Original Research Article

Farmers Perception of Climate Change and Adaptation Measures to Poverty Diseases Along River Niger in Edo and Kogi States, Nigeria

ABSTRACT

Climate variability also has the potential to worsen existing vulnerabilities such as Malaria, HIV/AIDS and Tuberculosis. This study examined the farmers' perception of climate change and adaptation measures to poverty diseases along river Niger. Primary data were collected from 358 respondents that were selected using multistage sampling technique from Edo and Kogi States, using questionnaires. Descriptive statistics, the threshold concept for discrete variables, were used as analytical tools. Results of the analyses revealed that the use of mosquito nets had the highest adaptation measure to poverty diseases, with a Likert scale mean score of 4.53, while land preparation pattern was the most used adaptive capacity to climate change. The study recommends that to reduce effect of poverty disease, there is need for policy makers to engage communities when taking decisions relating to their health.

Keywords: Farmers Perception, Climate Change Adaptation and Poverty Diseases

INTRODUCTION

Poverty is a major cause of diseases and a barrier to accessing health care when needed World Health Organisation (WHO, 2020). Poverty and diseases are closely tied with each factor aiding the other (Stevens *et al.*,2016). This relationship is financial, the poor cannot afford to purchase those things that are needed for good health, including sufficient quantities of quality food and health care. Disease, in most case can cause poverty. This is partly due to the costs of seeking health care, which include not only out-of-pocket spending on care (such as consultations, tests and medicine), but also transportation costs and any informal payments to health care providers which can reduce farmer scarce resource (Bennett *et al.*, 2019). Poverty disease is a term sometimes used to collectively describe diseases, disabilities and health conditions that are more prevalent among the poor than among wealthier people. In many cases, poverty is considered the leading risk factor or determinant for such diseases and in some cases, the diseases themselves are identified as barriers to economic development that would end poverty (Singh *et al.*,2018).

At the global level, there are three primary poverty-related diseases (PRDs) acquired immune deficiency syndrome (AIDS), malaria and tuberculosis (TB). Developing countries account for 95% of the global AIDS prevalence, 98% of active tuberculosis infections and 90% of malaria deaths occur in sub-Saharan Africa (WHO, 2020). Diseases of poverty kill approximately 14 million people annually (Stevens *et al.*, 2016). For example, malaria attacks an individual on average of four times in a year with an average of 10 to 14 days of incapacitation in Africa (Ekemhonye, *et al.*,2020). On a global perspective, between 400 and 900 Million of children under the age of five experience acute malaria annually in this malaria endemic region and this number may double by year 2020 if effective control measures are not implemented (Multilateral

Initiative on Malaria, 2018). In 2017, an estimated US$ 3.1 billion was invested in malaria control and elimination efforts globally by governments of malaria endemic countries and international partners (WHO, 2020).

The most serious threats facing human health today are deeply complex. The issue of poverty is also at the roots of the diseases in Africa (Ekemhonye, *et al.*,2020). Poverty impacts on self-treatment, health seeking behaviour and capacity for disease prevention at home and community level. In the public sector, poverty generates underdeveloped health services, with poor quality of care and low coverage of the population, which in some countries may be as low as 30-40 percent. Poverty diseases therefore have direct impact on farmers' incomes, wealth, labour productivity and labour market participation of both the sick and the caregivers (Ajani *et al.*, 2018). In Nigeria, poverty diseases such as malaria constitutes serious economic burdens to households through incapacitation and diversion of vital households' productive resources to treatment of the sick (Ugbomoiko, 2018).

Global warming is likely to increase disease, death and injury from heat waves, floods, storms, drought, and fire expand the geographic range of malaria, HIV/AIDs and TB in the poor countries of the world (Oluyole *et al.*, 2017). Gaps in knowledge of climate and health research is still in a rather primitive stage and many of the direct and indirect health effects of climate change in the regional have not been fully identified or understood. Hence, although a lot is known about the science of climate change, there remain many uncertainties of its potential impact on health. (Intergovernmental Panel on Climate Change. IPCC, 2020). Yet, this message has failed to penetrate public discussions on climate change and health policies. At the moment, few studies that have considered diseases and climate change were at global perspective or regional aggregates. This research has narrowed it down to two States along River Niger in Nigeria for easy use by policy makers. Thus, this study is expected to add to the scanty knowledge in this area of research. There is the need to investigate farmers' perception of climate change in the study areas and the various adaptation strategies measures carried out to mitigate the effect of poverty diseases

MATERIALS AND METHOD

Area of Study

The study was conducted in two of the States along river Niger in Nigeria. The selected States are Edo and Kogi. Edo State has a total land area of 19,794 km² and a population of 3,745,253 (National Population Commission (NPC) projection, 2018). It lies approximately between Latitudes 05º44ʻN and 07º34ʻN and Longitudes 05º04ʻE and 06º43ʻE. Average rainfall in the State ranges between 1,500 mm at the extreme north of the State and 3,500 mm in the south. Temperature averages are 25ºC in the rainy season and 28ºC in the dry season (Edo State Agricultural Development Programme, 2010).

Kogi State is located in the north-central zone of Nigeria; it has a total land area of 29,833 $km^{2.}$ with a Population size of 3,777,825 (National Population Commission (NPC) projection, 2018). It lies on latitude 7^{o} 49ʻN and longitude 6^{o} 45ʻE with sedimentary rocks and alluvium along the river beds which promote agricultural activities. The State has an average maximum temperature of 33.2^{o}C and average minimum temperature of 22.8^{o}C. Kogi State has two distinct weather, dry season lasts

from November to February and rain season lasts from March to October. Annual rainfall ranges from 1016mm to 1524mm. (Kogi State Agricultural Development Programme, 2012).

Sampling Procedure and Sample Size

The multi-stage sampling technique was used for the study. Edo and Kogi States are locations along river Niger. The first stage was the purposive selection of three farming Local Government Areas from each of the State. The Local Government Areas that were selected in Edo State are Etsako East, Etsako central and Esan south while Kogi, Lokoja, and Bassa Local Government Areas were selected from Kogi State. The L.G.As were purposively selected because they constitute centers of intensive agricultural activities along river Niger. The second stage was the random selection of 2 villages per Local Government Area using balloting method, giving a total of 12 villages. The third stage was the random selection of 358 farmers based on the sampling frame of farm households obtained from the States ADPs. The sample selection was based on Yamane sample selection model at 5% precision level and 95% confident limit (equation1) (Yamane, 2013). The model was employed to select respondents across villages premised on the population of each village as shown in Table 1.

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

Where:
n = the sample size,
N = the population size,
e = the level of precision.

Method of Data Collection

Data for this study were collected from primary sources. The data were obtained through administration of questionnaire to elicit information from the respondents. The researcher was assisted by trained enumerators from the State's Agricultural Development Programme (ADP) to carry out data collection.

Methods of Data Analysis

Likert Scale rating and descriptive statistics were employed in this study. To establish farmers' perception of climate change, 18 perception statements were developed, farmers interviewed, and responses were received based on respondents' levels of agreement or disagreement.

RESULTS AND DISCUSSION

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Respondents' Perception of Climate Change for Over the Past Years.

The effect of climate change as perceived by the respondents are presented in Tables 2. The result reveals that 4 out of twenty-one farmers' climate change indicators were slightly aware of change in climate with increase in flooding having the highest weighted means 4.11, followed by in high rainfall, increase in temperature, and increases sunshine with weighted mean of 4.07, 3.84 and 3.57 respectively. Furthermore, the remaining 14 were moderately aware of climate change with decrease in temperature recorded the highest with 3.84 which implies that majority of the

respondents were moderately aware of climate change. This finding agrees with Ayanwuyi *et al.* (2015) who explained that the more the perceived impacts of climate change the more the adoption of adaptation strategies to mitigate climate change impact by the farmers.

The result of Edo State affirmed that 6 out of numbers of climate change indicators by respondents were slightly aware of climate change with high rainfall having the highest means 4.32, followed by increase in temperature, decreases in temperature, increase in flooding, soil erosion and increase in sunshine with their weighted mean of 4.09, 4.01, 3.93, 3.66 and 3.51 respectively. It was also revealed that moderately awareness has the highest 11 recorded indicators with increase in draught having the highest weighted mean 3.47 score. While the not sure was 1 with a mean of 2.41. This also implies that most of

Table: 2. Respondents' Perception of Climate Change Over the Past Years

Indicators of Climate Change	Pooled		Edo State		Kogi State	
	Mean	Remark	Mean	Remark	Mean	Remark
Increase temperature	4.11	Slightly Aware	4.09	Slightly Aware	3.58	Slightly Aware
Decrease temperature	3.16	Moderately Aware	4.01	Slightly Aware	3.11	Moderately Aware
Increase sunshine	3.84	Slightly Aware	3.66	Slightly Aware	3.31	Moderately Aware
Decrease sunshine	3.49	Moderately Aware	3.43	Moderately Aware	2.89	Moderately Aware
High rainfall	3.57	Slightly Aware	4.32	Slightly Aware	3.80	Slightly Aware
Low rainfall	3.20	Moderately Aware	3.32	Moderately Aware	2.92	Moderately Aware
Longer rainfall season	4.07	Slightly Aware	3.32	Moderately Aware	3.23	Moderately Aware
Shorter raining season	3.13	Moderately Aware	3.39	Moderately Aware	3.16	Moderately Aware
Soil erosion	3.27	Moderately Aware	3.51	Slightly Aware	3.21	Moderately Aware
Soil infertility	3.28	Moderately Aware	2.84	Moderately Aware	2.80	Moderately Aware
Diappearance of wildlife	3.38	Moderately Aware	2.41	Not Sure	2.66	Moderately Aware
Disappearance of vegetation	2.82	Moderately Aware	2.46	Moderately Aware	2.86	Moderately Aware
Decrease in pest and disease	2.53	Moderately Aware	3.02	Moderately Aware	3.18	Moderately Aware
Increase in pest and disease	2.65	Moderately Aware	3.12	Moderately Aware	3.19	Moderately Aware
Increase in drought	3.13	Moderately Aware	3.47	Moderately Aware	3.29	Moderately Aware
Decrease in drought	3.18	Moderately Aware	3.34	Moderately Aware	3.23	Moderately Aware
Increase in flood	3.36	Moderately Aware	3.93	Slightly Aware	4.28	Slightly Aware
Decrease in flood	3.29	Moderately Aware	3.33	Moderately Aware	2.97	Moderately Aware

VA= Very Aware, S. A= Slightly Aware, M. A= Moderately Aware, N.S =Not Sure and N.A.= Not Aware
Source: Computation from field survey, 2019.

the respondents were moderately aware of climate change in the study area. The result is in line with that of stevens *et al.* (2016) who reported that local farmers are experiencing climate change even though they have not considered its deeper implications.

Furthermore, Kogi State shows that majority, 15 out of climate change indicators were moderately aware of climate change with increase in sunshine having the highest weighted mean 3.31, followed by increase in draught, longer raining season, decrease draught and soil erosion with mean of 3.29, 3.23, 3.23 and 3.21 respectively. While slightly aware indicators were increases in flooding, high rainfall and increases in temperature with mean of 4.28, 3.80 and 3.58 respectively. This implies that the respondents in Kogi State were moderately aware of climate change. The result is in agreements with Nigerian Environmental Study Team (2012) who reported that, flooding is a recurrent problem in Nigeria, particularly in the southern states where the Benue and Niger river converge. For example, in 2012 unprecedented levels of flooding affected 30 of the country's 36 States causing damage estimated by the government at ₦4.8 trillion.

Frequently use of adaptation strategies to poverty diseases

The frequently use of adaptation strategies measure to poverty diseases by the respondents is presented in Tables 3. The result reveals that the use of mosquitoes' net was common adaptation measure to reduce poverty diseases with a mean score of 4.53, followed by sanitation of environment and use of insecticides, with their means scores of 4.51 and 4.35 respectively. This implies that majority of the respondents use mosquito nets as means of preventing malaria diseases in their areas. This finding is in line with the study of Gething (2010), who reported that the use of mosquito nets is one of recommended measures to prevent malaria.

Table: 3. Frequently Used Adaptation Strategies Measure to Poverty Diseases.

Strategies	Pooled	Edo State	Kogi State
Use of mosquitos' net	4.53	4.66	4.43
Use of insecticides	4.51	4.47	4.36
Sanitation of environment	4.35	3.53	3.47
Preventive drugs	3.57	3.69	3.43
Use of herbs	3.50	3.22	3.23
Visit healthcare	3.20	2.02	2.19
Relocation	2.42	2.05	2.19
Spiritual head	2.11	2.35	2.51
Change source of water	2.10	1.72	1.49

Source: Computation from field survey, 2019.

Furthermore, result of Edo State showed respondents in Edo State, which reveals that use of mosquito nets, use of insecticides, sanitation of environment, preventive drugs, use of herbs, visit healthcare, relocation, spiritual head and change source of water were identified as the most frequently used adaptation strategy measures to reduce poverty diseases by the respondents in study area. Use of mosquito nets has the highest mean of 4.66 which was followed by use of insecticides with mean 4.47 and while lowest was change in source of water with mean 1.75. This implies that respondents' uses the available adaptation strategies frequently as measure against poverty diseases in the area.

The result in Kogi State, also revealed that among adaptation strategies used, mosquito nets had the highest with a mean of 4.43, followed by use of insecticides and sanitation of environment weighted mean and preventive drugs with their weighted mean values of 4.36, 3.47, 3.43 respectively. The implication is that mosquitoes was major challenge to the health of respondents, causing malaria diseases in the areas and use of mosquito nets was most frequently used adaptation strategy measure to reduce spread of this disease. This finding also agrees with the study of Gething (2010), who reported that the use of mosquito nets is one of recommended measures to prevent malaria.

CONCLUSIONAND RECOMMENDATIONS

Based on the empirical evidence emanating from this study, it was concluded that respondents' perception to climate revealed that respondents in the areas were moderately aware of climate change and practices of irrigation farming was the most used adaptive strategy to climate change by respondent in the study area. The study recommends that Nigerian Meteorological Agency and other climate change organizations should create climate change awareness centers in each Local Governments' Area of the States to improve on the moderate awareness level and enable farmers access information on climate change in their areas. To reduce effect of poverty diseases, there is need for policy makers to engage communities when taking decisions relating to their health. This will improve transparency and ease of obtaining information from respondents relating to their health for appropriate solution.

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