FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 2, No. 2, 2025
Print ISSN: 1595-9686
EISSN: 1595-9708

ASSESSMENT OF COMMUNITY PERCEPTION ON GOMBE STATE UNIVERSITY AND FEDERAL COLLEGE OF EDUCATION (TECHNICAL) GULLY CONTROL PROJECTS IN GOMBE TOWN, GOMBE STATE, NIGERIA

Danladi Aliyu

Department of Geography and Environmental Management
Gombe State University, PMB 127, Gombe.
Email: adanladi@gsu.edu.ng. Phone: 08065071810, 09049551608

https://doi.org/10/33003/jees.2025.0202/006

ABSTRACT
The study assessed the perception of the gully control project affected communities along the corridor of FCE(T) and GSU gully erosion control projects, both primary and secondary sources of data were used for this study, in-depth interviews and interaction with sampled community members was used to generate primary data, the total of 109 sampled were used, out of which 28 respondents are from GSU gully while 81 are from FCE(T) gully project area were selected from the list of Project affected persons using Random sampling. The study used descriptive statistics to analyse interview data. The result showed that the communities are satisfied with the project and were involved throughout project planning and implementation. Respondents agreed that the gully erosion control project carried out possessed the attribute required to withstand the test of time and to last long enough to benefit the community for an extended period, and indicated their willingness to support the project's sustainability. The study concluded that the gully erosion control projects at GSU and FCE(T) were holistic in their approach, carrying members of the project-affected communities along at various stages of the project, from project planning to implementation, which will go a long way toward ensuring ownership of the project by the affected communities.

Keywords: Community, Gully, Perception, Project, Town

INTRODUCTION

Soil erosion remains one of the world's environmental problems, threatening the sustainability of both plants and animals. Over 65 per cent of the soil on Earth is said to have been degraded by soil erosion, salinity, and desertification (Abegunde, 2003, as cited in Aliyu, 2017). The United Nations (UN) Convention to Combat Desertification (CCD) opines that soil erosion results in a reduction or loss of biological and economic productivity and in its impact on terrestrial ecosystems (Claasssen, 2004). Erosion is one of the surface processes that sculpt the earth's landscape and constitutes one of the global environmental problems (Abdultfatah, Okunlola, and Akande, 2014).

The term "Erosion" comes from "erodere", a Latin verb meaning "to grow." Soil erosion is defined as the part of the overall process of denudation that includes the physical breaking down, chemical dissolution, and transportation of material. Soil erosion occurs in both temperate and tropical regions and is widely considered a serious threat to the long-term viability of agriculture in many parts of the world. This concern is not without precedent. Erosion requires an agent, either wind or water. The level of erosion in a given place is determined by the interaction of several factors, including climatic erosivity, soil erodibility, and land use/management (Omeke, 2016).

Soil erosion caused by rainfall involves the application of energy from two distinct sources: falling raindrops and surface flow. The energy of a falling raindrop is applied vertically from above, whereas that of surface flow is applied more or less horizontally along the surface of the ground. The chief role of the falling of a rain drop on the ground is to detach soil particles, whereas that of the surface flow is to transport the soil. The falling of raindrops also significantly contributes to the movement of soil on unprotected sloping lands during heavy impact storms, by splashing large quantities down slope. Soil erosion caused by water can be distinguished in different forms, viz, splash erosion, sheet erosion, rill erosion, gully erosion, ravine erosion, and stream-bank erosion (Telkar, Shivendu Pratap, Joy Kumar, and Kamal Kant, 2015).

Gully erosion is one of the principal processes leading to land degradation across different environments (Romero-Diaz, Diaz-Pereira, and DE Vente, 2019) and at various spatial and temporal scales, causing considerable soil loss, exporting large amounts of sediment, and inflicting considerable damage to infrastructure (Romero-Diaz et al., 2019). Gullies are among the most important forms of water erosion and represent a significant environmental threat worldwide, affecting multiple soil and land functions (Romero Diaz, Pereira, and Devente, 2019). Baba et al. (2025) reported that land areas of 36.01 km², 82.02 km², and 109.36 km² were lost to gully erosion in 2002, 2012, and 2022, respectively, in Akko LGA. Additionally, 35.6 km³, 52.06 km³, and 159.70 km³ of soil were lost to gully erosion in 2002, 2012, and 2022, respectively. At FCE(T) Gully catchments, about 200 houses were lost, 200,000 houses affected, 11 communities cut off, 10 schools/health facilities destroyed, and about 2000 farmlands were also destroyed (GMS-ACReSAL, 2025).

Severe erosion on lands undergoing land-disturbing activities can be reduced by implementing proper control measures. The timely application of erosion and sediment control measures will minimise the time that the soils are exposed, control runoff, shield the soil from erosive forces, and bind the soils (Georgia Soil and Water Conservation Commission, 2000).

The most effective tool in controlling erosion is site planning, which includes planning and installation of erosion and sediment control practices. Standards and specifications for such practices that can be utilised in areas undergoing land-disturbing activities can be applied. These standards were developed to establish state-wide uniformity in selection, design, review, approval, installation, and maintenance of conservation practices. The commission established minimum requirements for planning, designing, and installing the practices on disturbed areas (GSWCC, 2000).

The incidents of gully erosion have caused much concern to successive governments of Gombe State and other stakeholders, including the various communities residing in the areas where these gully erosions are causing havoc, prompting concerted efforts to control them each year. Various methods adopted by the government and gully-affected communities of Gombe town for gully erosion control measures include engineering, Bio-remediation, stone walls, sandbags, and runoff diversion. However, the control has not kept pace with the rate of gully expansion, as some of these measures have been partially or fully successful. In contrast, others have failed, partly due to inadequate funds to adopt a holistic control method that may involve combining methods, such as Engineering/mechanical, vegetative/biological, and stone/gabion methods, which have stood the test of time (Mbaya, 2017).

Studies conducted in Gombe Town on erosion control by the Ministry of Environment in (2003) on the yearly physical assessment of gully situation after each rainy season shows that the total length of gully within the town was about 121.5km, out of this only 5.6km in length have been controlled while 7.62km have been partially controlled leaving about 107.3km still uncontrolled, State Economic Empowerment Development and Strategy 2006 as cited in Mbaya (2017).

FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 2, No. 2, 2025
Print ISSN: 1595-9686
EISSN: 1595-9708

Comparing the results of the manually digitised gully and ground-truth measurements in 2016 shows that most previously uncontrolled or only partially checked gullies have increased in length to 131.02 km, compared with 121.50 km in 2003. This represents an increase of 9.72 km (7.42 %) over the 13 years, or about 75 metres per year in gully length, despite various control measures taken by previous and current governments (Mbaya, 2017). The presence of these gullies and in ability of government at various level to control them effectively may not be unconnected with non-involvement of the gully affected communities in project planning and implementation, this lack of involvement to collate the community ideas and perception on the project, this led to community neglect and refusal to take ownership of the project, it is in this regard that this paper attempt to assess the level of community perception on the GSU and FCE Gully erosion project with the view to ascertain their level of involvement and acceptability of the project.

MATERIALS AND METHODS

Study Area

Gombe Town is located between latitude 10^0 0'N to 10^0 20'N and longitude 11^0 01'E and 11^0 19'E. It has a common boundary with Akko LGA in the South and West; Yamaltu-Deba to the East and Kwami to the North, as a town, it extends to Liji in the East, areas beyond southern bypass in the South, and to around Kundulum area in the North, the executive order four (4) signed by the Gombe State Governor extends the areas of urban center in the capital to 20km radius from the center (Emirs palace), the area occupied a total land mass of about 40Km^2. It is the capital of Gombe State and was designated as such upon the state's creation on 1st October, 1996.

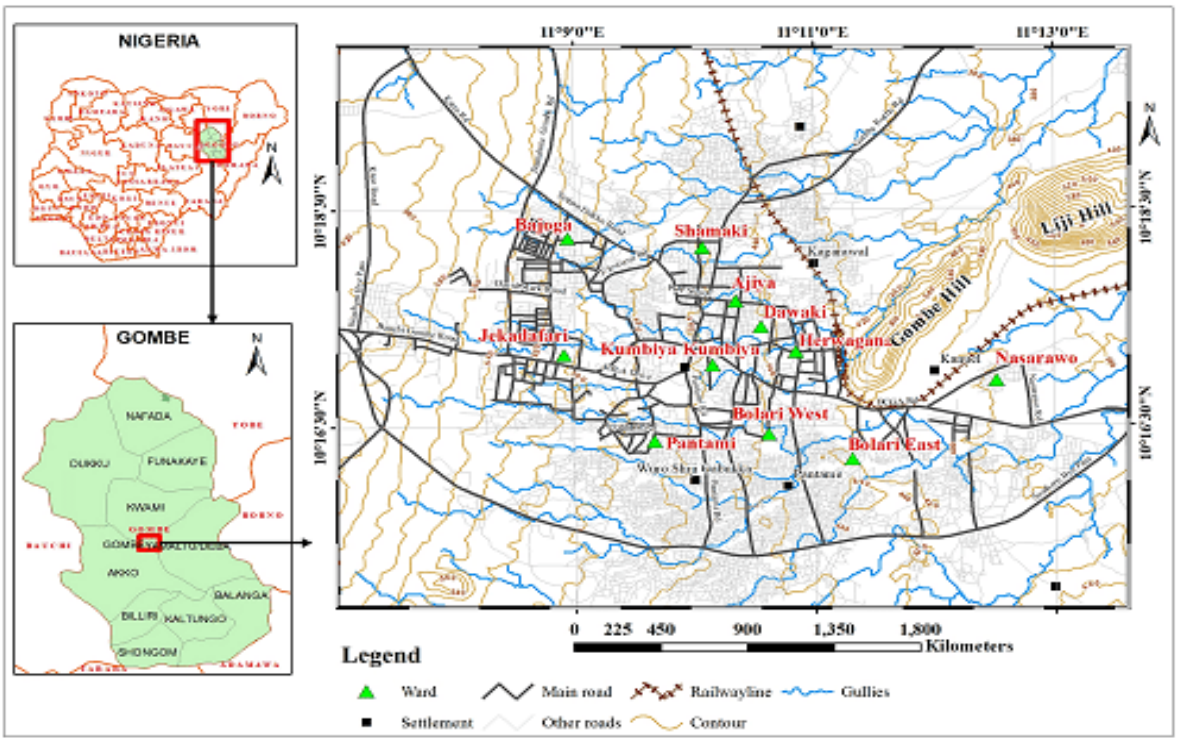

Figure 1: Map of Gombe Town
Source: GIS Map Services (2022)

Data Collection

The sources of data for this study were researcher-constructed data, commonly called primary data, and documented sources, commonly referred to as secondary sources. The primary data consist of face-to-face interviews with sampled members of communities residing along the gully corridor.

FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 2, No. 2, 2025
Print ISSN: 1595-9686
EISSN: 1595-9708

Secondary data included relevant information on the subject matter, reports, and documents related to the selected gullies, as well as other relevant literature extracted from published and unpublished sources, textbooks, journals, maps, and images. The data collected were analysed using descriptive statistics.

Sampling Size and Sampling Techniques

For this study, two active gully erosion-controlled sites in the town were selected; these gully control project sites are as follows:

i. GSU-Mallam Inna-Kagarawal Gully site. (known as the ***GSU Project site***)
ii. FCE(T)-Juro Abare-Jauro Kuna-M/Inna-Wuro Kesa-Tukulma (known as ***FCE(T) project site***).

In-depth and semi-structured interviews were conducted with the members of the communities affected by the project, especially the project-affected persons. At each project site, 25% of the affected persons were randomly selected from the list of project-affected persons for the interview to avoid bias (Table 1). Another set of interviews was conducted with officials from the relevant agencies responsible for the project, including the Ministry of Environment and NEWMAP staff. Two research assistants were employed and trained for fieldwork.

As previously noted, 25% of the affected population/households was considered the sampling size for the two gully erosion control areas within the study area. (i.e, 28 respondents for the GSU Project site and 91 respondents for the FCE (T) Project site, representing 25% of the total each). Purposive sampling was used to identify the target respondents, while random sampling was used to select the first respondent in each gully erosion control area. The responses recorded during the interview sessions were paraphrased, summarised, and presented as part of the study's findings.

Table 1: Population sample for Project Affected Persons

S/N	Gully Control Project	Affected Communities	Total PAP	Sample PAP
1	GSU Gully Project	Mallam Inna	34	9
		M/Inna Sabon fegi	35	9
		Kagarawal	41	10
2	FCE Gully Project	London mai Dorawa	79	20
		Arawa	72	18
		Wuro ladde	55	14
		Jauro Kuna	44	11
		Jauro Abare	33	8
		Koran Zaki	24	6
		Alkahira	15	4
3	**Total**		**434**	**109**

Source: Researcher Constructed (2023).

Data Analysis

Descriptive statistics were employed in the analysis of data in this study.

- Classified images, tables, and graphical presentations were used to show the results of the analysis of some data obtained from interviews conducted to determine the community perception of the gully control project in the area.
- Bar charts and pie charts were used to present the results of the analysis

FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 2, No. 2, 2025
Print ISSN: 1595-9686
EISSN: 1595-9708

RESULT AND DISCUSSION

Community Perception on the Gully Erosion Control Projects

Gully erosion control projects under study cover several communities within the catchments of the GSU Gully and FCE (T) Gully systems. These communities included Gombe State University, Mallam Inna, Mallam Inna Sabon Fegi, and Kagarawal under the GSU Gully project, while London mai Dorawa, Jauro Abare, Koran Zaki, Wuro Ladde, Arawa, Jauro Kuna, and Alkahira are all under the FCE (T) Gully catchment. Some sampled members of these communities, especially the traditional leaders, community group members, and project-affected persons, were identified and engaged in in-depth interactions to understand their perceptions of the project. Some key questions were asked, and their responses were collated and presented (Plates 1 and 2).

Plate 1: During Interaction with PAPs at the Hall of the District Head of Mallam Inna

Awareness of the existence of the control project in your communities

Figure 2 shows respondents' perceptions of the awareness and viability of gully erosion control measures implemented by the Gombe State government. The result revealed that 81.1% are aware of the control measures embarked upon by the state government, while 13. 2% indicated not aware of the project, while 5.7% did not respond to the question. This finding implies that community members, aware of the gully control project, may pay attention to protecting the project by ensuring that work is carried out properly through cooperation with project workers and other relevant people involved.

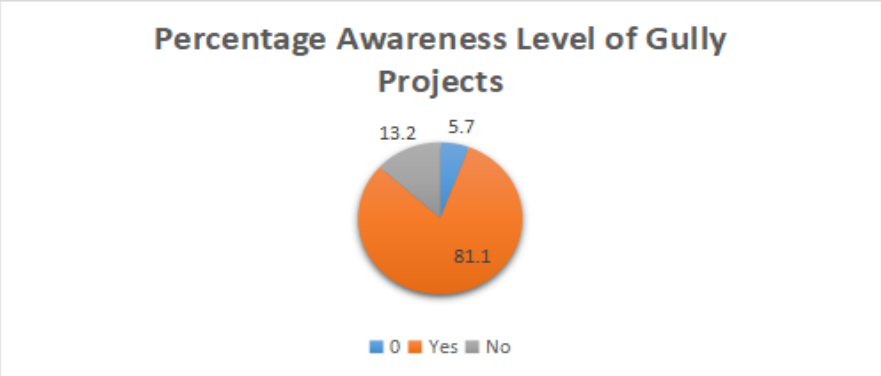

Figure 2: Familiarity with gully control projects
Source: Data Analysis (2024).

FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 2, No. 2, 2025
Print ISSN: 1595-9686
EISSN: 1595-9708

Respondents' Perception on the Viability of the Gully Control Projects

Regarding satisfaction with the gully erosion control project within the community, over 80% of respondents were satisfied, with less than 20% dissatisfied with the project's viability (Figure 3).

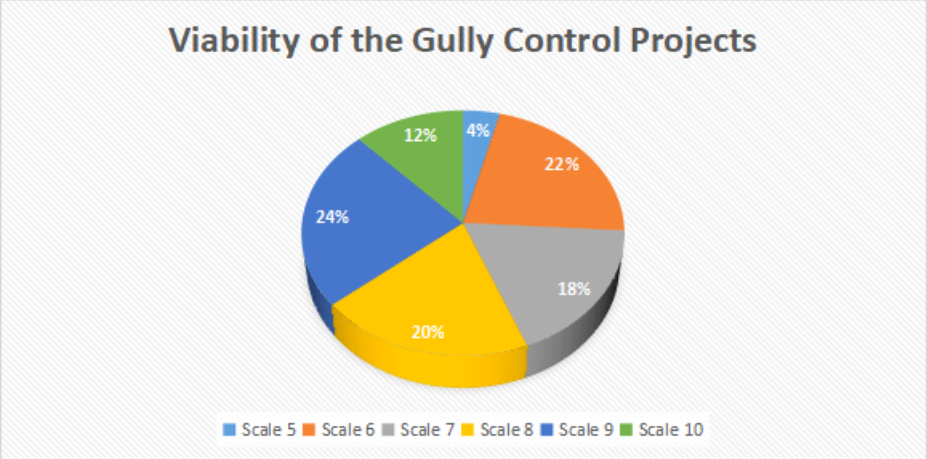

Figure 3: Satisfaction with the Gully Control Project

Most respondents rated the projects higher and were satisfied with the gully control project, with scores of 6, 7, 8, and 9, respectively. In contrast, a large percentage of them actually scored the project 10. Only a few respondents scored the project 5, and no one scored it below 4.

Perception on the Gombe State University Constructed Gully

Gombe State Government, in collaboration with NEWMAP, completed a Gully construction project on the GSU Gully control project in 2021 and is about to commence a project on the FCE(T) Gully system using concrete (Engineering). As part of the interview, an attempt was made to evaluate how community members, the project's beneficiaries, feel about the constructed gully and the one soon to be constructed. The result presented in Figure 4 shows that 22% of the respondents ranked the gully highest, at 10 on a scale of 1-10, while 20% and 18% ranked it 8 and 7, respectively. This shows general satisfaction with how well the first project was executed, the expectation for the second, and the reasonableness of the civil work. Like in previous cases, this is also presented in a bar diagram below:

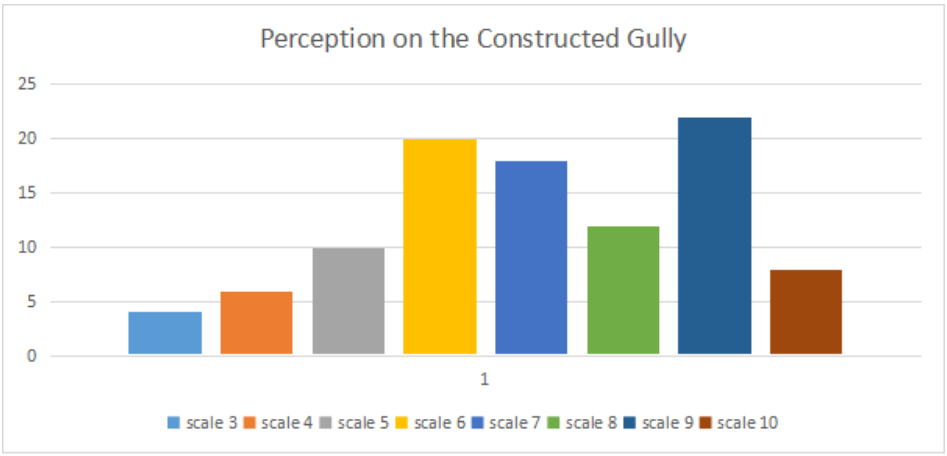

Figure 4: Perception on GSU Constructed Gully

FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 2, No. 2, 2025
Print ISSN: 1595-9686
EISSN: 1595-9708

It can be seen here that over 70% of respondents have ranked the gully 6 to 10, indicating great satisfaction, given that the highest possible satisfaction score on this measurement scale is 10. The implication of this finding is that, irrespective of the result of the cost-benefit analysis, the members of the community appeared to be satisfied with the project, and whether the control method was viable or not did not matter.

Community Participation in Gully Control Project Planning

As in every developmental project, community participation is a critical component of implementation. To ascertain how well the project is implemented, especially from the community point of view, participation and representation of community members are critical to evaluate.

Figure 5 shows that 64% of respondents agreed that the community is adequately carried along during the gully project planning stage, especially during the gully construction activities of GSU-Mallam Inna and FCE-Arawa. In comparison, only 8% disagreed, which is an insignificant number compared to the others. This finding implies that the community may have owned the project and ensured its protection from negative tendencies, as they were involved in the planning stages and their views were captured accurately. Simeneh and Getachew (2016) found that community mobilisation and participation strategies were effective in mobilising all active labour forces expected to participate in watershed development activities. However, Simeneh and Getachew (2016) further identified a gap between participation and reality, as some participation was not motivated by interest.

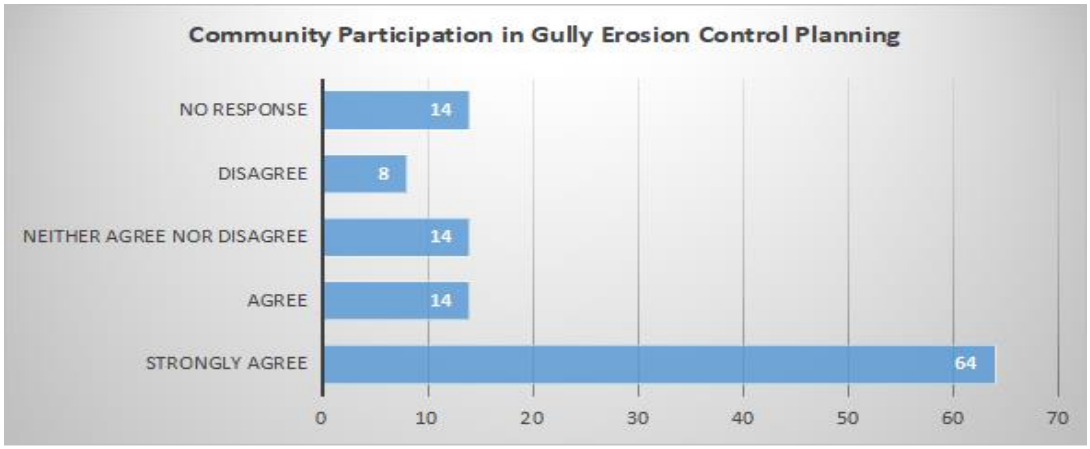

Figure 5: Community Participation in Planning
Source: Data Analysis (2022)

In terms of project implementation, the community also needs to be carried along, and its members need to be asked how well they feel they are being carried along. In this regard, figure 6 shown that more than 68% of the community members agreed that the community was carried along during project implementation through the formation of community associations and community interest groups formed by each project affected community through which meetings were held between the community and projects proponent, as well as grievance redress mechanisms put in place to resolve any grievance between the community and project implementation agencies, contractors or project staffs. With this result, it is safe to say that the project proponents in Gombe State have carried the community along in both planning and implementation. This is contrary to a study conducted by Onu, Osahon, and Ukonu (2020), who reported low participation by gully communities in gully control activities despite a strong perception of the effects of gully erosion.

FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 2, No. 2, 2025
Print ISSN: 1595-9686
EISSN: 1595-9708

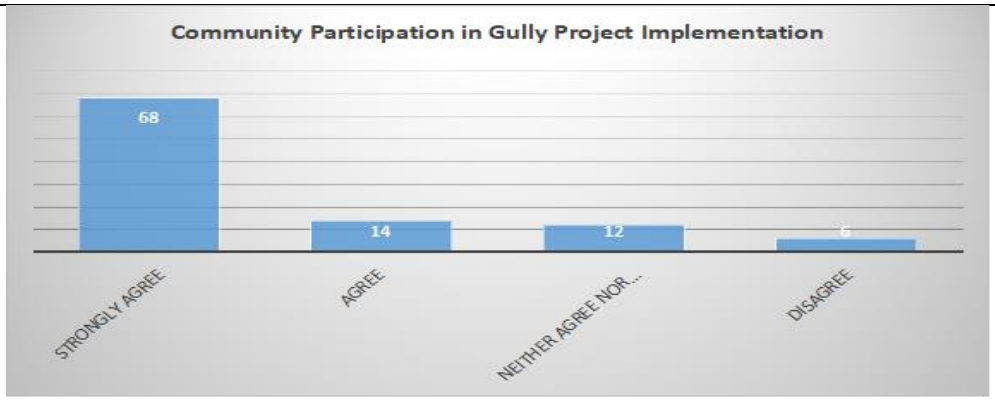

Figure 6: Community Participation in Implementation

Gully Erosion Project Longevity

Construction of a civil structure is a step in the right direction, but how long will the structure last without sustaining any foreseeable damage? Community members, based on what they can see at the project site, can provide their perception of that aspect.

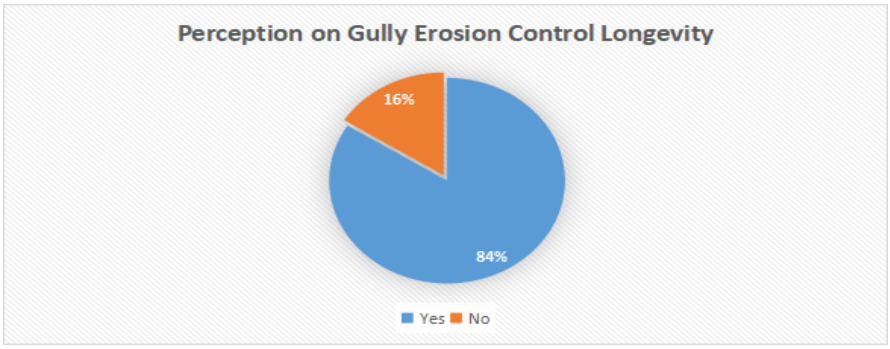

Figure 7: Project Longevity
Source: Data Analysis

Figure 7 revealed that 84% of the respondents agreed that the gully erosion control project carried out possessed the attribute required to withstand the test of time and to last long to benefit the community for an extended period. Even though about 16% of respondents disagree with this, the number is negligible compared to the 84% who agreed, so the general feeling in the affected communities is that the project will last long without causing any damage. However a close observation of the project site during field work indicated that the control method was conducted based on the specification agreed on the project especially the quality and quantity of the material used, couple with the fact that community members fully cooperated with the project workers both in terms of movement of construction materials, during construction work as well as safety measures for the community members.

Project Sustainability

The NEWMAP/Gombe State-funded project has a timeline, and it will end while the projects continue to mitigate the environmental problem and benefit the targeted communities. This is why project sustainability, especially after its implementation, is of paramount importance. This can only be achieved when the community is ready and willing to support that.

FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 2, No. 2, 2025
Print ISSN: 1595-9686
EISSN: 1595-9708

Figure 8: Project Sustainability
Source: Data Analysis (2022)

Figure 8 shows that 80% of respondents are willing to support the project's sustainability efforts after the project closes. This provides some confidence that the community is willing to manage the project after its completion. This can be done by preventing waste dumping in the water channel, implementing a water-harvesting strategy to reduce the development of new rills along the newly constructed channel, preventing animals and other vandals from destroying the vegetation planted for bio-remediation, and protecting the fence erected along the gully channels for safety.

Plate 2: During Interaction with PAPs at the Palace Hall of the District Head of Kagarawal

Another important component of these projects was community participation in implementing the projects studied. As in every developmental project, community participation is a critical component of implementation. Figure 9 revealed that 64% of respondents agreed that the community was adequately consulted during the implementation of gully control projects for GSU-Mallam Inna and FCE-Arawa. In comparison, only 8% disagreed, which was an insignificant number compared to the others. This finding implies that the community may have owned the project and ensured its protection from negative tendencies such as vandalism, as they were involved during the planning and implementation stages, and their views were adequately considered.

FUDMA Journal of Earth and Environmental Sciences (FUDJEES), Vol. 2, No. 2, 2025
Print ISSN: 1595-9686
EISSN: 1595-9708

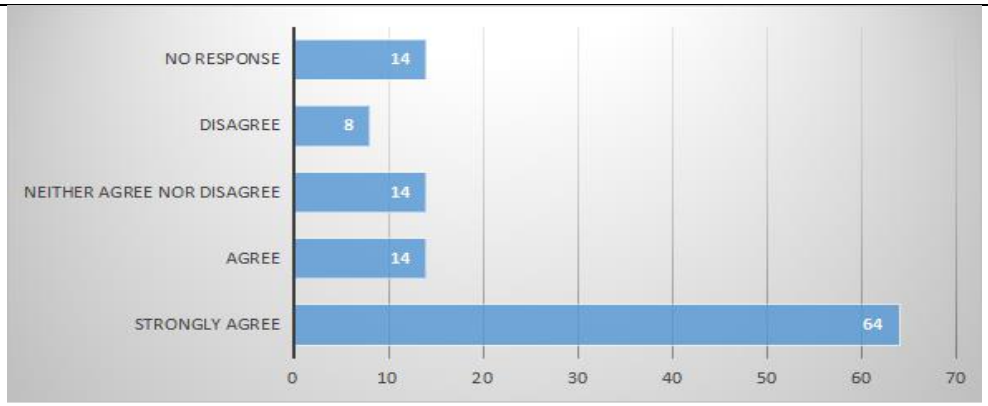

Figure 9: Community Participation in Implementation

These community members were mainly carried along during project implementation through the formation of community associations and community interest groups formed by each project-affected community through which meetings were held between the community and project proponents, as well as grievance redress mechanisms put in place to resolve any grievances between the community and project implementation agencies, contractors, or project staff.

With this result, it is safe to say that the project proponents in Gombe State have carried the community along through their representatives during project planning and implementation. This is contrary to a study conducted by Onu, Osahon, and Ukonu (2020), who reported low participation by gully communities in gully control activities despite a strong perception of the effects of gully erosion. Simeneh and Getachew (2016) acknowledged that community mobilisation and participation strategies were effective in mobilising all active labour forces expected to participate in watershed development activities. However, Simeneh and Getachew (2016) further discovered a gap between participation and reality, because some participation may not be based on interest.

CONCLUSION

The study concluded that the gully erosion control projects at GSU and FCE(T) were holistic in their approach, involving members of the project-affected communities at various stages of the projects, from project planning to implementation. The communities were also satisfied with how the project was executed, ensuring their support for the project's protection and sustainability. The study also concluded that there was community awareness and satisfaction with project execution, project viability, and their involvement in planning and implementation. The project recommended that, henceforth, community participation in all gully erosion projects is essential; therefore, the need to involve the community during project planning and implementation is sacrosanct.

REFERENCES

Abdulfatah I.A, Okunola I.A, Akande W.G, Momoh L.O, & Ibrahim K.O (2014). *Review of gully erosion in Nigeria: causes, impacts, and possible solutions. Journals of Geosciences and Geomatics,* vol. 2(3), pp. 125–129, Science and Education Publishing, 2014.

Aliyu D. (2017). *An Analysis of Gully Erosion and Land Use in Gombe Metropolis, Gombe State*, Unpublished MSc thesis, Department of Geography, Modibbo Adama University, Yola.

Amangabara G. T. (2012). *Analysis of Selected Failed Gully Erosion Control Works in Imo State*, Special Publication of the Nigerian Association of Hydrological Sciences, 2012.

Claassen R. (2004). *Have conservation compliance incentives reduced soil erosion*? Retrieved from www.ageconsearch.umm.edu. 15/7/2019.

Georgia Soil and Water Conservation Commission (2000). *Manual for Erosion and Sediment Control in Georgia, the Georgia* Soil and Water Conservation Commission, 2000, fifth edition.

Mbaya L.A (2017). Spatial Analysis of Gully Erosion Control Measures in Gombe Town. Journal of Advances in Image and Video Processing. Vol. 5, No. 4 (2017). DOI: doi.org/10.14738/aiv.53.3343.

NEWMAP-ESMP (2022). *Environment and social management plan (ESMP) final report*, Gombe-NEWMAP office.

Omeke J.O. (2016). SLM 306: Soil Erosion and Conservation (Lecture Modules) National Open University of Nigeria, School of Agricultural Science.

Onu S.E, Osahon E.E, & Ukonu B.U (2020). Assessment of Rural Community Efforts in Gully Erosion Control in Imo State, Nigeria. Nigerian Agricultural Journal. Volume 51, number 2, August 2020. ISSN: 0300-368, pp. 305-309. www.ajol.info

Romero-Díaz A., Díaz-Pereira E., DE Vente J. (2019). Ecosystem Services Provision By Gully Control. A Review. Cuadernos de Investigación Geográfica Geographical Research Letters 2019 Nº 45 (1) pp. 333-366 eISSN 1697-9540 DOI: http://doi.org/10.18172/cig.3552 © Universidad de La Rioja, 333 Cuadernos de Investigación Geográfica 45 (1), 2019, pp. 333–366.

Simeneh D.W., & Getechev F. (2016). Perception of Farmers toward Physical Soil and Water Conservation Structures in Wyebla Watershed, Northwest Ethiopia. The World Journal of Agricultural Sciences. Volume 12 (1): pp. 57–63, 2016. ISSN: 1817-3047. DOI: 10.5829/idosi.wjas.2016.12.1.1903

Telkar S.G., Shivendu Pratap Singh S, Joy Kumar D, & Kamal Kant (2015). Soil Erosion: Types and Their Mechanism. International Journal of Economic Plants 2015, 2(4):178–180. Dept. of Agriculture, Jagannath University, Chaksu, Jaipur, Rajasthan (303 901), India.