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SOCIO-ECONOMIC FACTORS INFLUENCING LAND DEGRADATION AND CONSERVATION PRACTICES AMONG SMALLHOLDER FARMERS IN OYO STATE, NIGERIA

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ABSTRACT

Land degradation is considered one of the major problems to achieving food security in Nigeria and also achieving the Sustainable Development Goal one and two. The study was carried out to examine the influence of socio-economic factors influencing land degradation and sustainable conservation management practices among smallholder farmers in Oyo State, Nigeria. Multi-stage sampling technique was used to select respondents with a well-structured questionnaire using descriptive and inferential statistics. The results revealed that 57.5% of respondents were male, 33.3% were above 51 years, with the mean year of 43.3 years and 46.0% had no formal education. Most respondents (96.6%) operate a smallholder farm of 1–5 acres, 39.1% privately owning land, while others relied on leasehold (29.9%), rented land (19.5%), or communal arrangements (11.5%), majority (48.3%) depended on family labour, land tenure insecurity discouraged long-term soil conservation, with 83.9% affirming that unclear boundaries and communal land use complicated land management. The inferential

statistics revealed that years of farming experience (β = 1.429, p < 0.01), household size (β = 1.454, p < 0.05), and income (β = 2.263, p < 0.10) as significant positive determinants of land degradation and R^2 was 0.59. It was however concluded that limited income, market access, and sustainable practices such as crop rotation, composting, agroforestry, manure application, soil testing, inadequate extension services and insecure land tenure were the factors influencing land degradation and soil conservation. The study recommends targeted interventions such as credit facilities, land policy reforms, capacity-building programs, and improved market linkages to promote sustainable land management and enhance productivity in the study area.

Keywords: *Land degradation; determinants; land tenure; smallholder farmers; soil conservation; regression analysis; Nigeria*.

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1. INTRODUCTION

Land degradation is a pressing issue that threatens agricultural productivity, rural livelihoods, and food security, especially in regions heavily reliant on agriculture. In sub-Saharan Africa, where agriculture contributes significantly to gross domestic product and employment, the effects of land degradation are severe, often resulting in reduced crop yields and economic hardship for farming communities (Oladele et al., 2020; Adamu et al., 2021). For maize-based farms, which are prevalent across Nigeria, including Ona Ara Local Government in Oyo State, the issue is particularly pronounced. The continuous cultivation of maize without adequate soil management

practices accelerates land degradation, leading to problems such as soil erosion, nutrient depletion, and loss of soil organic matter (Chinedu et al., 2019; Awotoye et al., 2022). The socioeconomic status of farmers is a crucial factor influencing land degradation. Farmers' income levels, educational background, farm size, access to credit, land tenure and awareness of sustainable practices all play a role in determining their approach to land management. Farmers with higher income levels, for example, are more likely to invest in soil fertility management practices, while those with limited income might not have the resources to afford essential inputs like fertilizers, erosion control structures, or high-quality seeds (Yusuf et al., 2020; Olatunde and Bello, 2023). Additionally, farmer's level of education and access to agricultural extension services influence their knowledge of and willingness to adopt sustainable practices, thus affecting the rate of land degradation on their farms (Olatunji and Fashola, 2021). Smallholder farmers in this region often practice continuous mono-cropping without fallow periods or soil replenishment strategies, which further exacerbates soil degradation (Okeke and Amodu, 2023). Environmental changes often disproportionately affect low-income farmers, who have fewer means to adapt to such changes (Akanbi and Omotayo, 2022). The interaction of socioeconomic factors and climate variability thus intensifies the cycle of land degradation, which, if left unaddressed, could undermine the sustainability of agricultural production and the livelihoods of farmers in Ona Ara (Adetola et al., 2023).This practice is largely driven by socioeconomic factors, includes limited landholding sizes, low income, and limited access to financial resources to invest in

sustainable farming technologies (Salawu and Agbaje, 2022). Therefore, understanding the socioeconomic and environmental interplay is crucial for developing effective land restoration interventions. Hence, this study aims to examine the socioeconomic drivers of land degradation on farmers livelihoods in Ona Ara local government, Oyo state, Nigeria by addressing the following research objectives, which are to: describe the socio-economic characteristics of the respondents, assess the influence of land tenure system on land degradation practices, identify the key socio-economic drivers of the land degradation on livelihood and food security of smallholder farmers, socio-economic determinants of land degradation and examine the solution towards land degradation among the farmers in the study area?

2. REVIEW OF LITERATURE

The challenges of land degradation in maize-based farms are further compounded by climate change. Increasingly unpredictable weather patterns, such as irregular rainfall and drought, contribute to soil degradation and erosion, making it harder for smallholder farmers to maintain soil quality. Also, the influence of land tenure systems has been a growing concern. Farmers operating under insecure or informal land arrangements are less likely to make long-term investments in land improvement technologies (Salawu and Agbaje, 2022). Also, the interaction between climatic factors and socioeconomic conditions further aggravates the issue. Recent climate variability-including delayed rainfall and prolonged dry seasons-has intensified soil degradation in southern Nigeria. These environmental stresses disproportionately affect

farmers with limited adaptive capacity, particularly those without access to climate-smart agricultural technologies (Akanbi and Omotayo, 2022).

Land degradation poses a serious threat to agricultural productivity, food security, and rural livelihoods, particularly in regions where subsistence farming and smallholder agriculture dominate. In maize-based farming systems within Nigeria, and specifically in Ona Ara Local Government, land degradation has been accelerating due to unsustainable farming practices, poverty, and limited knowledge of soil conservation. Over time, the degradation of land resources has led to declining soil fertility, reduced maize yields, and increased poverty among farmers, who often rely exclusively on the land for their livelihood. Several socioeconomic factors contribute to land degradation, including farmers' income levels, access to agricultural inputs, education, and farm size. Low-income farmers often lack the resources to invest in soil fertility management practices such as crop rotation, organic manure, and erosion control measures. This lack of investment can lead to nutrient depletion and erosion, further compounding the cycle of land degradation (Yusuf et al., 2020). Additionally, limited access to credit facilities constrains farmers' ability to purchase fertilizers or adopt sustainable farming technologies, leaving them vulnerable to land degradation and reduced productivity

Educational attainment also plays a significant role in land degradation. Farmers with lower levels of education may have limited awareness of sustainable farming practices and may not fully understand the long-term impact of continuous mono-

cropping and inadequate soil management. Studies have shown that educated farmers are more likely to adopt practices such as crop rotation, agro forestry, and the use of organic fertilizers, which can help to improve soil quality and reduce degradation. Conversely, in Ona Ara Local Government, the lack of education and access to agricultural extension services often hinders farmers' capacity to implement these practices, worsening the extent of land degradation.

2.1 Land Degradation: Definitions, Causes, and Effects

Land degradation refers to the long-term decline in the quality and productivity of land due to both natural and human-induced factors. It encompasses physical, chemical, and biological deterioration of soil, leading to diminished agricultural output and loss of ecosystem services. In sub-Saharan Africa, where farming is the main livelihood activity, land degradation is particularly pronounced due to the intensive exploitation of natural resources without adequate soil replenishment (Yusuf et al., 2020). According to Olawale and Adebisi (2024), the degradation of agricultural land often manifests through erosion, deforestation, salinization, nutrient depletion, and biodiversity loss. These environmental effects are not merely technical challenges but social and economic ones, as they directly impact food availability and farmer income. A key cause of land degradation is the overuse of land through continuous cultivation, especially under monoculture systems like maize farming. In regions such as Ona-Ara, smallholder farmers often lack the resources or knowledge to practice crop rotation or soil restoration techniques. As a result, soil nutrients are depleted over time, making the land

increasingly unproductive (Awotoye et al., 2022). Furthermore, poor land management practices such as bush burning, inadequate fallow periods, and improper tillage exacerbate erosion and topsoil loss. According to Akinola and Bello (2022), repeated cropping without nutrient replacement not only leads to soil exhaustion but also alters the soil structure, reducing water retention and increasing vulnerability to climate shocks like drought or heavy rainfall. Another major contributor to land degradation is population pressure and the resulting land fragmentation. As rural populations grow, available arable land is divided among more households, leading to smaller and less economically viable farm sizes.

This encourages farmers to exploit land more intensively, often beyond it carrying capacity. Salawu and Agbaje (2022) observed that in many Nigerian communities, this pressure reduces the likelihood of leaving land fallow or implementing conservation measures. In a related finding, Adetola et al., (2023) noted that high population density in agricultural regions increases the incidence of marginal land cultivation, where farmers are forced to use degraded or erosion-prone areas due to lack of alternatives.

The effects of land degradation are multifaceted, extending beyond yield losses to affect socio-economic and ecological systems. Reduced soil fertility leads to lower agricultural productivity, which diminishes household food availability and income, perpetuating cycles of poverty and food insecurity (Akanbi and Omotayo, 2022). In extreme cases, degraded lands become completely unfit for farming, prompting rural-urban migration and increased pressure on urban infrastructure.

According to FAO (2024), land degradation is also linked to broader environmental issues such as deforestation, water pollution, and loss of biodiversity. These effects disproportionately impact smallholder farmers who lack the means to adapt, thereby increasing their vulnerability to both economic and climatic shocks (Olatunji and Fashola, 2021).

2.2 Socioeconomic Determinants of Land Degradation

Socioeconomic factors play a fundamental role in shaping land use behavior and determining the extent of land degradation among smallholder farmers. Among these factors, income level is particularly influential. Farmers with higher incomes are more likely to invest in sustainable land management practices such as organic fertilization, soil testing, and erosion control. Conversely, low-income farmers often adopt exploitative practices to meet immediate survival needs, even at the cost of long-term soil health. According to Yusuf et al., (2020), poverty severely limits the capacity of farmers to purchase inputs like fertilizer or to implement restorative techniques like composting. Similarly, Awotoye et al., (2022) found that low financial capital compels farmers to cultivate the same plots continuously without fallow periods, accelerating nutrient depletion and land degradation.

Educational attainment is another significant determinant influencing how farmers interact with their environment. Education enhances the ability of farmers to access, interpret, and apply information related to soil conservation and sustainable agricultural methods. According to Etim et al. (2020), literate farmers are more likely to understand the long-term implications of poor land management and therefore

show a greater willingness to adopt modern practices. In contrast, those with little or no formal education may lack awareness of environmentally friendly techniques or may resist innovation due to traditional beliefs. Olatunji and Fashola (2021) similarly emphasized that limited education often correlates with minimal access to extension services and poor record-keeping, further exacerbating unsustainable farming practices. Household size also influences land degradation dynamics. Larger households tend to exert more pressure on farmland due to greater food needs, labor availability, and income requirements. While more family members may provide labor for farming, this can result in over-cultivation and reduced soil recovery time. Akinola and Bello (2022) observed that larger farming households often intensify land use without proportionate investment in soil regeneration, especially when they lack alternative income sources. Likewise, Olawale and Adebisi (2024) found that larger household sizes in southwestern Nigeria were positively correlated with rapid land exhaustion, as the same land is used repeatedly to feed growing families, often without implementing fallow or rotation strategies. Another critical factor is access to credit and agricultural inputs, which directly affects a farmer's ability to adopt sustainable practices. Farmers who can secure loans or financial support are more likely to invest in equipment, irrigation systems, or soil-enhancing products like lime and compost. However, limited access to formal credit institutions often due to lack of collateral or financial literacy—prevents many smallholders from adopting these solutions. Salawu and Agbaje (2022) highlighted that in areas like Ona-Ara, the lack of structured agricultural credit schemes discourages proactive

land management. Similarly, Adetola et al., (2023) reported that farmers without access to inputs such as high-yield seeds or subsidized fertilizers are more likely to rely on degraded land for production, creating a cycle of low productivity and persistent environmental degradation.

2.3 Influence of Land Tenure Systems

Land tenure systems—whether formal or informal—play a critical role in determining farmers' willingness to invest in sustainable land management. Secure land tenure gives farmers a sense of ownership and long-term control, motivating them to adopt practices that enhance soil quality and prevent degradation. In contrast, insecure tenure—such as leasing, renting, or communal ownership—often leads to short-term land use strategies that prioritize immediate gains over future productivity. According to Agwu et al., (2022), farmers with documented land rights were more inclined to invest in soil fertility practices like mulching, crop rotation, and agroforestry. Likewise, Deininger et al. (2021) found that the lack of legal recognition of land ownership discouraged farmers in rural Nigeria from undertaking long-term conservation projects. Communal and informal tenure arrangements, though culturally significant, often contribute to unsustainable land practices due to unclear boundaries and weak enforcement mechanisms. In many communities, especially in southwestern Nigeria, land is accessed through inheritance or communal allocation, with no formal documentation. This uncertainty leads to disputes and discourages investment in conservation measures that take years to yield benefits. Akanbi and Omotayo (2022) observed that communal land users are less

likely to adopt erosion control or invest in fertility restoration since the risk of land loss or reassignment is high. Similarly, Salawu and Agbaje (2022) noted that farmers working on inherited or communal land face constraints in accessing credit, as banks typically require formal land titles as collateral.

Furthermore, insecure land tenure increases the likelihood of land overuse and exploitation, especially among tenant farmers or seasonal users. These users often adopt extractive land use methods to maximize production within their limited contract period, without regard for long-term soil health. According to Lawry et al., (2021), this pattern of short-term tenancy leads to excessive use of chemical fertilizers, continuous cropping, and neglect of soil rehabilitation efforts. Teshome et al., (2021) also reported that temporary landholders tend to avoid high-cost conservation technologies, preferring practices that ensure quick returns but contribute to degradation over time.

However, land tenure reform policies have demonstrated positive outcomes where implemented. Secure land ownership not only increases farmers' confidence in land investment but also improves their eligibility for government support and donor programs. Programs that formalize customary rights or provide affordable land registration processes have shown promise in parts of Africa. According to Adetola et al., (2023), communities in which land titles were formalized saw increased adoption of soil restoration techniques and a reduction in land abandonment rates. Similarly, Ojiambo et al., (2020) emphasized that land certification programs in Kenya and Uganda enhanced farmers' long-term investment behavior and fostered better land governance systems.

3. RESEARCH METHODOLOGY

3.1 Study Area

The study was carried out in Ona-Ara Local Government Area of Oyo State with the administrative headquarters located at Akanran which was created in 1989. It has a total landmass of 3,570km2and a population of 265,059 as at the 2006 census (NPC 2006) with geographic coordinate 7.22120N, 4.02610E with Oluyole LGA to the South, Egbeda LGA to the North and to the West by Ogun and Osun State. The LGA is highly endowed with a fertile agricultural land suitable for the farming activities. The people are predominantly farmers who grow varieties of arable crops, food crops, cash crops and edible fruits.

3.2 Data collection and Sampling Procedure

Primary data was collected through the use of structured questionnaire in order to achieve the objective of this study Multi stage techniques were used to select the respondents for this study.

The first stage involved the purposely selection of ward five (5) in the local government area due to the population of existed farmers.

The second stage involved the random selection of ninety (90) agroforestry farmers which makes the population for the study.

3.3 Method of Data Analysis

Data was analyzed using descriptive and inferential statistical tools. Descriptive statistics such as frequency table and

percentage, and multiple regression analysis were used to analyze the objectives

3.4 Model Specification

Multiple linear Regressions

$Y = (\beta_0 + \beta_1X_1 + \beta_2X_2 + \ldots\ldots\ldots\ldots + \beta 8X8 + \varepsilon)$

Where:

Y: dependent variable (level of Land degradation)

$X_1, X_2, \ldots, X_n$: explanatory variables

β_0: intercept

$\beta_1, \ldots, \beta_n$: regression coefficients

ε: error term

Y=a + b1X1 + b2X2 + b3X3 + b4X4 + b5X5……..X8 + ε

Explanatory of variables area:

X1 = marital status (dummy)

X2 = education (year)

X3 = household size (actual)

X4 = source of land (dummy)

X5 = income (Naira)

X6 = farm size (acres)

X7 = years of farming experience (years)

X8 = age of farmer (actual)

ε = errro term.

4. RESULTS AND DISCUSSION

4.1 Socio-Economic drivers of land degradation on farmers livelihoods

The results from table 1 reveals that majority of respondents (89.7%) affirm that socio-economic constraints reduce their yield. This finding underscores the pervasive influence of factors beyond biophysical land characteristics on agricultural output. Such constraints can include limited access to credit, inadequate technological adoption, poor infrastructure, and insecure land tenure, all of which impede farmers' ability to invest in productive inputs and sustainable land management practices (Pretty et al., 2011; FAO, 2024). Reduced maize yields directly threaten food security, as maize is a staple crop in many regions, and can exacerbate poverty among farming households. Also, the data indicates that (70.0%) of respondents perceive land degradation as a direct threat to their household food supply. And also, majority (80.5%) of respondents stated that poor land management decrease their income. This emphasizes the economic consequences of unsustainable land practices. While poor land management might initially be a response to socio-economic pressures (e.g., maximizing short-term yields due to poverty), it creates a vicious cycle where degraded land leads to lower yields, reduced marketable surplus, and ultimately, diminished income (Lal, 2015). This economic feedback loop traps many farming

households in a state of vulnerability and limits their capacity to invest in restorative land management.

The table also shows that majority (85.1%) of respondents believe that limited access to markets affects their ability to invest in land conservation while (14.9%) said no. This highlights a critical barrier to sustainable land management.

When farmers lack access to reliable markets, they may have little incentive to produce surplus or high-value crops, which could generate the income necessary for investing in long-term land conservation measures such as terracing, agroforestry, or soil enrichment. Poor market infrastructure, lack of price information, and exploitative value chains can disincentives sustainable practices (Sheahan & Barrett, 2017). Conversely, improved market access can empower farmers to adopt more sustainable practices by increasing profitability and reducing risk (Omamo et al., 2020). Also, finding shows that (90.8%) of respondents acknowledge that land degradation increases their dependency on food aid or support, while (9.2%) of the respondent said no. This statistic serves as a stark reminder of the urgent need for interventions that address the root causes of land degradation to foster greater resilience and self-reliance among vulnerable populations.

Table 1. Socio-Economic drivers of land degradation on farmers livelihoods

Statements	Yes	No
Does socio- economic constraints reduce your maize yield?	78 (89.7)	9 (10.3)
Does land degradation threaten your household food supply?	60 (70.0)	27 (31.0)
Does poor land management decrease your income?	70 (80.5)	17 (19.5)
Does limited access to markets affect your ability to invest in land conservation?	74 (85.1)	13 (14.9)
Does land degradation increase your dependency on food aid or support?	79 (90.8)	8 (9.2)

Source: Field survey, 2025

4.2 Influence of land tenure system on land degradation practices in the study area

Table 2 reveals influence of land tenure system on land degradation practices in the study area. It shows that majority of respondents (83.9%) agreed that land tenure insecurity discourages them from investing in soil conservation, while (16.1%) do not agree to it. This finding is highly significant, aligning with extensive literature that underscores the importance of secure tenure for long-term investments in land. When farmers lack guaranteed rights to their land, they are hesitant to invest time, labor, and capital in practices like terracing, mulching, or tree planting, which yield benefits only over an extended period (Lawry et al., 2017; Agwu et al., 2022). Also, majority (87.4%) of the respondent affirmed that ownership of farmland reduces their concern about degradation, while (12.6%) said no. This highlights a strong

perceived link between proprietorship and environmental responsibility. Owning land typically fosters a sense of permanence and personal stake, encouraging farmers to adopt a long-term perspective on land productivity and health (Besley, 1995; Place & Hazell, 1993). Landowners are more likely to internalize the costs of degradation and benefit from investments in soil improvement, thereby motivating them to engage in practices that maintain or enhance land quality. And also, majority of respondents (63.2%) perceived that communal land use complicates land management while (36.8%) said no. The result also shows that majority of the respondent (73.6%) agreed that unclear land boundaries lead to over-exploitation of land, while (26.4%) do not agree with it. And also, (85.1%) of respondents affirming that secure land tenure encourages better soil care, while (14.9%) said no. This directly reinforces the positive feedback loop between tenure security and sustainable land management. Secure tenure empowers farmers with the confidence to make long-term investments in soil fertility, adopt conservation techniques, and practice sustainable farming, knowing that they will reap the future benefits of their efforts (Feder & Feeny, 1991; Deininger et al., 2021). It provides the necessary incentive for responsible stewardship of land resources. long-term conservation or may even engage in excessive resource extraction to maximize short-term gains before potential boundary disputes arise or land is reallocated (Holden & Golooba-Mutebi, 2017; Ojiambo et al., 2020). This uncertainty contributes to unsustainable practices and land degradation.

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Table 2. Influence of land tenure system on land degradation practices in the study area

Statements	Yes	No
Does land tenure insecurity discourage you from investing in soil conservation?	73 (83.9)	13 (14.9)
Does ownership of farmland reduce your concern about degradation?	76 (87.4)	11 (12.6)
Does communal land use complicate land management?	55 (63.2)	32 (36.8)
Does unclear land boundary lead to over-exploitation of land?	64 (73.6)	23 (26.4)
Does secure land tenure encourage better soil care?	74 (85.1)	13 (14.9)

Source: Field survey, 2025

4.3 Socio-economic determinants of land degradation among the farmers

The multiple regression analysis on socio economic determinant of land degradation among maize farmers revealed that the years of farming experience ($\beta = 1.429$, $p < 0.01$) significantly influence land degradation, The positive coefficient implies that as years of farming increase, the likelihood or intensity of land degradation also increases. This may be due to long-term exploitation of the land using conventional or outdated farming techniques without proper land management or conservation practices, this finding supports the work of Teshome et al., (2021) who found that farmers with longer experience, especially without adequate extension support, tend to exhaust the land over time, leading to higher levels of degradation, Income was significant ($\beta = 2.263$, $p < 0.10$) and positively related to land degradation. This aligns with findings of Ngwira et al., (2017) who noted that income alone does not guarantee

conservation behavior; the intended use of the income is what determines its effect on land sustainability. Household size also showed a significant positive relationship, ($\beta = 1.454$, $p < 0.05$). Larger households may exert more pressure on available farmland due to increased food and income needs, the remaining variables marital status, education, source of land, farm size, and age were not statistically significant though had positive relationship with land degradation. R2 value of 0.593 indicates that 59.3% of the variation in land degradation among maize farmers in the study area is explained by the variable's combination in the model. This indicates a moderately strong relationship between the socio-economic characteristics of the respondents and the extent of land degradation experienced. While 40.7% can be explain of the error term. The regression analysis revealed that years of the farming experience, household size, and income were the major socio-economic factors contributing to land degradation among maize farmers in Ona Ara Local Government Area. This implies that interventions aimed at reducing land degradation should prioritize training for long term farmers and guide income reinvestment into sustainable land use.

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Table 3. Socio-economic determinants of land degradation in the study area

Model	Variables	Co-efficient	Standard error	T-values	Significant
	Constant	26.176	5.060	5.173	0.000
X_1	Marital Status	-0.756	0.899	-0.841	0.403
X_2	Educational Qualifications	-0.172	0.890	-0.193	0.847
X_3	Household size	1.454*	0.636	2.287	0.025
X_4	Source of Land	-0.563	0.947	-0.594	0.554
X_5	Income	2.263*	1.099	2.058	0.043
X_6	Farm size	0.273	1.120	0.244	0.808
X_7	Year Farming	1.429***	0.258	5.541	0.000
X_8	Age	-0.019	0.058	-0.325	0.746
	R^2			0.593	

Field survey 2025 (*) and (***), Significant at 10%, and 1%.

4.4 Solution towards land degradation among maize farmers in the study area

Table 4 reveals the solution towards land degradation among maize farmers in the study area. It shows that majority of the respondent (40.2%) remain Neutral, significant portion of farmers (39.1%) consider crop rotation very effective, and while (12.6%) seems it Effective and only a small minority find it Ineffective (8.0%) Crop rotation is largely viewed as a beneficial

practice, aligning with established agricultural science that emphasizes its role in nutrient cycling, pest and disease control, and soil structure improvement (Kassam et al., 2021). Also, the results shows that majority (48.3%) of the respondent stated that composting as a soil improvement method is effective, (13.8%) stated it is very effective, while (34.5%) indicated neutral Composting is widely recognized by farmers as an effective soil improvement method. This aligns with its proven benefits in enhancing soil organic matter, nutrient availability, and water retention capacity, all crucial for combating land degradation (Oyewo, et al., 2021 and Adhikari & Bajracharya, 2023).

The high effectiveness ratings suggest that farmers have experienced positive outcomes from its application. And also, the result reveals that majority of the respondent (39.1%) stated that Effectiveness of Agroforestry in Controlling Land Erosion is effective, (29.9%) indicated that it is very effective, while (28.7%) indicated as neutral. Furthermore, majority of the respondents (31.0%) stated that Effectiveness of Manure Application in Enhancing Soil Quality is neutral, (28.7%) seen as effective, while (25.3%) seen as very effective. The use of manure is generally perceived as beneficial for soil quality, consistent with its role as an organic fertilizer that improves soil structure and nutrient content (Kumar & Singh, 2020). The "Neutral" and "Ineffective/Very Ineffective" responses might be linked to factors such as the quality and availability of manure, application rates, or potential for nutrient imbalances if not managed properly. Finally, majority of the respondents (34.5%) stated that effectiveness of soil testing in improving farm productivity is effective, (24.1%) seen it as very effective, while

(33.3%) remains neutral. Farmers recognize the value of soil testing in guiding input application and thus improving productivity. This aligns with precision agriculture principles, where understanding soil nutrient status is crucial for optimizing fertilizer use and minimizing environmental impact (Paliwal et al., 2023).

Table 4. Solution towards land degradation among maize farmers in the study area

Statements	Very Effective	Effective	Neutral	Ineffective	Very Ineffective
How effective is crop rotation in reducing land degradation?	34 (39.1)	11 (12.6)	35 (40.2)	7 (8.0)	0 (0)
How effective is composting as a soil improvement method?	12 (13.8)	42 (48.3)	30 (34.5)	3 (3.4)	0 (0)
How effective is agroforestry in controlling land erosion?	26 (29.9)	34 (39.1)	25 (28.7)	1 (1.1)	1 (1.1)
How effective is manure application in enhancing soil quality?	22 (25.3)	25 (28.7)	27 (31.0)	6 (6.9)	7 (8.0)
How effective is soil testing in improving farm productivity?	21 (24.1)	30 (34.5)	29 (33.3)	4 (4.6)	3 (3.4)

Source: Field survey, 2025

5. CONCLUSION AND RECOMMENDATIONS

The study reveals that socio-economic and institutional variables strongly influence land degradation and soil conservation practices among maize farmers. A predominantly male and aging farming population, coupled with low levels of formal education and income, underscores the structural vulnerabilities affecting agricultural sustainability. Most farmers operate on small plots of land and rely heavily on family labour, further limiting their ability to adopt capital-intensive, long-term soil management techniques, also limited income, insecure land tenure, lack of access to credit, and insufficient extension services significantly contribute to poor land management.

It was therefore recommended that targeted interventions such as credit facilities, land policy reforms, capacity-building programs, and improved market linkages to promote sustainable land management and enhance productivity, establishment of rural credit schemes and deploy more agricultural extension agents trained in sustainable land management and conservation practices to increase farmer knowledge and implementation in the study area.

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