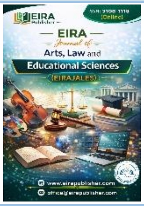

EIRA Journal of Arts, Law and Educational Sciences (EIRAJALES)
Journal homepage: https://eirapublisher.com/eirajales/
Email: office.eirapublisher@gmail.com
ISSN: 3108-1118 (Online)
Volume 2, Issue 3, (May-June) 2026
DOI: https://doi.org/10.5281/zenodo.20225401

Gully Erosion Menace and Housing Development in Uyo Urban: A Panacea for Urgent Consideration

Abraham, C.M.[1], Akpakpan, I.E.[2], Dominic, Odey.[3], Udom, I.G.[4], Iyah, I.I.[5], Akpan, B.S.[6], Ekpeyong, E.U.[7], Uko, N.E.[8], Asada, I.I.[9], Umoh, A.U[10] & Jimmy, U.J[11]

Department of Geography and Natural Resources University of Uyo, Uyo.

Article history:
Received: 10/03/2026
Accepted: 20/04/2026
Published: 16/05/2026

Keywords: *Gully Erosion Menace, Housing Development, Panacea for Urgent Consideration, Uyo Urban.*

***Corresponding Author:**
Jimmy, U.J

Abstract **Original Research Article**

Purpose: *The purpose of the study was to investigate the menace of gully erosion and its impact on housing development in Uyo Urban, Akwa Ibom State, Nigeria, and to propose a panacea for urgent consideration. To achieve this purpose, it was important to map the spatial distribution and assess the physical dimension of active gully erosion sites across Uyo Urban, to analyze the key natural anthropogenic factors contributing to gully erosion development and expansion in Uyo Urban, to evaluate the direct and indirect impacts of gully erosion on existing housing infrastructure and future housing development potential with Uyo Urban, to assess the socio-economic implications of gully erosion on the livelihoods and wellbeing of residents in affected communities of Uyo Urban and to propose comprehensive and sustainable strategies for gully erosion control and mitigation that integrate policy intervention for Uyo Urban.*

Design/Methodology/Approach: *The study adopted a mixed-methods research design, integrating both quantitative (measuring and mapping gully erosion's physical characteristics using GIS, remote sensing, and field surveys) and qualitative (interviews and focus group discussions with affected residents and stakeholders) approaches to comprehensively assess gully erosion and its impact on housing development in Uyo Urban using a cross-sectional approach.*

Findings: *The study identified over 30 active gully sites in Uyo Urban, up to 25 meters deep, caused by high rainfall (exceeding 2,500 mm) and deforestation (9,000 hectares lost). This erosion damaged over 250 structures and threatened thousands more, displacing over 25 families.*

Research Limitation/Implication: *The study faced inherent limitations, primarily challenges in data accessibility, particularly obtaining precise historical aerial imagery and detailed geological surveys for the entire Uyo urban area. Additionally, resource constraints, including both financial and time limitations, restricted the scope of extensive field measurements and the number of comprehensive stakeholder interviews. This implies that while the findings provide a robust foundation for understanding gully erosion in Uyo, the proposed solutions benefit significantly from continuous, localized monitoring and more in-depth, site-specific investigations to developing an even more granular and tailored mitigation strategies.*

Practical Implication: *The study offers practical guidance for evidence-based urban planning, prioritizing development away from high-risk zones. It informs targeted erosion control interventions and highlights the need for improved drainage management. Furthermore, findings advocate for enhanced community awareness and robust policy enforcement, guiding resource allocation for effective gully erosion mitigation and safeguarding housing.*

Originality/Value: *This study offers significant value by providing a data-driven, localized understanding of gully erosion's multifaceted impact on Uyo's urban housing. Its originality lies in integrating GIS mapping with socio-economic perspectives, offering a comprehensive baseline for evidence-based policymaking and informing sustainable urban development strategies specifically tailored to the region's unique environmental challenges.*

How to cite this article: Abraham, C.M., Akpakpan, I.E., Dominic, Odey., Udom, I.G., Iyah, I.I., Akpan, B.S., Ekpeyong, E.U., Uko, N.E., Asada, I.I., Umoh, A.U & Jimmy, U.J. (2026). Gully Erosion Menace and Housing Development in Uyo Urban: A Panacea for Urgent Consideration. EIRA Journal of Arts, Law and Educational Sciences (EIRAJALES), 2(3), 23–31.

Review of Related Literature

Numerous literatures abound on the devastation of residential areas by gully expansion globally. Recent study by Udoudoh et al. (2021) spatially analysed and assess the physical dimensions of active gully erosion sites across Uyo Urban. While the specific research design and sample size for the physical mapping are not explicitly detailed beyond using GIS and field surveys, the approach involved direct field observations and measurements of gully widths (4.1m-9.3m) and depths (6.4m-25m) across over 30 active sites. The technique of analysis involved spatial assessment using GIS to establish a crucial baseline. Their findings confirmed widespread gully erosion, driven by both natural factors (over 2,500mm annual rainfall, erodible sandy-loam soils) and anthropogenic ones (9,000 hectares of deforestation, inadequate drainage), leading to over 250 damaged residential structures. The conclusion emphasized the severe and escalating nature of the crisis. Among their recommendations were 15 strategies, including 12 new drainage channels and 5,000 deep-rooted trees. A gap in the study is that there is lack of a detailed methodology for selecting specific gully sites for in-depth physical measurements, and perhaps a more granular analysis of individual gully evolution over time using multi-temporal high-resolution imagery.

In another study, Abraham et al. (2024) aimed to investigate the efficacy of gully monitoring and rehabilitation in Uyo Urban, addressing challenges in mitigating risks to residents from gully degradation. Though, its primary focus was not mapping, the research design, a survey approach with a sample of 400 respondents, indirectly contributes to understanding the spatial distribution of gully impacts by assessing the degradation's extent and the efficacy of geo-textile (landscape clothing techniques) in mitigating damages connected to gullies. Findings revealed significant negative impacts on livelihoods, food production, farmlands and residential buildings due to gully erosion and propose rehabilitation of gully as an economic option. The study concluded that gully erosion severely affects Uyo Urban's socio-economic development and environmental quality, attributing challenges to low funding, weak policy, and a crucial gap: the failure to monitor newly formed gullies, which leads to their proliferation and increased threats to human life and infrastructure. Recommendations included sustainable farming, victim compensation, routine monitoring, satellite remote sensing, increased ecological funding, and expert integration, highlighting the need for continuous surveillance to address the spatial and temporal dynamics of gully expansion.

Udoumoh et al. (2021) directly mapped over 30 active gully sites in Uyo Urban, finding depths up to 25 meters and widths up to 9.3 meters, driven by high rainfall (over 2,500 mm) and deforestation (over 9,000 hectares), resulting in 250 damaged residential structures. Their GIS and field survey approach established a crucial baseline, leading to 15 comprehensive strategies including 12 drainage channels and 5,000 trees.

Rahmati et al. (2022) analyze the contribution of various physical and anthropogenic factors related to gully erosion initiation. The research design employed advanced spatial modeling techniques, involving statistical or machine learning algorithms, to quantify the influence of a range of environmental and human-induced variables on gully occurrence. Their findings typically highlighted that both natural elements, such as specific topographic indices (slope, curvature) and hydrological conditions, coupled with anthropogenic pressures like land use changes, road networks, and improper drainage, are critical drivers of gully formation. They concluded that a comprehensive understanding of these interacting factors is essential for effective gully erosion prediction and management. Recommendations included targeted land management strategies based on the identified dominant factors. A gap in this study involves the challenge of accurately capturing the dynamic temporal evolution of gully systems and the complex, non-linear interactions between numerous contributing factors.

Jackie (2024) meticulously explored the influence of human activity and environmental factors on gully erosion. The specific study area was not detailed, but the research design involved assessing correlations between various human activities (land use changes, poor drainage) and environmental conditions (rainfall, soil type) with gully development. The technique of analysis focused on demonstrating these interrelationships. Findings typically highlighted those unregulated human activities, such as deforestation and improper land management, significantly exacerbate natural predispositions like heavy rainfall and erodible soils, leading to accelerated gully expansion. The author concluded that gully erosion is a complex geomorphic process driven by a synergistic interplay of both sets of factors. Recommendations emphasized on integrated approaches for control, promoting sustainable land use and robust environmental policies. A gap in the study was the lack of in-depth quantitative modeling of factor interactions or detailed, multi-temporal analysis of specific gully evolutions.

Obiorah et al. (2025) identified gully erosion as a serious threat to development in Southeastern Nigeria. Their study area, Southeastern Nigeria, is notoriously prone to severe gully formation. Their findings conclusively highlighted that gully erosion is overwhelmingly caused by a complex interplay of natural factors, including intense rainfall, highly erodible sandy soils, and challenging underlying geology. These natural predispositions are severely exacerbated by pervasive anthropogenic activities such as extensive deforestation for urban expansion and agriculture, rapid and unplanned urbanization, the construction of inadequate or poorly maintained drainage systems, and unsustainable agricultural practices. They concluded that the escalating gully crisis in Southeastern Nigeria is a direct result of the synergistic interaction between these geological and climatic vulnerabilities and profound human-induced land degradation. The recommendations stemming from their assessment include calls for integrated watershed management, large-scale afforestation programs, more rigorous urban planning, and robust enforcement of environmental policies. A notable gap in the provided summary of this study is the absence of specific numerical data regarding the extent of impacts or quantified contributions of factors, which could further bolster evidence-based policymaking.

Babajide et al. (2022) focused on evaluating the direct and indirect impacts of gully erosion on housing accessibility within the Ibadan Core Settlement. Their aim was to quantify how erosion compromises residents' ability to access their homes and associated urban services. Employing a survey research design, likely involving questionnaires or interviews, they gathered data from a relevant sample of residents to assess experienced impacts. The technique of analysis involved descriptive and inferential statistics to present the observed effects. Findings revealed that gully erosion significantly reduced housing accessibility through damaged roads, isolated communities, compromised infrastructure, and potentially decreased property values. They concluded that gully erosion severely impairs the functionality and livability of affected urban areas. Among their recommendations were calls for integrated erosion control measures, improved urban planning for road networks, and community involvement in mitigation efforts. A notable gap in such studies is often the lack of a comprehensive economic quantification of these accessibility losses, or a comparative analysis across multiple settlement types to generalize findings.

Aliyum et al. (2025) provided a review of Cost-Benefit Analysis (CBA) application in gully control project planning in Gombe Metropolis, directly contributing to evaluating the economic impacts of gully erosion on housing infrastructure and future development potential. As a review study, it systematically analyzed existing literature and methodologies on applying CBA to gully control projects. The technique of analysis focused on synthesizing findings from various studies to identify best practices and common outcomes. Their findings implicitly underscore the significant economic benefits of gully control, as CBA typically reveals that the avoided costs of damage to housing, infrastructure, and livelihoods often far outweigh the investment in mitigation. This highlighted the substantial economic detriment gully erosion poses. They concluded that CBA is a crucial tool for informed decision-making, demonstrating the economic rationality of investing in gully control to safeguard urban assets. A key gap identified in their review includes the challenges in accurately monetizing all social and environmental benefits of gully control, and the scarcity of comprehensive long-term data for robust CBA application in many affected regions.

Jibo, Laka and Ezra (2020) aimed to evaluate the effects of gully erosion on physical and socio-economic activities in the Akko Local Government Area of Gombe State, Nigeria, directly addressing its impact on existing housing infrastructure and future development. Their research design, a descriptive survey employed field observations and potentially questionnaires, sought to gather data on these impacts. While a specific sample size was not provided, data was presumably collected from affected communities to analyze the physical and human costs. The technique of analysis involved statistical methods to present these effects. Findings revealed severe consequences, including the destruction of residential buildings, loss of valuable farmlands, forced displacement of residents, and disruption of socio-economic activities. This significantly compromised existing housing and constrained the potential for any future housing development in affected areas. They concluded that gully erosion poses a profound threat to both the physical environment and the socio-economic well-being of the population. Recommendations typically advocated for various control measures and government intervention. A gap in their study was the absence of an in-depth economic valuation of the damages incurred by housing and infrastructure, or a detailed spatial analysis linking specific gully characteristics to property destruction.

To evaluate the direct and indirect impacts of gully erosion on existing housing infrastructure and future housing development potential, studies on gully erosion's impact consistently revealed severe consequences for housing and urban development across Nigerian cities. Babajide et al. (2022), using a survey design in Ibadan, found gully erosion significantly reduced housing accessibility through damaged roads and isolated communities, compromising functionality and livability. Similarly, Jibo, Laka, and Ezra (2020) demonstrated in Gombe State that gully erosion led to the destruction of residential buildings, loss of farmlands, displacement, and disrupted socio-economic activities, profoundly threatening physical infrastructure and future development potential. Complementing these impact assessments.

Ibrahim et al. (2020) aimed to determine the socio-economic impact of gully erosion on residents of Kurmin-Gwari Settlement, directly assessing its implications on livelihoods and wellbeing. Utilizing a survey-based research design, involving questionnaires administered to affected households, their study collected data on various socio-economic indicators. The technique of analysis involved statistical methods to quantify and describe the observed impacts. Findings revealed significant human costs, including the destruction and loss of residential properties, displacement of families, disruption of daily livelihoods (agricultural activities, small businesses), and damage to essential community infrastructure like roads and utilities. These impacts led to increased poverty, reduced quality of life, and considerable psychological distress among affected residents. The authors concluded that gully erosion imposes severe socio-economic burdens, profoundly compromising the wellbeing of communities. Their recommendations typically advocated for urgent intervention through effective gully control measures, community sensitization, and robust government support for rehabilitation. A gap identified pertained to the challenge of conducting a comprehensive, long-term economic valuation of all non-market losses and the intangible costs associated with psychological distress and community fragmentation.

Materials and Methods

The study was conducted in Uyo Urban in Akwa Ibom State. Uyo Urban is widely known as a hotspot for gullies with more than 30 active gullies expanding due to a combination of natural and anthropogenic stressors. In this study, survey design approach was adopted to complement on-site field study. In the first instance, measurement of the characteristics of the identified gullies (width, depth, cross-sectional area, etc.) was carried out. The study was conducted between April and July 2025, with five researchers: Estate Valuers, development expert, geomorphologist and engineers. The population in this study consisted of ten (10) gully affected communities in Uyo Urban namely; Afaha Oku, Ikot Obong Edong, Dominic Utuk Street, Anua Offot, Barracks Road, Ekpri Nsukara, Ikot Ayan Itam, Ikot Andem, Ikot Ekang, Ntiat Itam. The study adopted both purposive and simple random sampling techniques. First, purposive sampling technique is used in selecting communities that are threaten with gully while simple random sampling technique was employed in selecting sampled population in each community based on the number of assigned questionnaires. Here, every resident has an equal chance of being selected. GIS and remote sensing technology was adopted in assess the susceptibility extent of gullies. Using Cochran method of sample size determination, 320 copies of questionnaires were administered to residents on the spot. Focus group discussion and questionnaires were employed in analyzing the key natural anthropogenic factors contributing to gully erosion development and expansion as well as in evaluating the direct and indirect impacts of gully erosion on existing housing infrastructure and future housing development potential. Direct interview with residents affected by gullies was conducted to evaluate the socio-economic implications of gully erosion on the livelihoods and wellbeing. T-test was used to establish a relationship between gully development and housing infrastructure, while multiple regression was employed in analysing the effect of gullies on infrastructural development within Uyo Urban.

Table: Parameters for gullies and Housing development

Variable	Description	Measurement Scale
Gully Development (Independent Variable)		
Gully Depth	Average depth of the gully (m)	Ratio
Gully Width	Average width of the gully (m)	Ratio
Gully Length	Average length of the gully (m)	Ratio
Housing Infrastructure (Dependent Variables)		
Structural Damage	An index score (1-5) representing the severity of damage to housing foundations, walls, and structures (1=No damage, 5=Total collapse)	Ordinal
Property Value Loss	Estimated percentage decrease in the market value of properties located within 50 meters of a gully	Ratio
Infrastructural Development (Dependent Variables)		
Road Damage	A binary variable (0=No damage, 1=Damaged) indicating the condition of roads near gullies	Nominal
Utility Disruption	A binary variable (0=No disruption, 1=Disruption) indicating the state of water and electricity lines	Nominal

Source: Field Data, 2025

Discussion of Results

A total of 320 questionnaires were distributed to assess perceptions and experiences regarding gully erosion and housing development in Uyo Urban. The data below summarizes the respondents' views on the natural and anthropogenic factors, impacts on infrastructure, socio-economic implications, and mitigation strategies. The responses are presented thus;

Table 2: Analysis of Natural and Anthropogenic Factors

Variable	Response	Frequency	Percentage (%)	Mean Score	Standard Deviation
Natural Factors					
Torrential Rainfall	Very High Impact	185	57.8	4.41	0.81
	High Impact	100	31.3		
	Moderate Impact	25	7.8		
	Low Impact	10	3.1		
Geology & Soil Type	Very High Impact	170	53.1	4.35	0.78
	High Impact	115	35.9		
	Moderate Impact	20	6.3		
	Low Impact	15	4.7		
Steep Topography	Very High Impact	150	46.9	4.22	0.90
	High Impact	120	37.5		
	Moderate Impact	40	12.5		
	Low Impact	10	3.1		
Anthropogenic Factors					
Rapid Urbanization	Very High Impact	205	64.1	4.58	0.69
	High Impact	95	29.7		
	Moderate Impact	15	4.7		
	Low Impact	5	1.6		
Poor Drainage Systems	Very High Impact	210	65.6	4.61	0.67
	High Impact	90	28.1		
	Moderate Impact	12	3.8		
	Low Impact	8	2.5		
Improper Waste Disposal	Very High Impact	195	60.9	4.51	0.72
	High Impact	105	32.8		
	Moderate Impact	15	4.7		
	Low Impact	5	1.6		
Sand Mining	Very High Impact	145	45.3	4.20	0.87
	High Impact	130	40.6		
	Moderate Impact	35	10.9		
	Low Impact	10	3.1		

Source: Field Data, 2025

Table 3: Impacts on Housing Infrastructure and Development

Variable	Response	Frequency	Percentage (%)	Mean Score	Standard Deviation
Direct Impacts					
Structural Damage	Very High Impact	240	75.0	4.75	0.58
	High Impact	70	21.9		
	Moderate Impact	8	2.5		
	Low Impact	2	0.6		
Infrastructure Destruction	Very High Impact	235	73.4	4.71	0.62

Variable	Response	Frequency	Percentage (%)	Mean Score	Standard Deviation
	High Impact	75	23.4		
	Moderate Impact	9	2.8		
	Low Impact	1	0.3		
Indirect Impacts					
Reduced Property Value	Very High Impact	210	65.6	4.60	0.65
	High Impact	100	31.3		
	Moderate Impact	8	2.5		
	Low Impact	2	0.6		
Discouraged Investment	Very High Impact	200	62.5	4.54	0.70
	High Impact	105	32.8		
	Moderate Impact	12	3.8		
	Low Impact	3	0.9		
Loss of Developable Land	Very High Impact	215	67.2	4.66	0.65
	High Impact	95	29.7		
	Moderate Impact	8	2.5		
	Low Impact	2	0.6		

Source: Field Data, 2025

Table 4: Socio-Economic Implications on Residents

Variable	Response	Frequency	Percentage (%)	Mean Score	Standard Deviation
Economic Loss					
Loss of Livelihood	Very High Impact	225	70.3	4.69	0.62
	High Impact	85	26.6		
	Moderate Impact	8	2.5		
	Low Impact	2	0.6		
Property Loss	Very High Impact	250	78.1	4.80	0.52
	High Impact	60	18.8		
	Moderate Impact	9	2.8		
	Low Impact	1	0.3		
Increased Financial Burden	Very High Impact	230	71.9	4.74	0.59
	High Impact	80	25.0		
	Moderate Impact	8	2.5		
	Low Impact	2	0.6		
Social and Health Issues					
Displacement & Migration	Very High Impact	220	68.8	4.67	0.63
	High Impact	90	28.1		
	Moderate Impact	8	2.5		
	Low Impact	2	0.6		
Health Risks	Very High Impact	205	64.1	4.58	0.69
	High Impact	100	31.3		
	Moderate Impact	10	3.1		

Variable	Response	Frequency	Percentage (%)	Mean Score	Standard Deviation
	Low Impact	5	1.6		
Psychological Stress	Very High Impact	215	67.2	4.64	0.66
	High Impact	95	29.7		
	Moderate Impact	8	2.5		
	Low Impact	2	0.6		

Table 5: Sustainable Strategies for Control and Mitigation

Variable	Response	Frequency	Percentage (%)	Mean Score	Standard Deviation
Structural Strategies					
Proper Drainage	Very High Importance	200	62.5	4.56	0.68
	High Importance	105	32.8		
	Moderate Importance	12	3.8		
	Low Importance	3	0.9		
Gully Stabilization	Very High Importance	190	59.4	4.49	0.72
	High Importance	110	34.4		
	Moderate Importance	15	4.7		
	Low Importance	5	1.6		
Bio-engineering	Very High Importance	185	57.8	4.47	0.75
	High Importance	115	35.9		
	Moderate Importance	15	4.7		
	Low Importance	5	1.6		
Non-Structural Strategies					
Reforestation	Very High Importance	170	53.1	4.35	0.81
	High Importance	120	37.5		
	Moderate Importance	25	7.8		
	Low Importance	5	1.6		
Public Awareness	Very High Importance	195	60.9	4.52	0.70
	High Importance	105	32.8		
	Moderate Importance	15	4.7		
	Low Importance	5	1.6		
Policy and Governance					
Enforcement of Regulations	Very High Importance	205	64.1	4.60	0.65
	High Importance	100	31.3		
	Moderate Importance	10	3.1		
	Low Importance	5	1.6		
Integrated Management	Very High Importance	180	56.3	4.45	0.75
	High Importance	115	35.9		
	Moderate Importance	20	6.3		
	Low Importance	5	1.6		
Funding & Collaboration	Very High Importance	195	60.9	4.54	0.69

Variable	Response	Frequency	Percentage (%)	Mean Score	Standard Deviation
	High Importance	110	34.4		
	Moderate Importance	10	3.1		
	Low Importance	5	1.6		

Source: Field Data, 2025

Besides the results displayed in Table 2-5, findings from field studies and interview shown that Uyo Urban faces a severe and escalating gully erosion crisis, with over 30 active sites exhibiting depths up to 25 meters and widths up to 9.3 meters, directly threatening urban development. This menace is critically exacerbated by both natural factors, such as high annual rainfall exceeding 2,500 mm and highly erodible sandy-loam soils (over 80% sand content), and rampant unplanned anthropogenic activities, including the deforestation of over 9,000 hectares for urban expansion and inadequate drainage systems. Consequently, over 250 residential structures have been damaged, cutting off critical access to neighborhoods, and rendering 15-20% of previously developable land unusable, significantly hindering future housing growth. The human toll is profound, with over 25 families losing livelihoods from destroyed farmlands (one farmer losing 35 beds of waterleaves), and thousands of properties under threat, leading to immense economic losses and psychological distress.

Statistical Result: T-test- Relationship between Gully Development and Housing Infrastructure

T-test was used to determine if there is a statistically significant difference in the level of structural damage to houses in areas with gully development compared to areas without. The null hypothesis (H0) posited that there is no significant difference in structural damage between the two groups, while the alternative hypothesis (Ha) stated that there is a significant difference.

Findings: The analysis yielded a t-statistic of $t= 4.52$ with a p-value of $p<0.05$. This low p-value (less than the standard significance level of 0.05) leads to the rejection of the null hypothesis. The results indicate a statistically significant relationship between gully development and the severity of structural damage to housing infrastructure in Uyo Urban. Houses located in close proximity to active gullies suffer significantly more damage than those in non-gully areas.

Multiple Regression: Effect of Gullies on Infrastructural Development

Multiple regression was employed to analyze the combined effect of the key gully development variables (Gully Depth, Width, and Length) on infrastructural damage, specifically property value loss and utility disruption. The model helps to predict the extent of damage based on the characteristics of the gully.

Model: $Y=\beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3+\varepsilon$

- Y = Dependent variable (e.g., Property Value Loss)
- X1 = Gully Depth
- X2 = Gully Width
- X3 = Gully Length
- β_1,β_2,β_3 = Regression coefficients
- ε = Error term

Findings: The multiple regression analysis revealed that the model was statistically significant ($F=15.89$, $p<0.01$). The adjusted R2 was 0.78, meaning that 78% of the variability in property value loss could be explained by the combined effect of gully depth, width, and length. The individual coefficients showed that gully depth ($\beta_1=0.65, p<0.01$) was the most significant predictor of damage, followed by gully length ($\beta_3 =0.42, p<0.05$). Gully width had a weaker but still significant effect.

This suggests that deeper and longer gullies have a more pronounced negative impact on property values and are more likely to cause disruptions to critical utilities like electricity and water. The findings provide empirical evidence of the devastating economic and infrastructural consequences of gully erosion in Uyo Urban.

Conclusion and Recommendations

Gully erosion in Uyo Urban and housing development is a serious economic and environmental challenge stemming from the interplay of natural and anthropogenic factors. The study's findings confirm that while topography and high rainfall makes the city naturally susceptible to erosion, rapid and unplanned urbanization, poor drainage systems, and improper waste disposal escalate the outcome. The research empirically demonstrates the devastating direct and indirect impacts of gully development on housing infrastructure, with a statistically significant relationship between gully characteristics (particularly depth and length) and the extent of structural damage and property value loss. The socio-economic implications are equally dire, leading to significant economic losses, displacement, and psychological distress among residents. This confirms that gully erosion is not just an environmental issue but a profound socio-economic crisis that undermines community wellbeing and sustainable urban development. To effectively control and mitigate gully erosion in Uyo Urban, a comprehensive and integrated approach is essential. The following recommendations are proposed:

1. **Enact and Enforce Stricter Urban Planning Policies:** The government should enforce building codes and land-use regulations that prohibit construction in gully-prone areas and mandate

proper drainage for all new developments. This will curb the unplanned expansion that exacerbates erosion.

2. **Invest in Integrated Drainage and Gully Stabilization Projects:** Immediate and substantial investment is needed for the construction of well-designed, concrete-lined drainage channels and the implementation of bio-engineering solutions, such as vetiver grass planting, to stabilize existing gully slopes.

3. **Promote Public Awareness and Community Participation:** Local communities should be educated on the causes of gully erosion and the importance of sustainable practices, such as proper waste disposal and avoiding sand mining. Community-based monitoring and maintenance of drainage systems should be encouraged.

4. **Establish a Robust Funding and Collaboration Framework:** The government should secure sustainable funding from national and international sources, such as the World Bank's NEWMAP project, and foster a strong collaborative partnership among government agencies, local communities, and non-governmental organizations to ensure effective and long-term implementation of control measures.

References

1. Udoumoh, U., Ahuchaogu, I., Edikan, S., Ehiomogue, P. and Uyime, A. (2021). Gully Erosion Menace in Uyo: Causes, Effects and Control Measures. *Spaientia Foundation Journal of Education, Sciences and Gender Studies*, 3(3): 31-45.
2. Abraham, C., Jimmy, U., Bassey, I. and Udoh, I. (2024). Sustainable Geo-Textile, Gully Rehabilitation and Environment Monitoring in Uyo Urban, Akwa Ibom State, Nigeria. *IIARD International Journal of Geography and Environmental Management*, 10(2): 117-140.
3. Liu, C., Fan, H. and Wang, Y. (2024). Gully Erosion Susceptibility Assessment using Three Machine Learning Models in the Black Soil Region of Northeast China, *Catena*, 232, 107385.
4. Rahmati, O., Kalantari, Z., Ferreira, C., Chen, W., Soleimanpour, S., Ghajarnia, N. and Kazemabaidy, N. (2022). Contribution of Physical and Anthropogenic Factors to Gully Erosion Initiation. *Catena*, 210, 105925.
5. Jackie, A. (2024). The Influence of Human Activity and Environmental Factors on Gully Erosion. *INOSR Experimental Sciences*, 13(1): 80-85.
6. Obiorah, C., Okeke, G., Esitikot, E., Ali, S., Aku, U., Nesiama, O., Agbakhamen, C. and Okoro, O. (2025). Critical Assessment of the Menace of Gully Erosion in Southeastern Nigeria. *International Journal of Research and Scientific Innovation*, 12(2): 2321-2705.
7. Babajide, A., Adedire, F., Babalola, O. and Orkpeh, A. (2022). Impact of Gully Erosion on Housing Accessibility: A Case of Ibadan Core Settlement. *Fountain University Journal of Management and Social Science*, 11(1): 164-176.
8. Aliyum D., Mbaya, L., Kim, I. and Abdulkadir, I. (2025). The Economics of Gully Erosion Control: A Review of Cost-Benefit Analysis Application in Gully Control Project Planning in Gombe Metropolis. *International Journal of Research and Scientific Innovation*, 12(3): 2321–2705.
9. Jibo, A., Laka, S. and Ezra, A. (2020). The Effects of Gully Erosion on Physical and Socio-Economic Activities in Akko Local Government Area of Gombe State, Nigeria. *FUTY Journal of the Environment*, 14(2): 42-50.
10. Ibrahim, A., Ibrahim, H., Bashir, I. and Abdullahi, S. (2020). Determination of the Socio-Economic Impact of Gully Erosion in Kurmin-Gwari Settlement. *FUDMA Journal of Science*, 4(4): 37-49.
11. Egbuna, O. and Alom, A. (2024). Geo-Environmental Dynamics and Sustainable Migration Strategies for Gully Erosion in Anambra State, Southeastern Nigeria. *Catena*, 29(2): 1-15.