

The vulnerability of women in coping with climate change effects and accessing mitigation/adaptation practices in Nigeria

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Abstract

Nigerian smallholder farmers have been experiencing reduction in their harvests particularly over the last five decades due to the negative impacts of climate change which are already impacting on food sustainability in the country. Climate change is recorded to have increased the vulnerability of women smallholder farmers because of their critical gender roles as home keepers and their overwhelming socio-economic responsibilities in farming and trading in many communities especially in Africa. Women smallholder farmers are responsible for carrying out agricultural work, animal farming related activities, food handling activities and they have restricted rights of use to land. The study showed that nearly 69% of the women farmers surveyed are majorly laborers rather than farm owners or tenants. The study further revealed that 7% out of the remaining 31% owned or inherited their farm lands, while 14% rented the lands and 10% leased it. These women farmers are combating the effects of climate change on their farm; almost all respondents (97%) lamented about the various losses they have incurred due to the damaging effects of climate change ranging from dry and infertile soil to flooding in the southern part of the country. All the respondents have poor knowledge of the scientific explanations behind climate change, but experience has over the years taught them that nature (weather) is no longer their friend and they have to devise strategies to make it work in their favor. Their understanding is that Mother Nature (or the deities) is hostile to them through the massive attack of pest and diseases, flooding, erratic rainfall, high temperature and low yield. The women farmers create indigenous adaptation strategies (innovations) to fight against the effects of climate change on their livelihood. They devise methods like using swamp farming, rain harvesting for dry season irrigation, forming cooperative societies to make funds and government initiatives available to members among many other adaptations methods. However, the Nigerian government has over time made efforts to curtail climate change challenges by promoting various adaptation measures including provision of improved crop varieties, fertilizers, irrigation schemes and soft loans. Most of these measures and palliative are not readily accessible to women due to a gender bias, they are to take left overs and cannot compete with men because most culture and some religion forbids it.

Key words: Gender, Climate Change, Vulnerability, Food sustainability, Farmers

Introduction

Nigerian rural dwellers are greatly dependent on agriculture as their source of livelihood; but their means of sustainability is being threatened by climate change, resulting in poor harvests especially in the last fifty years.¹ Climate change has negative influences on weather patterns, with subsequent increment in the occurrence and concentration of climate induced threats, thus, aggravating the vulnerability of the poor and destitute by increasing the level and patterns of interconnected risks.² For example, farmers in South-West Nigeria experienced great floods late 2019 and lost their harvests to its destructive effects.³ The area has in the past twenty years been exposed to inconsistent rainfall pattern leading to unpredictable yields.⁴ The consequence of these occurrences is a poor crop yields which eventually leads to a poorer livelihood. As a result, farming will probably gradually become unprofitable because of continuing variations in climatic parameters, especially temperature and rainfall, crediting the looming food insecurity in Nigeria to climate

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3. Farmers' Academy Ede –FAE. Our Crops are failing, volume 4. (Osun Press, Osogbo 2020)

4. Ayanlade Sina, Radeny Maren and Morton John. Comparing smallholder farmers' perception of climate change with meteorological data: A case study from southwestern Nigeria. (Weather and Climate Extremes 2017).

change.⁵ According to Heltberg⁶, locations that recorded increased rainfall also experienced severe crop devastation as a result of water logged soils leading to soil nutrients leaching and subsequent poor crop production. Such water logged areas are also plagued with crops' pest and diseases which thrives in humid conditions and destroys crops thus hampering food security and promoting malnutrition. Independent Group of Scientists (2019)⁷ stated that climate change can frustrate the achievement of the Sustainable Development Goals 2030, as there is certainty of poverty increase and food insecurity. Exposure to climate change impacts such as droughts and floods differs by location, signifying the need for location-specific adaptation strategies.

Climate change affects all people in all countries causing hardships, hunger and devastation, but its effects are not equally disseminated.⁸ The poor, women, orphans and the disabled in developing and least developed countries of the world are the most vulnerable.⁹ In Nigeria, women are vulnerable not because they are necessarily poor or disabled, but because they are referred to as the "weaker gender".¹⁰ Nigeria is a male-dominated nation that promotes male dominance especially when it relates to land ownership, leaving the women to limited adaptive capacity.¹¹ Women's knowledge and abilities are not always accepted and they are frequently excluded from social-economic development issues, making them more exposed than men to climate change effects.¹² Likewise, women are not equally represented or accounted for in national climate change mitigation and adaptation initiatives to withstand climate change induced natural disasters. The vulnerability of women to the effects of climate change is mainly because of their over-dependence on natural resources, their responsibility in obtaining water and food and their increased risk exposure during times of disasters and severe weather crises.¹³

In recent years, there has been effort to bringing more women to the forefront of agricultural development and sustainability, politics and other spheres of life. They seek special recognition for women (corporate, agricultural, commerce) in every walk of life who has contributed immensely to their sectors especially the agricultural sector which is natural to them.¹⁴ Women farmers, especially in rural areas are responsible for climatically delicate tasks of securing food, water and energy such as the production, processing, procurement, packaging, transportation and marketing of food all over the country. They do this mainly as a form of occupation and for subsistence, to provide food security and family welfare and not necessarily to make large profit from it.¹⁵ Thus, women are reported to be the greater part of the impoverished and most disadvantaged groups in the society.¹⁶ This paper's aim therefore is to measure how women's livelihoods are affected by climate change.

Since majority of women farmers are working for survival, they are therefore unduly affected by climate change effects resulting in high mortality rates, illnesses and drastic reduction in their disposable income. Women's ability to effectively cope with and contribute to climate change societal adaptation in the agricultural sector is greatly restricted by access to land.⁶ Eskander and Steele¹⁷ reported that rural households that are headed by women incur comparable expenses on climate-related disaster like their male counterparts. But in the real sense, since their average disposable income is far lesser than that of men, they are on the long run spending more than the

5. Fudjumdjum H., Leal Filho W., Ayal D.Y. Assessment of Barriers to Food Security in North-Eastern Nigeria. In: Leal Filho W. (eds) Handbook of Climate Change Resilience. (Springer, Cham 2019). https://doi.org/10.1007/978-3-319-71025-9_99-1
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men. This implies that “female-headed rural households” are much more affected by climate-induced adversities, and developing solutions policies must be put in place for them. Otzelberger and Marshall¹⁸, described climate change an inequalities amplifier, emphasizing the disparity between women and men in their adaptation capability to manage with its effects. They also propose the necessity of relational studies between gender and the environment so as to ascertain the gender aspect of climate change.

Women in the course of their daily tasks have developed an intimate knowledge of the prevailing climatic conditions and possible solutions.¹⁹ Initially, in the perspective of the negative effects of climate change, gender issues have been downplayed. But recently, scholars like Phiri²⁰ and Dimitrov²¹ have brought out notable works on the vulnerability of women to climate change effects. This study is building on their works by evaluating how resilient women are to climate change by assessing their adaptation methods. The objective of this study is to assess how Nigerian rural women adapt to climate change effects and avail themselves of available mitigation/adaptation initiatives.

Materials and Methods

The study focused mainly on rural women-farmers, although data on male farmers are also collected for information comparison. The study area is the Oke Ogun area of Oyo State, Nigeria. Background information on indigenous climate change mitigation and adaptation strategies, woman-led household disposable income and past government initiatives was acquired through structured questionnaires, focus group discussions (FGDs), interviews and also from secondary sources. Three hundred (300) questionnaires were distributed by purposive sampling to female smallholder farmers in the study area. The questionnaires were distributed through Agricultural Extension Workers in the area. The questionnaires were designed to collect information on farmers’ age, access to land and number of farms. It also sampled their opinions on climate change, its effects on their harvests, and their mitigation/adaptations strategies. The study used qualitative approach analysis using Statistical Packages for Social Sciences (SPSS) and presented the results in frequencies and percentages.

Demographic and socio-economic characteristics of respondents

Three hundred (300) questionnaires were distributed to smallholder rural women-farmers in Oke Ogun area of Oyo State, Nigeria. Through the assistance of Oke Ogun Agricultural Extension workers, all questionnaires were dully filled and retrieved. The average age of respondents is thirty-two years (Table 1), explaining the reason why they are vulnerable; because at this age they are trying to raise their children and make a living. If the effects of climate change continues to make the agricultural sector unprofitable, they may be more impoverished or abandon farming for other profession entirely, thus aggravating food insecurity. It was gathered that about 5% of women farmers in Igboho have abandoned farming and already left for the city in search of a better life.

Table 1: Age Distribution of Farmers

| Age Group | Frequency | Percentage |
|--------------|------------|------------|
| 15-30 | 51 | 17.0 |
| 31-40 | 123 | 41.0 |
| 41-50 | 74 | 24.7 |
| 51-60 | 27 | 9 |
| 61-70 | 18 | 6 |
| >70 | 7 | 2.3 |
| Total | 300 | 100 |

Source: Field Survey

A large percentage of the respondents (69%) are laborers and not land owners or tenants (Table 2); this signifies that they do not own a farm, but work as laborers on other people’s farms for daily wages. They are skilled farmers who can contribute to national food production, if given access to farm lands. About 7% (21) of the women-farmers bought or inherited their farm lands; twelve of

18. Otzelberger Agnes and Marshall Mipsie. Tackling the Double Injustice of Climate Change and Gender Inequality. (CARE International 2014)
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21. Dimitrov, George. Effects of Climate change on Women. Research Review International Journal of Multidisciplinary (RRIJM 2019). 4(5) 2455-3085

them have only one farm while the other 9 have two farms. It was gathered that some of the women who are now laborers, once owned lands that were inherited, but due to devastating effects of floods (especially 2012 floods), they lost all and sold their lands. 10% of the women leased their farm lands for 10 years or more while the other 14% rented their farmlands and have to renew the rent yearly. Renting farmlands for a woman is risky especially if she had good harvests; the land owner can refuse to renew the rent and in some cases the tenant may not be able to renew the rent. These findings support the work of Phiri²² who said women are poor and vulnerable and they have limited access to farmlands.

Table 2: Land Ownership

| Land Status | Frequency | Percentage |
|------------------|------------|------------|
| Laborers | 207 | 69 |
| Bought/Inherited | 21 | 7 |
| Rented | 42 | 14 |
| Leased | 30 | 10 |
| Total | 300 | 100 |

Source: Field Survey

Climate Change effects on women-farmers

The study gathered that the women do not understand the term “climate change” since they are not educated. But they can relate to climate change in terms of fluctuations in temperature and rainfall. Table 3 shows that a large percentage (97%) of the respondents was affected by inconsistent rainfall which delayed the planting season as well as the quality of the crops harvested. Likewise, about 78% of the respondents lamented how their farms were affected by increase in temperature causing dry and infertile soils. Dry and infertile soils made them to procure fertilizers which increase their capital cost, while poor crops reduce their disposable income leaving them with lesser profits. This findings supports the work of Fudjumdjum et.al.²³ who stated that rainfall and temperature are major climatic parameters affecting agriculture. The study equally showed that the state government periodically provide fertilizers to farmers at subsidized rates and sometimes free, but these rural women rarely benefit from such initiatives because they are women and have limited rights.

Table 3: Climate Change Effects

| Climate Change Effects | Frequency | Percentage (%) |
|------------------------|-----------|----------------|
| Irregular Rainfall | 291 | 97 |
| High Temperature | 234 | 78 |
| Pest and disease | 300 | 100 |
| Flooding | 300 | 100 |

Source: Field Survey

Another prominent impact of climate change on the women is the infestation of pest and diseases intensified by warmer temperatures, wetter climates and increased carbon dioxide (CO₂) levels.²⁴ Bacterial blight of Cassava and various species of corn stem borers are the most prominent pests reducing crop yields by up to 20-40%. All the respondents (100%) have this challenge as well as that of flooding. Flooding is the most devastating effect of climate change as lamented by the respondents; it leaves them empty handed and helpless, thus increasing food insecurity and poverty. All these negative attacks on their livelihood made them appease the gods of nature with the belief that the gods are angry with them; the sacrifices also take a toll on their income. Adger²⁵ stated that floods are direct effects of climate change that have resulted in harvest failures and have brought despair to women.

22. Phiri, Keith, Sibonokuhle Ndlovu and Tanyaradzwa Bonga Chiname. Climate Change Impacts on Rural Based Women: Emerging Evidence on Coping and Adaptation Strategies in Tsholotsho, Zimbabwe. *Mediterranean Journal of Social Sciences* (2014). 10.5901/mjss.2014.v5n23p2545.

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Climate Change Adaptation Strategies in Oke Ogun Area

The frequency and degree of climate change effects are fast exceeding that of natural change in agriculture and so the need for coping methods to mitigate severe effects.²⁶ There is a necessity for people to adopt adaptation strategies to alleviate the effects of climate change which is an occurrence that will be around for a long time with its negative effects. Table 4 shows the varying coping methods which were adopted by the women-farmers to secure their harvests from climate change effects. The most recently adopted adaptation method is crop substitution (52%) which is the planting of drought tolerant small grain plants such as pearl millet and sorghum instead of cultivating maize which is water sensitive. Another related adaptation strategy practiced by the women is mixed cropping (37%); they planted variety of crops such as cassava, yam, vegetables, Okra, water melons, maize, sorghum and millet to reduce the risks of losing all to climate hazard. Crop rotation (66%) is likewise used as a coping strategy; it is most preferred by the women as legume plants are used to restore nitrogen to the soil thereby enriching the soil in place of fertilizers for better crop production. These adaptation methods will save harvests and improve food security.

Few women practice land fallowing (4%), an exercise were a piece of farmland is left uncultivated for a season in order to allow it recover its fertility. This practice is possible in Oke Ogun area because the women involved inherited the lands. The research also showed a large number of other women who cannot practice land fallowing because of limited land access, adopt minimum tillage (65%) as an adaptive strategy for crop cultivation. Minimum tillage is the process of reducing the exposure of the land to high temperature by planting before weeding in order to conserve soil moisture. Delayed planting (81%) is also being used as an adaptive strategy; it is effective as farming is considered a high risk exercise because of high rates of crop loss. Farmers no longer observe traditional plowing periods; they now wait for the first rains to come before plowing and planting in order to secure their plants.

There are also two indigenous adaptation methods typical to Oke Ogun, the use of swamp farming (32%) and rainfall harvesting (47%). The Ogun River fertile shorelines are being used for swamp farming to cultivate vegetables and maize; this is a secure means for non-seasonal all year cultivation except for the risk of flooding. Some households channel their bathroom drainage to a small vegetable farm behind their houses so as to secure all year cultivation thereby boosting their disposable income. Rainfall harvesting is a means of collecting rain water through roof drains into a reservoir to be used later for irrigation during unexpected droughts or dry seasons.

Table 4: Farmers' Indigenous Adaptations to Climate Change Effects

| Indigenous Adaptation | Frequency | Percentage (%) |
|-----------------------|-----------|----------------|
| Swamp Farming | 96 | 32 |
| Rain harvesting | 141 | 47 |
| Mixed Cropping | 111 | 37 |
| Crop Substitution | 156 | 52 |
| Crop rotation | 198 | 66 |
| Minimum tillage | 195 | 65 |
| Delayed planting | 243 | 81 |
| Land Fallowing | 12 | 4 |

Source: Field Survey

Oyo State Government Climate Change Adaptation Initiatives

The Oyo State federal government has put in place some palliatives to alleviate the impacts of climate change on farmers in the state. The state government through the Oyo State Agricultural Development Programme (OYSADEP) has established various poverty alleviation schemes including the provision of nitrogen fertilizers and improved crop varieties in order to boost crop production in the state and secure a bumper harvest. They also provide low interest loans, farming machinery and ready markets through farmers' cooperative groups. Other farmers' distribution networks include farmers' interactive groups, village meetings and age bracket groups.

26. Parry M.L.; Rosenzweig C. and Iglesias A. UNEP Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies. (UNEP 2001). Pp 8-1-8-89

A major limitation to State government's efforts is the marginalization of women groups. As earlier mentioned, the community is male dominated, frustrating the efforts of the government to alleviate the sufferings of the women. It is for this cause that women in agriculture groups were created in Oyo State in an effort to deliver government initiatives directly to women farmers (most of them have small to average farm sizes and high rate of rural poverty). The State government is specially making public disaster funds available to women in agriculture groups with the aim of assisting them to adapt to the effects of climate change and live decent lives.

Table 5: Oyo State Climate Change Adaptation Schemes accessible to women farmers

| | Frequency | Percentage (%) |
|-------------------------|-----------|----------------|
| Improved Crop Varieties | 99 | 33 |
| Fertilizers | 273 | 91 |
| Irrigation | 9 | 3 |
| Soft loan | 252 | 84 |
| Farming Machinery | 0 | 0 |
| Ready Market | 174 | 58 |

Source: Field Survey

Conclusion

The study used qualitative method to assess the effects of climate change on women farmers in Oke Ogun and their vulnerability/resilience. The women are mostly laborers and those with access to farmlands mainly have one farm compared to their male counterparts with two or more farms. A large number of the women are poor, making efforts to feed their children on daily wages or on profits largely reduced by climate change impacts. Oke Ogun agriculture is rain fed, exposing the women more to climate risks as their occupation is no longer viable. Increase in temperature and irregular rainfall is climate change impacts that the women can relate with because of its devastating effects on their livelihood and thus the need to appease the gods, an exercise which made them poorer. The women adopted some brilliant strategies such as crop substitution, delayed planting, minimum tillage and crop rotation to cope with climate change impacts. Women farmers' efforts to survive are constantly being jeopardized by climate change impacts and their access to government initiatives obstructed by bureaucratic gender issues. They have little or no access to government benefits that promotes agriculture in the state.

As a result, women in agriculture (cooperative) groups are formed to allow them access government policies that promote women in agriculture groups and support them to cope against climate change effects. Most rural women farmers do not know about these initiatives and so it is important to adequately inform and train them on these initiatives and how they can benefit from them. These women can be trained through Agricultural extension workers and enlightenment campaigns on state radio programmes to educate them about climate change, its impacts, and government mitigation and adaptation initiatives.

The indigenous adaptation strategies in the area (swamp farming and rainfall harvesting) can also be technically developed and publicized; these strategies may have limitations but they have been proven efficient to secure crops against the climate risks and ensure food security in the area. The efficacy of these indigenous adaptation methods should be improved through policy research to protect farmers' livelihood from the adverse effects of climate change. The State government should intensify its climate finance programs in order to alleviate poverty among the farmers; other poverty alleviation schemes should be developed to focus on improving farmers' livelihoods and income in a culturally accepted approach so as to encourage them to accept government adaptations schemes.