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ANALYSIS OF THE SMALLHOLDER FARMERS INFORMATION NEEDS ON CLIMATE CHANGE IN SOUTHEAST OF NIGERIA

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ABSTRACT
This study was designed to investigate the smallholder farmers information needs on CC in the Southeast, Nigeria. Using a multiphase sampling approach, 280 farmers were proportionately studied. Data were gathered through the help of an organized questionnaire and analysed using mean, percentages frequency count and a 3-point Likert scale rating with 2 as the decision point. Results revealed that 91.79% of the smallholder farmers were aware of CC. Their perceived causes of CC were among others bush burning (mean score (MS)=2.30), inappropriate use of agrochemicals (MS=2.30) and bush clearing (MS=2.96). Furthermore, their main sources of CC information were through radio (20%), friends (16.07%), and extension agents (14.64%). And their CC information needs were based on causes (MS= 2.07), effects (MS=2.26), mitigation (MS=2.74), adaptation (MS=2.49), Weather forecast (rainfall intensity forecast) (MS=2.79) and crop yield forecast (MS=2.34). Factors militating against the effective communication of CC information were mainly poor CC information translation to local dialects (MS=2.80), limited access to accurate and timely information (MS=2.77) and poor enlightenment (MS=2.77). Finally, they believe that disseminating information through the agricultural extension officers (MS=2.72), and the use of vernacular and mass media in disseminating information (MS=2.72) would improve the dissemination of CC information amongst them. Therefore, to efficaciously address CC issues among the smallholder farmers, CC communication experts should use simple English and local vernacular transmit CC information to the farmers for better understanding.

KEY WORDS
Information needs, climate change, rural farmers.

Climate variability denotes any alteration in climate due to the erraticism of nature or man's activity (IPCC, 2007). It is not a wholesome occurrence but usually noticed gradually and its impact maybe seen after a long period of continuous change (Joyce, Blate, McNulty, Millar, Moser, Neilson, and Peterson, 2009). Several ecological researches have shown that the climate is changing with grave consequences on both human and natural resources (Joyce, Blate, McNulty, Millar, Moser, Neilson, and Peterson, 2009). Evident among these changes are changes in temperature (becoming hotter and drier), variation in rainfall pattern (increasingly erratic), land degradations, and loss of pastures. These issues have grown to become a major concern for sustainable agriculture (Tambo & Abdoulaye, 2013; Smith & Skinner, 2002). These changes have continued to adversely affect agriculture since it influences the vegetation pattern and the duration of farming calendar/season (FAO, 2014).

In Africa, agriculture remains the major source of living for 70% of the population (World Economic Forum, 2016; World Bank, 2017). However, the changing weather

condition over the years remains a formidable challenge for farmers who mainly depend on rain-fed farming (Bierbaum and Zoellick, 2009). Thereby causing substantial crop output losses estimated for about 10-50% losses by 2050 if nothing is done to abate it (FAO, 2014; Jones, 2003; Nwaobiala and Nottidge, 2013). In addition, smallholder farmers are more susceptible to these climate variation effects. This is due to their poor coping capacity with the stresses and shocks of climate capriciousness and their over-dependence on nature and its resources (DFID, 2004). As a result, they have continued to lose their investments in agriculture due to poor perception and comprehension of CC, lack of proper adaptation measures and inadequate knowledge of CC dynamics and interplay. There is therefore an urgent need to identify the appropriate information necessary for equipping farmers so as to strengthen their adaptive capacities and improve their capacity to respond to climate variability.

As it is said, information is power, farmer's access to climate change information equals his adaptive ability to the variations in the climate. But for this information to be able to create the intended change in the farmer, it has to be accurate and possess all the ingredients that is suitable for addressing the farmers need at each point in time. If the information needs of farmers are met effectively, it would give them the opportunity to take proper decisions on climate associated problems confronting him or her (Solomon, 2002). Farmers need necessary information on the adverse weather variations affecting their crop yield, livestock production, processing and storage processes, and other production stages which may include packaging, stocking, distribution to middlemen and sales to the final consumer of their commodity. They also need to know how they themselves have been contributing to the changing climate which in turn affects them. It is important for them to understand that through some of their activities such as continuous cropping, removal of vegetative covers, cropping along river banks, over grazing, inappropriate use of chemicals, and general overuse of land and its resources continues to contribute to climate change and has in turn high implications to the agricultural sector than it may be perceived in other sectors.

There is no doubt therefore, that farmers need information on climate change. Firstly, they need to be conscious of the existence of the concept "climate change" before we go on to see what else can be done for the farmer. The farmers also need to know that climate change effects are not just the adverse temperature and rainfall alteration rather these are just indicators of climate change as climate change may be felt in many ways. Improving the quality and quantity of information provided to farmers on climate change, will improve their social, educational, cultural and economic status. It is therefore important that as more and more facet of climate variability impact on agriculture arise, farmers should be updated on regular basis since they are the very first people who receive this shock and equipping them with this weapon (information on climate change) would be the very best way forward in this menace the agricultural sector is facing as a result, which in turn combats the problems of food availability in an efficient manner. Bearing this in mind, this research evaluated the extent of farmers' CC consciousness and knowledge; identify their CC information needs, sources of the information, and factors militating against climate change information transfer to farmers.

METHODS OF RESEARCH

The study area for this study was the Southeastern Nigeria. Southeast is among the Nigeria's six geopolitical zones, comprising five states being; Anambra, Imo, Enugu, Ebonyi and Abia. The ecology is mainly rainforest, occupying a whole 10,952,400 hectares land mass with about 16,381,729 population (National Population Commission 2006). The dry and rainy seasons are the two main seasons of the zone. Its climate is the tropical rainforest and farmers grow food crops like fresh pepper, vegetables, cassava, rice, cocoyam, yam, etc., and rear livestock like goats, birds, etc.

We adopted a multiphase random sampling approach to choose the study areas and smallholder farmers studied. We purposively selected two local governments from the five

states that made up the zone due to their high rate of agricultural activities and randomly selected from each of the selected LGAs 28 smallholder farmers thereby, making an overall number of 280 smallholder farmers studied (Table 1).

Table 1 – Distribution of Sampling Procedure

State	Sampled Local Government Areas (LGAs)	Smallholder Farmers
Abia	Arochukwu Isuikwuato	28 28
Anambra	Aguata Ihiala	28 28
Ebonyi	Abakiliki Ishielu	28 28
Enugu	Orji River Uzouwani	28 28
Imo	Okigwe Orlu	28 28
Total		280

With the help of research assistants, we collected data using a prearranged questionnaire. The questions were translated to local dialects by the research assistants for neither farmers, who could not read nor write. Prior to their participation in the study, they consented to the consent form by signing it.

We employed mean, percentages frequency count and a 3-point Likert scale rating with 2 as the decision point in analysing the data. The farmers responses were rated as follows 3 = most likely/high/very severe, 2 = likely/moderate/severe & 1 = not likely/low/not severe with a cut-off point of 2 (gotten by adding the ratings (3+2+1) and dividing it by its number 3; 6/3 = 2). Decision; accept if mean score (MS) ≥ 2.0 and reject if MS < 2.0.

RESULTS AND DISCUSSION

The result of the smallholder farmers' CC awareness level and knowledge as shown in Table 2 revealed that majority 91.79% were conscious of climate change. This confirms that smallholder farmers noticed variations in the environment as regards the variations in rainfall pattern, excess heat, extreme weather, cold etc. This is a high indication that farmers know about climate change and are eager to find solutions to its menace. This outcome agreed with (Sofoluwe et al., 2011; Amusa, Okoye, & Enete, 2015) who stated that in Nigeria, smallholder farmers level of CC consciousness is relatively high and Mehmood, et al, (2022) in Punjab province Pakistan who found that most of the smallholder farmers (75%) were conscious of CC. Other studies have shown that over 85% of smallholder farmers were highly conscious of the variations in climate (Mandleni & Anim, 2011; Hasan & Akhter, 2011; Ajuang et al., 2016; Huong et al., 2017).

Table 2 – Farmers' level of consciousness and knowledge of CC

Level of consciousness	Percentage (n = 280)
Conscious	91.79
Unconscious	08.21

Source: Survey, 2022.

There is the need to get farmers view about the changes in their environment for instance temperature, rainfall pattern, erosion and so on to be able to understand the needed information gaps. The result of Table 3 showed that farmers are knowledgeable of the changes in the environments such as the changes in temperature (MS = 2.34) and rainfall pattern (MS = 2.40); land degradations (MS = 2.20) and loss of flora and fauna (MS = 2.10).

Table 4 shows that climate change is caused by farming activities such as bush burning (MS = 2.30), inappropriate use of agrochemicals (MS = 2.30), bush clearing (MS = 2.96), deforestation (MS = 2.15), urbanization (MS = 2.20), and spiritual forces (MS = 2.15).

However, the discovery that farmers believe that spiritual forces contribute to CC is harmoniousness with the results of Nkwusi, et al. (2015) who found that farmers still cling to the belief that CC were not due to man's actions but a supernatural phenomenon which may not stay around for a very long time.

Table 3 – Knowledge of environmental changes

Knowledge of environmental changes	MS	Remarks
Temperature (hotter and dryer)	2.34	AC
Rainfall pattern Variation (short & irregular)	2.40	AC
Land degradations (erosion, flooding)	2.20	AC
Loss of flora and fauna	2.10	AC

Source: Survey, 2022; (NB: AC represents Accepted and RJ rejected).

Table 4 – Smallholder farmers perception on the causes of CC

Factors	MS	SD	Remark
Bush burning	2.30	1.07	AC
Spiritual forces	2.15	1.43	AC
Deforestation	2.15	1.12	AC
Overgrazing by farm animal	1.94	1.34	RJ
Cooking with firewood	1.97	1.04	RJ
Increasing population	1.89	1.43	RJ
Urbanization	2.20	1.16	AC
Inappropriate use of agrochemicals	2.30	1.33	AC
Bush clearing	2.96	1.24	AC

Source: Survey, 2022; (NB: AC represents Accepted and RJ rejected).

Table 5 shows that the main sources of CC information by the farmers were through radio 20%, friends 16.07%, extension agents 14.64%, television 13.93%, farmers' cooperative 13.21%, and religious organization 12.50%. Though extension was not the main source of CC information, it ranked high in among other sources. This means that if extension is strengthened to meet up to its expectations, it would be capable of improving largely the farmer's CC adaptive power. The use of religious groups as sources of CC information makes it a good medium of transferring climate change information through religious magazines, bulletin, and their leaders during gatherings.

Table 5 – Farmers' climate change information sources

CC information sources	Percent (n = 280)
Extension agent	14.64
Friends	16.07
Farmers' cooperative	13.21
Internet	04.29
Newspaper/magazine	02.14
Religious organization	12.50
Mobile phone (SMS)	03.21
Radio	20.00
Television	13.93

Source: Survey, 2022.

Table 6 shows that most pressing CC information need by farmers are in the areas of causes (MS = 2.07), effects (MS = 2.26), mitigation (MS = 2.74), adaptation (MS = 2.49), Weather forecast (rainfall intensity forecast) (MS = 2.79) and crop yield forecast (MS = 2.34). The high level of CC information needs by the farmers do not reflect an erudite society of literates who could source information by themselves through the use of digital technologies. It rather showed that there has been poor transfer of information on CC in the past, hence the farmers are yet to grasp knowledge on causes, effect, adaptation and reduction of CC. This high level of CC information demand implies that the farmers are willing to finding CC

solutions through workshops, seminars and trainings on CC related issues, thus this avenue could be used to educate the farmers and improve their farming and the climatic condition.

Table 6 – Farmers' CC information needs

Information Needs	MS	SD	Remark
Causes of CC	2.07	1.89	AC
Effects of CC	2.26	1.35	AC
Mitigation strategies	2.74	1.74	AC
Adaptation	2.49	4.40	AC
Weather forecast (rainfall intensity forecast)	2.79	1.86	AC
Climate forecast (seasonal forecast)	1.90	1.94	RJ
Climate change projections	1.01	0.45	RJ
Drought forecast	1.03	1.09	RJ
Crop yield forecast	2.34	2.54	AC

Source: Survey, 2022; (NB: AC represents Accepted and RJ rejected).

Table 7 shows the farmers perceptions on the factors affecting CC information communication. The result showed that poor CC information translation to local dialects (MS = 2.80), limited access to accurate and timely information (MS = 2.77), poor enlightenment (MS = 2.77), poor participatory communication approach (MS = 2.54), abstraction of climate change information (MS = 2.16), poor communication of skills by CC experts (MS = 2.41), poor communication facilities (MS = 2.17), complexity of climate change information (MS = 2.16), CC information sources not reliable (MS = 2.09), farmers poor level of education (MS = 2.08), inadequate information (MS = 2.05) and poor electricity (MS = 2.00) were the factors militating against CC information communication. This however, depicts that many of the farmers will continue to be in oblivion of the underlying factors in climate change except effort is made to break down this information to local terms. There is need to find equivalent meaning of every single term used in describing or discussing climate change. This will not only enhance understanding of the concept but also create an avenue for harnessing the farmers' local knowledge in formulating lasting solutions to the CC issues.

Table 7 – Factors militating against climate change information transfer to farmers

Factors	MS	SD	Remark
Poor participatory communication approach	2.54	2.09	AC
Poor CC information translation to local dialects	2.80	1.82	AC
Poor communication skills by CC experts	2.41	2.40	AC
CC information sources not reliable	2.09	3.01	AC
Poor communication facilities	2.17	1.63	AC
Complexity of CC information	2.16	1.28	AC
Abstraction of CC information	2.16	2.03	AC
Limited access to accurate and timely information	2.77	2.14	AC
Poor enlightenment	2.71	1.97	AC
Inadequate information	2.05	1.04	AC
Farmers poor level of education	2.08	1.14	AC
Poverty	1.98	0.85	RJ
Poor electricity	2.00	1.02	AC

Source: Survey, 2022; (NB: AC represents Accepted and RJ rejected).

Table 8 showed that the use of local languages (dialects) and folks (MS = 2.60), disseminating information through the agricultural extension officers (MS = 2.72), use of vernacular and mass media in disseminating information (MS = 2.72), ensuring the reliability of information sources (MS = 2.67), ensuring relevance of the information to the target audience (MS = 2.63), incorporating the needs and concerns of the target audience (MS = 2.59), disseminating information through the community and religious leaders (MS = 2.64), use of participatory communication approach (MS = 2.53), provision of accurate/timely information (MS = 2.55), use of credible expert that have good knowledge of vernacular (MS = 2.31), and the training of communication experts on audience peculiarities (MS = 2.04) would improve the dissemination of CC information amongst the farmers.

Table 8 – Farmers' perceived strategies for improved climate change information dissemination

Strategies	MS	SD	Remark
Use of participatory communication approach	2.53	1.96	AC
Use of local languages (dialect) and folks	2.60	2.01	AC
Incorporating the needs and concerns of the target audience	2.59	2.73	AC
Ensuring reliability of information sources	2.67	1.98	AC
Ensuring relevance of the information to the target audience	2.63	2.09	AC
Use of credible expert that have good knowledge of vernacular	2.31	1.89	AC
Use of vernacular and mass media in disseminating information	2.72	2.54	AC
The use of audio-visuals in disseminating information	1.60	1.07	RJ
Provision of communication facilities by government	1.74	1.84	RJ
Training of communication experts on audience peculiarities	2.04	1.09	AC
Provision of accurate/timely information	2.55	3.11	AC
Bridging the communication gap between scientists and farmer	1.79	1.95	RJ
Disseminating CC information through the service providers	1.89	0.89	RJ
Disseminating information through the community and religious leaders	2.64	2.79	AC
Disseminating information through the agricultural extension officers	2.72	1.78	AC

Source: Survey, 2022; (NB: AC represents Accepted and RJ rejected).

However, the findings that the use of audio-visuals in disseminating information (MS = 1.60), the provision of communication facilities by government (1.74) and bridging the communication gap between scientists and farmer (MS = 1.79) does not improve the dissemination of climate change information were against the study apriori expectations and may be due to other factors such as education, cost, and technical skill required in using them.

CONCLUSION

The success of any farmer is largely based on the quantity of information available and used for to take decisions during agricultural production. Climate information helps farmers to plan their planting and harvesting periods for their crops, know when to produce crop or animal and where/when to sell them; where to acquire farming inputs and loans. These pieces of information are crucial for communicating existing issues and solutions as well as identifying the costs and benefits upon which decisions are made. This helps the farmer to improve agricultural productivity and their wellbeing. Having studied the farmers CC information needs in the Southeastern Nigeria and determined their challenges/possible strategies for improving the dissemination of climate change information, we can conclude that the farmers were in dare need for information on weather forecast (rainfall pattern) and adaptation/mitigation practices (irrigation, change in timing of farm operations, agrochemical use, use of improved drought/flood tolerant seed varieties, afforestation, and soil nutrification) upon which they can plan their farming and hedge against the menace of the climate change. The farmers weren't so knowledgeable on mitigation in-spite of their appreciable knowledge and awareness on climate change. We therefore, recommend that the climate change information should be transmitted to the farmers using local dialects especially through the community and religious leaders.

REFERENCES

1. Ajuang, C. O., et al. (2016). Determinants of climate change awareness level in upper Nyakach Division, Kisumu County, Kenya. Springer Plus, 5(1), 1015. https://doi.org/10.1186/s40064-016-2699-y.
2. Amusa, T. A., Okoye, C. U., Enete, A. A. (2015). Determinants Of Climate Change Adaptation Among Farm Households in Southwest Nigeria: A Heckman Double Stage Selection Approach. Review of Agricultural and Applied Economics, 18(2), 03-11. https://doi.org/10.15414/raae.2015.18.02.03-11.
3. Bierbaum, R. M., & Zoellick, R. B. (2009). Development and Climate change. Science, 326(5954), 771-771. https://doi.org/10.1126/science.1183876.

4. DFID. (2004). The impact of climate change on the vulnerability of the poor. Department for International Development, (DFID).
5. FAO. (2014). Family Farmers: Feeding the world, caring for the earth [FAO Official]. Family Farmers: Feeding the World, Caring for the Earth. http://www.fao.org/family-farming-2014/ retrieved June 8, 2022.
6. Hasan, Z. & Akhter, S. (2011). Determinants of public awareness and attitudes on climate change in urban Bangladesh: Dhaka as a case. European Journal of Social Sciences, 21(1), 154-162.
7. Huong, N. T. L., et al. (2017). Farmers' perception, awareness and adaptation to climate change: evidence from northwest Vietnam. International Journal of Climate Change Strategies and Management. https://doi.org/10.1108/IJCCSM-02-2017-0032.
8. IPCC (2007), Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K. and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland.
9. Jones, J. W. (2003). Agricultural Responses to Climate Variability and Climate Change. Insights and Tools for Adaptation Learning from Climate Variability, 1-7. http://www.climateadaptation.net/docs/papers/Jones%20draft.pdf retrieved April 9, 2022.
10. Joyce, L. A., Blate, G. M., McNulty, S. G., Millar, C. I., Moser, S., Neilson, R. P., & Peterson, D. L. (2009). Managing for Multiple Resources Under Climate Change: National Forest. Environmental Management, 44(1022). https://doi.org/10.1007/s00267-009-9324-6.
11. Mandleni, B. & Anim, F. D. K. (2011). Climate change awareness and decision on adaptation measures by livestock farmers in South Africa. Journal of Agricultural Science, 3(3). https://doi.org/10.5539/jas.v3n3p258.
12. Mehmood, M. S., Li, G., Khan, A. R., Siddiqui, B. N., Tareen, W. U. H., Kubra, A. T. & Ateeq-Ur-Rehman, M. (2022). An evaluation of farmers' perception, awareness, and adaptation towards climate change: a study from Punjab province Pakistan. Ciência Rural, 52(3), 1-13. https://doi.org/10.1590/0103-8478cr20201109.
13. Nkwusi, G., Adeaga, S., Ayejuyo, S., Annuk, A. (2015). Climate change; Farmers' awareness, perceptions and responses in Lagos State. Applied Ecology and Environmental Sciences, 3(4), 95-99. https://doi.org/10.12691/aees-3-4-1.
14. Nwaobiala, C. U., & Nottidge, D. O. (2013). Effects of Climatic Variables on Cassava Production in Abia State, Nigeria. Nigerian Journal of Agriculture, Food and Environment, 9(4), 57-62.
15. Smith, B., & Skinner, M. W. (2002). Adaptation Options in Agriculture to Climate change: A Typology. Mitigation and Adaptation Strategies for Global Change, 7, 85-114. https://doi.org/10.1023/A:1015862228270.
16. Sofoluwe, N. A., et al. (2011). Farmers perception and adaptation to climate change in Osun State, Nigeria. African Journal of Agricultural Research, 6(20), 4789-4794. https://doi.org/10.5897/AJAR10.935.
17. Solomon, P. (2002). Discovering information in context. Annual Review of Information Service and Technology. 36, 229-264. https://doi.org/10.1002/aris.1440360106.
18. Tambo, J. A., & Abdoulaye, T. (2013). Smallholder Farmers' Perceptions of and adaptation to Climate Change in the Nigerian Savanna. Reg Env Chang, 13(2), 375-388. https://doi.org/10.1007/s10113-012-0351-0.
19. World Economic Forum (WEC), (2016). The World Economic Forum on Africa. Kigali, Rwanda.
20. World Bank (WB), (2017). Agriculture in Africa: Telling Myths from Facts. https://www.worldbank.org/en/programs/africa-myths-and-facts retrieved April 4, 2022.