



DIFFERENTIALS IN SUSTAINABLE LAND MANAGEMENT PRACTICES BETWEEN MALE AND FEMALE CROP FARMERS IN SOUTHEAST NIGERIA

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ABSTRACT

The study assessed differentials in the utilization of sustainable land management (SLM) practices by male and female crop farmers in Southeast Nigeria. Purposive and random sampling techniques were used in selecting the study sample made up of 160 male and 160 female farmers. Mean, frequency, percentage, and logit analysis were employed in analysing the data collected from field survey. Result showed that the rate of adoption of SLM practices among the respondents was low (26%) on the average. Participation in critical family decisions (z -prob=0.021), access to formal credit (z -prob=0.000), access to and control of capital assets (z -prob=0.001) and participation in taking communal decisions and leadership (z -prob=0.057), were found relevant in dichotomizing the utilization of SLM practices based on gender. The study recommended that policies targeted at sustainable management of land resources by male and female farmers should take into cognizance the above-mentioned variables with a view to addressing them through affirmative action. Agricultural policy interventions should also be based on empirical evidence from gender-disaggregated data to ensure proper mainstreaming of gender-related issues in agricultural production.

Keywords: Differentials, Sustainable Land Management, Gender, Crop Farmers

INTRODUCTION

Sustainable land management (SLM) is a knowledge-based procedure that helps to integrate land, water, biodiversity, and environmental management (including input and output externalities) to meet rising food and fibre demands while sustaining ecosystem services and livelihoods (World Bank, 2006). This has to do with ensuring that land use options are economically viable, socially equitable and environmentally sound (Schwilch, Liniger and Hurni, 2014; Mamoudou and Yang, 2019). Then sustainable land management practices are those technologies and their embodied techniques that are applied in ensuring that the goals of

sustainable land management are realized in any given agro-ecosystem (FAO, 2009; Okereke, 2016; Folasade, Olatunji and Rosulu, 2018).

Generally, there is an appreciable level of concern in different quarters with regard to the sustainability of land use for various purposes especially agricultural production *vis-a-vis* land productivity (Ademola, Sabastien and Chinwe, 2022). As at year 2000, the capacity of the available land in Nigeria was already exceeded by 40 – 50 million people, given the level of available agricultural technology (FAO, 2000; Oyekale, 2007). Historically, the land per capita in Nigeria decreased from 0.5km² in 1960 to 0.18km² in 2018; a period of about 58 years (World Bank, 2022). This is because while the country's land area remains relatively fixed, human population has continued to increase, thereby necessitating actions towards sustainable management of available land.

An FAOSTAT (2008) report showed that less than 3% or 5 million hectares of total cropland in Sub-Saharan Africa are under SLM using low-cost technologies for enhancing the productivity and sustainability of their land. Pender (2008) observed that that adaptation of SLM technologies was alarmingly low within the sub-Saharan region. Similarly, World Bank (2010) noted that though many sustainable land management (SLM) practices have positive cost-benefit ratios in agro-ecologies in Sub-Saharan Africa, adoption has however remained low in Nigeria.

In 2009, the Federal Government of Nigeria implemented the Third National Fadama Development Project (Fadama III) which had a sub-project wholly dedicated to the funding of sustainable land management activities among the project beneficiaries (World Bank, 2008; FMARD, 2014). The recommended SLM practices under the project framework, included agro-forestry, cover cropping, intercropping and mixed cropping, contour ploughing, ridge tying, tree planting and wind break. Others are composting, improved fallow, liming, fertilizer application, zero/minimum tillage, ridging, zero burning, small earth dam, drainage and mulching (Suleiman, 2013).

In order to ensure that a given project such as the SLM sub-project of Fadama III is gender-sensitive, gender mainstreaming is often necessary as part of the interventions. This ensures the effectiveness of project implementation, reasonable impacts, sustainability and gender relations as well as their influence on natural resource management and livelihoods productivity (Magigi and Sathiel, 2014). Gender in this context refers to socially constructed roles, rights, responsibilities and relations existing between men and women (Moser, 1993).

Numerous studies have been carried out on a wide variety of issues relating to gender, adoption and sustainable land management practices (Onu, 2006; Onu, 2013; Gbemisola, Markus and Paul, 2014; British Council, 2012; Kayode, Oladipo and Daudu, 2017; Alem-meta and Singh, 2019). However, a review of available literature suggests that none has specifically focused on the subject matter of this study especially as it relates to Southeast Nigeria thereby creating a gap in knowledge. This study is therefore an attempt to fill this knowledge gap by situating the issue of gender differences within the context of sustainable land management in the study area.

Available research results seem to favour the male folk above their female counterparts in terms of general access to resources including participation in various intervention programmes by government and other agencies (Okorie, Onyeabor and Okereke, 2014). Such unequal access tends to limit women's capacity to achieve optimum levels of agricultural

productivity, security of livelihoods and food security (UN, 2009). As such, research is required to determine the actual gender disparities in an important area such as the application of SLM practices *vis-a-vis* access to critical sociological assets.

The study specifically assessed the rates of adoption of SLM practices along gender lines; established the relationships between gender and some selected sociological factors and determined the nature of influences of the selected factors on adoption of SLM practices in the study area.

MATERIALS AND METHODS

The study focused on the southeast geo-political zone of Nigeria comprising Abia, Anambra, Ebonyi, Enugu and Imo states. Southeast Nigeria has an estimated population of 25,612,828 (NPC, 2020). The area is located in the rain forest vegetation belt of Nigeria with thick forests in a number of places especially areas close to water bodies.

Sampling for respondents was based on the sampling frame of Fadama user groups (FUGs) of the Third National Fadama Development Project of Nigeria, under which a sustainable land management sub-project was implemented. The first stage of the sampling involved the purposive sampling of three out of the five states that make up the southeast Nigeria. The states selected were Ebonyi, Enugu and Imo States based on proximity and preponderance of crop farmers' FUGs. At stage two, three local government areas were purposively selected in each of the three states based on Fadama Community Associations with preponderance of Fadama User Groups (FUGs) dedicated to crop production. This gave a total of nine LGAs. Similarly, stage three involved the purposive sampling of two (2) all male and two (2) all female FUGs involved in crop production from each of the nine LGAs selected in stage two. This gave a total of eighteen (18) all male and eighteen all female FUGs.

Then stage four involved the random sampling of ten (10) male and ten (10) female farmers from each of the two sub-samples giving a total of 180 male and female farmers respectively. The final sample for the study which is made up of 160 male and 160 females was drawn based on random sampling using Excel Random Numbers Generator function. Data were collected from the respondents through field survey using interview schedule.

Mean, percentage, logit analysis, and t-test were used in analysing the data. Computer-based data analysis software including Microsoft Excel, STATA and IBM-SPSS were employed in the data entry, cleaning and analysis. Logit model was adopted in exploring the relationship between selected sociological variables having gender bias and adoption of sustainable land management practices by farmers. Logit regression analysis is based on the assumption that the dependent variable which is categorical in nature reflects a binomial logistic distribution. The empirical logit analysis model used in the study is specified as:

$$P_i = f(X_{i1}, X_{i2}, X_{i3}, X_{i4}, X_{i5} + \mu_i) \quad \text{Eq. 1}$$

$$P_i = a_0 + b_1X_{i1} + a_2X_{i2} + a_3X_{i3} + a_4X_{i4} + a_5X_{i5} + \mu_i \quad \text{Eq. 2}$$

Where;

P_i = Probability of a farmer adopting a given SLM practices (dichotomous adoption variable that takes value 1 for adopters and 0 for non-adopters).

X_{i1} = Access and Control over land (1 if a farmer has full control over land; 0 if otherwise)

X_{i2} = Participation in important family decisions (1 if a farmer takes part in making important family decisions on land use; 0 if otherwise)

X_{i3} = Access to formal credit (1 if a farmer has access to formal credit; 0 if otherwise)
 X_{i4} = Access and control of capital assets (1 if a farmer has full control of productive assets; 0 if otherwise)
 X_{i5} = Participation in taking community decisions and leadership (1 if a farmer participates in taking communal decisions and leadership, especially in relation to use of communal lands; 0 if otherwise)
 μ_i = error term

RESULTS AND DISCUSSIONS

Adoption of Sustainable Land Management Practices by Male and Female Farmers

Table 1 presents the proportions of the male and female farmers that adopted the various recommended sustainable land management practices on continuing basis. Generally, it is obvious from the result that most of the practices had low adoption rates among both male and female respondents in the study. However, the adoption rates among the male respondents were significantly higher than those of the females especially, for those practices requiring relatively substantial capital investment to implement such as tree planting, wind breaks and agro-forestry.

Table 1: Adoption of Recommended Sustainable land Management Practices

SLM Practices	Male	Female	t-cal. & P prob.
	Percentage (n=160)	Percentage (n=160)	
Mulching	65.63 (105)	66.25 (106)	-0.120 (0.548)
Cover cropping	38.13 (61)	28.13 (45)	1.929** (0.028)
Improved fallow	47.75 (76)	42.50 (68)	0.223 (0.411)
Agro-forestry	35.63 (57)	26.88 (43)	1.659** (0.049)
Contour farming	0.63 (1)	0.63 (1)	0.000 (0.500)
Intercropping	38.13 (61)	50.00 (80)	-2.221 (0.986)
Zero	8.75 (1)	15.63 (25)	-1.931 (0.9724)
Ridge tying	38.13 (61)	30.63 (49)	1.380* (0.085)
Composting	14.38 (23)	10.00 (16)	1.152 (0.126)
Liming	12.50 (20)	16.25 (26)	-0.973 (0.834)
Mixed cropping	76.88 (123)	70.00 (112)	1.506* (0.067)
Zero burning	15.00 (24)	11.25 (18)	1.029 (0.153)
Tree planting	35.63 (57)	20.63 (33)	2.893*** (0.002)
Wind breaks	8.75 (14)	3.13 (5)	2.086** (0.019)
Drainage	12.50 (20)	14.38 (23)	-0.492 (0.688)
Fertilizer	83.75 (134)	76.88 (123)	1.649** (0.051)

Source: Field Survey, 2015

Figures in bracket are frequencies

Note: Multiple responses obtained

World Bank (2010) had noted that though many sustainable land management (SLM) practices have positive cost-benefit ratios in agro-ecologies in Sub-Saharan Africa, adoption has however remained low in Nigeria. This is attributed to socio-economic, technical, socio-cultural, institutional and environmental factors within the operating ecosystem (Nkonya, Sserunkuuma and Pender, 2002; Drechsel, Olaleye, Adeoti, Thiombiano, Barry and Vohland, 2005; Stotz, 2009; Kayode *et al.*, 2017; Alem-meta *et al.*, 2019). Such factors include size of land holding, land tenure system and socio-economic characteristics of farmers.

Most of the practices that have been more or less integral part of the indigenous knowledge system (IKS) within the agro-ecosystem of the study area, recorded relatively higher levels of adoption among the two groups. These include mulching, mixed cropping and fertilizer application. Incidentally, the use of small earth dam as a water conservation mechanism was found to be completely non-existent among the farmers. This is rather not encouraging considering that it is one effective way of harvesting and storing rain water which is usually abundant during the rainy season in the study area for dry season farming.

The overall result here is in agreement with the findings of FMARD (2014) which showed similar trends in the adoption of most of the SLM practices in the study area. In a similar vein, Adejobi and Babatunde (2012) had reported the land management practices mostly adopted by households in their study to include inorganic fertilizer, mulching and ridging. The report also corroborates the finding of Alimba and Akubuilu (2002) that almost hundred percent of the respondents in their study had adopted inorganic fertilizer while about half of them adopted other agro-chemicals respectively with agro-forestry and contour ploughing recording low levels of adoption.

Gender-Related Factors in Adoption of Sustainable Land Management Practices

Several factors are thought to be intrinsically tied to gender differences in agricultural production and as such could be essential in explaining the ability or otherwise of either the male or female gender to adopt available technologies or utilize production practices. Such variables include access and control over land, participation in important family decisions, access to formal credit, access and control of assets and participation in taking communal decisions as well as leadership. The study dichotomized the respondents on the basis of these variables in relation to gender using cross tabulation (Table 2).

Table 2: Selected Sociological Variables in Adoption of Sustainable Land Management Practices and Gender

Factors	Male (n=160)	Female (n=160)
Access and control over land	77.5 (124)	31.9 (51)
Participation in important family decisions	80.6 (129)	24.4 (39)
Access to formal credit	32.5 (52)	15.6 (25)
Access and control of capital assets	73.1 (117)	26.9 (43)
Participation in taking community decisions and	76.2 (122)	21.9 (35)

Source: Field survey data, 2015

Note: Figures in bracket are frequencies

Based on the result of cross tabulations, the male respondents were more favoured on the basis of all the sociological factors evaluated, than the females (Table 2). It is evident from the foregoing that the male farmers were three times in more advantaged position than the female counterparts in relation to their participation in important family decisions as well as taking community decisions. Similarly, the males were twice more advantaged than the females in relation to access and control over land, access to formal credit and access/control of capital assets. Of course, this result goes to corroborate other findings on the relatively lopsidedness in the level of access to critical productive assets by gender in favour of the males not only in the study area but also in most parts of Africa (Isis, Rahul and Wenjie, 2018).

To further buttress the foregoing, a logit analysis was carried out to establish the relationship between gender and each of the sociological variables (Table 3.)

Table 3: Relationship Between gender and selected sociological variables

Variables	Coefficient	Standard Error	z-cal. & z
Access and control over land	1.996	0.254	7.85***(0.000)
Participation in important family decisions	2.558	0.272	9.41***(0.000)
Access to formal credit	0.956	0.275	3.47***(0.000)
Access and control of capital assets	2.002	0.252	7.94***(0.000)
Participation in communal decisions and	2.439	0.267	9.15***(0.000)

Source: Computed based on field survey data

The output indicates that all the factors had greater tendencies of association with men than women in the study implying that the situation was positively biased towards the men than the women in relation to these variables. This goes to strengthen the findings of previous studies that women are mostly disadvantaged when it comes to the access and use of major agricultural production resources in the rural farming system (Bongiwe and Susan, 2015; Okereke, 2016).

Analysis was also carried out to explore the nature of the influences of these variables on adoption of sustainable land management practices in the study area (Table 4).

Relationship between gender-associated sociological variables and adoption of SLM practices

Variables	Coefficient	Standard	z-cal & z prob.
Access and Control over land	0.248	0.448	0.55 (0.579)
Participation in important family decisions	-0.954	0.415	-0.30** (0.021)
Access to formal credit	1.449	0.303	4.78***(0.000)
Access and control of capital assets	0.952	0.373	2.55***(0.001)
Participation Communal Decisions and	0.724	0.381	1.90*(0.057)
Constant	-1.186	0.205	-5.77***(0.000)

Source: Computed based on field survey data

On the influences of the gender-related variables on adoption of sustainable land management practices, access and control over land (X₁), access to formal credit (X₃), access to and control

of capital assets (X_4) and participation in taking communal decisions and leadership (X_5) yielded positive coefficients of 0.248, 1.449, 0.952 and 0.724 respectively. These were all in line with the *a priori* expectations for the estimation since these variables were expected to impact positively on the adoption of the SLM practices by the crop farmers. However, participation in important family decisions had a negative coefficient.

In terms of significance of effects, access to formal credit tested highly significant at 1% while participation in family decisions and access to and control of capital assets tested significant at 5% level. Then participation in communal decisions and leadership (X_2) tested significant at 10%. This implies that these were indeed important factors in explaining the probability of farmers to adopt recommended SLM practices in the study area. A study by Khalid and Andrew (2008) on related issues had a similar outcome.

CONCLUSION

There is substantial evidence of gender differences between men and women in relation to the access and control over land, participation in critical family decisions, access to formal credit, access to and control of capital assets and participation in taking communal decisions and leadership in the study area. Such differences were biased against the female folk though this does not in any way obliterate the fact that the male respondents also faced other challenges not covered by this research in the adoption of SLM practices.

RECOMMENDATIONS

It is recommended that policies targeted at sustainable management of land resources by male and female farmers should take into cognizance the above-listed variables with a view to addressing them through affirmative action. This could be done by integrating gender perspectives in any agricultural technology package being formulated for dissemination to farmers. Also, agricultural policy interventions targeted at the rural farmers should always be based on sex-disaggregated data.

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