

Research Application Summary

Vulnerability to climate change and variability: A gender analysis of forest based-communities in South-West of Nigeria

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Abstract

Climate change and climate variability is a global phenomenon that has caused serious concern to many sectors of the economy and people's livelihoods in Africa. In this regard, community based dwellers most especially farmers and forest resources dependent people in Southwest Nigeria are particularly vulnerable to changes in the climate that affect the availability of forest resources, farm productivity and their weather-dependent livelihood systems. The purpose of this study was to analyze and provide empirical information on gender-based vulnerability in term of climate variability on source of livelihood, dependence on forest resources, climate change perception and involvement in decision making about forest management and climate change among forest based communities in Southwest Nigeria. The study was conducted in selected five States of Southwest Nigeria. A multi-stage sampling procedure was used to select States. Two forest based communities were selected again purposively from each State making total combination of 10 communities in all States based on accessibility, free access to the forest reserve, dependency on forest resources for livelihood and rain-fed agriculture practices. The formula by Cochran (1977) was used to estimate the sample size. Data collection for the study was carried out in two phases. Firstly, detailed survey using a structured questionnaire administered to 306 respondents randomly in sampled communities across the selected States followed by the second phase which was a Focus Group Discussion and in-depth interview with the respondents. The males and females were distributed equally. Using 3-scale rating approach, high, medium and low scale on the effect of climate variability on livelihood sources, female were more involved in decision and participation in sustainable forest management, community social networks (51%) compared to males (49%), while males were more in representation, in community committee and in government representation (65%) in comparison to female (35%). The results of the study confirmed disparity in gender vulnerability to climate change in terms of resources dependency, source of livelihoods, and decision making between male and female in their respective communities. Based on these findings, the study recommended that for adaptation and mitigation to the impact of climate change to be successful and effective in forest dwelling communities, gender mainstreaming policy needed to be formulated and promoted as matter of urgency. Therefore, gender sensitive approach with full participation of men, women, youth and elderly ones both within the household and community level need to be promoted.

Keywords: Adaptation, forest-based community, governance, livelihoods, mitigation, Nigeria

Résumé

Le changement et la variabilité climatiques sont un phénomène mondial qui a causé de sérieuses inquiétudes dans de nombreux secteurs de l'économie et des moyens de subsistance des populations

en Afrique. À cet égard, les habitants des communautés, plus particulièrement les agriculteurs et les personnes dépendant des ressources forestières dans le sud-ouest du Nigeria, sont particulièrement vulnérables aux changements climatiques qui affectent la disponibilité des ressources forestières, la productivité agricole et leurs systèmes de subsistance dépendant du climat. L'objectif de cette étude était d'analyser et de fournir des informations empiriques sur la vulnérabilité basée sur le genre en termes de variabilité climatique sur la source de subsistance, la dépendance aux ressources forestières, la perception du changement climatique et l'implication dans la prise de décision sur la gestion forestière et le changement climatique parmi les communautés forestières du sud-ouest du Nigeria. L'étude a été menée dans cinq États sélectionnés du sud-ouest du Nigeria. Une procédure d'échantillonnage à plusieurs degrés a été utilisée pour sélectionner les États. Deux communautés forestières ont été sélectionnées à nouveau à dessein dans chaque État, ce qui fait une combinaison totale de 10 communautés dans tous les États, sur la base de l'accessibilité, du libre accès à la réserve forestière, de la dépendance aux ressources forestières pour les moyens de subsistance et des pratiques d'agriculture pluviale. La formule de Cochran (1977) a été utilisée pour estimer la taille de l'échantillon. La collecte des données pour l'étude a été réalisée en deux phases. Tout d'abord, une enquête détaillée à l'aide d'un questionnaire structuré administré à 306 personnes interrogées de manière aléatoire dans les communautés échantillonnées dans les États sélectionnés, suivie par la deuxième phase qui était un groupe de discussion et un entretien approfondi avec les personnes interrogées. Les hommes et les femmes ont été répartis équitablement. En utilisant une approche d'évaluation à 3 échelles, haute, moyenne et basse sur l'effet de la variabilité climatique sur les sources de revenus, les femmes étaient plus impliquées dans les décisions et la participation à la gestion durable des forêts, les réseaux sociaux communautaires (51%) par rapport aux hommes (49%), tandis que les hommes étaient plus impliqués dans la représentation, dans le comité communautaire et dans la représentation gouvernementale (65%) par rapport aux femmes (35%). Les résultats de l'étude ont confirmé la disparité de la vulnérabilité des hommes et des femmes au changement climatique en termes de dépendance aux ressources, de sources de revenus et de prise de décision dans leurs communautés respectives. Sur la base de ces résultats, l'étude a recommandé que pour que l'adaptation et l'atténuation de l'impact du changement climatique soient réussies et efficaces dans les communautés forestières, une politique d'intégration du genre doit être formulée et promue de toute urgence. Par conséquent, une approche sensible au genre avec la pleine participation des hommes, des femmes, des jeunes et des personnes âgées, tant au niveau des ménages que des communautés, doit être encouragée.

Mots-clés : Adaptation, communauté forestière, gouvernance, moyens de subsistance, atténuation, Nigeria.

Background

Climate change and climate variability is a global phenomenon that has caused serious concern to many sectors of the economy and people's livelihoods. According to IPCC (2007b), Climate change refers to "a change in the state of the climate that can be identified (using statistical tests) by changes in the mean and / or the variability of its properties, and that persist for an extended period, typically decades, or longer. Communities all over the world have encountered changes and events that impact both positive and negatively to their lives. Africa is presumed to be more vulnerable to the risk of climate change compared to other continents (IPCC, 2007). Africa is prone to impacts of climate change because of reliance on natural resources, rainfed agriculture (Dixon *et al.*, 2003) and limited adaptive capacity (Olsen, 2006). Climate change and variability affect gender access to natural resources differently based on the different capacity/roles they play (Kakoka *et al.*, 2011). According to IPCC (2007), "Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity". Buttressing

IPCC, Hertel and Rosch (2010) described vulnerability to the impact of climate change as dynamic, which is locally specific and its manifestation is felt along gender, social and poverty line. Therefore, understanding gender equity and their connection is important in decision making on climate change adaptation and mitigation. This is crucial because strategies to address gender plight concerning climate change is unclear or vague (Brown, 2011).

It has been recorded that most studies on climate change including Millennium Development Goals (MDG) and sustainable development nexus lack a gender focused analysis (Angula *et al.*, 2005; Mfunne *et al.*, 2007). However, these studies have often focused on poverty, vulnerability and well-being of men and women, while they are silent on the links of gender to climate change based forest resources dependency and climate dependent occupation in forest-based communities in Africa, including Southwest Nigeria. Different studies have suggested and recommended that decision making and approaches that involve gender in combating climate change mitigation and adaptation from grassroots to the national level will go a long way in addressing gender inequality and vulnerability problems (Arora-Jonsson, 2011).

Available studies recently conducted in forest-based communities in selected Africa countries where gender and climate change vulnerability are captured include the study of Apata *et al.* (2009), Adekunle *et al.* (2011), Obeng *et al.* (2011), Onyekuru and Marchant (2014), Amusa *et al.*, (2015), among others. None of these studies addressed gender and climate change in relation to social role and constructed responsibility. On the other hand, majority of the empirical studies that assessed gender vulnerability to the effect of climate change focused on farm decision making related to adaptation, perception and adaptation, variation in farm household vulnerability and measurement of climate vulnerability across ecological zone. Therefore, despite the importance and potential role of gender in mitigating and adapting to the effect of climate change and climate variability, little has been done in analyzing gender based on social groups and cross-sectional roles to vulnerability to climate change in Africa forest based communities. Consequently, this study sought to assess gender degree of vulnerability to the effect of climate change and variability in Southwest Nigeria.

The information is important in enabling the vulnerable/social groups to develop adaptive capacity/ measures and shed light on levels of vulnerability and coping mechanisms of different social groups. The outcomes should feed into the climate negotiating process to enable decision makers to have a better understanding of how different groups of peoples are affected and what adaptive capacity and support is needed in holistic approaches to tackle the menace of climate change impact.

Materials and Methods

Five States were selected purposively for the study and multi stage sampling was used to determine the respondents for the survey. Two communities were purposively selected to make total of 10 locations across the States. Cochran formula was used to determine sample size. In each of the ten locations, respondents were classified as male (male youth, men and elderly men) and female (women, female youth and elderly women (six strata). Within each stratum, simple random sampling was applied to select 306 respondents. Both qualitative and quantitative methods were used for data collection (Wilhelmi and Hayden 2010). Collected data were subsequently analyzed with frequency, percentage, bar chart, chi-square, Likert scale, mean using 3-point rating scale for degree of vulnerability and dependence on forest resources.

Degree of gender vulnerability to impact of climate change. The data analysis was carried out using TCR (Three Categorized Ranking) methods as outlined by Obieng *et al.* (2011). The degree of vulnerability to the impact of climate change was graded High Degree (HD=3), Medium Degree (MD=2) and Low Degree (LD=1). In order to determine the degree of vulnerability for the gender

categories, effect of climatic variability was assessed on the source of livelihood of the gender categories. The mean was translated into TCR and rated accordingly.

Gender perception and level of awareness of climate change. In order to determine the level of awareness, and the gender perception about climate change, the general awareness about climate change was captured by direct answer from respondent in form of YES OR NO, and the level of awareness was determined by the 4-scale ranking method used by Obieng *et al.* (2011), High level=1, Moderate level=2, Low level=3 and Spiritual phenomenon=4. Perception was measured through respondent observable changes in climatic variables and the causes from key themes.

Governance and decision making on climate change issues, sustainable forest management and community policy formulation was measured by a three- point Likert rating scale. The scale was graded by gender, for each of the governance statements: strongly agreed = 2; agreed= 1; and disagreed = 0. Based on this grading, the level of governance was ranked using a weighted mean. The mean score of the respondents based on the three- point scale was computed as: $2 + 1 + 0 = 3 / 3 = 1$. Using the interval scale of 0.05, the upper limit cut-off was $1.0 + 0.05 = 1.05$, while the lower limit was $1.0 - 0.05 = 0.95$. On the basis of this, any mean score for a particular governance statement below 0.95 (i.e., mean score < 0.95) was regarded as disagreed, those between 0.95 and 1.04 was considered as agreed and any mean score that was greater than 1.05 was regarded as strongly agreed. The results were discussed based on the agreement and disagreement on the selected statement to determine the level of participation and involvement in decision making.

Result and Discussion

The degree of negative impact of climate change on livelihoods of all the sampled States was rated as medium by both males and females but with more females perceiving high impact (Figure 1). The direct impacts may be manifested in form of physical or stress while manifestation of indirect impact could be through constructed role and responsibilities. Variability in rainfall on-set and early withdrawal, long and persisted drought, erratic rainfall pattern, flood and erosion have caused crop yield reduction through crop failure, reduction in both quality and quantity of water, drying up of streams and rivers, increases in both pest and weed infestation.

Consequently, since activities such as farming and households chores are mostly carried daily by female in the area they are sensitive to climate variability, and are more likely vulnerable to impact of climate change. This research finding resonates with Kakoka *et al.* (2011) that majority of females in rural area of Malawi were more affected by climate variability than men farmer due to their engagement in farming activities and household chores. There was almost equal agreement on the perception between the male and female that reduced rainfall, drought, excessive temperature and bush burning were the factors responsible for the reduction in forest products and services in the study area. (Table 1). There was also an agreement that human activities were the major causes of forest resources declination. This finding agreed with the study of Obieng *et al.* (2011) that reported reduced rainfall, long drought, farming (through clearing of land for farming), bush burning and excessive temperature regime as the major factors that contributed majorly to decline in availability of forest resources in four agro-ecological zone of Ghana.

There was reportedly balanced representation in governance in terms of decision making by males and females concerning the forest management and climate change related issues in the selected communities. The respondents were required to rank a number of selected governance statements according to their involvement. This was achieved using a three point Likert type scale. The summary of the gender disaggregated results as presented in (Figure 2) shows that female participated in selected decision making and ranked highly in statement such as: voice are heard in the community

(Omokhudu, 1999), participated in sustainable forest management (51%:49%), while male were involved in re-organising in time of climate change disaster, dominated committees and served as government representative (35% to 65%).

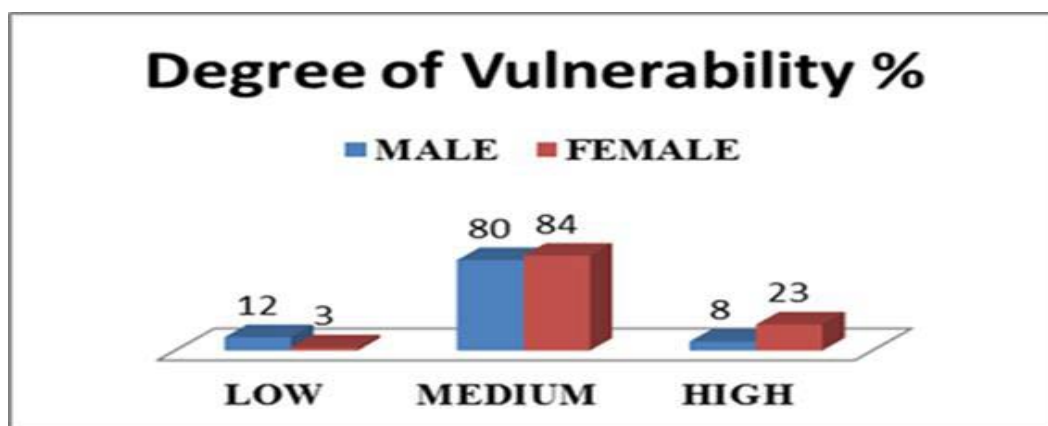


Figure 1. Gender participation on vulnerability, Climate change perception, participation and decision making

Table 1: Gender perception about causes of climate change

Key themes	Causes of climate change	Male	Female
Anthropogenic causes	Deforestation	54.9	49.7
	Illegal felling	35.6	35.1
	Bush burning	82.0	82.8
	Over-exploitation	4.0	1.3
	Farming/agriculture	38.9	37.0
Natural causes	Drought	6.0	7.0
	Spiritual	2.1	0.6
	Sin	30.8	18.5
	Natural phenomenon	2.0	5.1
	Little rainfall	5.4	5.0
	High temperature	2.1	0.6

***Percentages were based on the actual responses

Conclusion and Recommendations

Impacts of climate change are being felt across Nigeria. It has both positive and negative effects on both young and old, rich and poor, rural and urban but the impacts are felt disproportionately among the social groups in forest based communities. One of the main strategies to know the degree and magnitude of impact felt (vulnerability) is to explore gender analysis. It is against this basis that this study was conducted to explore the role and responsibilities, social and cultural construction of different social groups within the household, and community on decision making, involvement in forest management and climate change adaptation and mitigation in order to know the most vulnerable groups and develop most workable adaptive capacity.

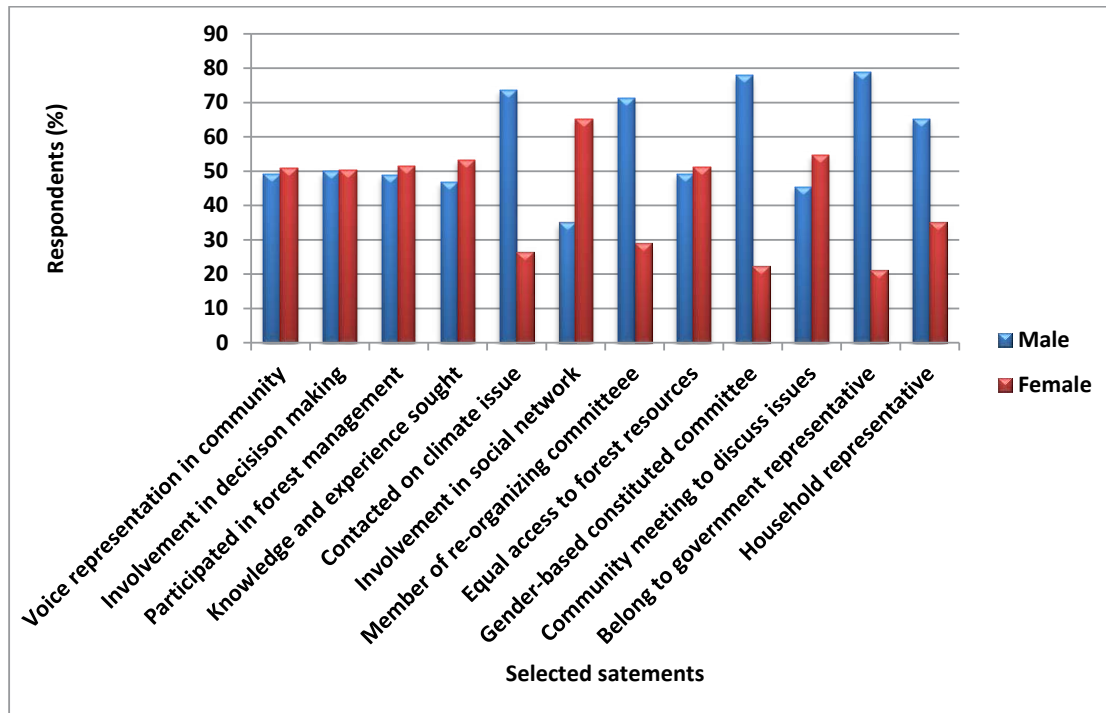


Figure 2. Gender statements on governance and decision making about climate change and forest management

The study analysed gender roles, needs, responsibilities and access to resources in their environment based on biological sexual identities in order to develop effective adaptive capacities. From the results, it can be inferred that:

- (i) The impact of climate change and vulnerability are not gender neutral. Also the impact are higher for women (84%) than male (80%) in forest based communities of Southwest Nigeria.
- (ii) There is general perception that climate has changed (male 97% and female 90%), contributing to disappearance of forest resources attributed to anthropogenic causes (Table 1)
- (iii) In terms of governance and decision making on sustainable forest management, female were more involved in decision, participation in sustainable forest management, community social networks (51%) compared to males (49%) while males were more in representation, re-organizing in time of climate change, dominated community committees and served more as government representative (65%) in comparison to female (35%).

Based on these results, the study confirmed that the effect of climate change impact is not gender neutral. Therefore it is recommended that for adaptation and mitigation to the impact of climate change to be successful and effective in forest dwelling communities, the following be undertaken:

- (i) Gender sensitivity policies and interventions to assist communities to adapt to the effect of climate change be made.
- (ii) Sustainability of forest ecosystem hinge on participatory and community-based forest management. Such as State governments need to decentralize forest management by including communities in managing forest resources.

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