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Assessment of Knowledge and Awareness of Climate Change amongst Arable Crop Farmers in Abia State, Nigeria

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Abstract: ***This study was initiated to assess the knowledge and awareness level of climate change amongst arable crop farmers in Abia State, Nigeria. To achieve this study purpose, the cross sectional research design was adopted where questionnaire was used as the instrument for data collection. The study made us of a sample size of 374 arable crop farmers which cut across the seventeen (17) Local Government Areas of Abia State out of a total of 18697, this however was achieved through the use of the Taro Yamane formula for sample size determination. Data for the study was analyzed using descriptive statistics. The study findings showed that farmers in Abia State have good knowledge of arable crops and that arable crops grown in Abia State are weather sensitive, it also revealed that farmers are aware and do have good knowledge of climate change also that climate change has a lot to do with arable farming and farmers in Abia State and that climate change concerns are not only limited to arable crop farmers alone rather that other sectors of the economy have climate change concerns and that its experience is challenging in Abia State. The study however recommends the need for effective funding of agro based sector to ensure that the improvement in food production and climate change impacts reduction is actualized.***

Keywords: Climate, Change, Arable Crops, Farmers, Assessment, Knowledge, Awareness

1. Introduction

It is an obvious fact that Agriculture is strongly influenced by weather and climate [1], [2], [3], [4]. While farmers are often flexible in dealing with weather and year - to - year variability, there is nevertheless a high degree of adaptation to the local climate in the form of established infrastructure, local farming practice and individual experience [5], [6], [7]. Climate change can therefore be expected to impact on agriculture, potentially threatening established aspects of farming systems butalso providing opportunities for improvements [8]. Although arable agriculture is a farming system that has its interest on crops which can be grown and harvested with a period of one year, this does not rule out the fact that it is still subjected to the effects that other farming techniques are exposed to arising from climate change rather adopting a method or strategy that enhances its result of crop yield have become the focus of researchers in the discipline of agriculture and climate sciences [4], [7], [9].

According [10] temperature and precipitation are determinants to the carrying capacity of the earth systems ability for the production of food that will meet the food needs of the ever increasing human population and domestic animals. Rising temperature associated with a reduction in rainfall and sometimes excessive rainfall will together bring about a significant change in the normal, which includes a drop in crop yields, planting/cropping pattern and the other agriculture related activities.

In the opinion [11], by the 2100s, there will be a noticeable decrease in suitable rain - fed land extent and production capacity for cereals will drop drastically under climate change condition. Wheat production according to their report will probably no longer exist in the African continent by 2100s. The above - mentioned crops in the tropics are arable crops for the inhabitants as they play very important role in the food supply chain been considered as staple foods [12], [13], [14].

Despite that agriculture is a very important sector to Nigeria, the practice and its yield in terms of production capacity is still low since most practitioners are primarily subsistence in nature and depends solely on rain fed agriculture [15]. This however implies that any alteration in the climate system would in turn affect the crop yield of different crops in that particular area. Globally in recent times it is observed that agricultural productivity is dwindling in Africa and this could be associated with the changing climate system [1], [3], [4], [7]. However, this daunting situation is expected to increase significantly having that the development of technological changes for adaptation are slow and yet not forth coming [3], [10], [12].

The food and agricultural organization (2007) as cited [10] made an estimate that between 400, 000 and 550, 000 food - insecure and vulnerable people (between 80, 000 - 110, 000 households) will require food assistance, with many households having already exhausted their cropping mechanisms in Africa. This however is a serious challenge that needs to be addressed urgently to save the life of this vulnerable population through the adoption of measures that can enhance agro productions, crop yield, reduction in maturity time and adequate supply especially for the developing nations. Climate change adaptation has to do with taking the right measures to minimize the identified

side effects of climate change as a challenge through the adoption of sustainable adaptation strategies and changes.

In the 2007 report of the Intergovernmental Panel on Climate Change adaptation with regards to climate change was seen to be a change in the operations of human or natural systems in response to actual or expected climatic stimuli or effects, which reduces dangerous conditions or exploits beneficial opportunities. These changes in operation also imply the response and strategies that are adopted by nations, communities and people to adjust to climate change that has occurred. The idea is to help in reduction of exposure to risk, develop the capacity to cope with unavoidable damages; and to take advantage of new opportunities. This as stated is the issue of interest which this present study intends to unveil.

Agriculture is the major economic activity and financial backbone of good numbers of African countries, except in oil - exporting countries [15]. Agriculture as identified contributes 20 - 30% of Africa's gross domestic product (GDP) and 55% of the total value of African exports. It further stated that more than half of the population of African nations depends on agriculture for their survival.

Farming as a practice in most nations of Africa is still at the subsistence level which depends greatly on rainfall as the source of water, arising from the advent of climate change which have led to inadequate distribution of rainfall since farming in Africa is rain fed, harvest have been greatly affected and thus food production. This scenario however places Africa at a disadvantaged position been vulnerable to climate change impacts which is worsened by its location in the tropics an already hot zone.

A close view to sub - Saharan Africa, reveals that there is growing interest on the likely impacts of climate change on agriculture, economic growth and sustainable development [15], [16]. This is occasioned by the present day reality amongst which are evidences of drought due to temperature rise and a reduction in rainfall. [16] stated that there are evidences of change in climate such as changes in soil moisture, soil quality, crop resilience, timing/length of growing seasons, yield of crops and animals, atmospheric temperatures, weed insurgence, flooding, unprecedented droughts, sea level rises and many more. This as they posited affects agriculture in Africa to a very large extent, more so and worrisome is the case of widespread poverty, over dependence on rain fed agriculture, inequitable land distribution, limited access to capital and technology, inadequate public infrastructure such as roads, long term weather forecasts and inadequate research and extension as described in the 1998 report of the Intergovernmental Panel on Climate Change [10].

2. Methodology

This study was conducted in Abia State which geographically is located lies between latitude $5^0$0'0"N and $6^0$0'0"N and longitude $7^0$0'0"E and 8^0 0'0"E (Figure 3.1). The aborigines of the town are the Ngwa people and they are mostly Christians (Chigbu, 2011) as cited in Jackson (2021). The State is statutorily divided into 3 senatorial zones and has 17 Local Government Areas (LGAs). The capital is Umuahia and the major commercial city is Aba.

The study adopted the cross sectional research design; using the survey research method, the study was carried out in the 17 seventeen Local Government Areas of Abia State, with a farmer's population of 18697which was subjected to Taro Yamane formula for sample size determination. Using the Taro Yamane formula, the study population was 392. Questionnaire was used as the instrument for data collection, this was distributed to 392 respondents using simple random sampling technique. Although from the 392 copies of questionnaire distributed, a total of 374 copies were returned filled and adequate for analysis. Conclusively data generated from the study were analyzed using descriptive statistics.

3. Results and Discussion

Table 1: Respondents perception to Arable crops that are grown in Abia State

S/N	Questionnaire Item	Strongly Agree	Agree	Disagree	Strongly Disagree
1.	Do you have knowledge of arable crops	278 (74.3%)	37 (9.9%)	5 (1.3%)	5 (1.3%)
2.	Have you been involved in growing arable crops for a long period.	269 (71.9%)	96 (25.6%)	5 (1.3%)	5 (1.3%)
3	Have they been any identified challenge with the cultivation of arable crops	232 (62.0%)	127 (33.9%)	10 (2.7%)	5 (1.3%)
4	If there are challenges have you identified any means of surmounting the challenges	156 (41.7%)	106 (28.3%)	86 (22.9%)	26 (6.9%)
5	Arable crops are in different groups (Cereals, tubers, legumes, vegetables, fruits)	261 (69.7%)	109 (29.1)	4 (1.06%)	1 (0.26%)
6	Are there other groups of arable crops outside those mentioned above	142 (37.9%)	161 (43.0%)	60 (16.04%)	10 (2.7%)
7	As an arable crop farmer you are involved in growing all the groups mentioned	202 (54.01%)	109 (29.1%)	46 (4.3%)	17 (4.5%)
8	Are there arable crops that can be grown and harvested in less than a year	225 (60.4%)	126 (33.7%)	17 (4.5%)	6 (1.60%)
9	The arable crops you grow /have grown are weather specific or sensitive	249 (66.6%)	113 (30.2%)	9 (2.4%)	3 (0.80%)

Source: Field Survey, 2021

Table 1 above, shows the respondents perception to arable crops that are grown in Abia State. The table shows that response to questionnaire item one showed that 278 respondents representing (74.3%) of the study population study strongly agreed that they have knowledge of arable crops, 37 respondents representing (9.9%) of the study population agreed, 5 respondents representing (1.3%) of the study population strongly disagreed and 5 respondents representing (1.3%) of the study population disagreed. This

concludes that good number of the respondents have knowledge of arable crops.

Questionnaire item 2, x rayed respondent's involvement in growing arable crops for a long period, the table shows that 269 respondents representing (71.9%) of the study population study strongly agreed that they have been involved in growing arable crops for a long period, 96 respondents representing (25.6%) of the study population agreed, 5 respondents representing (1.3%) of the study population strongly disagreed and 5 respondents representing (1.3%) of the study population disagreed. This concludes that most of the respondents have been involved in growing arable crops for a long period.

Questionnaire item 3, examined if they have been any identified challenge with the cultivation of arable crops, the respondent's perception shows that 232 respondents representing (62.0%) of the study population strongly agreed that they have been identified challenges with the cultivation of arable crops, 127 respondents representing (33.9%%) of the study population agreed, 10 respondents representing (2.7%) of the study population strongly disagreed and 5 respondents representing (1.3%) of the study population disagreed. This however concludes that they have been identified challenges with the cultivation of arable crops.

The table shows that 156 respondents representing (41.7%) of the study population strongly agreed that they have identified means of surmounting identified challenges affecting arable crops, 106 respondents representing (28.3%) of the study population agreed, 86 respondents representing (22.9%) of the study population strongly disagreed and 26 respondents representing (6.9%) of the study population disagreed. This however concludes that amidst the challenges the people have identified ways of surmounting the challenges.

The table also examines the different group of arable crops (cereals, tubers, legumes, vegetables and fruits) that the farmers grow in Abia State. From the table it is observed that 261 respondents representing (69.7%) of the study population strongly agreed that they grow the different groups of arable crops, 109 respondents representing (29.1%) of the study population agreed, 4 respondents representing (1.06%) of the study population disagreed while 1 respondent representing (0.26%) of the study population strongly disagreed.

Questionnaire Item 6 as observed showed the response of the farmers to agreeing or disagreeing the existence of other groups of arable crops outside those mentioned above, from the response 142 respondents representing (37.9%) of the study population strongly agreed that there exist other groups of arable crops outside those mentioned above, 161 respondents representing (43.0%) of the study population agreed, 60 respondents representing (16.04%) of the study population disagreed while 10 respondents representing (2.7%) of the study population strongly disagreed.

On the issue of involvement of the respondents in growing all the mentioned arable crop groups as observed in questionnaire item 7, 202 respondents representing (54.01%) of the study population strongly agreed that they are involved in the growing of all the arable crops mention above, 109 respondents representing (29.1%) of the study population agreed, 46 respondents representing (4.3%) disagreed while 17 respondents representing (4.5%) of the study population strongly disagreed. This however implies that good number of the respondents are involved in growing all the mentioned arable crops in Abia State.

The table also showed the response of the farmers to agreeing or disagreeing to whether they are arable crops that are grown and harvested in less than a year. The response showed that 225 respondents representing (60.1%) of the study population strongly agreed that there are arable crops that can be grown and harvested in less than a year, 126 respondents representing (33.7%) of the study population agreed, 17 respondents representing (4.5%) of the study population disagreed while 6 respondents representing (1.60%) of the study population strongly disagreed.

Conclusively, the table showed the response of the farmers with regards to ascertaining if the arable crops they grow or have grown are weather specific or sensitive, the results shows that 249 respondents representing (66.6%) of the study population strongly agreed that the arable crops they grow/ grown are weather sensitive, 113 respondents representing (30.2%) of the study population agreed, 9 respondents representing (2.4%) of the study population disagreed while 3 respondents representing (1.60%) disagreed. This however explains that arable crops grown in Abia State are weather sensitive.

Table 2: Respondents awareness and knowledge of climate change among farmers in Abia State

S/N	Questionnaire Item	Strongly Agree	Agree	Disagree	Strongly Disagree
1	Have you ever heard of climate change	250 (66.8%)	108 (28.9%)	16 (4.27%)	0 (0%)
2	Do you think that the issue of climate change concerns you	204 (54.5%)	152 (40.64%)	57 (15.2%)	0 (0%)
3	Climate change concerns is limited to farmers alone	26 (6.95%)	27 (7.2%)	169 (45.2%)	125 (33.4%)
4	Other sectors of the economy have climate change concerns	230 (61.5%)	111 (29.7%)	11 (2.94%)	7 (1.87%)
5	Climate change constraints is noticeable in Abia State	225 (60.1%)	136 (36.4%)	9 (2.41%)	4 (1.06%)
6	Noticeable changes exist in Abia State due to climate change	219 (58.6%)	141 (37.7%)	7 (1.87%)	7 (1.87%)
7	As a farmer, climate change experience is challenging in Abia State	219 (58.6%)	135 (36.1%)	16 (4.27%)	2 (0.5%)

Source: Field Survey, 2021

Table 1 above, shows the respondents awareness and knowledge of climate change in Abia State. The table shows that response to questionnaire item one showed that 250 respondents representing (66.8%) of the study population study strongly agreed that they are aware and have knowledge of climate change, 108 respondents representing

(28.9%) of the study population agreed, 16 respondents representing (4.27%) of the study population strongly disagreed none disagreed. This concludes that good number of the respondents are aware and have knowledge of climate change.

Questionnaire item 2, x rayed respondent's perception to climate change having anything to do with them, the table shows that 204 respondents representing (54.5%) of the study population study strongly agreed that they climate change has a lot to do with them, 152 respondents representing (40.64%) of the study population agreed, 57 respondents representing (15.2%) of the study population strongly disagreed and none disagreed. This concludes that climate change have a lot to do with arable farming and farmers in Abia State.

Questionnaire item 3, examined if climate change concerns is only limited to arable crop farmers alone, the respondent's perception shows that 26 respondents representing (6.95%) of the study population strongly agreed that climate change concerns is only limited to arable crop farmers alone, 27 respondents representing (7.2%%) of the study population agreed, 169 respondents representing (45.2%) of the study population strongly disagreed and 125 respondents representing (33.4%) of the study population disagreed. This however concludes that climate change concerns are not only limited to arable crop farmers alone.

The table shows that 230 respondents representing (61.5%) of the study population strongly agreed that other sectors of the economy also have climate change concerns, 111 respondents representing (29.7%) of the study population agreed, 11 respondents representing (2.94%) of the study population strongly disagreed and 7 respondents representing (1.87%) of the study population disagreed. This however concludes that other sectors of the economy have climate change concerns.

The table also examines if climate change concerns are noticeable in Abia State. From the table it is observed that 219 respondents representing (58.6%) of the study population strongly agreed that climate change concerns are noticeable in Abia State, 141 respondents representing (37.7%) of the study population agreed, 9 respondents representing (2.41%) of the study population disagreed while 4 respondent representing (1.06%) of the study population strongly disagreed.

Questionnaire Item 6 as observed showed the response of the farmers to agreeing or disagreeing to the existence of noticeable changes in Abia State due to climate change, from the response 219 respondents representing (58.6%) of the study population strongly agreed that there exist noticeable changes in Abia State due to climate change, 141 respondents representing (37.7%) of the study population agreed, 7 respondents representing (1.87%) of the study population disagreed while 7 respondents representing (1.87%) of the study population strongly disagreed. This shows that noticeable changes arising from climate change exist in Abia State.

On the issue of the challenging condition due to climate change experience in Abia State, as observed in questionnaire item 7, 219 respondents representing (58.6%) of the study population strongly agreed that as farmer's climate change experience is challenging in Abia State, 135 respondents representing (36.1%) of the study population agreed, 16 respondents representing (4.3%) disagreed while 2 respondents representing (0.5%) of the study population strongly disagreed. This however implies that good number of the respondents on a general note consented to the fact that climate change experience is challenging in Abia State.

4. Conclusion and Recommendations

The study has shown and confirmed that farmers are aware and do have good knowledge of climate change also that climate change has a lot to do with arable crop farming and farmers in Abia State. The study also concludes that climate change impact on arable crops is affecting farmer's economy in Abia State with it evidences noticed in the form of increase in temperature, change in rainfall pattern and intensity which has brought about a change in planting seasons. The study however found the following;

1) Farmers in Abia State have good knowledge of arable crops and that arable crops grown in Abia State are weather sensitive.
2) Farmers are aware and do have good knowledge of climate change also that climate change has a lot to do with arable farming and farmers in Abia State.
3) Climate change concerns are not only limited to arable crop farmers alone rather that other sectors of the economy have climate change concerns and that its experience is challenging in Abia State
4) Climate change impact on arable crops is affecting farmer's economy in Abia State.

In the light of the findings the following recommendations are made;

1) There is a need for sensitization of more farmers on awareness and knowledge of climate change.
2) There is need for effective funding of agro based sector to ensure that the findings of this study which suggests improvement in food production and climate change impacts reduction is actualized.

References

[1] Banerjee, S. K., N. Chattopadhyay and H. P. Das, 2003: Study of weather - based agricultural folk - lore of West Bengal. Pre - Published Scientific Report No.1. New Delhi, India Meteorological Department.
[2] Challinor, A. J., J. M. Slingo, T. R. Wheeler and F. J. Doblas - Reyes, 2005: Probabilistic simulations of crop yield over western India using the DEMETER seasonal hindcast ensembles. TellusA, 57: 498–512.
[3] Brás, Teresa Armada; Seixas, Júlia; Carvalhais, Nuno; Jägermeyr, Jonas (18 March 2021). *"Severity of drought and heat wave crop losses tripled over the last five decades in Europe"*. Environmental Research Letters.1**6** (6): 065012.
[4] Simelton E, Fraser E, Termansen M (2009). "Typologies of crop - drought vulnerability: an empirical analysis of the socio - economic factors that

influence the sensitivity and resilience to drought of three major food crops in China (1961–2001) ". Environmental Science & Policy.1**2** (4): 438– 452. *doi: 10.1016/j. envsci.2008.11.005.*

[5] Brimelow JC, Burrows WR, Hanesiak JM (26 June 2017). "The changing hail threat over North America in response to anthropogenic climate change". Nature Climate Change.7 (7): 516–522. *Bibcode*: *2017NatCC. . .7. .516B. doi*: *10.1038/nclimate3321*.

[6] Botzen WJ, Bouwer LM, Van den Bergh JC (August 2010). "Climate change and hailstorm damage: Empirical evidence and implications for agriculture and insurance". Resource and Energy Economics.3**2** (3): 341–362. *doi*: *10.1016/j. reseneeco.2009.10.004*.

[7] Doetterl S, Oost KV, Six J (1 May 2012). "Towards constraining the magnitude of global agricultural sediment and soil organic carbon fluxes". Earth Surface Processes and Landforms.3**7** (6): 642– 655. *Bibcode*: *2012ESPL. . .37. .642D. doi*: *10.1002/esp.3198*. *hdl*: *2078.1/123112*. *ISSN 1096 - 9837*.

[8] Lemmen, Donald S.; Warren, Fiona J., eds. (2004). *Climate Change Impacts and Adaptation: A Canadian Perspective (PDF)* (Report). *Natural Resources Canada*. *ISBN 0 - 662 - 3312*

[9] Kulshreshtha, Surendra N. (March 2011). "Climate Change, Prairie Agriculture and Prairie Economy: The new normal". Canadian Journal of Agricultural Economics.5**9** (1): 19–44. *doi*: *10.1111/j.1744 - 7976.2010.01211*.

[10] Parry ML (2007). "Box TS.2. Communication of uncertainty in the Working Group II Fourth Assessment". In Parry ML, et al. (eds.). *Technical summary*. Climate change 2007: impacts, adaptation and vulnerability: contribution of Working Group II to the fourth assessment report of the Intergovernmental Panel on Climate Change. Cambridge University Press (CUP): Cambridge, UK: Print version: CUP. This version: IPCC website. *ISBN 978 - 0 - 521 - 88010 - 7*. Archived from *the original* on 8 June 2011. *Retrieved 4 May 2011*.

[11] Boko, M., Niang, I., Nyong, A., Vogel, C., Githeko, A., Medany, M., Osman - Elasha, B., Tabo, R., and P. Yanda, (2007). Africa: 'Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change', M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. van der Linden andC. E. Hanson, Eds., *CambridgeUniversity Press, Cambridge UK*, pp 433 - 467.

[12] IPCC. Climate Change (2007) The Physical Science Basis: Working Group I Contribution to the Fourth Assessment Report of the IPCC. Vol.4. United Kingdom: Cambridge, University Press; 2007.

[13] Malebajao, M. A (2010) Climate Change Impacts on Crop Yields and Adaptive Measures for Agricultural Sector in the Lowlands of Lesotho. An unpublished M. Sc thesis submitted to the Department of Geography, LundsUniveristy.

[14] Mendelsohn, R., Dinar, A. and Dalfelt, A. (2000). 'Climate Change Impact On African Agriculture', World Bank.

[15] Organization for Economic Cooperation and Development (OECD). (2009). Climate change in West Africa: Sahelian adaptation strategies. SWAC briefing note, no.3, January, 2009, Pp.4 - 6.

[16] Ozor, N. and Nnaji, C. E. (2011). The role of extension in agricultural adaptation to climate change in Enugu State, Nigeria. *Journal of Agricultural Extension and Rural Development* 3 (3): 42 – 50.