INFLUENCE OF UNWHOLESOME PRACTICES AS PRECURSOR OF GULLY EROSION AND ITS IMPACTS ON HEALTH AND ENVIRONMENT IN IGUOBAZUWA COMMUNITY OF EDO STATE

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Abstract
The study investigated the unwholesome practices as precursor of gully erosion and its impact on health and the environment in Iguobazuwa community. Four research questions were raised to guide the study. The study adopted the descriptive survey research design. The population of the study was 250,560 residents of Iquobazuwa. The sample size for the study was 400 and the research instrument used was a questionnaire, its reliability was determined using split half method of which a reliability coefficient of 0.82 was obtained. Findings revealed that poor drainage system, construction of buildings along water channels, poor agricultural practices and dumping of waste into drainage system are the unwholesome practices that contribute to gully erosion formation in Iguobazuwa community. Gully erosion exposes residents to high rate of malaria and make the soil infertile. It was recommended among other that the ministry of education should integration a practical module on surface runoff management and proper waste disposal into local school curricula and community training to halt the unwholesome practices contributing to gully formation.

Introduction
Soil erosion is one of the environmental issues worldwide, with far-reaching effects on land productivity, food security, and ecosystem sustainability. Among the various types of soil degradation, gully erosion poses a particularly severe threat, especially in developing parts of the country of Nigeria. Gully erosion involves the removal of soil along drainage lines by surface water runoff, which leads to the formation of large channels that are often difficult to control. This form of erosion has become increasingly common due to a combination of natural processes and human-induced activities (Arabameri et al., 2021).In the Iguobazuwa community of Edo State, gully erosion has intensified in recent years, largely due to anthropogenic factors. These include deforestation, poor land-use practices, unplanned urbanization, and the absence of effective drainage systems. Human interferences such as the indiscriminate removal of vegetation cover, sand mining, road construction without proper engineering designs, and the blockage of natural waterways for housing development have contributed significantly to the destabilization of soil structures and increased surface runoff (Ejaz et al., 2021; Okeke et al., 2023). These practices have disrupted the natural balance of the environment, making the soil more vulnerable to erosion, especially during heavy rainfall.

Gully erosion in Iguobazuwa not only affects the physical landscape but also has socio-economic consequences. Productive farmlands are being lost, infrastructure is threatened, and communities are increasingly exposed to environmental hazards. As gullies expand, they can isolate communities, destroy homes, and reduce access to basic services, compounding the existing challenges of poverty and underdevelopment. The impact is worsened by climate change, which has altered rainfall patterns and increased the frequency of extreme weather events (Usman & Ibrahim, 2019).Gully erosion, whether large or small, is a persistent environmental challenge in Nigeria and is fundamentally preventable and controllable. While gully processes can be naturally induced, research indicates that the artificially induced (anthropogenic) erosion, driven by unwholesome practices, is the most rampant and destructive form today. Despite the devastating effects being clearly visible in many communities, the specific causes remain poorly understood at the local level. Therefore, the purpose of this study is to precisely identify the unwholesome practices as precursor of gully erosion and its impact on health of the residents and the environment in Iguobazuwa community, Edo State, and, most importantly, to develop effective, local means of controlling these factors to prevent future gully formation.

Statement of the Problem

Erosion is a major issue that leads to degradation of land and loss of quality of land. Not only does it affect land but also affect crop productivity, animals and is even capable of taking human life. Edo state is one of the states amongst others that is affected by gully erosion. In Edo State, urban degradation is a growing problem. It is estimated that gully and sheet-rill erosions account for 5% of degraded land. The increased population migration to metropolitan regions has resulted in high land use pressure, which makes the terrain more susceptible to gully erosion. Gully erosion in Edo State is becoming more severe on a daily basis and drawing attention from outside agencies. Every state senate district faces a fair share of the issue. The University of Benin (Ugbowo campus), Queen Ede, West Moat Ekehuan Road, and Costain are the primary locations for gully erosion in Edo South. The Auchi gully complex and Ikabigbo gully are the primary gully sites in Edo North, whilst the Ewu and Ibore gullies are the primary gully sites in Edo Central.

Although gully erosion is perceived as a natural phenomenon, the human factor that contributes to the formation of gullies are more, but these factors caused by human activities can be managed or controlled. The government, communities and individual have taken measures such as mechanical methods of back filling, sand bagging, construction of channels and construction of speed breakers to help control the gully. However, it is still evidence that despite these measures adopted, the problem remains. Various researches have been carried out by other researchers on the impact of erosion on the environment and the various factors contributing to it but emphasis has been placed on the natural causes and its impact on agricultural land. Not much research has been conducted on the unwholesome practices as precursor of gully erosion and its impact on health of the residents and the environment in Iguobazuwa community of Edo state. Thus, this study is geared towards understanding the influence of unwholesome practices as precursor of gully erosion and its impacts on health and environment in Iguobazuwa community of Edo State.

Research Questions

1. What are the unwholesome practices that contribute to the formation of gully in Iguobazuwa community?
2. To what extent will gully erosion impact on the health of people in Iguobazuwa community?
3. To what extent will gully erosion affect the environment in Iguobazuwa community?
4. What are the possible ways to control gully erosion in Iguobazuwa community?

Methodology

This study used the descriptive survey research design. This design is suitable because it allows the researcher to gather detailed information from a specific group without influencing the environment or behavior of the participants. In this case, the design helped to describe how human activities in the Iguobazuwa community are contributing to gully erosion formation. The study aimed to understand people's opinions and experiences as they relate to land use and environmental management.

The estimated population in Iguobazuwa community was one hundred and thirty-eight thousand and seventy two (138, 072) residents. This included seventy-two thousand one hundred and thirteen males (72, 113) and sixty-five thousand nine hundred and fifty-nine (65, 959) females based on the National Population Estimated Census conducted in 2006 (National Population Commission, 2023). However,the Compound Growth Formula was applied for this study. Using the standard population compound growth formula: Current Population (Pt) = Current Population (Pt)=P0(1+r)t. Current Population = $138{,}072^{x}$ (1 + 0.032)19. Current Population =$138{,}072^{x}$ (1.032)19 Current Population =$138{,}072^{x}$ 1.815 Current Population approx. 250,560. Based on this calculation the researcher estimated that the current population of residents in Iguobazuwa would be 250,560.

The sample size (n) of 400 respondents was determined using the Taro Yamane formula n = $\frac{N}{1+Ne^2}$, calculated from the estimated target population (N) of 250,560 at a 0.05 level of significance (5% error margin). The sampling technique used for this study was cluster sampling. The community was clustered into natural zones such as villages or settlements. The study used a total of ten clustered with forty respondents selected from each cluster.
The instrument used to collect data was a questionnaire developed by the researcher. It used a simple four-point scale with response options of strongly agree, agree, disagree, and strongly disagree. The questions were designed to collect information about human activities linked to gully erosion and how the residents perceive the problem. The questionnaire was reviewed by three experts from the Department of Health, Safety and Environmental Education. Their comments were used to correct unclear or misleading items, which helped improve the quality of the instrument.

To test for reliability, the questionnaire was given to twenty residents of Iguobazuwa who were not part of the main study. The responses were divided into two sets. The scores from the two sets were compared using a statistical method of Cronbach's Alpha to measure

internal consistency. A reliability score of 0.82 was obtained. This means that the instrument is reliable and can produce consistent results.

The questionnaire was given directly to the selected respondents by the researcher with help from two assistants. All copies of the questionnaire were collected on the same day to avoid loss or delay. The data collected was analyzed using simple statistics like frequency and percentage to show the patterns in the responses.

Research Question 1: What are the anthropogenic factors that contribute to the formation of gully in Iguobazuwa community?

Table 1: Frequency and Percentage Distribution of Anthropogenic Factors that Contribute to Formation Gully

S/N	Statement items	SA (%)	A (%)	D (%)	SD (%)	Total (%)
1	Poor drainage contributes highly to gully erosion	240 (60)	128 (32)	20 (5)	12 (3)	400 (100)
2	Construction of buildings along water channels contributes to gully erosion	192 (48)	140 (35)	56 (14)	12 (3)	400 (100)
3	Poor agricultural practices can result in gully erosion	132 (33)	160 (40)	72 (18)	36 (9)	400 (100)
4	Dumping of waste into drainage system causes gully erosion	220 (55)	136 (34)	40 (10)	4 (1)	400 (100)

Table 1 showed the anthropogenic factors that contribute to the formation of gully in Iguobazuwa community. In item one, (60%) respondents strongly agreed and (32%) respondents agreed that poor drainage system contributes highly to gully erosion, (5%) of the respondents disagreed and (3%) respondents strongly disagreed. This reveals that the highest number of respondents (60%) strongly agreed that poor drainage system contributes to gully erosion. In item two, (48%) respondents strongly agreed and (35%) respondents agreed that construction of buildings along water channels contributes to gully erosion, (14%) respondents disagreed and (3%) respondents indicated the strongly disagreed option. This clearly shows that the highest number of respondents (48%) strongly agreed that construction of buildings along water channels contributes to gully erosion. In item three, (33%) respondents strongly agreed and (40%) respondents agreed that poor agricultural practices can result in gully erosion, (18%) respondents disagreed and (9%) respondents strongly disagreed. This clearly indicates that the highest number of respondents, which is (40%), agreed to the statement item. Statement in item four, (55%) respondents strongly agreed and (34%) agreed that dumping of waste into drainage system causes gully erosion, (10%) respondents disagreed and (1%) respondent strongly disagreed. This clearly indicates that the highest number of respondents which is (55%) strongly agreed to the statement item. Based on the analyses above, it can be deduced that poor drainage system, construction of buildings along water channels, poor

agricultural practices and dumping of waste into drainage system are the anthropogenic factors that contribute to gully formation.

Research Question 2: To what extent will gully erosion impact on the health of the people in Iguobazuwa community.

Table 2: Frequency and Percentage Distribution of Extent of Gully Erosion Impact on Health

S/N	Statement items	SA (%)	A (%)	D (%)	SD (%)	Total (%)
5	Stagnant water from gully erosion serves as breeding medium for mosquitoes that increase prevalence of malaria in the area.	216 (54)	156 (39)	12 (3)	16 (4)	400 (100)
6	The severe dust pollution caused by gully erosion worsens lung health, thereby increasing the risk of contracting tuberculosis.	152 (38)	128 (32)	80 (20)	40 (10)	400 (100)
7	Gully erosion may lead to occurrence of injuries from resultant accidents.	216 (54)	152 (38)	12 (3)	20 (5)	400 (100)
8	Gully erosion pollutes water supply leading to cholera	204 (51)	156 (39)	20 (5)	20 (5)	400 (100)

Table 2 showed the extent to which gully erosion impact on the health of the people in Iguobazuwa community. In item five, (54%) respondents strongly agreed and (39%) respondents agreed that Stagnant water from Gully erosion serves as breeding medium for mosquitoes that increase prevalence exposes of malaria in the area, (3%) respondents disagreed and (4%) respondents strongly disagreed. This reveals that the highest number of respondents (54%) strongly agreed to the statement item. In item six, (38%) respondents strongly agreed (32%) respondents agreed that severe dust pollution caused by gully erosion worsens lung health, thereby increasing the risk of contracting tuberculosis, (20%) respondents disagreed and (10%) respondents strongly disagreed. This shows that the highest number of respondents (38%) strongly agreed to the statement item. In item seven, (54%) respondents strongly agreed and (38%) respondents agreed that Gully erosion may lead to occurrence of injuries from resultant accidents, (3%) respondents disagreed and (5%) respondents strongly disagreed. This shows that the highest number of respondents, which is (54%) strongly, agreed to the statement item. In item eight, (51%) respondents strongly agreed and (39%) respondents agreed that gully erosion pollutes water supply leading to cholera, (5%) respondents disagreed and (5%) respondents strongly disagreed. This reveals that the highest number of respondents (51%) strongly agreed that gully erosion pollutes water supply leading to cholera. Based on the analyses above, it can be

inferred that gully erosion exposes residents of Iguobazuwa to high rate of malaria. Formation of gully erosion increases the rate of accident cases thereby leading to injury and death.

Research Question 3: To what extent will gully erosion affect the environment in Iguobazuwa community**?**

Table 3: Frequency and Percentage Distribution of Extent of Gully Erosion Impact on the Environment

S/N	Statement items	SA (%)	A (%)	D (%)	SD (%)	Total (%)
9	Land for development like schools and health facilities are now affected by gully erosion.	252 (63)	96 (24)	36 (9)	16 (4)	400 (100)
10	Gully erosion renders the soil infertile	160 (40)	156 (39)	56 (14)	28 (7)	400 (100)
11	Gully erosion renders roads non motorable	272 (68)	80 (20)	36 (9)	12 (3)	400 (100)
12	Gully erosion restricts the economic growth of a community	148 (37)	144 (36)	64 (16)	44 (11)	400 (100)

Table 3 revealed the extent to which gully erosion will affect the environment in Iguobazuwa community. In item nine, (63%) respondents strongly agreed and (24%) respondents agreed that land for development like schools and health facilities are now affected by gully erosion, (9%) respondents disagreed and (4%) respondents indicated the strongly disagreed option to the statement item. The data shows the highest number of respondents which is (63%) strongly agreed to the statement. In item ten, (40%) respondents strongly agreed and (39%) respondents agreed that gully erosion renders the soil infertile, (14%) respondents disagreed and (7%) respondents chose the strongly disagreed option to the statement item. This indicates that the highest number of respondents (40%) strongly agreed that gully erosion renders the soil infertile. In item eleven, (68%) respondents strongly agreed and (20%) respondents agreed that gully erosion renders roads non-motorable, (9%) respondents disagreed and (3%) respondents indicated the strongly disagreed option to the statement item. This shows that the highest number of respondents which is (68%) strongly agreed to the statement. In item twelve, (37%) respondents strongly agreed and (36%) respondents agreed that gully erosion restricts the economic growth of a community, (16%) respondents disagreed and (11%) respondents strongly disagreed to the statement item. This shows that the highest number of respondents strongly agreed that gully erosion restricts the economic growth of a community.

Based on the above analyses, it can be deduced that gully erosion render soil infertile, making roads non-motorable, restriction of economic growth and total destruction of lands are some of the extents to which gully erosion impacts on the environment.

Research Question 4: What are the possible ways to control gully erosion in Iguobazuwa community?

Table 4: Frequency and Percentage Distribution ofPossible ways to control gully erosion

S/N	Statement items	SA (%)	A (%)	D (%)	SD (%)	Total (%)
13	Planting of trees and cover crops helps to check gully erosion	164 (41)	140 (35)	64 (16)	32 (8)	400 (100)
14	Disposing of waste along water channels should be prohibited	244 (61)	116 (29)	32 (8)	8 (2)	400 (100)
15	Farmers should be encouraged to practice crop rotation	200 (50)	152 (38)	36 (9)	12 (3)	400 (100)
16	Proper enlightenment on prevention of gully erosion should be provided to communities	280 (70)	88 (22)	24 (6)	8 (2)	400 (100)

Table 4 showed the possible ways of controlling gully erosion. Regarding statement item thirteen, sixteen percent of respondents disagreed and eight percent strongly disagreed, whereas forty-one percent of respondents agreed and thirty-five percent strongly disagreed that planting trees and cover crops helps to prevent gully erosion. The majority of respondents, according to the statistics, strongly agreed that planting trees and cover crops prevents gully erosion. Regarding statement item fourteen, the percentage of respondents who strongly agreed and agreed (61%) and opposed (29%) that rubbish disposal along water channels should be forbidden were respectively 81% and 22%. This indicates that the greatest percentage of participants firmly agreed that it should be illegal to dispose of rubbish alongside waterways. Statement item number fifteen received strong agreement from 50% of respondents and agreement from 38% of respondents, however 9% of respondents disagreed and 3% strongly disagreed with the statement item. This shows that the highest number of respondents strongly agreed that farmers should be encouraged to practice crop rotation. Statement item sixteen, the majority of respondents—70%—strongly agreed, 22% agreed, and 6% disagreed that communities should receive appropriate education regarding gully erosion. Just 2% significantly disagreed. This suggests that the greatest percentage of respondents firmly agreed that communities should receive appropriate education regarding gully erosion. It follows that the best methods to reduce gully erosion are to plant trees and cover crops, forbid dumping rubbish alongside waterways, encourage farmers to rotate their crops, and provide them with appropriate information.

Findings

1. Poor drainage system, construction of buildings along water channels, poor agricultural practices and dumping of waste into drainage system are the unwholesome practices that contribute to gully erosion formation in Iguobazuwa community.
2. Gully erosion exposes residents of Iguobazuwa to high rate of malaria as the gull retains water thereby providing a breeding ground for mosquitoes to multiply. Formation of gully erosion also increases the rate of accident cases thereby leading to injury and death. These are the extent to which gully erosion impacts on the health of the residents in Iguobazuwa.
3. Gully erosion render the soil infertile, it make roads non-motorable, restriction of economic growth and total destruction of lands are some of the extent to which gully erosion impacts on the environment.
4. Planting of trees and cover crops, proper disposal of wastes, good agricultural practices and proper enlightenment of the public about the causes, dangers and control of gully erosion are the possible ways of controlling gully erosion in Iguobazuwa community.

Discussion of Findings

From research question one, the study identified poor drainage systems, construction of buildings along water channels, improper agricultural practices, and waste dumping into drainage systems as key human-induced factors contributing to gully erosion in Iguobazuwa. This aligns with findings by Okoeka et al. (2025), who emphasized that poor drainage network, unplanned urbanization were the major causes of gully erosion. Additionally, Biswas (2019) highlighted that improper waste disposal can obstruct natural water flow, exacerbating erosion processes during heavy rainfall events.

Furthermore, research question two focusing on health and safety impacts from gully erosion in the community revealed that gully erosion in Iguobazuwa leads to stagnant water accumulation, creating breeding grounds for mosquitoes and increasing malaria incidence. Furthermore, the presence of gullies contributes to higher accident rates, resulting in injuries and fatalities. This is consistent with Igwe, et al. (2023) focusing on factors influencing gully erosion in Eastern Nigeria strongly emphasized that the most severe impact of gullies is damage to footpaths, roads, and properties. This infrastructural damage is the direct precursor to the higher accident rates.

The study indicated from research question three, that gully erosion renders soil infertile, makes roads impassable, restricts economic growth, and leads to land destruction in Iguobazuwa. This finding is in agreement with Ologu et al. (2020) who studied the socio-economic effects of gully erosion in Southeast Nigeria; their findings explicitly confirm that gully erosion causes farmland loss, reduced agricultural yield and the inability to transport goods to markets

Research question four identified major mitigating measures like tree planting, proper waste disposal, sustainable agricultural practices, and community education as effective measures to control gully erosion. This finding align with the study Lima et al.

(2019) highlighted that raising awareness among rural communities about the causes and consequences of gully erosion can lead to more sustainable land management practices. Doriean et al. (2021) demonstrated that large-scale remediation of gullies through re-vegetation and soil stabilization significantly reduced sediment loss and improved water quality in affected catchments. These findings collectively reinforce that vegetation restoration, proper waste management, and community sensitization remain crucial for mitigating the impacts of gully erosion in Iguobazuwa.

Conclusion

Based on the study's findings, the researcher came to the conclusion that while gully erosion is a naturally occurring process brought on by elements like wind and precipitation, human activity plays a significant role in the problem and is getting worse every day. The primary cause of the gully erosion in the Iguobazuwa neighborhood is the actions of its residents, including inappropriate land use, inadequate drainage, subpar agricultural techniques, and the disposal of trash into water channels, which obstructs the flow of water. The nature and the people living in the neighborhood have both been greatly impacted by this gully erosion issue. A key route in the community was destroyed, which limited community members' mobility and made it nearly impossible to transport their goods to the market. Low crop yields and a large amount of unproductive land are further consequences. This condition has been known to result in accidents and the deaths of both adults and children during the rainy season. Based on the findings in this study, it is therefore recommended that;

1. The researchers recommend that the ministry of education should integration a practical module on surface runoff management and proper waste disposal into local school curricula and community training to halt the unwholesome practices contributing to gully formation in the area of study.
2. The local community leaders should implement an Environmental Health Education (EHE) campaign, led by the local PHC that explicitly links standing water in gullies to the increased risk of malaria and promotes bioengineering controls like vegetation to eliminate mosquito breeding grounds in the community.
3. Buildings should be constructed in compliance to approved environmental standards put in place by the government.
4. Dumping of refuse into drainage system and water channels should be prohibited. Government at all levels should enact and enforce laws to halt such activities. Monitoring teams should be mobilized to ensure complete compliance of such laws and failure to comply should attract punishment or fine.

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