



Perception of Rice Farmer's and Climate Variability in Oru-Ijebu, Ogun State

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ABSTRACT: Rice (*Oryza sativa*) is an important crop that plays a significant role in sustaining national food security as well as creation of employment and income in Nigeria. The impact of climate variability cannot be overemphasised as it threatens natural resources and food production in sub-Sahara region. A better understanding of climate variability and implementation of proper adaptive measure by farmers are important in ameliorating climatic variability. We examined rice farmers' awareness, perception about climate variability and factors influencing choice of adaptation strategies and techniques in Oru-Ijebu, Ogun State with the aid of social survey of 50 pretested and validated questionnaires which were self-administered randomly to 50 farmers and 40 were retrieved. We deduced that rice farmers in Oru are much aware of climatic variability, 89.1% observed variability and 78% ascertain rainfall as the most varied climatic parameter. However with more than 70% having poor perception regarding its cause. The main adaptive strategy that had been used as on farm adaptation over the decade are Crop diversification(27%), Mixed cropping (51.3%), Changing crop varieties (10.8%) and Irrigation farming (5.4%). And for off-farming strategy 59.4% of total respondent agreed not to take an adaptation rather than changing occupation (13.5%) change farm location (5.4%) or migrate (27%) owing to the current variability in climate. The major driver that influences farmers' preference for climate change adaptation techniques is their incomes and experiences.

KEYWORDS: Climate variability, Awareness, Perception, Adaptation, Farmers

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I. INTRODUCTION

Short term departure of climate variables from normal either positively or negatively are termed climate variability, as against climate change; where climatic changes are observed and or remain constant for a very long period of time range of 30 years [1]. Climatic variability is very fast, while climate change is very slow [2], It is a continuous process which is mostly observed through rainfall and temperature inconsistency [3]. [4] reported that rain variability in space and time is one of the most relevant characteristics of climate that has socioeconomic and ecological implications.

Rice (*Oryza sativa*) is an important crop that plays a significant role in sustaining national food security as well as creation of employment and income in Nigeria [1]. Nigeria is the largest producer of rice in West Africa, yet it accounts for 20% of Sub-Saharan Africa's rice imports [5]. Regrettably, the annual demand for rice in the country is estimated at 5million tons, while production level is 3 million, this deficit has resulted in a huge importation of rice [6].

Available evidences showed that Nigeria is already being plagued with diverse ecological problems which have been directly linked to the on-going climate change [7]. Climate change has made the vision of Nigeria to have physical and economic access to food even in rice production to remain a mirage which if left unaddressed will lead to food crisis [8]. Nigerian agriculture is highly dependent on climate, as temperature, sunlight; water and relative humidity are the main drivers of crop growth and yield [9]. The impact of climate change is vast and its threatening sector is agriculture, it has a cumulative effect on natural resources and food production [10].

One of the most serious long-term challenges to achieve sustainable growth in rice production is Climate change [11], rice productivity and sustainability are threatened by biotic and abiotic stresses, and the effects of these stresses can be further aggravated by dramatic changes in global climate. Drought and flood already cause widespread rice yield losses across the globe and the expected increase in drought and flood occurrence due to climate change would further add to rice production losses in the future.

[12] Estimated 25% loss of cereals, 37% loss of root and tubers and 53% loss of fruits in developing world owing to factors like weather conditions, production practices to harvesting, handling to processing. All this are actually hinged on peoples perceptive especially farmers view about the cause of climatic change. A better understanding of climate variability and change together with farmers' perceptions, on-going coping and adaptation measures, and institutional roles are important to mitigate the effect of climatic variability. Therefore we examined the perception of farmers on the influence of climate variability on rice cultivation in Oru-Ijebu, Ogun State, so as to understand farmers awareness, perceptive, causes, effect and suitable geographical adaptation strategies for climate variability.

It is obvious that farmers' adaptation methods depend on social and economic status of the individual farmers and communities orientations [13]. Conceptual framework is based on the hypothesis that climate change impacts assessment and adaptation strategies is influenced by community's capabilities. Moreover this study implies that climate change adaptation should be oriented to increase communities' welfares and capabilities to cope with climate change.

Study Area (Oru-Ijebu, Southwest)

We conducted this research at Oru –Ijebu, which lies at a distance of about 461km from the equator within the equatorial belt of Nigeria at longitude $3^{\circ} 55'$ east of the Greenwich Meridian and at latitude $6^{\circ} 56'$ North of the equator. The town is located within Ijebu –North Local Government Area of Ogun State (Fig. 1). Oru, is a semi urban town in Ijebu North Local Government Area of Ogun State, Nigeria, covering an area of 300 sq.km².

Geologically, Oru is made up of two main rock types: the basement complex rock of the Precambrian which is made up of the older and younger granites and the sedimentary layers rocks which consist of cretaceous, tertiary and quaternary sediments.

The study is located within the equatorial rain forest and guinea savanna vegetation having tall grasses, shrubs and scattered trees which are well grown [14]. It topography is characterized by a wide area of undulating lowland, sandy type of soil combining small amount of clay. Average temperature ranges between 29° to 30° C [15], with tropical climatic condition having 2 major seasons; the dry and rainy season. The average rainfall is between 28mm to 40mm, peaking between May and August annually.

Socio-demographically agriculture is the main occupation of Oru people; farmers cultivate variety of crops such as yam, cassava, maize, rice, plantain, beans, vegetables and citrus fruits such as orange, paw-paw, pineapple and so on. Although the main cash crops produced in the area are cocoa, cashews, kola nut, oil palm and palm kernels [14].

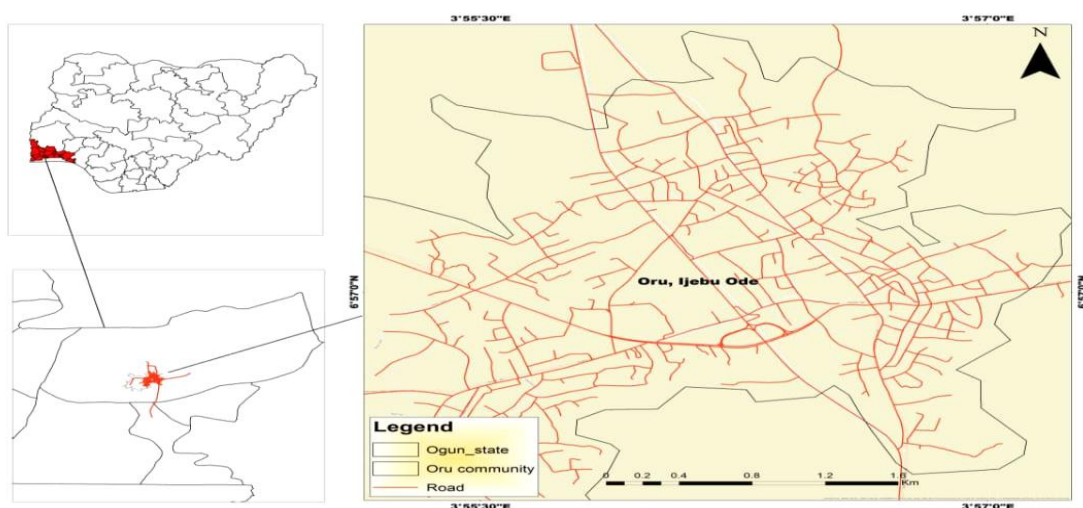


Fig. 1

II. Methods

Data collection

Our data were obtained primarily via administration of both open ended and close ended questionnaire. The questionnaire was designed to elicit information on the demographic characteristics of farmer (respondents) as well as other vital items in relation to the influence of climate variability on rice cultivation. We sectioned the questionnaire into five (5). Where section 1 was designed to obtained information on socio-economic characteristics of the respondents, section 2 elicits information on perception of climate variability trend in the study area, section 3 helped obtaining data on the perceived causes of climate variability in the study area, section 4 elucidates information as regard the effect of climate variability on rice cultivation in the study area and section 5 helped us in gathering information on the adaptation strategies adopted to mitigate the effect of climate variability on rice cultivation.

Sampling Method

A semi- structured, self-administered questionnaire was used to assess respondents' perception about climate variability, it causes, effect and adaptation strategies. Stratified and simple random sampling method was adopted in selection. Within the pool of 200 farmers (one-fourth) 50 respondents were selected randomly in Oru-Ijebu, Ogun State.

Data Analysis

Data obtained from the field and questionnaires were subjected to analysis considering frequency, percentage and proportion using SPSS IBM Corp (version 20.0., 2011 for windows). All graphical presentations are done using Microsoft Office Excel 2010.

III. Results

A total number of 50 pretested and validated questionnaires were self-administered randomly to 50 farmers where only 40 were retrieved in Oru-Ijebu, Ogun State. Most of our respondent are male 86.4%, within the range of 40-49 (51.3%) and 50- 59 (35.5%), while most (59.4%) had secondary education as there highest qualification, 65% are married and 35% of our respondents are single. None of the respondent are had up to 31 – 40 rice farming experience although on average 43.2% had 11- 20 years' experience and 40.5% had 21 – 30 years of experience while 16.2% of the farmers had 1-10 rice farming experience as shown below in table 1.

Table 1: Social demographical status of farmers in Oru-Ijebu, Ogun State

Socio-demography	Variables	Frequency	Percentage (%)
Sex	Male	32	86.4
	Female	05	13.5
Age	30 -39	3	8.1
	40-49	19	51.3
	50- 59	13	35.5
	60 above	2	5.4
Educational level	Primary	8	21.6
	Secondary	22	59.4
	Non	7	18.9
Marital status	Single	14	35.0
	Married	26	65.0
Rice Farming Experience	1-10	6	16.2
	11- 20	16	43.2
	21 – 30	15	40.5
Monthly Income	Below 18,000	3	8.1
	18,000 – 50,000	13	35
	51,000 – 83,000	13	35
	83,000 – 115,000	8	21.6
	Above 115,000	6	15

Furthermore, our results indicates that 89.1% of respondents observed variability of the climate over past decade while 78% ascertain rainfall as the major climate variable that has vary over the past decade. Manifestation of high temperature suggests climate variability to 81% of our respondent, although 45% of the respondents indicated that warming had been moderate in the last decade and 94% of the respondent states

drought experience; however 86.4% reported moderate severity in drought experience. 89.1% stated flood experience in their farm while 59.4% of the respondents ascertain frequent flood annually in their farm (Table 2).

Table 2: Awareness of Climate Variability Trend in Oru-Ijebu, Ogun State

Awareness of Climate Variability Trend	Variables	Frequency	(%)
There is climate variability over the years	Yes	33	89.1
	No	2	5.4
	Not sure	2	5.4
What is the most varied climate variable over the years	Temperature	8	21.6
	Rainfall	29	78
	Others	0	0
	Drought	4	81
What manifestation of climate variability have you observed over the decade	Unpredictable rainfall pattern	3	8.1
	Heavy rainfall	0	0
	High temperatures	30	81
	Strong wind	0	0
	Severe	12	32.4
What is the level of climate warming over the last decade	Moderate	17	45
	Not at all	8	21.6
	Yes	35	94
Had there been drought condition over the years	No	17	45
	Not sure	2	5.4
	High	4	10.8
What is the severity of Drought Condition in the Community	Moderate	32	86.4
	Low	1	2.7
Had there been Flooding in Farm over the past	Yes	33	89.1
	No	3	8.1
	Not sure	1	2.7
How frequent is Flooding in Farm	Yearly	5	13.5
	Quarterly	0	0
	Annually	22	59.4
	Seasonally	10	27

The research survey revealed that 64.8% of our respondent believed deforestation had low effect on climate variability, 45.9% accepted that bush burning has high effect on climate variability while 81% ascribed high effect of climate variability to overgrazing. 81% of the respondent indicated that burning fossil fuels had low impact on climate variability and 94.5% indicated the use of excessive chemicals in rice production had low impact on climate variability (Fig. 2).

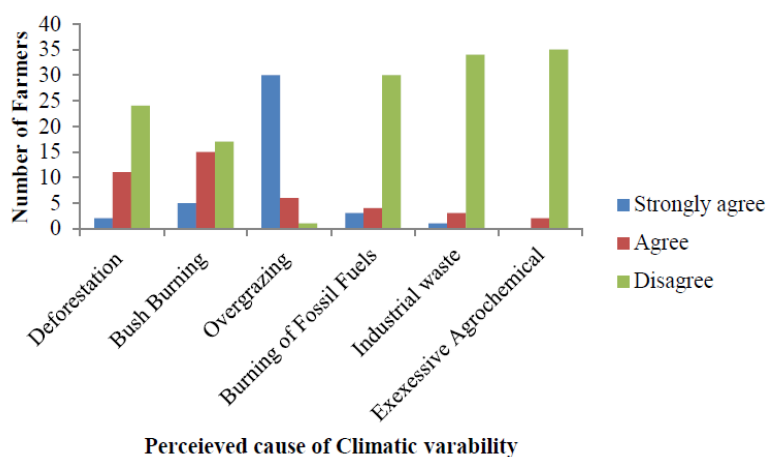


Fig. 2

Mainly it was discovered via the responses (72.9%) that there is average reduction in crop yield, 47.5% of the respondents indicated high reduction in grain quality and majority (89.1.5%) reported low loss of crops due to flood. In term of income 56.7% had loss average of income.

We observed that majority of the respondents (51.3%) suggest and practice mixed cropping as viable on-farm adaptation needed to ameliorate crop failure and climate variability on rice cultivation and 59.4% of total respondent agreed not to take an off-farm adaptation rather than changing occupation (13.5%) change farm location (5.4%) or migrate (27%) owing to the current variability in climate. See fig. 3.

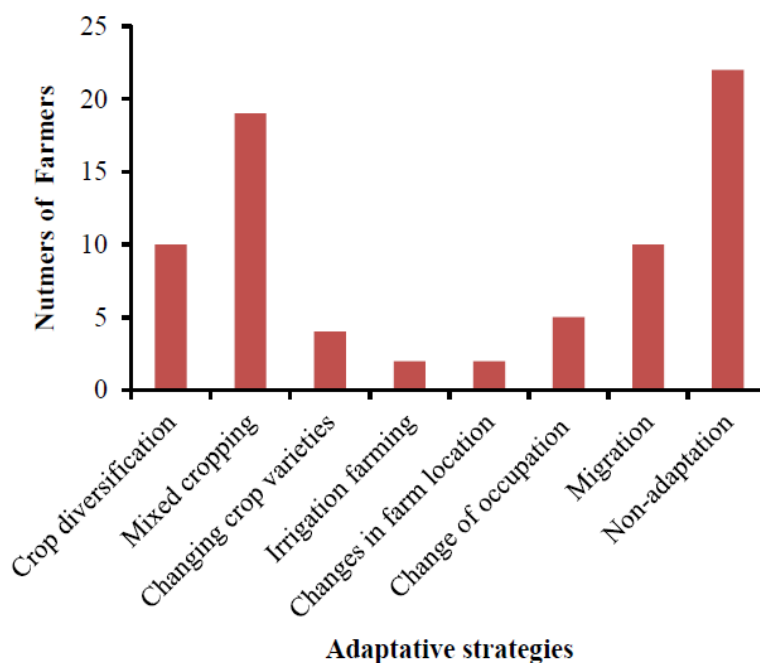


Fig. 3

IV. Discussion

Rice (*Oryza sativa*) is an important crop that plays a significant role in sustaining national food security as well as creation of employment and income in Nigeria [1]. The adverse effect of climatic variability had drawn attention overtime. We examined the farmers' sensitivity on the influence of climate variability on rice cultivation in Oru-Ijebu, Ogun State, including farmers awareness, perceptive, causes, effect and suitable geographical adaptation strategies.

Important factors in determining farmer's perception and climate change adaptation strategies are length of farming experience, income, size of farm and age. Our result pronounced that most rice farmers in Oru are aware of climate variability over the decade, and have observed incessant increase in temperatures [16] and many experienced flood annual due to climate variability within the cropping seasons. Although rain fall, drought condition and climatic warming are average in pattern, these compliment the study area as tropic rainforest.

In climate discourse, the cause of climate variability had always been a debatable issue; some farmers had attribute climate variability to anthropogenic factors [17], while others perceived natural factors as major cause [18]; [19]. Some schools of thought even move further to attribute the causes to spiritual factors especially, those who are dogmatic in some religious sects [20][19]. We discover that majority of rice farmers in Oru perceived anthropogenic factors as major cause of climate variability. Nevertheless their perception on cause of climate variability is poor. Many of the rice farmers wrongly affirm anthropogenic factors such as deforestation, bush burning, burning fossil fuels and use of excessive chemicals in rice production had little or no effect on climate variability. Farmer's age, level of education, income and other socio-economic characteristics must have been responsible for poor perception which is in line with previous studies [21] ; [22]. Also since these rice farmers are well acquainted with the use of chemicals in rice cultivation this might have sponsor their wrong perception.

It is worth noting that climate variability affects food crop farmers in most parts of sub-Saharan Africa, Oru is not an exception as most rice farmers complained of income loss, low rice yield [20] and low availability of food as adverse impacts of climate variability on rice production [23] ; [24] increasing the price of rice. The farmers must have been affected in all wise since rice appears to be the major food in this study area it

availability influences the community economy either by inflation or deflation, however it obvious as reported by this experienced rice farmers that climate variability had an adverse effect on rice production and wellbeing of Oru community. Although the community experienced excessive rainfall and flood however farming calendar seems averagely stable and many opined that these had little or no effect on rice production which is contrary to [25]; [26]discovery. Invariably rice cultivation are suitable in marshy area this might had motived their responses.

Climate adaptation can be summed as the set of actions, strategies, processes and policies that respond to actual or expected climate changes so that the consequences for individuals, communities and economy are mitigated [27]. According to [28] there are two ways of farmer's adaptation the on farm and off farm. With our claims and deduction, notwithstanding rice farmers in Oru communities communicated some livelihood coping on farm strategies which they adopt to adapt/mitigate the incidences of climate variability in their spaces. Some of the strategies/coping mechanisms include; Crop diversification, Mixed cropping, Changing crop varieties and Irrigation farming. These practices are of less cost and feasible in coping with the current fluctuations, however off farm adaption option such as migrating and change of occupation were rejected by the farmer since this require huge finances [29].

Obviously from literatures local farmers in sub-Saharan Africa are aware of the global climate variability and had been trying to mitigate it effect through cheap cultural practices such as shifting cultivation, mulching etc. [30]; [12] however this had not been effective in mitigating the incidence and insurgency of this variability. Increasing grass root capacity in adaption to climate variability is an urgent case [31]. Below are recommendations that can help in mitigating climate variability.

V. RECOMMENDATIONS

- Successful adaptation cannot be achieved except for proper frequently sensitization so as to increase local farmer's awareness and perception. Giving out information that can help farmers understand present and future climatic changes.
- In addressing behaviour significant knowledge gaps, sensitization alone may not change farmers however capacity building programme should be in place at grassroots in order to strengthen climate change adaptation especially in rural areas.
- Empowerment of rural farmer through several acquisitions of skills which projects alternative occupations and sources of income.
- Enforcement of proper land use planning, avoiding illegal deforestation, bush burning and so on.
- Participatory adaptation strategy that involves local farmers in decision making and planning will ensure cooperation of local people in climate change adaptation.

VI. CONCLUSION

We did examined rice farmers awareness level, perception and adaptive practice in regards to climate variability on rice cultivation in Oru-Ijebu, Ogun State. We deduce that climatic variation is an urgent situation caused by poor level of perception and adaptive strategy of farmers. Climate variability calls for quick intervention as it affects all social demography strata in sub Saharan region and the world at large.

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