PERCEPTION ON CLIMATE CHANGE AND COMMUNITY RESILIENCE IN SELECTED RURAL COASTAL COMMUNITIES OF BADAGRY, NIGERIA

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ABSTRACT

Climate change is a multi-faceted phenomenon and its impacts vary with specific socio-economic realities. Rural residents especially in the coastal regions of developing nations remain the most vulnerable because their livelihood is tied to climate-sensitive sectors such as farming and fishing. Mitigation and adaptation strategies employed are, however, a function of residents' perception of the phenomenon. The study, therefore, investigated the perception of coastal rural residents in Badagry West Local Government Area of Lagos on the impact of climate change on their livelihood. A total of 200 questionnaires were administered to respondents using a multistage stratified sampling technique. Results indicated that the primary occupation of 44% of the residents was farming or fishing, and 70% indicated they earned less than N50,000 monthly. About 58 % of the residents perceived climate change as an act of God, while 51% and 58% indicated that it resulted in more rainfall/flooding and less farm productivity. Over 60% relied on extension workers for guidance while another 59% planted different varieties of crops and increased cropping land area as adaptation strategies. This implied a more intensive use of natural resources and land conversions as they encroached into virgin lands in search for more cropping area. Aggressive investment in agricultural extension services and development of local non-farm economy is recommended to ensure sustainability.

Keywords: Climate change, Resilience, Coastal Livelihood, Nigeria

INTRODUCTION

Climate change is a multi-faceted phenomenon and its impacts vary with specific socio-economic realities. It is one of the most daunting global challenges of our time posing great threats to the realization of sustainable development, as climate hazards are increasingly impacting human communities and ecosystems alike (Girot *et al.*, 2012; UNDP, 2013). More specifically, it is expected to lead to higher average global temperature especially in the tropical and semi-tropical areas (Huang *et al.*, 2011). With this comes more significant risks to health,

livelihood, economic growth, water supply, human and food security of local communities (IPCC, 2018). Unfortunately, the world's poorest people and communities seem to be the most vulnerable to the impacts of climate change impacting their livelihood assets and rights, especially those that are dependent on biodiversity and ecosystem services for food, water and shelter. (Pisunati and Warner, 2003)

Climate change in IPCC usage refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer; while the UNFCC defines it as a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods (UNFCC, 2011). Climatic change has thus been found to occur due to natural variability or as a result of human activities. While the natural factor includes terrestrial causes such as the alternation in the orientation of the earth, extra terrestrial causes, such as in solar activities (variability), planetary motion, cloud formation and albedo, Bio-thermostat and ocean current, the human causes include the emission of green house gases (GHGs) and depletion of the ozone layer through various human activities such as industrialization, agriculture and land clearance (Tsojon, 2017).

UNFCC (2011) projected that globally, coasts are very likely to be exposed to increased risk from extreme weather events, including coastal erosion, due to climate change and sea-level rise. The effect will be exacerbated by increasing human-induced pressures on coastal areas. Densely-populated and low-lying areas where adaptive capacity is relatively low, and which already face other challenges such as tropical storms or local coastal subsidence, are especially at risk. The numbers affected will be largest in the mega-deltas of Asia and Africa, while small islands are especially vulnerable.

Resilience, on the other hand, was defined by IPCC (2008) as the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning. Smith (2012) stated that resilience that simply lessens vulnerability to climate change – that only enables coping – is not sufficient as poor and less-developed countries require a capacity for transformation needed to move out of poverty towards prosperity that can be sustained under dynamic climate and global change. Hence, climate resilient communities and nations will take impact-specific action for adaptation, but they

will also make sure they organise their institutions, infrastructure and economy in ways that are highly adaptive, warranting higher capacities to cope with shocks and, when necessary, re-adjust and rebuild – or transform – according to new realities (Malone, 2009).

Misconceptions about climate change are among the most important problems facing climate change campaigns. These misconceptions affect people's attitude to climate change so much that Bostrom and Lashof (2007) proposed the use of mental models and effective ways of presenting the climate issue that suggest the right causes in order to improve the public's understanding of climate change and influence them taking towards taking action. Stamm, *et al.*, (2000) discovered that although people are aware of climate change in a general sense, their perceptions of its causes and consequences differ greatly. This perception differs according to levels of conceptualization depending on socio-economic variables, location and livelihood activity and as much the individual's physical surrounding and experiences (Weber, 2010). Indeed Onyekuru and Marchant (2017) noted that personal characteristics and economic conditions influence the response of rural residents to climate change and variability as poor households are likely to take measures to ensure their survival, while wealthier families make decisions to maximize profits from their investments. Hence in order to motivate people to understand climate change and orientate their attitude towards addressing the impact, there is need to appraise their perceptions of climate change.

Nigeria, like other African nations is dwarfed as a greenhouse gas producer by more industrialised nations. Yet deforestation, burning of fossil fuels and gas flaring are concrete activities that contribute significantly to increase in the concentration of Greenhouse Gases (GHGs) in Nigeria. Indeed Odekunle *et al.* (2005) and Ojugo (2011) asserted that Nigeria's climate has been witnessing increasing temperature at the rate of about 0.15 degree Celsius per decade and decreasing amount of rainfall in the last 70 years. Already, visible occurrences of drought for a cumulative period of approximately 8-18 years were observed in most of Adamawa, Bauchi, Borno, Jigawa, Kano, Kastina, Sokoto, Yobe and Zamfara states of Nigeria while the Niger Delta states like Bayelsa, Delta, Edo and Rivers, among others had flooding and over flowing seas (Onu and Ikehi, 2016).

Local studies in the urban environment have examined extreme weather events, risks, and management (Adenekan, 2011; Ajibade, 2013; Soneye, 2014). Rural studies, on the other hand, have focused on the relationship between climate

change and agriculture. Some examined farmers' perception of climate change and their adaptation strategies (Salman, 2011; Tsojon, 2017; and Onyekuru and Marchant, 2017) while others studied the effects of climate change on crop yield (Ajadi *et al.,* 2012; Akinniran *et al.,* 2013 and Adewuyi *et al.,* 2015). This study went a step further to examine beyond agriculture, the livelihood response of coastal communities in Lagos suburbs to climate change. This is because knowing the perception of rural communities about access to and use of natural resources to satisfy their livelihood demands is important for improving the adaptive capacities and ability to respond to climate shocks.

The aim of study was thus to examine the perception of climate change and its relationship with the livelihood of the rural populace in the suburbs of Lagos State, Nigeria focusing on Badagry West Local Council Development Area. Specifically, it identified the various means of livelihood of residents, ascertained their perception of climate change and examined current adaptation and coping strategies.

The Study Area

Lagos state is one of the coastal states in Nigeria with an area of 3,577km^2 and lies in the south west geopolitical zone of the country (Fig. 1). It is bounded on the West by the Republic of Benin, in the North and East by Ogun State and in the South by the Guinea Coast of the Atlantic Ocean. It has an extensive network of Lagoon and Creeks in Lagos, Ikorodu, Badagry and Epe local governments which cover about 22 percent or 786.94km^2 of the total area, a coast line of about 180km and a handful of streams and rivers (Udo and Mamman, 1993). Lagos state extends approximately from latitude 6°20' North to 6°40'North and from latitude 2°45' East to 4°20' East. All these provide a unique opportunity for fishing activities, which in fact has always been a traditional occupation among the people. The main suburbs in Lagos state include Ikorodu, Epe and Badagry, and more local councils have recently been created. However, this study is concerned with rural settlements because they are engaged in agricultural activities. The focus of this study would be on Badagry West Local Council Development Area.

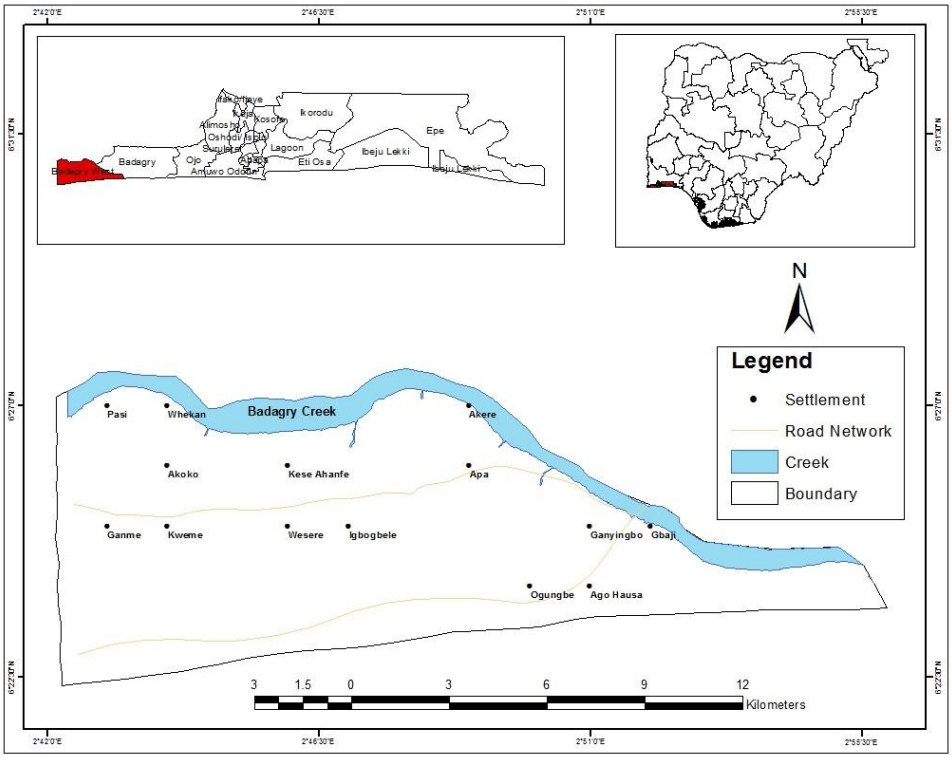

Figure 1: The Study Area: Badagry West Local Council Development Area

Badagry is a coastal town, the sandy nature of the local government makes drainage easy and this is what is responsible for its sparse vegetation. Given its coastal location, there are many creeks and lagoons and it has a total land area of about 441km^2. Badagry comprises of about eighty three (83) communities and four L.G.As.

The study area is situated in a low-lying coastal region with a general elevation of less than 20metres lying within the tropical rainforest zone of south western Nigeria. Mean daily temperatures remain high throughout the year at about 26-28^{o}C. Badagry falls into the ecological zone of wetland soils that are sandy in nature and lies on the coast where inland water empties into the Atlantic Ocean. It has a geologic origin of deltaic basis and tidal flats. The natural vegetation is mangrove. The relief of Badagry is typical of a coastal region and it is situated on a flat coastal plain with swamps, marshes and Creeks. The terrain is low lying and the area occasionally experiences flooding especially during the rainy seasons. (Adebayo, 1994)

According to the 2006 population census, Badagry LGA has 241,093 people. Economic activities in Badagry are determined by the ecological setting of the settlements. Its location at the coast of the Lagos Lagoon and the Atlantic Ocean, means its soil has never been amenable to elaborate farming but it is instead being dominated by fishing occupations (Ayodeji 1994). An excellent long stretch of sand beach also makes the local government one of the longest tourist beach in the country. Some of the villages around this location include: Aradagun, Ajido, Ajara, Gbaji, Igbogbele, Asipa, Kwame, Iworo and Igbanko.

METHODOLOGY

Data for this study were collected through a set of multiple sources which include: topographic maps and field assessment, administrative records, and social survey. Questionnaires were administered to residents of the Badagry West LCDA and covered issues of household income sources, perception on climate change origin, validation and evidence, adaptation and coping strategies among others. The stratified sampling technique was used wherein largely populated villages in proximity to the coast were initially selected, and the questionnaires thereafter distributed randomly according to the adopted sampling frame (Table 1).

Table 1: The Sampling Frame

Settlement	1991 Population*	2015 Population*	Sample size
Ajido	3,357	7,149	83
Ashipa	1,078	2,296	26
Igbobele	712	1,516	18
Sakpo	542	1,154	13
Akoko	264	562	7
Kankon	538	1,146	13
Gbaji	275	585	7
Apa	748	1,593	19
Ganyinbo	553	1,177	14
Total		17,178	200

Source: *NPC (1991), Projected for 2015*

A total of 200 copies of the questionnaire were administered, each village receiving its proportion of the total population and 182 were successfully retrieved. The perception of respondents on climate change, their adaptation and coping strategies, were retrieved from questions using a 10-point sematic differential scale, and the data summarized with percentages. Other data on livelihood were analyzed means of central tendency.

RESULTS

Livelihood Structure in Badagry West LCDA: The traditional rural occupations of farming and fishing ranked second among the respondents giving way to the high proportion of government employees in the region (Fig.2).

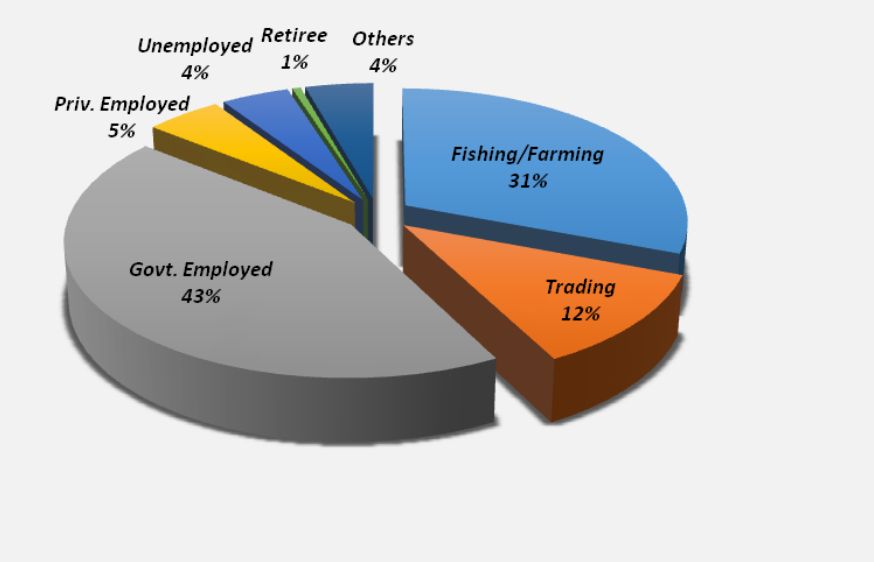

Fig 2: Primary Means of Livelihood of the Residents

Government employees accounted for about 43% while those primarily into farming and fishing were about 31%. This was explained by the nature of Badagry as a border town with stations of a number of government agencies. The lower cost of staying in these villages and proximity to stations make them choice places of residence. It should however be noted that most of these government employees are not indigenes hence there is always a flow of personnel in and out of the area.

The emergence of trading and private employment was due to the several alternative income opportunities opened up by the socio-economic environment. Hence the seeming departure from the traditional occupation of fishing/farming into transportation, mining and others.

About 70% of the residents earned less than N50,000 and a higher proportion of those that earn above N50,000 were the government employees and few traders (Fig. 3).

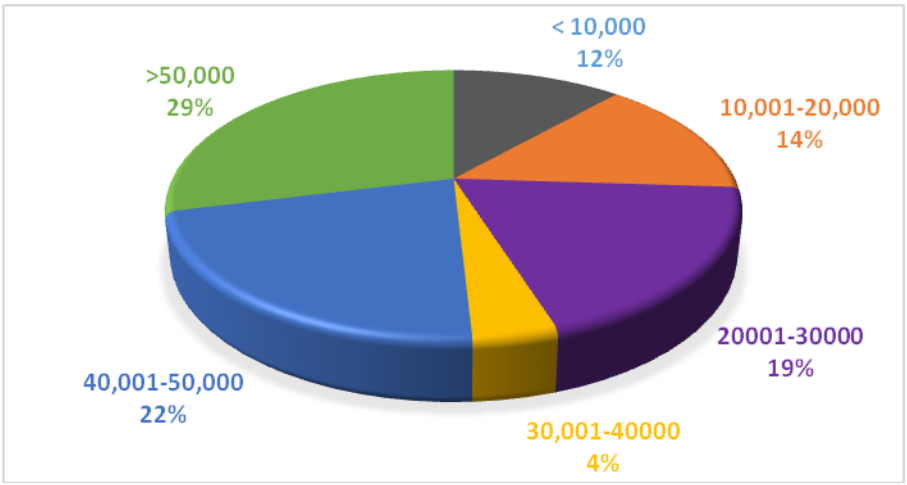

Fig. 3: Distribution of Monthly Income of the Residents in the LCDA

Perception of Climate Change: about 58% of the respondents described climate change as an act of God while 39% described it as a human-induced phenomenon and the rest were indifferent. It is unfortunate that a lower proportion acknowledged the significant contribution of man to changing environmental conditions (Fig. 4). In terms of validation of the veracity of climate change, 57% stated that it was a concept proven by science while 23% are yet to be convinced of the science behind it.

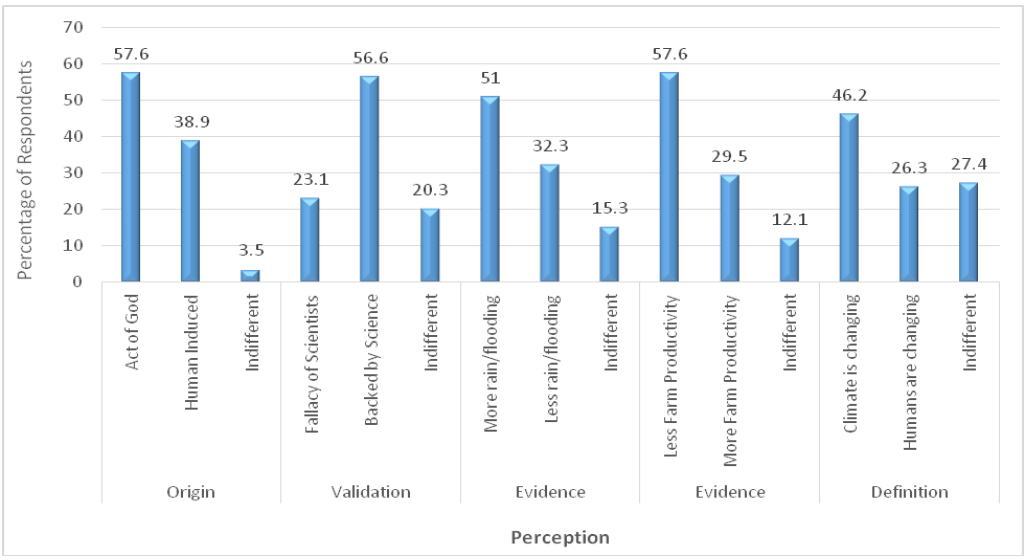

Fig. 4: Perception of the Residents on Climate Change

Two sets of evidences were reviewed – rainfall and farm productivity where most of the respondents agreed that they have been experiencing more rainfall, flooding, and less farm productivity; 51% and 58% respectively.

Further examination of their perception revealed about 47% of respondents affirming that indeed climate is changing while about 27% stated that it was rather man's way of life that was changing and the rest were unsure. This was also evaluated across the occupations and revealed generally the higher proportion of those who accepted its reality except for traders and private employees (Fig. 5).

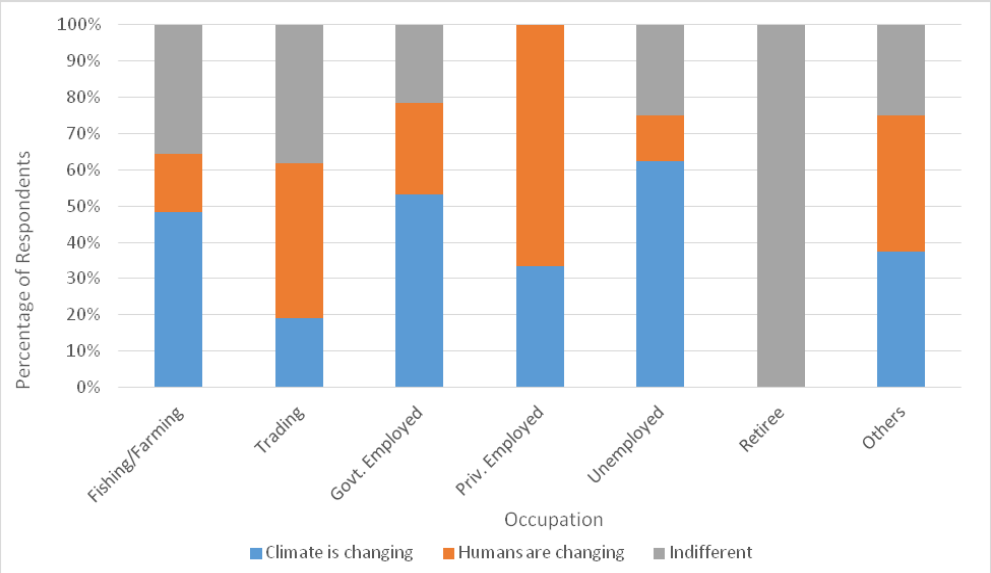

Fig. 5: Perception of residents on climate change across occupations
Source: *Authors, 2016*

Adaptation and Coping Strategies: changing environmental conditions affect all members of a society beyond those whose livelihood are directly climate-dependent. Hence multiple adaptation and coping strategies were adopted by residents in the study area (Fig. 6)

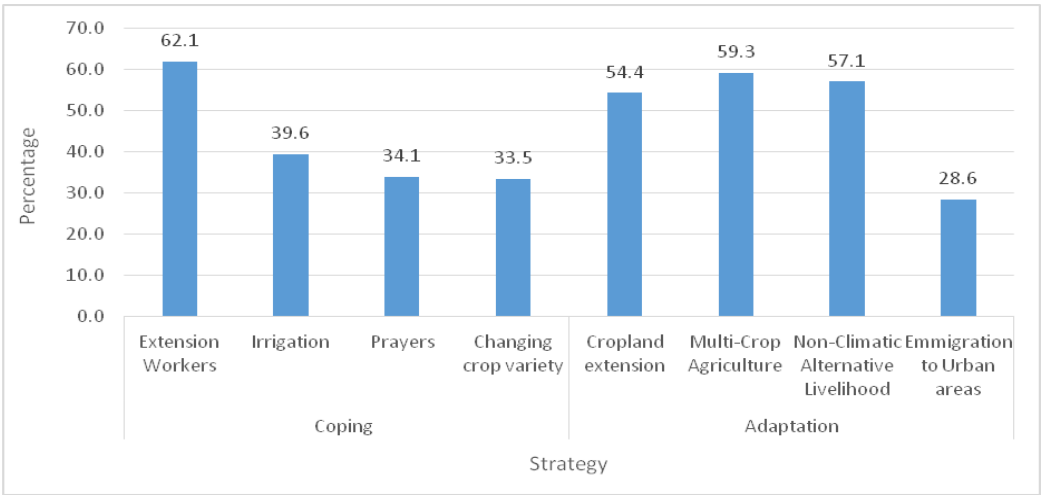

Fig. 6: The Climate Change Coping/Adaptation Strategies in the Area

Most residents in the study area have some links with agriculture either directly (commercial and subsistence) or as investors, hence their immediate response to changes in climatic conditions ranged from reliance on information from extension workers (62%) to changing crop variety (36%). The mid to long term plan of residents on the study area in the face of recurrent changes range from emigration to urban areas (29%) for better livelihood to multi-crop agriculture (60%).

CONCLUSION

Farming and fishing rank significantly as the primary occupation of residents yet there are concerns about its neglect for more white-collar jobs. The preponderance of government employees in the area suggests the need for service provision by indigenes who turn their attention to trading as their main income source. There is also a general idea of the concept of climate change among residents having noted its perceived impacts in more rains/flooding, and reduction in farm productivity due to variability in rainfall patterns. Residents' primary occupation barely affected their acceptance of the reality of climate change as a higher proportion of residents across major occupations agreed to this except traders. Multiple strategies were employed by residents to respond to changing climatic conditions relying mostly on guidelines from extension workers and adopting multi-crop agriculture.

Multiple stakeholders including government, community leadership and individuals are required to ensure sustainable livelihood in rural areas in view of

changing climatic conditions. It is observed that aggressive climate data-based extension services are facilitated to complement current level of interaction. Further, there is need for awareness creation of the residents on the development of efficient value chains for both farm and fishing products to reduce losses and improve income base. Adoption of non-farm income sources will improve the current coping strategies.

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