for the people of the Niger-Delta. However, Figure 1 shows that there is a gradual decrease in the number of respondents deriving their income from farming. For instance, in the 1990, about 65 per cent of the respondents derived their income from farming only and this has reduced to 39 per cent in 2014. On the other hand, the percentage of respondents earning their income from non-farm only has risen from 10 per cent in 1990 to 20 per cent in 2014 while the percentage of respondents earning their income from farm and non-farm increased from 25 per cent in the 1990 to over 40 per cent in the year 2014. From Figure 1, it suggests that the main livelihood response to climate change is diversification out of agriculture. Fishing now occurs mainly in the form of aquaculture due to salt water intrusion into the fresh water. The Focus Group Discussants explained that the sharp decline in income from the farm sector occasioned by declining crop yield and fish catch is responsible for their diversification of their livelihoods into the non-farm sector. According to the FGD discussants:

Farming is a mere supplementary occupation. It cannot provide physical cash to sustain any family in this community. Depending on farming in this community is a sure way to starvation. The people currently farming in this community have no opportunity outside farming (Erowa/Umeh Men FGD)

About twenty years ago, just from cassava farming, I was able to feed my family and even send many to school but the situation have changed. Today, the cassava cannot grow more than six months before the flood arrives and destroy the entire farm. Even my fish pond suffers from the same flooding. Last year, when the Atlantic ocean over flooded, it washed away all the fish in my pond. I am better off as a trader now (Erowa/Umeh Women FGD).

They also opined that crop farming and fishing cannot take anybody out of poverty in the region. This explains why youths in the various communities are not ready to go into farming. One of the discussants noted that she has been cultivating yam for several decades but the perennial flooding in their farms destroys his yams on a yearly basis. This phenomenon, he explained, pushed him into trading which have yielded more income to her than farming.

Table 3 shows the major non-farm activities in the area.

Table 3: Rural Non-Farm Activities

S/N	Non-farm Livelihood Activities	No. of Respondents	% of Respondents
1	Civil servant	12	5.7
3	Trading/business activities	78	36.6
5	Agricultural produce processing	16	7.5
6	Hair dressing	18	8.3
7	Furniture making/boat making	17	7.9
8	Motor mechanic	9	4.5
10	Transporting	19	9.1
14	Bicycle repairer	5	2.3
16	Medicine selling	5	2.3
17	Tailoring	11	5.3
18	Vulcanizing	4	1.9
19	Welder	6	2.6
21	Daily wage labourer	12	6.0
	Total	212	100.0

Source: Fieldwork, 2014

Table 3 shows that about 212 respondents out of the total 265 respondents representing 80.0% of the total respondents are now engaged in different non-farm livelihood activities. It also shows that the major non-farm activity is trading (36.6%) which normally occurs along major roads. This is followed by transporting, hair dressing, furniture/ boat making activities and agricultural produce processing with percentages of 9.1%, 8.3%, 7.9% and 7.5% respectively. In the light of this diversification out of crop farming and fish catch, the paper further sought to determine the implication of this on food security in the region.

Food security is the accessibility of all people, at all times, to enough food for an active and healthy life (Reutlinger, 1987). Food security has two aspects; ensuring that adequate food supplies are available, and that households whose members suffer from under nutrition have the ability to acquire food, either by producing it themselves or by being able to purchase it (Riscopoulos *et al.*, 1988). Food insecurity simply implies uncertainty, unsustainable production, availability and inaccessibility of vital food resources to meet the daily food requirement of the population (Ajake, 2002). Table 4 shows the average prices of basic food needs in the Niger-Delta from 1991-2011.

Table 4: Average Prices of Basic Food Needs in the Niger-Delta from 1991-2011

Types of Food	Weight	Price 1991 (Naira)	Price 2002 (Naira)	Price 2011 (Naira)	% Increase
Garri	100kg	750	1,500	5,000	566
Rice	50kg	1200	3500	10,000	733
Yam	5 kg	250	500	1000	300
Bean	200kg	1350	7000	10000	640
Palm oil	20kg	350	2000	5620	1505
Fish	1kg (dry)	120	800	1800	1400

Source: Compiled from Ajake, 2002 and Fieldwork, 2014

Table 4 shows that within a period of ten years, there has been a geometric increase in the prices of basic food items such as garri, rice, yam, beans etc. Within this period, the highest percentage increase was witnessed in rice with over 700 percent increase. This situation is worrisome when viewed against the background that rice is the most widely eaten staple food in the region. Garri has also increase by over 500 per cent within the period under review. Surprisingly, fish which is widely produced in large quantity before now in the region has witnessed over 1000% increase within the period. This scenario may not be unconnected with the declining fish catch in the water bodies which has been attributed to salt water intrusion and other degradation in environmental quality in the region. One of the consequences of high cost of food prices is chronic hunger, famine and malnutrition. In fact, most cities such as Port Harcourt, Benin, Warri, Uyo, Owerri, Aba and Calabar are now faced with the problem of many families being involved in begging along major streets. This has never happened before this present era in the Niger-Delta region (Ajake, 2002).

Figure 2 presents level of access to food among respondents in the region.

Figure 2: Level of Access to Food among Respondents

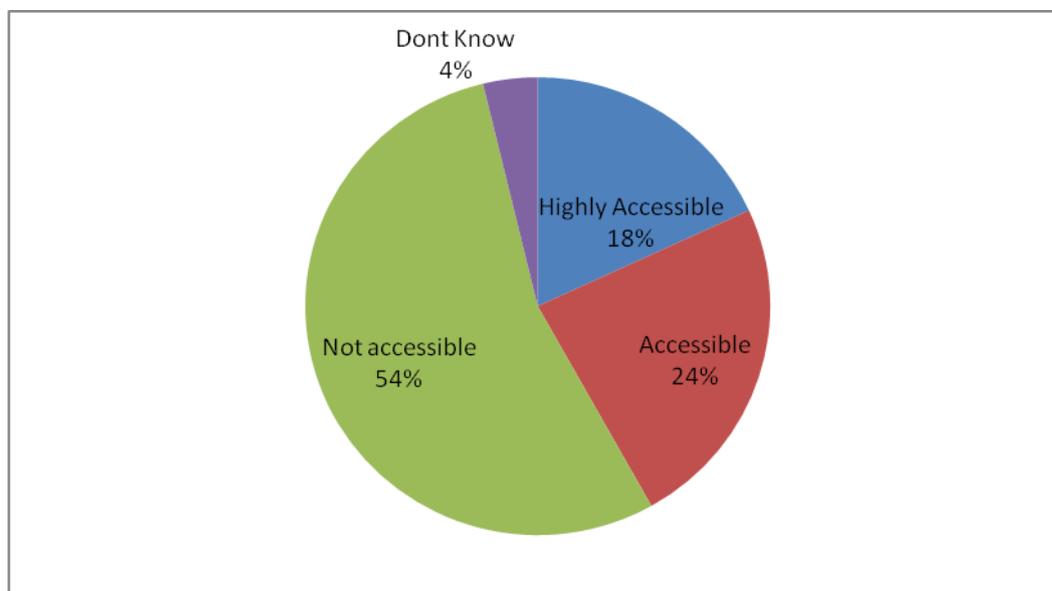


Figure 2 shows that only 18% of the respondents had full access to food. In addition, about 54% of them stated that food is not accessible to their households. During the FGD, the

discussants maintained that food is available in the market but the high cost of the various food items is beyond their purchasing power. Supporting the above finding, Iyayi (2004) observed that in the urban areas in the Niger-Delta, the cost of living index is the highest in Nigeria (Iyayi 2004). Similarly, Uyigue and Agho (2007) noted that the cost of goods and services are quite high compared to other parts of the country. For example, the cost of table water (popularly called “pure water”) is Ten Naira (N10) in Portharcourt while in other parts of the country it is sold for Five Naira (N5) (Uyigue and Agho, 2007). This high cost of basic food items contributes to food insecurity among many households considering their low income.

Conclusion

Changes in global climatic condition have been predicted to continue into the distant future. Therefore, the livelihood assets of the poor will continue to be negatively impacted. Food production in vulnerable local communities such as the study area will continue to dwindle. The obvious effect of this is food insecurity manifesting in malnutrition and hunger. Also, in this paper, it has been shown that the rural households diversified their livelihood into the non-farm sector. Therefore, food production will continue to decrease and this has affected food prices beyond the reach of poor households in the region. In the light of the above findings, the paper makes the following recommendations.

Recommendations

- There is an urgent need for a review of existing environmental laws to protect the rights of the poor rural farmers.
- Government should support local communities through provision of credit facilities and capacity building of community members to improve their adaptive capacity to climate change and other degradation in environmental quality in the region.
- The various problems plaguing farming in the area should be addressed by relevant authorities to avoid the danger of impending food insecurity in the region
- . Finally, policies to build synergies between the farm and non-farm sector in the region should be developed so that both households engaged in the farm and non-farm sector could benefit from each other.

References

- Ajake, A.O (2002): Population Changes and Food Insecurity in the Niger-Delta. *Global Journal of Social Sciences*. Vol, 2, No. 1, 45-53
- Amnesty International Nigeria (2009): *Petroleum, Pollution and Poverty in the Niger: Delta*, International Secretariat, UK
- Anyakwe, N. (2000): *Extractive Industries and Economic, Social and Human Rights*; Port Harcourt: Institute of Human Rights and Humanitarian Law.
- Ashton, N.J., Amott, S. and Douglas, O. (1999): *The Human Ecosystems of the Niger Delta- An ERA Handbook. Environmental Rights Action*, Lagos.
- CASS (2003) *Poverty Knowledge and Policy Processes in Bayelsa State, Nigeria*. Centre for Advanced Social Sciences, Port Harcourt, Research Report

- Chambers, R and Conway R. (1992) *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century*, IDS Discussion Paper No. 296; Brighton, Institute of Development Studies.
- Daniel Omoweh (2005). *The Paradox of Water Crisis and Rural Poverty in the Niger Delta of Nigeria: The Case of Bayelsa State*. Nigerian Institute of International Affairs, 13-15, Kofo Abayomi Road Victoria Island Lagos, Nigeria
- Ellis, Frank (2000), *Rural Livelihoods and Diversity in Developing Countries*, Oxford University Press.
- Eteng, I. A, (1997): *The Nigerian State, Oil Exploration and Community Interest: Issues and Perspectives*, University of Port Harcourt, Nigeria.
- FAO. (1983). *World Food Security: A Reappraisal of the Concepts and Approaches*. Director General's Report. Rome
- FAO (2003). *Trade Reforms and Food Security*. Director General's Report. Rome
- IPCC. (2001) *Climate Change 2001: Impacts, Adaptation, and Vulnerability, Summary for Policy Makers*. A Report of Working Group II of the IPCC. Geneva: IPCC.
- IPCC (2007). *Climate Change (2007). The Physical Science Basis (Summary for Policy)*, IPCC, Geneva.
- Iyayi, F. (2004). *An Integrated Approach to Development in the Niger Delta*. A Paper Prepared for the Centre for Democracy and Development (CDD)
- Madzwamuse, M (2010). *Climate Governance in Africa: Adaptation Strategies and Institutions*. Unity Press Cape Town
- Maxwell, S. & Smith, M. (1992). Household Food Security; a Conceptual Review. In S. Maxwell & T.R. Frankenberger, eds. *Household Food Security: Concepts, Indicators, Measurements: A Technical Review*. New York and Rome: UNICEF and IFAD
- Moffat, D. and L. Olof (1995). "Perception and Reality: Assessing Priorities for Sustainable Development in the Niger River Delta". *Ambio* Vol. 24. 7/8 PP. 527-538.
- National Population Commission NPC (2006) Provisional Result based on 2005 Census
- NEST (2004). Executive Summary of Five Multi-Sector Surveys on Nigerian's Vulnerability and Adaptation to Climate Change, Ibadan, Nigerian Environmental Study/Action Team (NEST) and Global Change Strategies International (GCSI) Canada
- ODI & Partners (2000), *Livelihood Diversification and the Rural Poor in Asia: Concepts and Methods Paper* (Draft mimeo).

- Odjugo, P.A.O (2009). Quantifying the Cost of Climate Change Impact in Nigeria: Emphasis on Wind and Rainstorms. *Journal of Human Ecology*, 28(2): 93-101
- Odingo, R.S. (2008). Climate Change and Economic Development-Issues, Challenges and Opportunities for Africa in the Decades Ahead. *African Economic Research Consortium*, pp. 1-20
- Omuta, G.E.D (1985): The Petroleum Factor in Environmental Decay in Isoko Local Government Area, Bendel State, Nigeria, *GeoJournal*, Vol. 11, No. 2, pp. 173-181.
- Onakuse S. and Eamon L. (2007). *Community-Based Organisations Approach: Household Food and Livelihood Security in Southern Nigeria*. Joint International Conference on Globalization: Migration, Citizenship and Identity University of Ibadan, Ibadan, Nigeria, November 6-9, 2007
- Onakuse, S and Lenihan, E (2008). Livelihood Systems and Rural Linkages in Niger-Delta Region of Nigeria accessed 10th March from www.nuigalway.ie/dern/.../44_stephen_onakuse_and_eamon_lenihan.pdf
- Onofeghara, F. A. (1990). Nigerian Wetlands: An Overview. In: T. V. I. Akpata, and D. U. U. Okali, (eds). *Nigerian Wetlands: Man and the Biosphere* pp 14-26.
- Onwuebele, A. And Olorunfemi, F.B (2010). Climate Change Perceptions and Adaptation Strategies among Rural Farmers in Coastal Communities in Delta State. *Ife Research Publication in Geography*, Vol. 9, No. 1, pp.12-20.
- Reutilinger, S. (1987), "Food Insecurity and Poverty in Developing Countries". In, *Food Policy*. J.P. Gittinger, J. Leslie and D. Hoisington, eds. The Johns Hopkins University Press.
- Riscopoulos, S.J., Mukanyanye and O. Guyaux (1988). Agriculture in the Year 2000, The Case of the African, Caribbean and Pacific Countries. *International Forum, Athens*, November.
- Soussan, J. (2000) 'Linking the Local to the Global: Can Sustainable Development Work in Practice?': In Granger, A. and Purvis, M. (eds.) *Sustainable Development: Geographical Perspectives*, Earthscan, London
- UNDP (2006). *Niger-Delta Human Development Report*
- Uyigue, E. and Agho, M. (2007). *Coping with Climate Change and Environmental Degradation in Niger Delta of Southern Nigeria*. A Publication of the Community Research and Development Centre, Nigeria.
- United Nations. 1975. *Report of the World Food Conference, Rome 5-16 November 1974*. New York.