Climate change information for farmers in Nigeria: what challenges do women face?

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Abstract. Women in developing nations are more exposed to climatic risk due to higher dependence on the natural resources that tend to be more sensitive to these changes. Quality climate change information for rural women farmers can be a decisive factor in how they perceive and cope with these changes, thus the purpose of this study. Purposive sampling technique was used to select 5 communities each from the five Local Government Areas in Kwara North, giving a total of 25 communities. Raosoft online sample size calculator was used to determine the sample size. Three hundred and eighty-four (384) copies of the questionnaire were administered; in addition, Focus Group Discussion and oral interviews were conducted to determine the; (i) sources of climate information (ii) medium/language of communication and, (iii) adequacy of climate information. Results from the data analyzed indicates that about (68.0%) of all the women farmers in the study area do not always receive adequate climate information as their sources of information are not official, while only (32.0%) of the respondents received information in English. Also, the contents of climate information generated and disseminated in Nigeria and particularly the study area does not meet the actual needs of the farming population. Recommendations are therefore made accordingly for improvement.

Keywords: Communication, Extension, Women empowerment, Women farmers

1. Introduction
The agricultural sector assumes a crucial role in the grass-root economies of most countries of Sub-Saharan Africa. These rural areas are important producers of food crops, thereby serving as a source of employment, income generation, and a source of raw materials to the small and medium scale enterprises in their various countries. In Nigeria for instance, about 90% of the rural population, depend on agriculture for their livelihood [1]. The majority of these rural dwellers are women, who make up the bulk of the country’s food producers [2]. The international development community also acknowledges agriculture as the backbone of growth and poverty eradication, particularly in the Sub-Sahara African countries [3].

Agriculture in Nigeria is mainly rain-fed therefore highly sensitive to environmental variability and weather extremes, characterized by irregularities like droughts, floods and severe storms [4]. Therefore, climate change is, without a doubt, the most pressing challenge to agriculture and efforts of alleviating hunger, malnutrition, disease, and poverty in this part of the world.

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While climate change affects everyone in society, it is, however, undeniably that it does not affect us equally. Several studies [5,6] asserts that women make up the most share of the world’s poor, and are most affected by changes in climatic conditions. Women are more susceptible to climatic changes not just due to the fact they represent the majority of the world’s poor or lack the skill to cope with negative effects of the changing climate; however it is due to the fact that their livelihoods are mostly reliant on the natural resources that tend to be more sensitive to these changes.

Agriculture in many tropical countries largely underperforms because women who constitute an integral part of the workforce in the agricultural domain particularly at the very local levels are not usually given the preferred attention [7]. Women perform such roles as farmers, farm laborers, and small-scale entrepreneurs. A United Nations estimate, according to [8] says that women’s agricultural production is at 60% in Asia, 80% in Africa and Pacific 40% in Latin America and in Nigeria specifically, women make up about 60-80 percent of the agricultural labor force. This statement is similarly corroborated by a number of different studies [6,9]

The submissions above demonstrate the fundamental role of women in the agricultural sector, and which therefore justifies the relevance of this study. In the home front, various research [6,10] verify that women make contributions to household well-being via their income-generating activities. Even with such giant contributions of women to agriculture, a number of findings have shown that the percentage of climate change awareness differs significantly between men and women. In Nigeria precisely, women farmers nevertheless lack adequate access to basic agricultural resources such as land, credit facilities and extension services. The women farmers in most cases lack access to appropriate climate and technological information, and where they do, the information is often found inadequate and unspecific with respect to gender [11]. It is in light of the above that this study was therefore carried out based on three objectives, which are to:

- Identify the sources of climate change information for women farmers in the study area.
- Evaluate the language of information transmission
- Evaluate the adequacy of climate change information for the women farmers

2. Material and Methods

2.1. Study area
The study area is Kwara North in Kwara State, Nigeria. It is located between latitudes 70°39’ and 90°10’ N of the Equator and longitudes 20°40’ and 40°20’ East of the Greenwich Meridian. The region shares boundaries with Niger state to the north, Oyo state to the south and Republic of Benin as an international boundary to the west (figure 1).

The climatic characteristics of Kwara North are similar to those of other parts of the Middle Belt Region of Nigeria. It is marked by distinct wet and dry seasonal periods each lasting for about six months between May to October and November to April respectively as well as the mean monthly temperature during the wet season is 28 °C and 35 °C during dry seasons while the annual mean rainfall ranging between 1,000 and 1,200 mm. Both men and women are into farming, the men engage in crop farming, livestock, forestry, fishing, and hunting. The women, in addition to crop farming and rearing of livestock, are into multiple livelihood activities like a vegetable garden, trading of farm products and caring for the family.
2.2. Methods

Data were obtained from both primary and secondary sources. Primary data were obtained with the aid of structured questionnaires and interview schedules from literate and illiterate farmers respectively in the study area while secondary data were obtained from annual reports of state Agricultural Development Programme, textbooks, journals, internet and previous studies of other researchers.

There are five (5) Local Government Areas (LGAs) in the study area namely; Baruten, Edu, Kaiama, Moro, and Patigi. Communities selected for the study were drawn from these LGAs. Based on the prior knowledge of the study area, a simple random sampling procedure was adopted to pick one community without replacement out of every ten communities until the five (5) communities required for each LGA was attained. The choice of five (5) communities was based on the fact that the study focuses on rural communities with homogenous characteristics in both socio-economic and livelihood activities. Thus a total of twenty-five (25) communities were sampled. Within each of the twenty-five (25) communities, the required sample for each LGA was distributed over the sample communities; finally, systematic sampling was again used to select one house out of every six houses starting from the village head’s compound. In each household, the target respondent was a woman who is also a farmer. The sample size for this study was three hundred and eighty-four (384) respondents; this was obtained using the Raosoft Online sample size calculator to obtain a required sample size for the study. The Online sample size calculator is a simplified way of obtaining sample sizes for research purposes. A total of three hundred and eighty-four questionnaires (384) were therefore administered.
Raosoft sample size calculator uses a given margin error of (confidence interval) = 5% (usually a common choice), and a confidence level = 95% (other typical choices are 90% or 99%), while the Population size = 769,026 (total projected female population to 2015).

3. Results and Discussion

3.1. Sources of Climate Information
Farmers, particularly women need to have information on the impending problems of climate change. Table 1 reveals the sources of climate information available to the women farmers in the study area. Respondents reported that (38.1%), of women farmers in Baruten source climate information through community organized discussions while only (0.7%) of women farmers source climate information through extension workers. This implies that agricultural extension workers do not exist in many communities in Baruten, and where they do, they don’t seem to be efficient. In Edu LGA of the study area, there is a difference, findings reveal that (45.5%), of the women farmers source climate information through community organized discussions, followed keenly by the extension workers (33.3%), while the lowest percentage of women farmers (3.0%) source climate information through discussion at agricultural meetings/seminars and through neighbors/neighboring farmers (3.0%).

Table 1. Sources of Climate and Agricultural Information

| Sources                                      | Baruten | Edu | Kaiama | Moro | Patigi | Total |
|----------------------------------------------|---------|-----|--------|------|--------|-------|
|                                              | F       | F   | F      | F    | F      | %     |
| 1 Media (Radio, TV, Newspapers etc)          | 13      | 9.4 | 7      | 10.6 | 20     | 37.7  |
| 2 Extension Agents                           | 1       | 0.7 | 22     | 33.3 | 5      | 9.4   |
| 3 School                                     | -       | -   | -      | -    | 9      | 10.6  |
| 4 Discussions at agricultural meetings/seminars | 4      | 2.9 | 2      | 3.0  | 4      | 7.5   |
| 5 Community/Local Farmers’ group             | 53      | 38.1| 30     | 45.5 | 18     | 34.0  |
| 6 Family Members                             | 15      | 10.8| 3      | 4.5  | 5      | 9.4   |
| 7 Neighbours /Neighbouring Farmers           | 27      | 19.4| 2      | 3.0  | -      | -     |
| 8 Others (Specify)                           | 26      | 18.7| -      | -    | 1      | 1.9   |
| Total                                        | 139     | 100 | 66     | 100  | 53     | 100   |

Source: Author’s Fieldwork, 2017 F- Frequency % - Percentage

This implies that the extension agents are fairly active in Edu. Also, the highest percentage (37.7%), of the women farmers in Kaima source climate information through the media possibly through radio because it was observed during the survey that most of the communities had no electricity. This was closely followed by community organized discussions (34.0%), while the lowest percentage of women farmers source climate information was through other means (1.9%). The highest percentage of women farmers in Moro (58.8%), source climate change information through the media. This could be as a result of the proximity of Moro LGA to the state capital where the communities around are connected to rural electrification, while the lowest percentage of women farmers’ source of climate change information was through family and friends (1.2%). Also, the highest percentage of the women farmers in Patigi source climate change information through community organized discussion (46.3%), while the lowest percentages of women farmers’ source of climate change information were through...
neighbors’/neighboring farmers (2.4%) and discussion at agricultural meetings/seminars (2.4%). In all, most respondents in the study area, identify community/Local farmers’ group (32.03%) and the media (25.52%) (radio, newspaper, and television) as their main sources of climate information. These two sources were common to all categories of respondents. Women farmers share climate information with colleagues during local farmers’ meetings. This implies that women farmers need prompt and adequate information necessary for the consequences of climate change. Such information will serve as advice and assistance for farmers to help them respond proactively to climate change and improve their production and marketing styles.

Discussants in the FGDs, as well as key informants, reported that: in the absence of organized climate information institutions coupled with the irregularity of the inadequacy of ‘News’ on weather from the radio and television stations, we rely more on our peers for climate information. Apart from these mentioned sources, respondents claimed that from their indigenous knowledge systems, they are able to compare the current situations with the past and form an opinion as to how the climate situation is, which in the long run enable them to make decisions on their livelihood activities.

3.2. Language of Information Received

Table 2 shows that the majority of the women farmers (64.03%) in Baruten received climate/agricultural information mostly in their native language, while the lowest percentage of respondents received the information in the English language (35.97%) from the media. In Edu, (62.1%) of most rural women, farmers received climate/agricultural information in their native language usually interpreted mainly through the extension agents while (37.9%) of the respondents' source information in the English language. Also in Kaiama, the highest percentage of the women farmers received climate/agricultural information in their Native language (64.2%) while the lowest percentage of respondents received the information in the native language (35.8%) probably through the media.

| Nr | Language/ LGA     | Baruten F % | Edu F % | Kaiama F % | Moro F % | Patigi F % |
|----|-------------------|-------------|---------|-------------|----------|------------|
| 1  | Native Language   | 89 64.03    | 41 62.1 | 34 64.2     | 25 29.4  | 26 63.4    |
| 2  | English Language  | 50 35.97    | 25 37.9 | 19 35.8     | 60 70.6  | 15 26.6    |
| Total |                 | 139 100    | 66 100  | 53 100      | 85 100   | 41 100     |

Source: Author’s Fieldwork, 2017

The result further reveals that the (70.6%), of the women farmers in Moro receive climate/agricultural information in the English language while the lowest percentage of respondents received the information in the native language (29.4%). This is peculiar because of the proximity of Moro to the state capital, they are opportune to enjoy electricity, listen to the radio, watch television and even read newspapers regularly. Also in Patigi, most of the women farmers received climate/agricultural information in their native language (63.4%), while the lowest percentage of respondents received the information in the English language (26.6%). The implication is that Local Government Areas that are farther away from the state capital are at disadvantage to source information from agricultural officers and other relevant institutions directly, coupled with the majority of the rural women farmers’ inability to read. The women complained during the Focus Group Discussion (FGD) that: The few ones among us who are a little bit exposed don’t like to share information with us, they don’t want to associate with us even though they met us in the business. Generally, it means about (63.4%) of the respondents receives agricultural and climate information in their native language during their local meetings, while only about (26.6%) source information in English. This means that the adequacy of such information is minimal. A participant at the Focus Group Discussion (FGD) complained that: Women that can speak and understand English language or whose husbands understand the English language are usually
better informed on climate and agricultural issues and they realize better yields than those of us who neither speaks nor married husbands that speak English.

3.3. Adequacy of Information Received

Climate information no matter the source is very crucial in agricultural development, particularly for the rain-fed farming communities which most rural farmers in Nigeria practice. The result of the finding in table 3, shows that the majority of rural women farmers (71.2%), in Baruten receive inadequate climate and agricultural information while a few of them (28.8%) claim they receive adequate information. In Edu also (69.7%), of the women farmers received inadequate climate/agricultural information, while only about (30.3%) of the respondents received adequate information. In like manner, (75.5%) of the respondents in Kaiama received inadequate climate/agricultural information, while about (24.5%) of the respondents received adequate information (24.5%).

Table 3. Adequacy of Climate/Agricultural Information Received

| Nr | Options | Baruten | Edu | Kaiama | Moro | Patigi | Total |
|----|---------|---------|-----|--------|------|--------|-------|
| 1  | Adequate| 40      | 20  | 13     | 30   | 16     | 139   |
|    |         | 28.8%   | 30.3%| 24.5%  | 35.3%| 39.0%  | 32.0% |
| 2  | Inadequate| 99     | 46  | 40     | 55   | 25     | 139   |
|    |         | 71.2%   | 69.7%| 75.5%  | 64.7%| 60.1%  | 68.0% |
| Total | | 139 | 100 | 100 | 100 | 100 | 100 |

Source: Author’s Fieldwork, 2017  F- Frequency % - Percentage

The result further reveals that many women farmers in Moro received inadequate climate/agricultural information (64.7%), while only (35.3%) received adequate information. The situation in Moro again seems fairer because there is the likelihood that the women farmers have access to first-hand climate information from the Ministry of Agriculture and Natural Resources or from Kwara ADP because of their proximity to the state capital. Further, in Patigi, the highest percentage of the women farmers received inadequate climate/agricultural information (60.1%), while the lowest percentage of respondents received adequate information (39.1%). The result generally implies that (68.0%) of all the women farmers in the study area do not always receive adequate climate information as their sources of information are not official, while only (32.0%) of the respondents received information in English. Often times, women farmers have had to augment the available information with those from their indigenous knowledge practices. It also implies that such information is not only inadequate it is also not reliable nor dependable. One key informant summed up the views as: “These sources are not reliable because they give us reports of their environment over there.” These findings largely agree with the reports of [9,11,14] that says studies over the years have established the fact that women form the bulk of the farming population in Nigeria and in a situation where women farmers find available climate information inappropriate and inadequate, it implies that the contents of climate information generated and disseminated in Nigeria and particularly the study area does not meet the needs of the farming population. Indeed, it could be safely said that government-owned weather stations in Nigeria hardly focus on providing data for farmers’ use at all, even at the national level, it is only recently that NIMET started providing annual weather forecasts with explanations for possible impact on agriculture.

4. Conclusions

Rural women farmers are aware that formal sources of climate and agricultural information exist, but that such sources are not always available to women farmers in the study area. Majority of women farmers (32.03%) source weather information through community/local farmers’ group, while source information through the mass media (26.25%) (Mainly through Televison and Radio), Extension workers (11.20%) who rarely talk to women farmers, community-organized meetings, agricultural discussions (and through neighbours / neighbouring farmers. Responses from FGD shows women farmers sometimes source climate and agricultural information through the village rainmaker or the
community’s head farmer (sarkin gona). Result of the FGD show that women farmers are aware of the existence of extension agents, local weather stations, etc. They have the mandate to supply ready-made information to farmers generally, but women farmers have no access to such information because the officials are usually men who prefer to deal with male farmers only. Respondents also revealed that climate and agricultural information received through mass media is not regularly available and inadequate for their livelihood activities. Therefore, their source of information on climate issues and agricultural practices, their medium of the communication network is however very poor. Information through formal sources is usually in English and such information is not always adequate. The traditional system of disseminating information to the people is the easiest way of reaching out to them in remote areas.

5. References
[1] Akinola M O, Ene O M and Baiyegunhi L J S 2017 The Adopted Village Project and Farm Income of Beneficiary Households in Kaduna State, Nigeria Study Tribes Tribals.
[2] Okwu O J and Umoru B I 2009 A study of women farmers’ agricultural information needs and accessibility: A case study of Apa Local Government Area of Benue State, Nigeria African J Agric Res. 4(12) 1404-1409
[3] [IPCC] Intergovernmental Panel on Climate Change 2007 Mitigation Contribution Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change
[4] Usman U, Yelwa S A, Gulumbe S U and Danbaba A 2013 An Assessment of the Changing Climate in northern Nigeria Using Cokriging Am. J. Appl. Math. Stat. 1(5) 90-98
[5] Okali C and Naess LO 2013 Making Sense of Gender, Climate Change and Agriculture in sub-Saharan Africa: Creating Gender-Responsive Climate Adaptation Policy Future Agriculture Consortium.
[6] Ogunlela Y I and Mukhtar A A 2009 Gender Issues in Agriculture and Rural Development in Nigeria: The Role of Women Humanity and Social Sciences Journal 4(1) 19–30
[7] Ifad 2014 The Gender Advantage Women on the front line of climate change The Gender Advantage 2014 23.
[8] [FAO] Food and Agricultural Organization of the United Nations 2010 FAO statistical database (Rome, IT: Food and Agricultural Organization (FAO) of the United Nations).
[9] World Bank 2006 Mozambique: Agricultural Development Strategy. Stimulating Smallholder Agricultural Growth. Social Development.
[10] Ogbonna K I and Okoroafor E 2004 Enhancing the capacity of women for increased participation in Nigeria mainstreaming agriculture: a re-designing of strategies Paper prepared for presentation at the Farm Management Association of Nigeria Conference, Abuja, Nigeria. Enhancing Capacity Women Increased Particip Niger Main-Streaming Agric a Re-Designing Strategy 2004 33–48.
[11] Achaomwie P K 2015 The Effects of Climate Change on Rural Female Farmers in the Wenchi Municipality (Ghana: University of Ghana Business School) p 80.
[12] Rebecca A 2013 Attitude of women farmers towards agricultural extension services in Ifelodun local government area, Osun State Am. J. Soc. Manag. Sci. 3(4) 125–31.
[13] Iyella A and Ikwuakam O T 2015 Poverty Coping Strategies of Rural Women Dwellers of Batagarawa Local Government Area of Katsina State, Nigeria Mediterr. J. Soc. Sci. 6(6) 296–306.
[14] McOmber C, Panikowski A, McKune S, Bartels W and Russo S 2013 Investigating Climate Information Services through a Gendered Lens CCAFS Working Paper no. 42 (Copenhagen, Denmark: CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS)) Available online at www.ccafs.cgiar.org