

<http://dx.doi.org/10.4314/jae.v18i1.7>

Climate Change Information Needs of Pineapple Farmers in Enugu State, Nigeria

Iwuchukwu J.C and Udoye C. E.

Department of Agricultural Extension,
University of Nigeria Nsukka, Enugu State, Nigeria.

E-mail: julieiwuchukwu@yahoo.com (08063276459)

Abstract

The study identified climate change (CC) information needs of pineapple farmers in Enugu State, Nigeria. Purposive sampling technique was used to select two zones (Awgu and Nsukka zones), four blocks, eight circles and eighty pineapple farmers that were used for the study. Data were analysed with percentage, mean score and standard deviation.. Majority (97.5%) of the pineapple farmers were aware of climate change while 95% indicated that pineapples are sensitive to climate change. They sourced information on climate change from newspaper (95%) and radio (63.8%). They pointed out excessive heat (86.2%) and irregular rain (82.5%) as evidences of climate change with respect to their area while reduction in yield (95%), size (86.2%) and income (86, 2%) were effects of climate change on pineapples. Avoidance of bush burning (M=2.56) and avoidance of deforestation (M=2.29) were respondents major mitigation measures while diversification into non-farm occupations was their only major adaptation measure to climate change. Prediction of commencement of rain and adaptation measures to climate change (97.5% each) were areas respondents needed information on climate change. The study pointed out the need to acquaint pineapple farmers with credible information that will emphasize on prediction of rain and specific mitigation and adaptive measures to climate change on pineapple farms and in general for a better agriculture and a healthier nation.

Key words: Information, Climate, Pineapple.

Introduction

Climate has been on a constant state of change throughout the earth's 4.5 billion-year history, but most of the changes occur in astronomical and geological time scale and are too low to be observed on a human scale (Killiman, 2008). The author further stated that natural climate variation on these scales is sometimes referred to as climate variability as distinct from human induced climate change. Climate change refers to any change in climate overtime, whether due to natural variability or as a result of human activity (International panel on climate change (IPCC), 2001). Climate change may be said to be one of the serious threats that hamper sustainable development and its adverse effects can be manifested on human health, food security and physical infrastructure.

Climate change is happening now: temperatures are rising, rainfall patterns are shifting, glaciers and snow are melting, and the global mean sea level is rising. It is expected that these changes will continue, and that extreme weather events resulting in hazards such as floods and droughts will become more frequent and intense (Alley, 2014). The author further stated that impacts and vulnerabilities to these changes will differ across geographical locations, gender, socio-economic status etc.

Generally, Africa has been described as one of the most vulnerable continents to climate change and climate variability (IPCC, 2007). Local knowledge indicates that climate change impacts are leading to significant negative effects on livelihood in Africa, particularly among subsistence and small scale agricultural communities (Simms, 2005; Margrath, 2006).

In Nigeria, as in numerous countries around the world, the poorest sections of the society are often disproportionately represented by women, young children and the elderly, and these groups will accordingly be most vulnerable to climate change (United Nations International Children Emergency Fund (UNICEF, 2007). Also the group of people who bears much of the burden of its impacts is rural farmers, who practice rain-fed agriculture and hence depend on adequate rainfall for good crop yield (Okoro, 2012).

Given the adverse effects and impacts of climate change, there is need to guard against this phenomenon by ways of mitigation and adaptation. This is more important to farmers whose occupation heavily depend on climate for performance. Therefore, provision of information on climate change to farmers will serve as critical factor that will help them to mitigate and adapt to climate change. Also, people living in climate sensitive areas are most in need of access to climate information and support service. Such group of people in those areas are yet to experience the full benefits of climate research; information and support services to enable them effectively cope and build adaptive capacity to the changing climate (O'Brien, Sygan, Kingamlono and Hochobeb, (2008) in Okoro (2012)). Cherotich, Saidu and Bebe (2012) expressed that information sharing among climate change actors in Africa is limited and may be worse in semi-arid environments due to barriers like poverty, lack of infrastructure, illiteracy and socio-economic factors. Most importantly, information on climate change especially on climate change and agriculture are generally too broad to apply on specific needs of farmers like pineapple farmers.

Pineapple is among the most popular and nutritious tropical fruit grown in most tropical and sub tropical countries (FAO, 2004). Nigeria is the leading pineapple producing country in Africa contributing about 5.1% of total world production (Indian Horticulture Database, 2006). It is becoming an important commercial crop in Nigeria for both fresh market, exports and as raw materials for the local fruit juice industry (Asoegwu, 1987). Unfortunately, there were few studies relating specifically to pineapple production. Also, there exist a scarcity of literature specific to pineapple and in particular to pineapple in West Africa in some impact categories (West Africa Fair Fruit (WAFF), 2011) like climate change impact. Inferences on pineapple were drawn from knowledge of the farming activities and the impacts general to crop production. Which is not a standard environmental impact category used in life cycle assessment (LCA) (WAFF, 2011).

Conducting independent study on pineapple will provide more realistic impact result. In the same vein, identifying climate change information needs of this category of farmers will go a long way in providing specific climate change solution that they can apply in their farms in order to cushion, mitigate and adapt to climate change for increased yield and balanced ecosystem. This study was therefore undertaken to specifically ascertain pineapple farmers awareness, evidence of climate change and sources of information on climate change. Others were; effects of climate change on

pineapple production, mitigation and adaptation measures used as well as their climate change information needs.

Methodology

Population and Sample

The study was carried out in Enugu state, Nigeria. The state has seventeen Local Government Areas and six agricultural zones. Pineapple farmers in the state constituted the population for the study. A multi stage sampling procedure was used in the selection of the respondents as follows;

Stage one: from the six agricultural zones, two (2) zones; (Awgu and Nsukka) known for pineapple production were purposively selected.

Stage two: from each of the selected zones, two (2) blocks were purposively selected because of their involvement in pineapple production giving a total of four (4) blocks for the study.

Stage three: from each of the selected blocks, two circles where pineapple farmers dominate were also purposively selected giving a total of eight (8) circles for the study.

Stage four: Ten pineapple farmers were purposively selected from each of the circles giving a total of eighty (80) respondents for the study.

Data Collection

Data for the study were collected from the respondents through the use of structured interview schedule that was administered by the researcher and other research assistants to the respondents. It contained relevant questions based on the objectives of the study. Respondents were asked to indicate whether they are aware of climate change, evidence and their sources of information on climate change as well as the effects of climate change on pineapple.

In order to ascertain climate change mitigation and adaptation strategies employed by these farmers, a three point Likert-type scale with responses as; to a great extent (3), to a little extent (2), and to no extent (1) was used. Variable with a mean score higher or equal to 2.0 was regarded as either major mitigation or adaptation strategy while variable with mean score less than 2.0 was regarded as either minor mitigation .or adaptation strategy they used. Some variables listed under mitigation strategies were avoidance of bush burning and avoidance of rearing of animals especially ruminants while expansion of animal farm and movement into non-farm occupations were listed under adaptation strategy.

They were also asked to indicate areas they need information on climate change, method, language and resource person that they will want to be used in communicating the information to them. Data generated were analysed with percentage and mean score .

Results and discussions

Awareness and evidence of climate change

Table 1 shows that majority (97.5%) of the respondents were aware of climate change. Excessive heat (86.2%), irregular rain (82.5%), abnormal rise in temperature (80%), excessive sunshine (57.5%), drying up of streams (53.8%) were evidences of climate change in the area as pointed out by the respondents. Since majority of these respondents were aware and were witnessing climate change in their environments through these evidence they pointed out they are likely to welcome information or technology related to it.

Sources of information on climate change

Respondents sourced information on climate change from newspaper (95%), radio (63.8%), neighbour (67.5%) and friends (56.2%). Smaller proportion sourced information on climate change from television (46.2%), extension agent (26.2%) and spouse (18.8%). This means that these farmers received information on climate change from both formal and informal sources. This is in line with Okoro, (2012) who identified personal observation, friends, radio and television as rural farmers sources of information on climate change.

Table1: Distribution of the respondents on awareness and sources of information on climate change

| Awareness and sources of information | Percentage(n=80) |
|--|-------------------------|
| Awareness | |
| Aware | 97.5 |
| Not aware | 2.5 |
| Evidences of climate change | |
| Abnormal rise in temperature | 80 |
| Excessive heat | 86.2 |
| Irregular rain | 82.5 |
| Drying up of streams | 53.8 |
| Excessive Sunshine | 57.5 |
| Overflow of streams | 43.8 |
| *Sources of information on climate change | |
| News paper | 95.0 |
| Radio | 73.8 |
| Television | 46.2 |
| Neighbour | 67.5 |
| Friends | 56.2 |
| Spouse | 18.8 |
| Extension agent | 26.2 |
| Ministry of Agriculture | 2.5 |
| Primary and secondary school children | 2.5 |
| Tertiary education students | 5.0 |
| Posters | 6.2 |

***multiple responses**

Sensitivity and effects of climate change on pineapple

Majority (95%) of the respondents indicated that pineapples are sensitive to climate change. Thus effects of climate change on pineapples according to the respondents were reduction in yield (95%), reduction in size (86.2%), reduction of income from pineapple (86.2%), change in taste (70%) and change in colour (70%) (Table 2). Given that pineapples are sensitive to climate change and their effects manifested in aforementioned ways, there is need to acquaint pineapple farmers with information on climate change especially on how to mitigate and adapt themselves and their farms to it.

Table 2: Distribution of respondents on sensitivity and effects of climate change on pineapple

| Sensitivity/effects | Percentage(n=80) |
|------------------------------------|-------------------------|
| Sensitivity | |
| Sensitive | 95.0 |
| Not sensitive | 5.0 |
| *Effects | |
| Reduction in yield | 95.0 |
| Change in taste | 70.0 |
| Reduction in size | 86.2 |
| Change in colour. | 70.0 |
| Reduction of income from pineapple | 86.2 |
| *multiple responses | |

Strategies for mitigating climate change

Entries in Table 3 indicates that avoidance of bush burning (M=2.56), avoidance of deforestation (M=2.29) were major strategies used by the respondents to mitigate climate change. Also, avoidance of use of fertilizer and other agro chemicals (M=1.80), avoidance of use of animal manure (M=1.55), avoidance of rearing of animals especially ruminants (M=1.28) and avoidance of mixed farming (M=1.21) were minor strategies used by the respondents to mitigate climate change. These practices that the respondents engaged may be ideal. Although they will not reverse existing warming/climate change but will prevent or mitigate further changing of climate.

Table 3: Mean scores on strategies used by the respondents to mitigate climate change

| Mitigation measures | Mean | Standard deviation |
|---|-------------|---------------------------|
| Avoidance of bush burning | 2.56 | 0.74 |
| Avoidance of deforestation | 2.29 | 0.75 |
| Avoidance of use of fertilizer and other agro chemicals | 1.80 | 0.75 |
| Avoidance of use of animal manure | 1.55 | 0.65 |
| Avoidance of mixed farming | 1.21 | 0.52 |
| Avoidance of rearing of animals especially ruminants | 1.28 | 0.57 |

Adaptation strategies to climate change

Table 4 reveals that movement into non-farm occupations (M=2.0) was the only major strategy the respondents used to adapt to climate change. Since agriculture is risky in this era of climate change farmers need to adapt to climate change by way of diversifying their income sources via non-farm occupations. Thus risk minimization is the motive of income diversification (Pieniadz, 2009). It should also be noted that this adaptation option may not be ideal because movement of this category of farmers and farmers generally into non-farm occupations may lead to extinction of agriculture as a livelihood strategy and may consequently cause or aggravate food insecurity.

Increase production of crops grown before (M=1.94), practice of crop rotation (M=1.85), production of crops not produced before (M=1.80), practice of bush fallow (M=1.79), reduction of pineapple farm size (M=1.75), movement into animal production (M=1.74) and expansion of animal farm (M=1.62) were some of the minor strategies used by the respondents in order to adapt to climate change.

Table 4: Mean scores on strategies used by the respondents to adapt to climate change

| Adaptive strategies | Mean | Standard Deviation |
|--|-------------|---------------------------|
| Increase production of crops grown before | 1.94 | 0.51 |
| Production of crops not produced before | 1.80 | 0.49 |
| Movement into animal production | 1.74 | 0.59 |
| Expansion of animal farm | 1.62 | 0.58 |
| Movement into non-farm occupations | 2.0 | 0.66 |
| Reduction of pineapple farm size | 1.75 | 0.54 |
| Increase pineapple production farm size | 1.21 | 0.52 |
| Adoption of organic farming in my pineapple production | 1.38 | 0.64 |
| Changing date of planting and other operations concerned with pineapple production | 1.29 | 0.51 |
| Practice of bush fallow | 1.79 | 0.44 |
| Practice of crop rotation | 1.85 | 0.48 |

Climate change information needs of pineapple farmers

Areas information are needed

Table 5 reveals that majority of the respondents indicated all the variables in the table as areas they need information on climate change. Consequently, prediction of commencement of rain and adaptation strategies to climate change (97.5% each), human beings contribution to climate change and prediction of stopping of rain (96.2% each), climate change effect on pineapple production/agriculture (93.8%) and mitigation strategies to climate change (92.5%) were mostly indicated by the respondents as areas they needed information on climate change. Their other areas of climate change information needs were prediction of normalization of rain (81.2%) and use of weather measuring equipment (65%). Respondents quest for information on these areas especially on commencement and stopping of rain is in order because agriculture in developing countries like Nigeria is rain fed and irregularity of rain has being pointed out as evidence of climate change in the area (Table 1). These farmers need to be fortified with information related to rain in order to cope in this era of climate change.

Communication methods

Data in Table 5 further shows that majority of the respondents indicated demonstration method (95%), drama (91.2%), organizing workshop/training (86.2%), announcement/advertisement in radio (73.8%) and using folk tale (66.2%) as methods that will be used in communicating climate change information to them. Their preference for these methods may be due to the fact that virtually all of them are visible and practical in nature thus enhancing understanding, retention and probably application of knowledge gained through them. Folk tale is a traditional method of communication that is interactive and boosts interest and participation of client so that learning can take place.

Language of communication/ resource person

Majority (87.5%) of the respondents were of the opinion that vernacular should be used in communicating climate change information to them. The respondents also indicated researchers (77.5%), religious leaders (68.8%) and tertiary institution teachers/lecturers (61.3%) as resource persons that will communicate the information to them. Normally these people are seen as being reputable in the society and are likely to disseminate credible information to people including farmers.

It is worrisome that only (26.2%) of the respondents indicated extension agent as resource person to communicate climate change information to them. This points at lapses in agricultural extension services in Nigeria due to poor funding and logistic problems that hinder paying required visits and dissemination of credible information to farmers so that they will acknowledge the importance of agricultural extension. Also, there may be gap in accommodating and in updating extension staff with information on new/emerging issues like climate change so that they can educate the farmers as well.

Table 5: Distribution of respondents according to their climate change information needs

| Climate change information needs | Percentage(n=80) |
|--|-------------------------|
| *Areas information are needed | |
| Human beings contribution to climate change | 96.2 |
| Agriculture/ pineapple production contribution to climate change | 95.0 |
| Prediction of commencement of rain | 97.5 |
| Prediction of normalization of rain | 81.2 |
| Prediction of stopping of rain | 96.2 |
| Climate change affect on agriculture/ pineapple production | 93.8 |
| Mitigation strategies to climate change | 92.5 |
| Adaptation strategies to climate change | 97.5 |
| Use of weather measuring equipment | 65.0 |
| Communication methods | |
| Using drama | 91.2 |
| Using folk tale | 66.2 |
| Demonstration method | 95.0 |
| Using posters/leaflets | 6.2 |
| Announcement/advertisement in television | 46.2 |
| Announcement/advertisement in radio | 73.8 |
| Text messages from phones | 27.5 |
| Organizing workshop/training | 86.2 |
| Formal education training | 27.5 |
| *Language of communication | |
| Local dialect/language | 3.8 |
| English | 27.5 |
| Vernacular | 87.5 |
| Resource person | |
| Extension agent | 26.2 |
| Religious leaders | 68.8 |
| Researchers | 77.5 |
| Primary and secondary school teachers | 22.5 |
| Tertiary institution teachers/lecturers | 61.3 |
| *multiple responses | |

Conclusion

The study concluded that majority of the respondents knew about climate change through newspaper and radio and affirmed that pineapple is sensitive to climate change as manifested in reduction of yield, size and income from pineapple. Strategies such as avoidance of bush burning and avoidance of deforestation were used to mitigate climate change effects while major adaptive strategy was movement into non-farm occupations. Respondents needed information on prediction of commencement of rain

as well as adaptation strategies to climate change. These will be better communicated to them through researchers, religious leaders and lecturers with the aid of demonstration methods using vernacular.

Recommendations

The study pointed out the need to formally and informally acquaint pineapple farmers with credible information that will emphasize on prediction of rain and specific mitigation and adaptive measures to climate change on pineapple farms. They should also be discouraged from moving into non-farm occupations as adaptation strategy to climate change. Rather they should be encouraged to practice adaptation options like changing planting and harvesting dates, crop rotation, bush following, farm/agricultural diversification among others. This will invariably help them to adapt to climate change and boost their output/ yield .

References

- Alley, R (2014). Meteorology. Department of Geosciences, College of Earth and Mineral Sciences, The Pennsylvania State University.
- Asoegwu, S.N (1987).. Effects of irrigation and nitrogen on the growth and yield of Pineapple (*Ananas comosus*). *Smooth Cayene Fruits*, 42,505-509.
- Cheriotic, V.F., Saidu, O Bebe, B.O.(2012). Access to climate change information and support services by vulnerable groups in Semi-Arid Kenya for adaptive capacity development. *African Crop Science Journal*, vol20 (2) 169-180.
- Farauta, B.K, Egbule, C.L, Idrisa,Y.L and Agu, V.C (2011), Farmers perceptions of climate change and adaptation strategies in Northern Nigeria. An empirical assessment African Technology Policy Study Network (ATPS), Research paper, No. 15. Nairobi, Kenya: ATPS.
- Food and Agriculture Organisation (FAO), 2004. Food and Agriculture Organisation Statistical database, Italy, Rome.
- Indian Horticulture Database,(2006). National Horticultural Board, Ministry of Agriculture, Government of India.
- Intergovernmental panel on climate change (IPCC), (2001). Impact, Adaptation and Vulnerability. Contribution of working group 11 of the Intergovernmental Panel on Climate change to the third assessment report of IPCC, Cambridge University Press, London.
- Intergovernmental panel on climate change (IPCC), (2007). *Climate Change 2007: The Physical Science Basic Summary for policy makers*. Contributions of working group1 to the Fourth Assessment Report of the IPCC.
- Killiman, W. (2008). Climate change and food security. A framework document Food and Agriculture Organisation of the United Nations, Rome.
- Magrath, J.(2006). Africa-up in smoke?. The second Report on Africa from the working Group on climate change and development. New Economics Foundation, London, United Kingdom.
- O' Bien et.al. 2008 in Okoro, J.C (2012). Climate change information needs of rural farmers in Enugu State, Nigeria. Unpublished M.Sc. thesis, Department of Agricultural Extension, University of Nigeria, Nsukka.
- Okoro, J.C (2012). Climate change information needs of rural farmers in Enugu State,

- Nigeria. Unpublished M.Sc. thesis, Department of Agricultural Extension, University of Nigeria, Nsukka
- Onyeme, N. F. and Iwuchukwu, J. C. (2012). Responsiveness of Extension workers to climate change in Anambra State Nigeria. *Journal of Agricultural Extension* 16(1) 88-102
- Pieniandz, A., Renner, S., Rathmann, C., Glauben, T. and Loy, T. P (2009). Income diversification of farm households: relevance and determinants in Germany. III EAAE-IAAE Seminar, small farms: decline or persistence, University of Kent, Canterbury UK. 26th-27th June 2009.
- Simms, A. (2005). The second Report on Africa from the working Group on climate change and development. New Economics Foundation, London, United Kingdom.
- United Nations International Children Emergency Fund (UNICEF), (2007). *Climate Change and Children*. New York.
- West Africa Fair Fruit (WAFF), (2011). Summary of studies on environment performance of fresh Pineapple produced in Ghana for export to Europe. Kanda Estate, Accra, Ghana.