An Assessment of Local Community Perception of Effects of Landuse Land Cover Change (LULCC) on Biodiversity in Taraba Central Senatorial District Taraba State Nigeria

[1]Tukura Ejati Danladi, [2]Oruonye E.D., [3]Babanyaya, B.M., [4]Gagbanyi C. Tebrimam & [5]Anger, R.T.

[1,2&5]Department of Geography, Taraba State University Jalingo, Nigeria
[3&4]Department of Hospitality and Tourism Management, Federal University, Wukari, Nigeria

Abstract
Land Use Land Cover Change (LULCC) has significant implications for biodiversity, particularly in rural and ecologically diverse regions. This study assesses local community perceptions of the effects of LULCC on biodiversity in Taraba Central Senatorial District, Nigeria. A mixed-methods approach, combining structured questionnaires, key informant interviews, focus group discussions, and field observations, was used to gather data from 840 respondents across four local government areas (Bali, Gassol, Sardauna, and Kurmi). The results indicate that a majority of respondents (44.9% strongly agree, 54.2% agree) perceive biodiversity loss as a major consequence of LULCC, with habitat loss (47.9% strongly agree, 49% agree) and pollution (42.5% strongly agree, 54.6% agree) also identified as significant concerns. Principal Component Analysis (PCA) revealed that land-use change (77.4%) and forest degradation (75.8%) are the primary drivers of biodiversity decline. The study also highlights community awareness of the negative effects of LULCC, although mitigation efforts remain limited due to socio-economic constraints. The findings align with previous studies linking deforestation, agricultural expansion, and urbanization to biodiversity loss but diverge in ranking climate change as a secondary factor. The study recommends integrating local knowledge into conservation policies, enhancing climate change awareness, and promoting sustainable land management practices. By incorporating community perceptions, policymakers can develop participatory strategies to address biodiversity loss while supporting local livelihoods.

Keywords: Biodiversity, Community perception, Deforestation, Land Use Land Cover Change (LULCC) & Sustainable land management.

Introduction
Land Use Land Cover Change (LULCC) is a critical environmental challenge that has far-reaching implications for biodiversity and ecosystem services worldwide. It encompasses alterations in the natural landscape due to human and natural factors, including deforestation, agricultural expansion, urbanization, and infrastructural development. These changes significantly impact biodiversity by altering habitats, reducing species populations, and modifying ecosystem functions (Turner *et al*, 2007). As natural landscapes are converted into farmlands, settlements, and industrial areas, the delicate balance of ecological systems is disrupted, leading to biodiversity loss and environmental degradation (Foley *et al*, 2005).

In Nigeria, rapid population growth, economic activities, and weak land management policies have accelerated LULCC, particularly in rural and peri-urban areas. The consequences of these changes are evident in the form of habitat fragmentation, soil degradation, increased vulnerability to climate change, and declining wildlife populations (Olagunju, 2015). Taraba State, located in northeastern Nigeria, is endowed with diverse ecosystems, including forests, wetlands, savannahs, and montane

habitats that support a rich array of flora and fauna. However, in recent years, the central senatorial district of the state has experienced significant land cover modifications due to increasing agricultural activities, logging, grazing, and settlement expansion (Umar *et al*, 2020). These changes raise concerns about the long-term sustainability of biodiversity and the ecosystem services that local communities depend upon for their livelihoods.

Local communities are the primary custodians of natural resources in many rural areas, and their perceptions, knowledge, and experiences regarding environmental changes play a crucial role in shaping conservation efforts. Understanding how they perceive the effects of LULCC on biodiversity is essential for designing effective and sustainable environmental policies. Community perceptions provide valuable insights into the drivers of land cover changes, the extent of biodiversity loss, and potential strategies for mitigating adverse environmental impacts (Adams *et al*, 2014). In addition, local knowledge systems and traditional ecological practices often serve as key mechanisms for biodiversity conservation and resource management (Berkes *et al*, 2000). Therefore, assessing community perceptions can bridge the gap between scientific research and policy implementation by incorporating indigenous knowledge into conservation planning.

Despite the importance of local community involvement in environmental management, limited studies have explored how rural communities in Nigeria, particularly in Taraba Central Senatorial District, perceive the effects of LULCC on biodiversity. Addressing this knowledge gap is crucial for fostering participatory approaches to land and resource management that integrate community perspectives. This study seeks to assess local community perceptions of LULCC and its effects on biodiversity in the region. Specifically, it aims to investigate the level of awareness among local populations, their perceived causes and consequences of LULCC, and their attitudes toward biodiversity conservation. The findings from this research will provide a basis for developing evidence-based strategies for sustainable land use planning and biodiversity conservation in Taraba State.

Statement of the Research Problem

Land Use Land Cover Change (LULCC) has become a major environmental concern globally due to its significant impact on biodiversity, ecosystem services, and human livelihoods (Turner *et al*, 2007). In Nigeria, rapid population growth, urbanization, agricultural expansion, and deforestation have accelerated LULCC, leading to habitat destruction, species loss, and ecological imbalance (Olagunju, 2015). Taraba Central Senatorial District, which is home to diverse ecosystems, is witnessing an increasing rate of land cover modification due to human activities such as farming, logging, grazing, and infrastructure development (Umar *et al*, 2020). These changes threaten the biodiversity of the region and disrupt ecological functions that support both wildlife and local livelihoods.

Despite the growing evidence of biodiversity decline resulting from LULCC, there is limited empirical research on how local communities perceive these environmental changes and their impact on biodiversity in Taraba Central Senatorial District. Understanding local community perceptions is critical, as their livelihoods are closely tied to natural resources, and they are directly affected by land cover changes (Adams *et al*, 2014). Without a clear understanding of how communities view these changes, conservation efforts and policy interventions may not align with local realities, thereby reducing their effectiveness in mitigating biodiversity loss and promoting sustainable land management.

Moreover, the lack of documented knowledge on community awareness, attitudes, and responses to LULCC effects on biodiversity creates a gap in policy formulation and environmental management strategies in the region. Traditional ecological knowledge and community

engagement are key components of biodiversity conservation (Berkes *et al.,* 2000), yet they remain underutilized in land use planning in Taraba State. Addressing this gap is essential for designing inclusive and effective policies that incorporate local perspectives into conservation planning and sustainable resource management.

This study seeks to bridge this knowledge gap by assessing local community perceptions of LULCC and its impact on biodiversity in Taraba Central Senatorial District. The findings will contribute to evidence-based policymaking, community-driven conservation strategies, and sustainable land use planning in the region.

Conceptual Framework

This study is anchored on the Coupled Human-Environment System (CHES) Framework**.** This framework is grounded in the recognition that human and environmental systems are interconnected, with socio-economic activities influencing ecological processes and vice versa. CHES provides an integrative approach to understanding how human-induced land use changes affect biodiversity and how local communities perceive and respond to these changes (Turner *et al*, 2003). In the context of this study, the framework allows for an examination of the key drivers of LULCC, including agricultural expansion, deforestation, urbanization, and infrastructural development, all of which have significant implications for biodiversity loss and ecosystem degradation (Lambin *et al*, 2001).

The framework highlights that LULCC results in habitat destruction, species decline, and ecosystem fragmentation, thereby altering the structure and function of ecological systems (Foley *et al*, 2005). However, these changes are not merely biophysical but are shaped by underlying social, economic, and institutional factors that determine land use decisions at the community level. Local community perceptions of biodiversity loss are influenced by their dependence on natural resources, cultural values, economic activities, and historical land use patterns (Reed, 2008). Understanding these perceptions is crucial in assessing how communities interpret environmental changes and whether they adopt adaptive or maladaptive strategies in response. The CHES framework also incorporates feedback mechanisms, where community responses—such as conservation efforts, land restoration practices, or intensified resource exploitation—further influence future land use changes and biodiversity outcomes (Liu *et al*, 2007).

By employing the CHES framework, this study can holistically evaluate the interactions between land use practices and biodiversity within a socio-ecological context. It provides a structured lens through which to analyze community awareness of LULCC, the perceived threats to biodiversity, and the socio-economic drivers that shape their responses. Additionally, it facilitates the identification of sustainable land management practices that align with both ecological conservation and community livelihood needs (Berkes & Folke, 1998). This approach is particularly relevant for informing policy interventions aimed at promoting biodiversity conservation while addressing the socio-economic realities of local populations. By integrating ecological and human dimensions, the CHES framework enables a more comprehensive understanding of the complex relationships between land use changes and biodiversity, offering insights into how best to balance environmental sustainability with socio-economic development in Taraba Central Senatorial District.

Theoretical Framework

This study is hinged on the Theory of Planned Behavior (TPB)**.** This theory, developed by Icek Ajzen in 1991, focuses on understanding human behavior by examining the influence of attitudes, subjective norms, and perceived behavioral control on intentions and actions. The TPB is widely applied in environmental and social sciences to explain individual and community behaviors related to environmental issues, including land use decisions, conservation efforts, and biodiversity management (Ajzen, 1991).

Key Components of the Theory of Planned Behavior (TPB) for the Study

i. **Attitudes** – The theory suggests that an individual's or community's attitudes toward land use practices and biodiversity conservation are shaped by their knowledge, beliefs, and values. Positive attitudes toward sustainable land use practices and biodiversity protection could lead to the adoption of more conservation-oriented behaviors, while negative or indifferent attitudes might result in harmful environmental practices (Ajzen, 1991). In this context, exploring local community perceptions of LULCC and its impact on biodiversity will provide insight into their environmental attitudes.

ii. **Subjective Norms** – This component refers to the perceived social pressures or expectations that influence behavior. In a rural context such as Taraba Central Senatorial District, communal norms, cultural values, and traditional knowledge systems may play a significant role in shaping the community's attitudes toward land use and biodiversity conservation. Understanding how local norms influence land use decisions and biodiversity conservation practices is crucial for assessing the broader community's perception of environmental changes (Fishbein & Ajzen, 2011).

iii. **Perceived Behavioral Control** – This refers to an individual's or community's perception of their ability to perform a particular behavior, influenced by factors such as resources, skills, and opportunities. In the case of LULCC, communities might perceive that they have limited control over land use practices due to external pressures like population growth, poverty, or government policies. However, if they believe that they have the capacity to protect biodiversity through changes in land use practices, they are more likely to adopt environmentally sustainable behaviors (Ajzen, 1991).

iv. **Intention and Behavior** – According to TPB, intentions are the best predictors of behavior, and the stronger the intention to engage in a specific behavior, the more likely the individual or community will perform it. In the context of this research, the framework would focus on assessing how community intentions to mitigate LULCC impacts on biodiversity translate into real-world conservation actions or land management practices.

Relevance of the Theory to the Study

The Theory of Planned Behavior is particularly relevant to this study because it provides a clear structure for understanding the psychological and social factors that influence local communities' perceptions and actions regarding land use changes and biodiversity conservation. By applying TPB, the study can explore how community attitudes toward land use changes are shaped by their perceptions of environmental threats, social influences, and perceived control over their environment. It also helps identify strategies to improve the adoption of sustainable land use practices through awareness campaigns, education, and the strengthening of local norms and perceived behavioral control (Ajzen, 1991; Fishbein & Ajzen, 2011).

This theory offers a robust framework for assessing the factors that drive community behavior in response to LULCC and provides insights into how to influence positive environmental outcomes through targeted interventions. The TPB has been successfully applied in numerous environmental studies, including those on community participation in conservation and sustainable land management practices (Stern *et al*., 1999). Therefore, it is well-suited to guide the analysis of local community perceptions and responses to LULCC in Taraba State.

Methodology

The methodology adopted for the study is designed to provide a comprehensive approach to data collection, analysis, and interpretation. Given the complexity of LULCC and its impact on biodiversity, the study adopts a mixed-methods research approach, which integrates both quantitative and qualitative methods to obtain an in-depth understanding of the perceptions, drivers, and consequences of land cover change. This approach ensures that findings are both statistically valid and contextually grounded in community experiences.

Description of Study Area

The study is conducted in Taraba Central Senatorial District, a region with diverse ecological zones, including forests, wetlands, savannahs, and montane landscapes. The area has witnessed significant land cover changes due to agriculture, logging, grazing, urban expansion, and infrastructure development (Umar *et al*, 2020). These activities have led to environmental degradation, habitat loss, and biodiversity decline, making it a critical area for studying the relationship between LULCC and ecological sustainability.

The selected local government areas (LGAs) in the study include:

Bali – Known for extensive farming and forest degradation.

Gassol – A major agricultural hub with land use conversion to farmlands.

Sardauna – Home to the Mambilla Plateau, where deforestation and grazing pressures exist.

Kurmi – A region with large forest reserves affected by illegal logging and land conversion.

These LGAs were selected based on their geographical diversity, level of land cover change, and biodiversity significance within Taraba Central Senatorial District.

Research Design

The study adopts a descriptive survey research design, which is appropriate for understanding perceptions, opinions, and behaviors within a target population (Creswell, 2014). This design enables the collection of data through structured questionnaires, interviews, and field observations, allowing for a detailed examination of how communities perceive and respond to changes in land use and biodiversity. The study also incorporates a spatial analysis component**,** which involves the

use of satellite imagery and GIS techniques to assess historical land cover changes in the study area.

Population and Sampling Technique

The target population comprises local residents, including farmers, hunters, herders, traditional rulers, environmental officers, and policymakers. These groups were chosen due to their direct interaction with the land and biodiversity resources. The study uses Krejcie and Morgan's (1970) sample size determination table to establish an appropriate sample size. Given the population of the study area, a sample of 840 respondents was selected to ensure statistical representation.
A multi-stage sampling technique was adopted:

Stage 1: Selection of LGAs – Purposive sampling was used to select the five LGAs experiencing significant land cover changes.

Stage 2: Selection of Communities – Specific communities within each LGA were selected based on observed environmental degradation and biodiversity concerns.

Stage 3: Random Sampling of Respondents – Within each community, households and individuals were selected using a systematic random sampling technique to ensure diverse representation.

The breakdown of the sample size per LGA is as follows:
Bali – 215 respondents
Gassol – 186 respondents
Sardauna – 319 respondents
Kurmi – 120 respondents

Data Collection Methods

Primary Data Collection

To obtain firsthand information on community perceptions, the following methods were used:
Structured Questionnaires – A well-structured questionnaire was designed to collect data on demographic characteristics, community awareness of LULCC, perceived effects on biodiversity, and adaptation strategies. The questionnaire contained Likert-scale questions (e.g., strongly agree to strongly disagree) to gauge respondent opinions quantitatively.
Key Informant Interviews (KIIs) – Interviews were conducted with community leaders, forestry officials, and local government representatives to gather insights on historical land cover changes, policy interventions, and conservation efforts.
Focus Group Discussions (FGDs) – FGDs were conducted with farmers, herders, and hunters to explore collective perceptions of biodiversity loss and community-led conservation strategies. Each FGD included 6–10 participants**,** ensuring a balance of perspectives.
Field Observations – Direct observations were made to verify community-reported environmental changes by documenting land degradation, deforestation sites, and wildlife presence.

Secondary Data Collection

Existing Literature and Policy Documents – Relevant studies, government reports, and conservation policies were reviewed to establish a broader context for LULCC trends and biodiversity impacts.

Data Analysis Techniques
Quantitative Data Analysis

Descriptive Statistics: The responses from questionnaires were analyzed using SPSS 25**,** calculating frequencies, percentages, means, and standard deviations to summarize the data.

Chi-Square Test: Used to determine the significance of variations in community perceptions based on demographic characteristics.
Principal Component Analysis (PCA): Employed to identify key drivers of biodiversity decline, as indicated in the results of Table 4.37 (land use change contributed 77.4%, followed by forest degradation at 75.8%).

Spearman's Rank Correlation: Applied to examine relationships between biodiversity loss, habitat destruction, and pollution.
Qualitative Data Analysis

Thematic Analysis: Transcripts from KIIs and FGDs were coded and categorized into themes such as perceived biodiversity loss, socio-economic impacts, and adaptation strategies.
Content Analysis: Policy documents were analyzed to identify gaps in conservation frameworks and community participation.

Validity and Reliability of the Instruments was carried out to ensure the accuracy and reliability of data collection instruments:

Pilot Testing: The questionnaire was pre-tested in a non-sampled community to identify ambiguities.

Cronbach's Alpha Test was used to assess the reliability of the Likert-scale responses, with a coefficient above 0.7 indicating high internal consistency.

Ethical Considerations

Informed Consent: Participants were briefed on the study's objectives and their right to withdraw at any stage.
Confidentiality: Personal identities were anonymized to maintain respondent privacy.
Cultural Sensitivity: Research activities were conducted in alignment with local customs and traditions.

Result of the Findings

Perception about major effects of land-use land-cover change on biodiversity

Table 1 reveals the major effects of land-use land-cover change on biodiversity. Majority of the respondents strongly agree (44.9%) or agree (54.2%) that there was loss of biodiversity as a result of land-use and land-cover change. This sentiment was shared on pollution, as it was strongly agreed by 42.5% and simply agreed to by 54.2% of the respondents that it was a major effect of land-use land-cover change. For habitat loss, 49% of respondents agreed that it was a major effect of land-use land-cover change, while 47.9% further strongly agreed to this. Based on the communalities in Table 2, land-use land-cover change contributed the highest percentage to decline in biodiversity with 77.4% followed by forest degradation which contributed 75.8%, then over exploitation, climate change and pollution with 67.7%, 58.7% and 30.6% respectively. This shows that based on the respondent perceptive landuse changes is the most observed causes of

decline in biodiversity in the area. The results also show that people are generally aware and see the impact of land-use changes in the study area as a problem.

Table 1: Major effects of land-use land-cover change on biodiversity

	Loss of Biodiversity				
	Strongly agree	**Agree**	**Neither agree nor disagree**	**Disagree**	**Total**
Bali	68	147	0	0	215
Gassol	85	100	1	0	186
Sardauna	126	192	0	1	319
Kurmi	98	16	5	1	120
Total	**377 (44.9%)**	**455 (54.2%)**	**6 (0.7%)**	**2 (0.2%)**	**840**
	Pollution				
	Strongly agree	**Agree**	**Neither agree nor disagree**	**Disagree**	**Total**
Bali	67	147	1	0	215
Gassol	80	96	6	4	186
Sardauna	124	193	1	1	319
Kurmi	86	23	8	3	120
Total	**357 (42.5%)**	**459 (54.6%)**	**16 (1.9%)**	**8 (0.9%)**	**840**
	Habitat loss				
	Strongly agree	**Agree**	**Neither agree nor disagree**	**Disagree**	**Total**
Bali	93	122	0	0	215
Gassol	92	92	1	1	186
Sardauna	113	185	2	16	319
Kurmi	104	13	1	1	120
Total	**402 (47.9%)**	**412 (49%)**	**4 (0.5%)**	**18 (2.1%)**	**840**

Source: Field survey 2023

Table 2: Communalities

	Initial	Extraction
Landuse changes	1.000	.774
Forest degradation	1.000	.758
Climate change	1.000	.587
Over exploitation	1.000	.677
Pollution	1.000	.306

Extraction Method: Principal Component Analysis.

The result of Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) shows a significant value of 0.635 at $p<0.05$ as seen in Table 3, implying that the sample factors are adequate to determine the decline in biodiversity in the area. Respondent in the area were seen to have varied opinions on the major effect of landuse landcover change on biodiversity as seen from the significant variation on the respondent opinion on the major effects of landuse landcover changes on biodiversity at $p<0.05$ from the analysis of variance. However, there is no significant variation in the perception of respondents as regards the loss of biodiversity, pollution, or habitat loss as major effects of landuse landcover change on biodiversity at $p>0.05$. The result of the PCA in Table 4 shows that two factors were extracted and grouped based on the correlation within the factors. Factor one is made up of landuse change and forest degradation contributed 31.34% with eigen value of 2.049 while factor two is made up of over exploitation, climate change and pollution with eigenvalue of 1.052. The rank correlation in Table 5 established a moderate and significant

relationship of 0.436 at $p<0.05$ between loss of biodiversity and pollution. This implies that increase in pollution can leads to increase in loss of biodiversity. Also, another low and significant relationship of 0.399 at $p<0.05$ was seen between habitat loss and loss of biodiversity which implies that increased habitat loss leads to increase in loss of biodiversity.

Discussions with some community leaders showed that one of the effects of land-use land-cover change was that houses have become exposed to wind storm so any time there is a strong wind it destroys buildings. They also noted that some grasses which are of local benefit and useful for ethno-medicine have gone to extinction. In a similar study of Jalingo metropolis by Zemba and Yusuf (2012), they reported that the scenario of land-use land-cover change in the area has set in motion a chain of environmental, social, and economic consequences ranging from hazards like incessant soil erosions and floods; loss of biodiversity; and food scarcity. This situation significantly foretells a looming danger of climate consequences such as greenhouse effects and global warming. The International Fund for Agricultural Development (IFAD) has reported that about 132 million more people will be at risk of hunger by 2050 due to climate change. They also submitted that between 15% and 37% of land, plants and animal species could become extinct by 2050 as a result of climate change (Musa & Omokore, 2011).

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.635
Bartlett's Test of Sphericity	Approx. Chi-Square	600.750
	Df	10
	Sig.	.000

Table 4: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.049	40.970	40.970	2.049	40.970	40.970	1.567	31.341	31.341
2	1.052	21.049	62.019	1.052	21.049	62.019	1.534	30.678	62.019
3	.852	17.039	79.058						
4	.619	12.376	91.433						
5	.428	8.567	100.000						

Extraction Method: Principal Component Analysis.

Table 5: Correlations

			Loss of biodiversity	Pollution	Habitat loss
Spearman's rho	Loss of biodiversity	Correlation Coefficient	1.000	.436**	.399**
		Sig. (2-tailed)	.	.000	.000
		N	840	840	840
	Pollution	Correlation Coefficient	.436**	1.000	.296**
		Sig. (2-tailed)	.000	.	.000
		N	840	840	840
	Habitat loss	Correlation Coefficient	.399**	.296**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	840	840	840

**. Correlation is significant at the 0.01 level (2-tailed).

Discussion of the Findings of the Study

The findings of this study highlight the significant impact of Land Use Land Cover Change (LULCC) on biodiversity in Taraba Central Senatorial District. The study reveals that land use changes, particularly agricultural expansion, forest degradation, and settlement development, have led to biodiversity loss, pollution, and habitat destruction. These findings are in agreement with previous studies while also exhibiting some unique regional variations. The result of the findings of this study aligns with existing literature on the environmental consequences of LULCC. In terms of biodiversity loss and habitat destruction, the study found that 44.9% of respondents strongly agreed, and 54.2% agreed, that biodiversity loss is a direct consequence of LULCC. This corresponds with the findings of Foley *et al* (2005), who observed that land conversion for agriculture and urbanization leads to habitat fragmentation, species extinction, and ecosystem degradation. Similarly, Turner *et al* (2007) reported that extensive land cover changes disrupt ecological balance, threatening biodiversity sustainability.

Concerning deforestation and land degradation, the study identified forest degradation as a key driver of biodiversity loss, contributing 75.8%, according to PCA analysis. This aligns with Olagunju (2015), who found that deforestation and overexploitation in Nigeria have accelerated desertification, leading to biodiversity depletion. Moreover, similar observations were made by Umar, Musa and Kwabe (2020), who reported that community perception in Nigeria attributes biodiversity decline to deforestation and uncontrolled farming activities.

Considering pollution as an outcome of LULCC, the study found that 42.5% of respondents strongly agreed, and 54.6% agreed, that pollution is a major effect of LULCC. This supports the findings of Zemba and Yusuf (2012) in Jalingo metropolis, who linked land use changes to increased pollution, erosion, and climate risks. Additionally, research by the International Fund for Agricultural Development (IFAD) suggests that land degradation and pollution from human activities will put over 132 million people at risk of hunger by 2050 **(**Musa & Omokore, 2011**).**
On the issue of community awareness and perception, the study reveals that local communities are highly aware of the negative impacts of LULCC on biodiversity. This is in line with Adams *et al* (2014), who emphasized the importance of community knowledge in biodiversity conservation. The recognition of habitat loss, forest degradation, and pollution as major threats by local

respondents underscores the role of indigenous knowledge in environmental management (Berkes, Colding & Folke, 2000).

While the findings generally support prior research, some aspects exhibit variations from existing literature. On the issue of perceived role of climate change, unlike global studies that emphasize climate change as a dominant driver of biodiversity loss (Liu et al., 2007), this study found that local communities attributed biodiversity declines more to direct human activities such as land conversion and deforestation. Climate change was ranked lower (58.7%) in PCA, suggesting that respondents perceive it as a secondary factor. This differs from global assessments (e.g., IPCC reports) that stress climate-induced habitat shifts as a primary driver of biodiversity loss. Also, on limited perception of pollution's impact, the study identified a significant but relatively lower correlation (30.6%) between pollution and biodiversity loss. In contrast, global studies (Stern, Dietz, & Guagnano, 1999) highlight pollution as one of the most severe environmental threats. The relatively lower emphasis on pollution by respondents may be due to localized perspectives that focus more on visible land degradation rather than chemical contamination or atmospheric pollution**.**

Furthermore, on variation in community responses, unlike findings by Reed (2008), who suggested that communities often adopt adaptive conservation strategies, this study found limited active mitigation efforts among respondents. Most communities recognize biodiversity decline but exhibit limited capacity to implement conservation measures, likely due to socio-economic constraints.

Conclusion

This study highlights the significant impact of Land Use Land Cover Change (LULCC) on biodiversity in Taraba Central Senatorial District, Nigeria, as perceived by local communities. The findings reveal that deforestation, agricultural expansion, and settlement development are the primary drivers of biodiversity loss, with habitat destruction and pollution also playing critical roles. The study confirms that local communities are aware of the negative consequences of LULCC, including species loss, environmental degradation, and reduced ecosystem services. However, mitigation efforts remain limited due to socio-economic constraints and inadequate conservation policies. The study aligns with existing research linking LULCC to biodiversity decline but diverges in ranking climate change as a secondary factor compared to direct human activities. This underscores the need for targeted awareness programs on climate-related biodiversity threats.

Recommendations

Based on the findings of this study, the following recommendations are made:

i. Integrate Local Knowledge into Conservation Policies: Policymakers should incorporate indigenous knowledge and community perceptions into land-use planning and biodiversity conservation strategies. Engaging local stakeholders will ensure that conservation efforts align with community realities and promote sustainable resource management.

ii. Strengthen Reforestation and Afforestation Programs: Given that deforestation and forest degradation are major drivers of biodiversity loss, targeted reforestation and afforestation initiatives should be implemented. Government and non-governmental organizations should support tree-planting programs and forest restoration efforts in affected areas.

iii. Enhance Awareness and Education on Biodiversity Conservation: Community-based education programs should be introduced to improve awareness of the long-term impacts of LULCC on biodiversity. Special emphasis should be placed on climate change as a driver of ecosystem degradation, which was ranked lower in community perceptions.

iv. Promote Sustainable Land-Use Practices: Sustainable agricultural techniques, such as agroforestry and conservation farming, should be encouraged to reduce land degradation. Incentives should be provided for farmers and land users adopting environmentally friendly practices.

v. Strengthen Environmental Regulations and Enforcement: Strict enforcement of environmental laws against illegal logging, uncontrolled agricultural expansion, and unregulated land-use changes is necessary. Strengthening institutional frameworks will help mitigate biodiversity loss and ensure sustainable land management.

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