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Awareness of Climate Change and Implications for Attaining the Millennium Development Goals (MDGS) in Niger Delta Region of Nigeria

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Abstract

The Niger Delta region of Nigeria is at the centre of both the economic wealth and climate change in the context of pressing national economic issues. It produces the nation's major foreign exchange earner-crude oil, has abundant fishery and marine resources- all of which are threatened by vagaries in climatic factors. The study was conducted to evaluate awareness of climate change and implications for attaining the MDGs in the Niger Delta region of Nigeria. The study made use of a multi-stage sampling technique to select three hundred and sixty respondents across three Niger Delta States (Delta, Edo, Ondo). Data for the study were collected with the aid of well-structured questionnaires assisted with interview schedules administered on the respondents. Data collected were analysed using descriptive statistics. The analysis of awareness of climate change indicated that level of awareness is low but improving. It was found, however, that the mass media has played the most significant roles in climate change awareness in the study area. The results also indicated that the respondents had been practicing some indigenous and emerging adaptive strategies to climate change for many years. This study concluded that more awareness about climate change in the Niger Delta region have implications for attaining the MDGs.

Key words

Awareness, climate change, Implications, MDGs, Niger Delta region.

Introduction

The Niger Delta region is at the heart of Nigeria's economic, environmental and geo-political significance. The Niger Delta with only more than 20% of the nation' s population is pivotal to Nigeria's economy as the area contributes over 80% of Nigeria's revenue, accounts for about 95% of the nation's foreign exchange earnings (Ejumudo, 2013). The region's enormous reserve of crude oil and gas creates ample room for foreign and local investments and its rich biodiversity in term of fauna and flora is almost incomparable to any part in the world.

Human activities have exacerbated climate change with its attendant impacts on agriculture in many communities in the Niger Delta region. Climate change also affects livelihood vulnerability (Bryceson et al., 2002, Cochrane, 2006, Ekins et al., 2003, Reed et al., 2013). Terrestrial water and carbon cycles also respond to climate change and variability through a set of coupled physical and physiological processes (Raupach, 2013), Social-ecological system collapse is also possible (Roser, 2001, Richter, 2013)

Akinro et al. (2008) reported that, the Niger Delta region of Nigeria has over 123 gas flaring sites making Nigeria one of the highest emitters of greenhouse gases in Africa. According to the World Bank (2008), Nigeria accounts for roughly one-sixth of worldwide gas flaring, flaring about 75% of her gas and all take place in the Niger Delta region. Agriculture in the Niger Delta is largely rain-dependent as irrigation is seldom practiced. Nzeadibe et al. (2011) further noted that changes in the rainfall pattern have greatly affected vegetation and agriculture in the region.

The long neglected social and infrastructural development of the region has attracted many development programmes of the international communities. These included many Millennium Development Goals (MDGs), the European Union-funded Micro Project Programmes in nine Niger Delta States (MPP9) and Niger Delta Development

Commission (NDDC). In all the nine states, there are State-development commissions fashioned after the NDDC (Ndem and Baghebo, 2012). Because the MDGs which started implementation in 2000, is expected to be wound up in the year 2015, this study is focusing on awareness of climate and implications for attaining the MDGs.

The Millennium Development Goals (MDGs) in the Niger Delta region

The Millennium Development Goals (MDG's) are a linked set of objectives – a portfolio of targets that represent a coherent assault on the problem of development (Hall, 2005). The Millennium Development Goals (MDGs) provide an international framework that builds commitment and cooperation towards poverty reduction. According to (CGIAR, 2005), the MDGs represent the shared commitment made by the Global community to fight poverty, endorsed in 2000 by 189 nations (Nigeria inclusive) as international commitment to the priorities for achieving sustainable development by the year 2015. Broadly, these goals are:

i. Eradicate extreme poverty and hunger
ii. Achieve universal primary education
iii. Promote gender equality and empower women
iv. Reduce child mortality
v. Improve maternal health
vi. Combat HIV/AIDS, malaria and other diseases
vii. Ensure environmental sustainability
viii. Develop a global Partnership for Development

With only about two years for the time limit set for the achieving the MDGs, the MDGs may be under threat by climate change. According to Nzeadibe et al, (2011), climate change is one of the most serious environmental and human threats undermining the achievement of the Millennium Development Goals (MDGs) and the international communities' efforts to reduce extreme poverty.

Climate change awareness in the Niger Delta

The Niger Delta had benefited from non-governmental organizations (NGOs), civil society and academic and policy-oriented awareness and advocacy on climate change. These include Community Research and Development Centre (CREDC) and Environmental Rights Action (ERA) which have been creating awareness about impacts of gas flaring and its linkages with climate change and poverty in the region (Uyigue, Agho, 2009, Nzeadibe et al., 2011). Notable among researches conducted in region on climate change include environmental degradation, vulnerability and mitigation of climate change impacts (Akinro et al., 2008), coastal management and adaptation to climate change (Etuonovbe, 2008), climate change, poverty and women's socio-economic challenges (Chinweze, Abiola-Oloke, 2009). Moreover, limited researches dealt with awareness of climate change and its impacts on MDGs in the Niger Delta region of Nigeria.

According to (Mani et al., 2008), adaptation is understood to include efforts to adjust to ongoing and potential effects of climate change. Noteworthy is the fact that farmers of Niger Delta communities, knowingly or unknowingly are adapting to the changing climatic conditions using their traditional knowledge, innovations and practices (Uyigue, Agho, 2009; Etuonovbe. 2008). Despite all these, it does appear that the level of awareness of farmers in the region of climate change and its impacts leaves much to be desired. As a result, the need for more awareness-raising among stakeholders about the phenomenon cannot be over-emphasized (Nzeadibe et al., 2011). With only about two years remaining for the MDGs and the Niger Delta region still struggling with aggravated climate change impacts attributed to concentration of greenhouse gases in the atmosphere, extensive dam construction, oil spillage, natural gas flaring, unfavourable farm practices, and over exploitation of natural resources found in the area. As majority of the people living in the Niger Delta are farmers, the environmental and social consequences of climate change is putting livelihoods at serious risks. Will MDGs really attain its goals in the Niger Delta? It is against this background that a study on awareness of climate change and implications for attaining the MDGs in the Niger Delta region of Nigeria was conducted with the following objectives which include to:

i. Determine the level of awareness of farmers about impacts of climate change in the study area
ii. Identify indigenous and emerging strategies for climate change adaptation in the study area and
iii. Investigate farmers' perceived implications of climate change in attaining the MDGs

iv. Make policy recommendations for building climate change resilience in the study area and national levels in Nigeria

Materials and methods

The study area

The area of this study is the Niger Delta region of Nigeria. The Niger Delta, as defined officially by the Nigerian government, covers about 70,000 km² of marshland, creeks, tributaries and lagoons that drain the Niger River into the Atlantic at the Bight of Biafra and makes up 7.5% of Nigeria's land mass consisting of the nine states of Abia, Akwa- Ibom, Bayelsa, Cross-River, Delta, Edo, Imo, Ondo and Rivers (Mba, Ogbuagu, 2013). The region is reputed for having diverse vegetation belts: from the largest rain forests in Nigeria to mangrove swamps, savannahs, mountains and waterfalls with rare animals, including endangered species and unusual plant families, making it one of the World's richest biodiversity centres attracting scientists and tourists. The region had a population of 31.2 million people at 2006 census (NPC, 2007) with more than 40 ethnic groups including the Bini, Efik, Ibibio, Annang, Oron, Ijaw, Itsekiri, Isoko, Urhobo, Ukwuani, and Kalabari, are among the inhabitants in the Niger Delta, speaking about 250 different dialects, the bulk of which lives in rural fishing and farming communities (http://en.wikipedia.org/wiki/Niger_Delta, 2013). The region is also the headquarters of Nigeria's oil and gas industry and currently the only oil and gas producing region in Nigeria (Nzeadibe, Ajaero 2010; Bakare et al., 2013). Regrettably, activities of multinational oil companies have recently been linked to degradation of the natural environment, pollution and low agricultural productivity (Abutudu et al., 2007; Ibeanu et al, 2007) as well as insecurity of lives and property, hence, a reduction in quality of life expectations in Niger Delta communities (Nzeadibe and Ajaero 2010). The Niger Delta region is therefore central to Nigeria's economic, environmental and geo-political importance.

Sampling technique, size and data collection

A multistage sampling technique was used for this study. In the first stage three states of Delta, Edo and Ondo were randomly selected from the nine (9) states that make up the Niger Delta region in Nigeria. In the second stage, using the delineation by the three (3) states' Agricultural Development Programmes (ADPs), two (2) agricultural zones were randomly selected from each state giving a total of six (6) agricultural zones. In the third stage, from each of the selected zones, two blocks were randomly selected for study. This gave a total of twelve (12) blocks. Initially, residents from the selected blocks were invited to a community forum at which a preliminary identification of different categories of households was carried out. At the community forum, fifteen (15) rural household members made up of males, females and youths who constituted the focus group were purposively selected from the list of those identified and discussions were held with them. During the community forum, Focus Group Discussion (FGD), and Key Informant Interviews (KII) and with the help of community leaders, a sampling frame of all farmers was built up in each community. From this list, random samples of 30 respondents were selected and interviewed using semi-structured interview schedules thus making a total sum of 360 respondents from the study area.

Data collection

The data collection method of Rapid Rural Appraisal (RRA) (transect walks, identification and inspection of farm lands) was used with the aim of encouraging the respondents to describe their relationship with their natural resources. Another advantage of this method is the identification of variables of importance to the rural dwellers and in the formulation of questions that were included in the more formal semi- structured interview schedule in locally meaningful terms. Two single gender Focus Group Discussions (FGDs), one for men and another for women were held with farmers in each state with number of participants ranging from 10-20. The resultant six FGDs were very helpful in eliciting clearer information from the respondents.

Data analysis

Descriptive statistics was used in data analysis. These included means, percentages, standard deviation and frequencies, charts, graphs and tables. The use of indigenous and emerging strategies for climate change in the study was measured on a three-point Likert-type scale of "always" (3), "rarely" (2) and "not at all". Adaptation strategies with mean scores of ≥ 2.5 were regarded "highly adopted", strategies with mean responses from 1.5

to 2.49 were regarded "adequately adopted while those with mean less than 1.5 were regarded as "poorly adopted.

Results and discussion

Respondent's' level of awareness of climate change

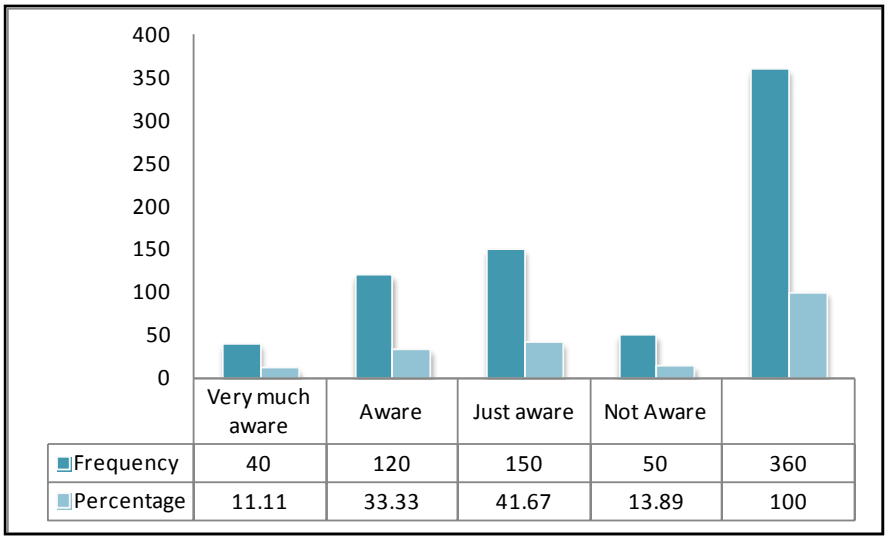
The result of respondents' level of awareness of climate change in the study area as shown in Figure 1 indicates that only 11.11% of the respondents were very much aware, 33.33% were aware, 41.67% were just aware while 13.89% were not aware at. The findings indicate that the level of awareness is still low in the study area but there is an improvement over a similar study conducted by Nzeadibe et al, (2011) who found that the level of awareness of climate change impacts was very low in the Niger Delta region of Nigeria with about 60% of respondents knowing little or nothing about climate change and its impacts.

Respondents' understanding of climate change

This study researched into respondents' understanding of climate change (Figure 2). Inquisitively, 50% of respondents indicated that they understood climate change as "change in weather". This observation is probably representative of the most basic understanding of the term "climate change". 13% related climate change to "prolonged drought" while 8% understood it as "excessive sunshine". Only 10% of respondents understood climate change as "heavy rainfall", 4% implied it to mean "poor yield" while just 3% took climate change for ozone layer depletion. The percentage of the respondents that had no idea of the concept of climate change was 12%. Those that had no idea of climate concept were as a result of non-awareness of the phenomenon.

Respondents' source of information on climate change

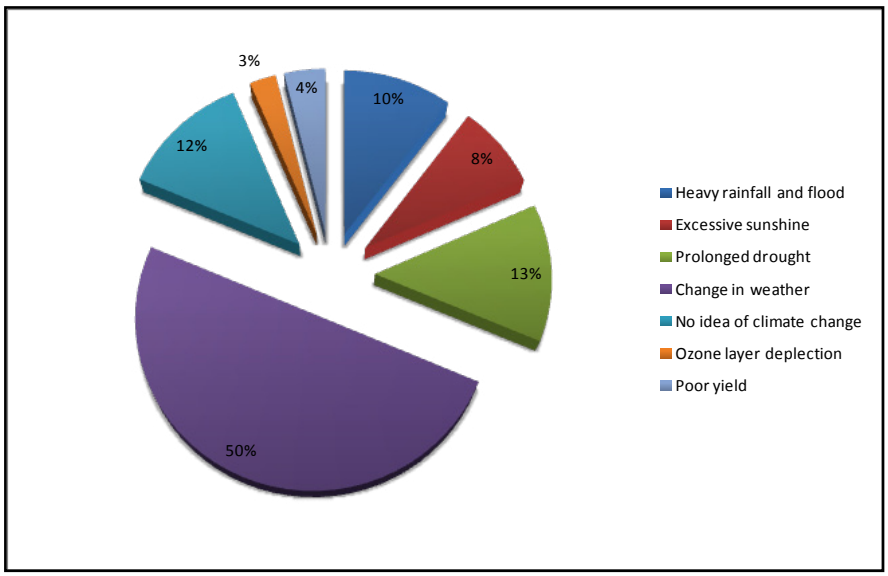
Availability and accessibility to information on climate change is a key determinant of level of awareness, understanding, and knowledge of climate change. It is crystal clear from Table 1 that the respondent received information mostly on climate change from the following three major sources; radio/television (50.83%), newspaper (25.28%), and friends (21.39%). Other sources included internet (9.72%), researchers (8.6%), extension workers (12.22%), farmers' co-operative (9.44%) and politicians (3.61%). The implication of the above is that the mass media remains that largest source of information to the respondents. The result also implies that extension workers had played little role in informing respondents on the climate change. This could be in part, due to the very small extension to farmer ratio in the country as extension services are poorly funded. Again, high incidence of poverty in country may explain why responses to newspaper were low (25.28%). More also, research is poorly funded and frequent power failure and poor communication



	Very much aware	Aware	Just aware	Not Aware	
Frequency	40	120	150	50	360
Percentage	11.11	33.33	41.67	13.89	100

Source: Computed from field survey, 2013

Figure 1: Respondents' level of awareness of climate change.



Source: Computed from field survey, 2013

Figure 2: Respondents' understanding of climate change.

Source of information*	Frequency	Percentage (%)
Extension workers	44	12.22
Friends	77	21.39
Farmers' co-operatives	34	9.44
Politicians	13	3.61
Internet	35	9.72
Newspaper	91	25.28
Radio/Television	183	50.83
Researchers	31	8.61

* Multiple response exist

Source: Computed from field survey, 2013

Table 1: Respondents' source of climate change phenomenon.

networks would have been largely responsible for low percentages to internet and researchers.

Respondents' indigenous and emerging strategies for climate change adaptation

Table 2 shows 27 indigenous and emerging strategies for climate change adaptation used by farmers in the Niger Delta region of Nigeria. This result revealed that out of the 27 adaptive strategies, 7 were "highly adopted" by the famers as reflected in their mean score values of ≥ 2.5. These strategies for climate change adaptation included the use of organic manures, planting of cover crops, planting of trees, increase in number of weeding, protection of water sheds, mulching, preservation of seeds/seedlings for planting and use of windbreaks/shelter belts. The remaining 20 strategies were "adequately adopted" given mean score values from 1.5 to 2.49. It was however noteworthy that none of the strategies was "poorly adopted". These findings corroborated (Nzeadibe et al, 2011, Ogunleye and Yekini, 2012) who concluded that the widely adopted adaptation measures of climate in the Niger Delta region were planting cover crops like melon to help conserve soil moisture, zero tillage so as not to expose the soil to loss of nutrients, regular weeding of cropped farmland, early planting with first rain especially for crops like maize and cassava, mulching and use of organic manure, preservation and selection of seeds for next planting season.

Adaptive strategies	Always (%)	Rarely (%)	Not at all (%)	Mean	Remarks
Early and late planting	58.05	26.40	15.56	2.42	A
Soil conservation and water	53.61	33.89	12.5	2.41	A
Use of organic manures	64.72	21.11	14.17	2.51	H
Use of inorganic fertilizer	57.78	25.28	16.94	2.41	A
Planting pest and disease resistant crop	56.95	24.44	18.61	2.38	A
Use of crops varieties that are well acclimated	36.94	25.28	37.78	1.99	A
Draining of wetland for crop cultivation	25.83	33.89	40.28	1.86	A
Making of contour bund around farmland	44.45	21.11	34.44	2.10	A
Planting of cover crops	66.94	20.56	12.50	2.54	H
Planting of trees	67.22	15.56	17.22	2.50	H
Minimum tillage system (zero/ minimum)	48.61	30.83	20.56	2.28	A
Use of irrigation system/water storage	27.50	34.17	38.33	1.89	A
Reforestation/ Afforestation	28.33	26.67	45.00	1.83	A
Use of chemicals like herbicide, insecticide	63.06	22.78	14.16	2.49	A
Increase in number of weeding	70.56	12.50	16.94	2.54	H
Use of early maturing crop varieties	60.28	27.22	12.50	2.48	A
Protection of water sheds and mulching	62.78	25.83	11.39	2.51	H
Preservation of seeds/seedlings for planting	66.11	18.33	15.56	2.51	H
Use of weather-resistant variety	42.22	26.94	30.83	2.11	A
Reducing access to eroded/erosion prone area	72.22	15.56	12.22	2.60	A
Mixed farming practices	49.17	26.11	24.72	2.24	A
Use of recommended planting distance	53.61	28.33	18.06	2.36	A
Changing the timing of land preparation	53.61	25.56	20.83	2.33	A
Changing harvesting dates	49.17	28.33	22.50	2.27	A
Out migration from climate risk areas	66.39	15.00	18.61	2.48	A
Use of windbreaks/shelter belts	72.22	18.61	9.167	2.63	H
Reclamation of wetlands/ river valleys	57.78	22.50	19.72	2.38	A

Source: Computed from field survey, 2013

Table 2: Respondents' indigenous and emerging strategies for climate change adaptation.

MDGs*	Yes (%)	No (%)	Rank
Eradicate extreme poverty and hunger	53.33	46.67	3rd
Achieve universal primary education	30.27	69.73	6th
Promote gender equality and empower women	39.72	60.28	5th
Reduce child mortality	27.22	72.78	8th
Improve maternal health	49.44	50.56	4th
Combat HIV/AIDS, malaria and other diseases	30.28	69.72	7th
Ensure environmental sustainability	61.67	38.33	1st
Develop a global Partnership for Development	56.94	43.056	2nd

* Multiple response exist

Source: Computed from field survey, 2013

Table 3: Climate change implications on attaining the MDGs.

Climate change implications on attaining the MDGs

The respondents were precise in responding "yes" or "no" to the question of whether climate change had implications on achieving the MDGs (Table 3). As shown by the percentage of responses to each MDGs, ensure environmental sustainability, develop

a global partnership for development, eradicate extreme poverty and hunger were the three MDGs according to the respondents may not be attained ranking 1st, 2nd and 3rd respectively citing extreme impacts of climate on them in the Niger Delta region. However, MDGs of reducing child mortality and combating HIV/AIDS, malaria and diseases were the least affected by climate change.

Conclusion

The study was conducted to determine awareness of climate change and implications for attaining the MDGs in the Niger Delta region of Nigeria. The study specifically revealed that the level of awareness of farmers about impacts of climate change in the study area as 11.11% of the respondents were very much aware, 33.33% were aware, 41.67% were just aware while 13.89% were not aware at all. The sum of the percentages of farmers that were aware i.e. much aware, aware and just aware was 86.11%. This level of awareness is an improvement over the result of Nzeadibe et al, (2011) who found that 60% of farmers in Niger Delta region of Nigeria knew little or nothing about climate change and its impacts. The study also found that this improvement was due mostly to the advocacy created by the mass media.

The study also identified 27 indigenous and emerging strategies for climate change adaptation used by the farmers. The study revealed that out of the 27 adaptive strategies, 7 were "highly adopted" by the famers, 20 strategies were "adequately adopted" while none was "poorly adopted". The 7 "highly adopted" strategies included the use of organic manures, planting of cover crops, planting of trees, increase in number of weeding, protection of water sheds, mulching, preservation of seeds/seedlings for planting and use of windbreaks/shelter belts.

The investigated farmers' perceived implications of climate change in attaining the MDGs revealed that ensuring environmental sustainability, developing a global partnership for development; eradicating extreme poverty and hunger were the three MDGs which may not be attained ranking 1st, 2nd and 3rd respectively. If these MDGs are therefore to be attained, then there is need for more inclusive collaboration among stakeholders for evolving innovative approaches and adaptive strategies for the climate change adaptation in the Niger Delta region.

Based on the above findings, the following recommendations are made:

i. Farmers and policy makers should tap into the vast potential of the media to disseminate climate change information and create more awareness about causes, and consequences of climate change as well as strategies for climate change adaptation in the Niger Delta.

ii. Extension workers, the media, researchers and civil society groups should build on the existing information apparatus in the Niger Delta region to diffuse the adaptive strategies for widespread adoption in other communities.

iii. Adequate investment in research and capacity building should be made on the identified indigenous and emerging strategies to climate change adaption in the Niger Delta region.

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