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Article

Assessment of benefits and challenges: Gender analysis of REDD$^+$ pilot sites, Cross River State, Nigeria

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Abstract: Climate change impacts and its associated injustice have been identified as one of the major challenges to the actualization of gender livelihood and resilience, particularly among vulnerable groups in rural areas. This study assessed genders' benefits and challenges distribution measures in REDD$^+$ (Reducing Emission from Deforestation and Forest Degradation$^+$) pilot sites in Cross River State, Nigeria. The assessment adopted the sustainable livelihood approach of the REDD$^+$ pilot sites (Afi Mbe, Ekuri, and Mangrove). Data were proportionately collected from selected 204 respondents at gender disaggregated levels using a questionnaire. Data were analyzed for descriptive and inferential statistics using SPSS Window (version 25). The Z-proportion test showed the existence of unequal benefit sharing that skewed in favour of men (livestock production (67%), livelihood enhancement (70%), distribution of seedlings to plants (100%), and distribution of REDD$^+$ shirts (100%), among others. The challenges encountered, particularly for women, ranged from a lower percentage of accessibility (22%), participation (13%), benefits sharing (6%), no idea about the REDD$^+$ (92%), no benefits from the REDD$^+$ (90%), and no knowledge about the REDD$^+$ (95%), among others, were statistically significant at $p = 0.005$. The benefit sharing of REDD$^+$ projects, which formed the basis of fair distribution with few challenges, was statistically significant at the 95% level. Independent z-test ($p < 0.005$) showed that men benefited (livestock production, livelihood enhancement, distribution of seedlings to plant, and distribution of REDD$^+$ shirts) more from the REDD$^+$ project than women. This indicates that the project has been mundaned and considered as men's affairs, while gender mainstreaming during the designing and implementation of the programs has been neglected. Infrastructure, employment, and alternative livelihoods, among others, were promising institutional frameworks that indicated gender resilience in the study area. The study recommends adoption of strategies that would circumvent both existing and future challenges for successive initiatives programs such as REDD$^+$, particularly for women.

Keywords: climate change; challenges; men; women; adaptation; livelihood; benefit sharing; decision making

1. Introduction

Whenever the issue of fairness is raised, it is always a fairness that exists between humans. Fairness has been characterised as a human's affair, therefore it involves human-human interactions and relationships. In the light of this, looking at it wholistically, it is better understood as a social concept. Fairness, specifically in the framework of environment and other interrelated issues, is frequently used concurrently with the concept of equity [1]. Since equity and fairness concepts are frequently knotted and projected in harmonized relationships, demands for equity are the same as demands for fairness. Equity, in its totality, means 'the quality of being fair or impartial' or 'something that is fair and just'. Different and numerous theories and approaches, among others, have addressed the issue of benefit sharing; they include [2–6]. For the sake of this study, two central themes—the distributive and procedural concepts of fairness in terms of benefits and challenges—were elaborated and discussed. The distributive concept in the context of climate change development programs deals with both equal and fair distribution of adverse effects of climate change among genders and the distribution of costs and benefits available to cope with and adapt to the changes [2]. Procedural, on the other hand, refers to equity in the policy process, i.e., recognition during decision-making and participation. Paavola and Adger [2] held the opinion that for a concept to fully realise its potential, the procedural aspect must have been progressed. Leach [6] in her own view, agitated for broadening of knowledge base in policy making process because single-minded evaluation can term a project a failure, assessing it through goals and outcome. Furtherance to her claim, she stated that this single-minded evaluation manifested because the actors that dominate the policy-making process consist of only scientists and conservationists of one type of knowledge. She elaborated more that the issue of nature and use of forest resources that involves other knowledge such as forest users, non-timber resource gatherers, and land use actors must be brought to the table for more discussion. Thereby, lack of proportion inherited from power and representation becomes an issue of equity and fairness. Just as climate benefits and challenges have been an instrument to balance power equity at the global level, they should be reciprocated to challenge power relations at the local level as well.

There is evidence of gender documentation on climate adaptation initiatives in Sub-Saharan Africa [7–10], but little or none is known about how benefits and challenges are being managed in Nigeria ($REDD^+$) with much view from a gender lens. Consequently, the benefit sharing delivery system, which forms an integral part of gender effectiveness and function, has been eroded for different reasons that can be linked to neglected gender priorities; therefore, this study assessed gender and $REDD^+$ benefits and challenges in Cross River State, Nigeria.

2. Materials and methods

2.1. Study area

This study was carried out in Cross River State (CRS) Nigeria, bound by latitudes 4°27′ to 5°32′ N and longitudes 7°50′ to 9°28′ E with an approximate

landmass area of 20,156 square kilometres respectively (**Figure 1**). For this study, three key sites (known as Reducing Emissions from Deforestation and Forest Degradation ($REDD^+$ pilot sites) were selected. These sites include the Afi-Mbe, Ekuri, and Mangrove forest communities (**Figure 1**) [11].

The relief of Cross River State consists of the coastal creeks towards the southern border with the Atlantic Ocean, Cameroon Mountains, and part of Bamenda highland in the east, as well as the Cross River basin in the west. Altitude ranges from sea level, gently undulating basins to the volcanic hills of Oban and Ogoja that extend up to 1829 m [12]. There is an annual alternation of distinct wet and dry seasons, mostly determined by the movement of Inter Tropical Convergence Zone (ITCZ). Normally, annual rainfall starts in April and ends in October, with a peak usually in August in most parts of the country [13].

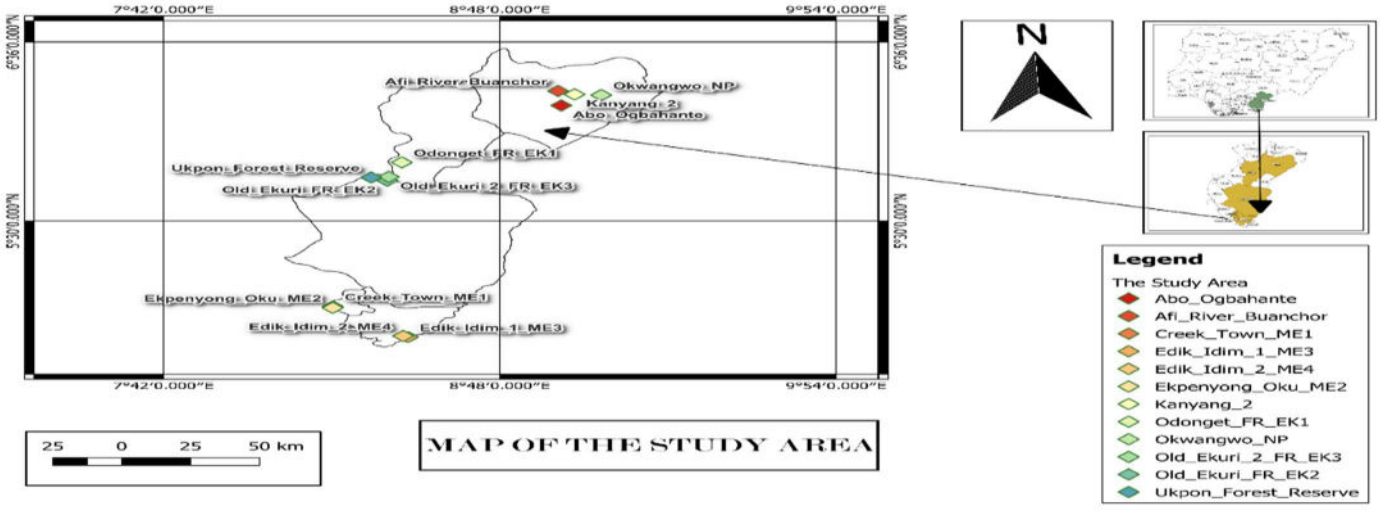

Figure 1. Map of Cross River State showing the three cluster sites and an insert map of Nigeria.
(Source: Author).

3. Methodology

3.1. Sampling procedure and methodology for questionnaire approach in data collection

The purposeful sampling method was used for the selection of Afi-Mbe, Ekuri-Iko, and Mangrove sites, as these are the approved Reducing Emissions from Deforestation and Forest Degradation+ ($REDD^+$) pilot sites in Nigeria. The second stage as well adopted the purposive sampling method to select two communities each from Afi-Mbe (Olum and Buanchor), Ekuri-Iko (Old and New Ekuri), and Mangrove (Creek town and Edik Idim) sites. The number of households selected from each community was also based on the purposive sampling technique. Within each community selected, all the genders in the households were listed and stratified into men and women along age brackets (youth: 18–35 years, men/women: 36–59 years, and elderly: 60 years and above) [14], and then this disaggregated gender level was used to select the required number of men and women to constitute the sample units to whom the questionnaire was later administered. Peradventure: the actual respondents target is not available in a chosen household; the next household was

included, and this continued until the required respondents were captured. In all, 204 gendered-disaggregated respondents were interviewed proportionately: 102 men and 102 women (36 copies of questionnaires each for male youth, female youth, men, and women for both Afi Mbe (72) and Ekuri (72) study locations, while Mangrove shared eight copies of questionnaires each for male youth, female youth, men, women, and the elderly (60) [15,16] (**Table 1**). To complement the questionnaire in assessing gender benefits and challenges in the study location, both secondary literature (policy documents) and interview groups (REDD$^+$ staff, Village Head, and Cross River State Forestry Commission principal officers) were conducted according to (a) respondents' perception of current benefits from trees, forests, and REDD$^+$ for their livelihoods; (b) policy discourses on forest resource and REDD$^+$ benefits sharing; (c) respondent's views and perceptions on REDD$^+$ benefits; and (d) how respondents perceived and evaluated various actors and institutions in forest resource, REDD$^+$ governance and structure, and their role in benefit sharing.

Table 1. Breakdown of the number of respondents sampled with age group per selected communities.

Gender with age bracket	Afi Mbe	Ekuri	Mangrove	Total
Youth (18–35 years)	Male = 12 Female = 12	Male = 12 Female = 12	Male = 12 Female = 12	72
Adult (36–59 years)	Men = 12 Women = 12	Men = 12 Women = 12	Men = 12 Women = 12	72
Elderly (60 and above)	Elderly men = 8 Elderly women = 8	Elderly men = 8 Elderly women = 8	Elderly men = 8 Elderly women = 8	60

3.2. Statistical analysis

Data were entered into MS Excel and then analyzed with SPSS (version 25) using descriptive and inferential statistics, and the results were presented in the form of tables.

This study adopted Z proportion to test for significant differences in the means of the both benefits and challenges major variables. The z-statistics are calculated using equation:

$$z = \frac{(\mu W - \mu M)}{\sqrt{\frac{\sigma_W^2}{N_W} + \frac{\sigma_M^2}{N_M}}} \quad (1)$$

where, μW and μM represent the means for the men and women categories, respectively, σ_W^2 and σ_M^2 stands for the standard deviations for the men and women, lastly, N_W and N_M stands for the sample size for the gender categories.

The null hypothesis (H_0) for the benefits and challenges is stated as:

H_0: There is no significant difference in the means of the benefits and challenges distribution for men and women categories (μW and μM).

The alternate hypothesis (H_1) for benefits and challenges is stated as:

H_1: There is a significant difference in the means of the benefits and challenges distribution for men and women categories ($\mu W \neq \mu M$).

4. Results and discussion

4.1. Gender Assessment of benefits associated with implementation REDD+ initiative in Cross River State, Nigeria

Table 2 showed gender-selective benefits derived from the REDD+ project since its inception in Cross River State, Nigeria. The table showed that men were more benefited in 14 out of the 17 benefits reported by gender categories in the study area.

Table 2. Gender assessment of benefits associated with implementation REDD+ initiative in Cross River State, Nigeria.

Benefits	Freq (*n*)	Freq (*n*)	% Men	% Women	Men vs. Women
	Men	Women			*p*-value
Project awareness	10	7	59	41	<0.001
Bridge/culvert construction	5	0	100	0	<0.001
Livelihood enhancement	7	3	70	30	<0.001
Livestocks production	8	4	67	33	<0.001
No REDD+ benefits	11	13	46	54	-
Preservation of the forest	1	0	100	0	<0.001
Social trust and togetherness	1	1	50	50	-
Training on conservation and sustainable forest management	2	1	67	33	<0.001
REDD+ shirts	1	0	100	0	<0.001
Mosquito nets	1	0	100	0	<0.001
Good forest management for sustainability	2	0	100	0	<0.001
Creation of knowledge of forest management	2	0	100	0	<0.001
Land use plan techniques	1	0	100	0	<0.001
The role of tree played in storing carbon	1	0	100	0	<0.001
Distribution of seedlings to plant on our farm	9	0	100	0	<0.001
Grading of roads	1	0	100	0	<0.001
Taken care of farm	1	0	100	0	<0.001

Independent *z*-test *p*-0.005.

The benefits derived include REDD+ project awareness (59%), bridge/culvert construction (100%), livelihood enhancement (70%), preservation of the forest (100%), training on conservation and sustainability (67%), distribution of REDD+ shirts (100%), mosquito nets (100%), good forest management for sustainability (100%), creation of knowledge of forest management (100%), land use plan techniques (100%), sensitization on the role of trees played in storing carbon (100%), distribution of seedlings to plant on our farm (100%), grading of roads (100%), and taking care of the farm (100%). Furthermore, the majority of women reported that they have not benefited from the REDD+ project since its inception (54%), while both categories agreed the REDD+ initiative has solidified their togetherness and social trust. As a result, there was a significant difference in the

mean of the selected variables between men and women ($p < 0.001$), indicating differences in productive, reproductive, and community engagement (**Table 2**).

4.2. Gender assessment of challenges associated with implementation REDD$^+$ initiative in Cross River State, Nigeria

Twenty-two (22%) of the women agreed that they have not been having smooth accessibility to the REDD$^+$ initiative in the community; 13% have not been actively participating in the initiative since inception, compared to men in terms of accessibility (78%), and participation (87%), respectively. This small percentage indicated that the project has been mundaned and considered as men's affairs (78%), as a result having a significant influence in decision-making, particularly in African settings. Proportion test results found this difference to be highly significant ($z = -15.245$, $p = 0.000$). Thus, it can be stated with nearly above 50% confidence that both men and women categories have vastly different views concerning who should have access to and participate in climate change action plans such as REDD$^+$, and this has a great effect on the design and implementation of the REDD$^+$ initiative. About 98% of the women category hold the opinion that attached benefits for the REDD$^+$ initiatives have not been fairly distributed. They asserted that the benefits were skewed in favour of men (94%) compared to 30% of the women category. This indicates that gender mainstreaming during the designing and implementation of the programs has been neglected, and these differences between the two categories were statistically significant (**Table 3**).

Table 3 clearly shows the difference between gender, program integration, community organisation and REDD$^+$ planning initiatives in the communities. 89% of men reported that members of the community were not carrying along, with 75% indicted poor community organisation and planning as the setbacks for the program compared to 11% and 25%, respectively, for the women response to the same investigation. Women had a higher percentage (92%) compared to (8%) men (that reported "no idea" about the REDD$^+$ project), and the majority of men (78%) also agreed that the REDD$^+$ project implementation has been a major challenge compared to women (22%). The results were significant in the difference at the *z*-test proportion results test ($z = 14.201$, $p = 0.000$; $z = 10.451$, $p = 0.000$). The low response from the women category both in project implementation and unawareness shows that both groups believe these two variables cannot be over-emphasized as far as climate change adaptation plans such as REDD$^+$ success are concerned. On the other hand, about 4% of the women feel that the "logging activities" are challenges facing the REDD$^+$ initiative. However, both gender categories agreed that the introduction of the REDD$^+$ initiative in the visited communities has blocked several of their livelihood strategies (50% each). The *z*-value for the proportion test is 10.240, with a *p*-value of 0.0000. The women perceive that differences exist to a much greater degree with higher confidence.

Table 3. Gender Assessment of challenges associated with implementation REDD$^+$ initiative in Cross River State, Nigeria.

Challenges	Men		Women		*z* proportion test indicator
	Freq	(%)	Freq	(%)	
Accessibility	30	78	8	22	***
Active participation	33	87	15	13	***
Benefit sharing	36	94	2	6	***
Community members were not carry along in decision making	34	89	4	11	***
Poor community organisation and planning	29	75	9	25	***
No idea	3	8	35	92	***
REDD$^+$ project implementation	30	78	8	22	***
REDD$^+$ project comes in phases	32	83	6	17	***
Logging	37	96	1	4	***
REDD$^+$ blocked several livelihoods of the community	19	50	19	50	-
No benefit derived from REDD$^+$ project since inception	4	10	34	90	***
No community empowerment since inception of REDD$^+$ project	34	90	4	10	***
No payment for community conservation since REDD$^+$ initiative inception	37	97	1	3	***
No knowledge of REDD$^+$ initiative	2	5	36	95	***
Inequality	2	6	36	94	***
No access to credit facilities for alternative livelihoods	3	9	35	91	***
No community development initiative	4	10	34	90	***
Source of revenue has been blocked	5	14	33	86	***
No youth empowerment	5	13	33	87	***
Only selected members of the community are involves in the REDD$^+$ programmes	3	7	35	93	***

Asterisks indicate where there was significant difference between the gender categories (*z* proportion test) at 95% (***) level of significance.

Nearly 100 percent (90% and 97%, respectively) of the men category have the impression that there has been no community empowerment and payment for ecosystem conservation since the inception of the project in the community, compared to 10% and 3% for women. Even among the women category, the majority (90%) reported that they have not benefited in whatever means from the REDD$^+$ project since its inception compared to men (10%), and this has been a serious challenge as far as the project is concerned. This proportion produced a *z* value of 8.243 and it is statistically different at the 0.000 significance level. It can be stated with nearly 100% confidence that women are more likely than men to be the climate justice receiving end in terms of procedural and benefit sharing. The percentage of women who indicated that they do not have knowledge of REDD$^+$ initiatives in the community was 95% compared to men 5%, respectively. The result suggests that in awareness and information dissemination related to the REDD$^+$ project, women are still lagging behind. The percentage proportion among the women that reported no access to credit facilities for livelihood enhancement and no community development initiatives (91%:90%) compared to men (9%:10%), respectively, with *p*-value of 0.001, and it is significantly different between the gender groups. Both gender categories hold a very divergent view in terms of how

the introduction of REDD+ projects in the communities have blocked larger percentages of their source of revenue (86%) compared to men (14%), which is significant with a z score of 7.907, p = 0.000, providing 100% confidence that women and livelihood strategies in forms of revenue generation issues can never be over-emphasized as far as climate change and adaptation plans are concerned. Men and women categories were also differing regarding the introduction of the REDD+ project and youth empowerment. About 87% of women reported that REDD+ have not come with youth empowerment programs, while only 13% of men agreed with REDD+ and youth empowerment programs. Above 90% of women reported that "only selected members in the communities' involves in the REDD+ projects/initiatives" compared to men (below 5%). Statistical testing revealed the difference between men's and women's responses (z = 18.421, p = 0.000). Overall, the shared responses from both women and men indicate that all the variables are fundamental factors that will determine the success and marred of the REDD+ project in the communities considering planning and implementation processes (**Table 3**).

According to **Table 4**, gender-supporting and promising frameworks were identified. These basically relied solely on the Sustainable Livelihood Approach (SLA), taking into consideration gender constructive roles and responsibilities in relation to REDD+ implementation.

Table 4. Promising institutional framework supporting gender sensitivity.

Men	Promising framework	Women	Promising framework
1)	Provision of succor materials in face of climate change effect or impact	1)	Provision of alternative livelihood strategies
2)	Provision of alternative livelihood support	2)	Creation of public awareness about climate change
3)	Creation of public awareness about climate change	3)	Conservation techniques on forest resources
4)	Capacity building on forest management and impact of climate change impact	4)	Creation of job and employment opportunities
5)	Community development and empowerment programmes	5)	Provision of infrastructural facilities
6)	Conservation techniques on forest resources	6)	Practicing incentive agriculture
7)	Creation of job and employment opportunities	7)	Capacity building on forest management and impact of climate change impact
8)	Educating people on alternative natural resources usage		
9)	Practicing incentive agriculture		
10)	Provision of infrastructural facilities		
11)	Training and skill acquisition programmes		

5. Discussion

Related to the subject of challenges and benefit-sharing arrangements. The 4 million USD take-off funding from the UN-REDD program that Cross River State received has already stirred controversy. The local communities feel excluded from the REDD+ monies, despite the REDD+ administrators' claims that the funds are intended for capacity building. This led to increased mistrust and suspicion among the communities as a result of the contentious benefit sharing proposal created by the Cross River State Forestry Commission. According to this study, certain

communities in the study regions are not ready to participate in any benefit-sharing arrangement that does not provide them the largest share of the REDD$^+$ benefits. According to Luttrell et al. [17], allocating benefits on the latter basis is advantageous for the local populations and is done thus in Brazil, Tanzania, and Peru. The issue with this strategy is that it undercuts the demand for additionality contained in the global REDD$^+$ architecture. Given their different preferences for monetary payments or development projects in lieu, which have been clearly proven between men and women categories in the examined communities, further complications may still arise from intra-community benefit sharing. This supports the claim that different stakeholder preferences exist for direct or indirect payments in PES contexts, whether they take the form of cash rewards or infrastructure provision [18,19]. The inability to identify beneficiaries among REDD$^+$ actors also led to the men's predominance of all small benefits (such as project awareness, bridge/culvert construction, livelihood improvement, livestock production, preservation of the forest, training on conservation and sustainable forest management, purchase of REDD$^+$ shirts, collection of mosquito nets, good forest management for sustainability, creation of knowledge of forest management, for example). According to Luttrell et al.'s [17] recommendations, beneficiaries can be identified and selected based on who legally owns the forests, in accordance with any existing statutory or customary property rights. These criteria, however, are difficult to apply in the Nigerian setting because of the fierce conflict over forest tenure that exists between state governments and local communities, particularly in favor of men. Due to unclear criteria across gender divisions, the benefits sharing structure for REDD$^+$ in Cross River State was met with a lot of skepticism and inequity. This study examines how gender concerns found in previous research have been taken into account by Nigeria's REDD$^+$ pilot programs. The result of this study agrees with Griffiths [4] that the REDD policy process failed to accomplish equality aims since it does not take underlying power dynamics into consideration in the case of Nepal. The consideration of gender concerns in forest management by explicitly integrating women in the policy debates and payment criteria within REDD$^+$ programs, including the REDD payment pilot project, is insufficient to address gender disparities in the absence of accounting for power.

Finally, the ability to benefit from things, as defined by Ribot and Peluso [20], depends on a "web of powers" that are exerted through social interactions and institutions, including markets, property, and informal, illegitimate, and coercive claims to resources. Gaining access to natural resources, whether legally or illegally, is essential for reaping their benefits. This includes access to other vital resources like capital, labor, market networks, technology, and knowledge. Access functions at higher organizational levels as well as at the level of interpersonal connections and skills.

6. Conclusion

This study fully specified the definition of equity as indispensible to just and effective policy, planning, and assessment of the social impacts of change in the value of ecosystem services. In contrast, much of the current policy discourse on

climate change seems to relegate equity to distribution alone. The study contends that the three interdependent dimensions of equity distribution, procedure, and the contextual disposition of capabilities in terms of access and power all contribute to the degree of (in) equity in the social condition. There are concerns over gender equity, which dominates current debates on gender participation and REDD$^+$ implementation. Yet, despite the apprehension that these initiatives may bring lasting solutions, undermining gender equity in terms of benefits and challenges, distribution is generally left undefined (participation, decision-making, and social inclusion). Benefit sharing has come under scrutiny due to the marginalization of the entities that represent local forest communities in Nigeria's REDD$^+$ program. This study comes to the conclusion that gender inequality exists in forest rights, benefits, and problems. Due to a lack of adherence to a gender-sensitive strategy, REDD$^+$ proponents in REDD$^+$ pilot communities have not defined the benefits and challenges of the program.

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