

COMMUNITY MONSTER: RECLAIMING THE BORROW PITS IN BATAGARAWA COMMUNITY OF NORTH-WESTERN NIGERIA

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Abstract

Land degradation is a global issue caused by weather extremes and human actions. Active pursuit of land reclamation policy, an aspect of land management techniques can help reverse the menace of land degradation. Land reclamation, particularly of borrow pits, can create a self-sustaining environment that attracts biodiversity and improves ecological services. Batagarawa township in North-Western Nigeria has a massive borrow pit covering an estimated area of 0.78 hectares. The pit is encroaching on other, important sites, causing environmental damage, loss of life, and contaminating other sources of water around it. This study used purposely selected samples and administered 300 copies of a structured questionnaire to collect primary data. Data collected were analysed using simple descriptive statistics such as percentages and frequency tables. The borrow pit, privately owned, has become a sewage and garbage dump due to extensive excavation work and population growth. It now extends to perimeter fencing walls of buildings, causing a threat to the environment. The study recommends restoring the site and supervising excavators with strict laws and penalties. Reclaiming existing borrow pits is a sustainable measure in environmental management.

Keywords: Borrow pits, Land degradation, Land Reclamation, North-western Nigeria, Rural community

INTRODUCTION

As a result of recent catastrophic environmental events in different parts of the world which claimed many lives and properties (Filkov et al., 2020), people are now beginning to give the environment the priority it deserves. Today, experts in every field tend to prioritize the environment in the course of their professional activities. Nonetheless, generally, human activities continue to pose threats to the natural environment, and if this trend is not urgently addressed, many more catastrophic consequences to the natural environment will occur. A borrow pit is a form of land degradation phenomenon caused by soil excavation activity. Land degradation shall continue to be a major global concern in the twenty-first century due to its negative influence on the environment, as well as its consequences for food security and quality of life (Barati et al., 2023). Aside from soil excavation, other factors that could cause land degradation are extreme weather conditions and other forms of human activities that pollute or deteriorate soil quality and land usability.

According to (Pratheepa et al., 2022), borrow pits and their associated risks are currently among the most noticeable degraded land areas in various communities, and they are on increasing with ever-increasing road construction works in many developing countries.

Frequent land sliding, loss of life and ecosystem services, groundwater contamination, and loss of arable land are all notable risk concerns (Tavares et al., 2021). Borrow pits are used to provide fill material for the construction of roads, canals, railways, and homes. They can be open or enclosed and can be subject to erosion or water infiltration. However, some borrow pits are left unattended, potentially causing negative environmental effects or aesthetics. Factors contributing to the construction and use of borrow pits include fluctuating fill material quality and demand, changes in management or ownership, and potential changes in environmental or societal effects.

There is a good amount of active and abandoned borrow pits in Nigeria, particularly in North-western Nigeria due to the increasing population and increased road construction works in the region (Owolabi et al., 2020). Mudi and Aliyu (2012) observed that laterite earth (found in these pits) has historically been the oldest and most widely recognized material used in building and construction. Many people in local communities where borrow pits exist prefer mud buildings made of laterite to cement block buildings essentially because of their low cost, ease of construction, and the opportunity to recycle the building material in the long run. Thus, it is mostly used in Northern Nigeria as a cheap source of building materials for the low-income group. Moreover, the low-income socioeconomic class constitutes the vast majority of the population of people in the Northwest region of Nigeria; hence mud buildings are a common landscape feature in the region.

Physical measures to stop land degradation include reduced tillage (minimizing soil disturbance and allowing crop residue or stubble to remain on the ground); residue retention (preventing on-site grazing of the remains of field crops after the valuable parts); the use of nitrogen-fixing cover crops or intercropping, and the management of mixed-species (forest management paradigm that aims to maintain or enhance the ecological, economic and social benefits of forests comprising different tree species). Previous researches indicate that, however, degradation can be stopped and reversed with the use of proper land management techniques (Shaon et al, 2022), which would also serve several other sustainable development goals. Managed ecosystems devote special attention to soils because of the vital role they play in regulating nutrient and water flows, fertility, and the potential long residence times of soil carbon. According to Arneeth et al., (2021), a sustainable solution to land degradation requires a combination of policies). Therefore, land restoration aspirations can be reinforced, first by, incorporating scientific knowledge of environmental, economic, and sociocultural drivers and consequences into environmental management policies, and second by considering stakeholders' perspectives for different ecosystem service options (Yang et al., 2020).

The process of transforming land to restore it to more beneficial use is known as land reclamation. Land reclamation involves restoring degraded land to its original state or a usable state through land levelling, selective planting technique, or by using both methods together. In environmental management practice, resources that are lacking or not functioning properly are frequently recovered to their original form, in keeping with the existing state of the immediate surroundings. In environmental management practice, an effort is usually made by using appropriate methods to restore resources that are lacking or not functioning properly to their original form, in keeping with the existing state of the immediate surroundings.

Beyond environmental management methods, engineering techniques could also be used in the land reclamation process.

Several engineering techniques, including rearranging landforms, importing soil, and revegetation, can be used to repair damaged ecosystems (Kalu et al., 2021); using topsoil, plants, good drainage, and landscape techniques. Borrow pits should be properly reclaimed by employing a bulldozer to move nearby land, fill the pit using soil, and move the surrounding area. Following this, the earth material is compacted, and in-situ and laboratory analyses are conducted to establish the initial geotechnical ground condition as observed (Nwachukwu, 2017). Reclaimed borrow pit sites are turned green and used as agricultural or recreational facilities. Properly reclaimed borrow pit encourages a self-sustaining environment that attracts biodiversity while also improving ecological services and the protection of the environment (Turner et al., 2021).

Borrow pits are regulated in many states and nations (Abraham et al., 2022), and owners must obtain licenses to operate them. Typically, severe conditions must be met, such as the rehabilitation of the area. Notwithstanding this, borrow pits remain common sights in many communities; however, the local community sees them as unpopular features which portend environmental scars on the landscape that promote erosion.

Housing developments in north-western Nigeria commonly use fill material from borrow pits to provide a strong base with the required conditions for building work in a specific location, and in addition, the clay material used in building construction in the area is excavated from borrow pits too (Maimagani, 2021). The existing borrow pit in Batagarawa Township has transformed into a significant landscape feature in the neighbourhood, posing substantial ecological challenges. The objective of this study is to investigate the pit's current situation, assess its impact on the environment, and recommend appropriate measures for its reclamation and restoration.

RESEARCH METHODOLOGY

Through on-site observations, a qualitative study makes use of first-hand data (Aldaihani, 2022). Following this pattern, the study of the borrow pit was conducted during the dry months of the year when the pit becomes more noticeable in the community as they collect water from it during such periods (see Figure 1). Additionally, a questionnaire was distributed to the community members who had been deliberately chosen. This method was chosen because it demonstrates and ensures objective findings, as recommended by Coleman (2022).

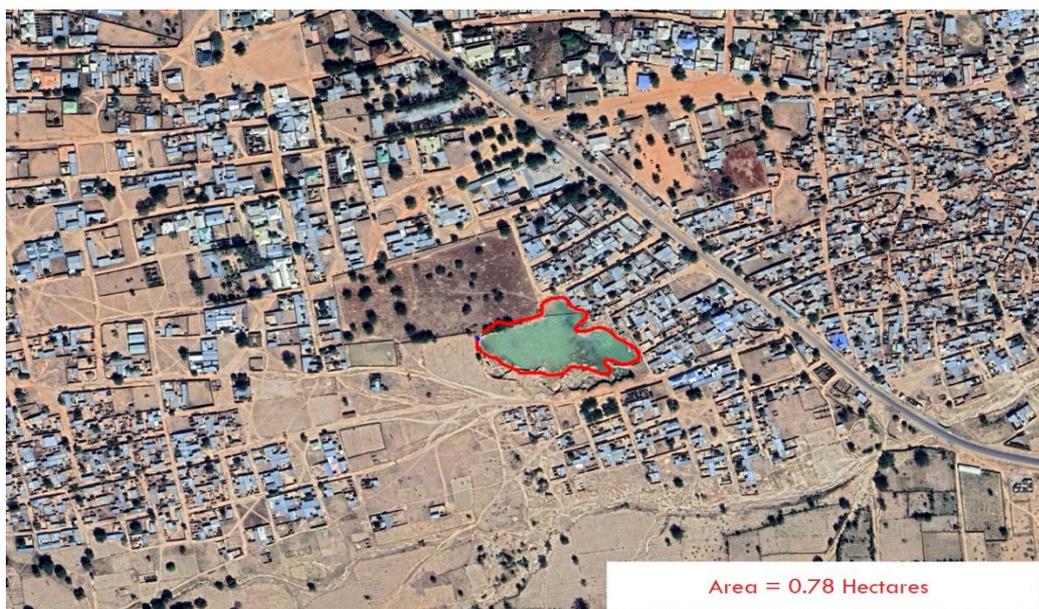


Figure 1: Google Image showing the borrow pit containing water within Batagarawa township

Source: Google Image (2023)

The study relied on primary data collected from site observations and a structured questionnaire. Two hundred and twenty (220) sets of structured questionnaires were distributed to various targeted populations that were purposefully selected to represent the community, excavators, and community-based organizations. Table 1 summarizes the findings relating to the participants' profiles as a consequence of the interview. All of the participants were men, with the majority (96%) falling between the ages of 40 and above. On educational attainment, 85% have attended tertiary education, and the majority 83% are civil servants.

Table 1: Participants' Profile

Category	Sub-category	Frequency	Percentage
Gender	Male	220	100
	Female	0	0
Age	20-39	8	8.4
	40-59	165	75
	60 and above	47	21
Education	Elementary	10	5
	Secondary	22	10
	Tertiary	188	85
Employment	Civil Service	180	83
	Self-employed	15	7
	Retiree	25	11

Source: Fieldwork, 2023

The findings show that all of the participants are male, which is a true representation of tradition in Northern Nigeria when only the male gender was in control and concerned with

the affairs of the community as demonstrated by (Ali, 2019; Ifekwe et al., 2019; Igwubor, 2020). The education level of the respondents is a translation of the proximity of the community to the educational institutions, this explains the need for an organized space as inferred by Abdulrashid et al. (2017). As previously mentioned, the site is situated in Batagarawa District of Katsina State, Nigeria. About 77 percent of participants responded that the borrow pits have been excavated for over 40 years (see Table 2).

RESULTS

The Study Area

The study was carried out in Batagarawa Local Government Area (LGA) of Katsina State Nigeria. The LGA which is 433km² (167 sq. mile) in size, is situated at 12°54'09.42" N 7°36'43.10" E, with an expected population of 280,916 in 2020 (Gidado et al., 2022). The existing borrow pit in Batagarawa Township is taken as a case for the study (Campbell et al., 2020). According to Abdulrashid et al. (2017), Batagarawa town in Katsina state is distinguished by loamy sand, sandy loam, sandy clay, and sand. The effects of weathering are amplified on Batagarawa by the geology and climate. Borrow pits are prevalent in rural communities in northern Nigeria. Batagarawa Township in North-Western Nigeria has a massive borrow pit covering an estimated area of 0.78 hectares. The pit is encroaching on other, important sites, causing environmental damage, loss of life, and contaminating other sources of water around it.

Batagarawa was chosen for this study because of its proximity to the Katsina metropolitan area (which is about 10 kilometers from Katsina); additionally, The presence of educational institutions (such as Al-Qalam University, Umar Musa Yar'adua University, Katsina Open University, Katsina Polytechnic, and Federal College of Education) indicates that Batagarawa residents have a high level of education, which contributes to the town's rapid development. This resulted in an increase in demand for space due to the inflow of population this demands the recovery of the borrow pit that could need extra adjustments or specialized knowledge to raise its quality. The chosen site is located in Batagarawa which is a good illustration of North-Western Nigeria because of the homogeneity nature of the region.

History and Location of the Borrow Pit

As previously mentioned, the site is situated in Batagarawa District of Katsina State, Nigeria. About 82 percent of participants responded that the borrow pits have been excavated for over 40 years (see Table 2). This is because a community member may decide to dig a section of his farmland, which is located approximately a km distant from the community's homes since he required soil to build a room in his house. Because at that time, farmlands were privately owned, there was no law prohibiting him from doing so, and he had no idea of the environmental effects, so he dug up the ground to get a strong building material. This motivated his neighbour to do the same, and soon, buildings made of dug-up materials started to appear in the neighbourhood. Table 2, indicates that 95% of the participants testified to the borrow pit being owned by individuals, just as farmlands were initially privately owned by individuals in the community, so too were the pits.

Table 2: History and Ownership of the Borrow pit

Category	Sub-category	Frequency	Percentage
How old is the pit?	20 years -39 years	40	18
	40 years -59 years	120	55
	60 years and above	60	27
What was the pit before?	Barren Land	10	4
	Farm Land	180	82
	Plot of Land	30	14
Who owns the borrow pit?	Government	1	0
	Community	10	5
	Individual	209	95

Source: Fieldwork, 2023

When the excavation began in the 1970s, the site was approximately one kilometre away from the settlement. As a result of extensive excavation activities due to population growth and increased shelter demand, the pit now covers a large area, and is almost merging with the settlement area. It is also encroaching on some important sites on the outer fringes of Batagarawa town, for example, the Muslims' annual congregational prayer site (Eid ground) and its environs. Equally, the perimeter walls of the community's graveyard's are almost on the pit. Also, because the pit has expanded to reach the perimeter fences of some buildings, it has been turned into sewage and refuse dump site, as shown in Plate 1.



Plate 1: Showing the borrow pit encroachment on the perimeter wall of community graveyard, as well as waste dump sites within it

Source: Fieldwork, 2023

The pit keeps getting bigger and deeper as the demand for clay as a building material increases. The ditches have now come together to form an enormous borrow pit, with excavation occurring at various points along the pit to deepen those points. This has created a monster in the community, as depicted in Plate 1, with an estimated area of 68,400 square meters and depths ranging from 0.7 meters to 6 meters, all formed into an irregular shape. The pit is active because excavation activities are continuing, and this has caused it to expand to the point where it now approaches the nearby land uses. There are narrow pathways in the

east and north of Batagarawa linking the community, and walking on these pathways could be dangerous, particularly for the children. With no safety barrier, the locals made a path for their waste dumping, as shown in Plate 2 and Plate 3. This shows that both adults and children pass through this dangerous narrow slippery path on the cliff of an unprotected raven to get to different parts of the community.



Plate 2: A woman walking on the narrow footpath which borders the borrow pits and the buildings with no protective barrier

Source: Fieldwork, 2023



Plate 3: A boy walking on the narrow footpath which borders the borrow pit and the buildings with no protective barrier

Source: Fieldwork 2023

Individuals from the community constructed borrow pits in the community of northwest Nigeria for a long time, according to (Aka et al., 2022; Ibeneme et al., 2014; Osumgborogwu & Chibo, 2017; Sumani, 2019) The study area is designated as degraded land and danger zone, which is an exact representation of any borrow pit situated within a community, as

shown in the literature (Gidado et al, 2022; Nwachukwu & Eburukevwe, 2013; Nwachukwu, 2017).

Positive Effects of Batagarawa Borrow Pit

Since the 1970s, residents of the study area have been using the borrow pit sites to extract clay or laterite for use as building materials. Plate 4 shows that the borrow pit is still in use, with people using the excavated clay to make blocks while utilizing the water that was stored in the lakes that were formed during the excavation. The community has used materials excavated up there to construct several buildings and has continued to use the rubble and soil dug up from the borrow pits. The best locations in the borrow pits to find clay is in the floodplains of rivers and streams as well as at the base of ponds, and lakes, this encourages the excavators to dig trenches within the pit forming a sort of man-made lake. They also use the lakes as sources of water supply in the mud block production process. Ponds of water are trapped in the excavated pits for various economic uses.



Plate 4: Shows how the community excavates the borrow pits to make the building materials.

Source: Fieldwork, 2023

Mudi and Aliyu (2012) confirmed that borrow pits are excavated to provide fill material, such as gravel or clay, for building projects, and most notably for house constructions in northern Nigeria (Akinwumi et al., 2021; Attah, 1994; Ibeneme et al, 2014; Nwachukwu & Eburukevwe, 2013; Owolabi et al., 2020)

Plate 5 and Plate 6 illustrate that water in the lake serves dual purposes, for example, Plate 5 shows mud excavators using water from the artificial mini lakes for making mud blocks, while a woman and her child are depicted in Plate 6 sourcing water for household's domestic uses.



Plate 5: Showing how the borrow pits store water in the form of lakes which the excavators use to mould blocks

Source: Fieldwork, 2023



Plate 6: A woman and her child crossed all the hurdles to fetch water from one of the lakes within the borrow pits for domestic use

Source: Fieldwork, 2023

Contiguously lying deep borrow pits in the site have formed a type of man-made lake in the area. These artificial mini lakes store large volumes of water to serve the community's water needs in the dry season. Water holdings in the lake which are close to the human settlement area are used by the community as a source of water for animal care and household uses. Borrow pits in Batagarawa are used as domestic water storage reservoirs, and this finding is in agreement with Kankara and Yunusa (2020) who submitted that borrow pits serve as sources of water supply in rural communities of northern Nigeria.

The Negative Effects of Batagarawa Borrow Pit

Although excavation activities in Batagarawa borrow pit have now developed into a source of income for both the excavators and other people, it nonetheless has some negative impacts.

Therefore, the pit's negative effects cannot be overstated. Loss of life in the site has almost become routine, with an average of two people dying annually, particularly during the rainy season because the unprotected narrow walk paths around the pits become slippery during the rainy season. All of the participants agreed that deaths occur almost yearly and that the water accumulated in the pit is turbid and does not visibly appear suitable for drinking (as can be seen in Plate 6). Some of the adjacent buildings' perimeter fence walls have collapsed, while the fence walls of other nearby buildings to the pits other are about to collapse too. Regardless, of the severe threat to human residences, presently caused by the expansion of the borrow pit in the area, excavation is still on-going. Furthermore, excavation in the pit has reached the road on the southern side, thus, narrowing the access way on that axis too, and also increasing the danger to human life in the area. Although it has earlier been highlighted that the borrow pit is a major source of water for the community, the participants however confirmed that water from the pit is of very poor quality. The use of such poor-quality water could be harmful to human health and well-being. Plate 7 shows how the pit's environment has deteriorated.



Plate 7: The borrow pits and the extent of damage done to the environment

Source: Fieldwork, 2023

Environmental safety and the likelihood of sliding are influenced by the sliding angle, pit slope angle, and pit effective depth, according to the study (Nwachukwu & Eburukevwe, 2013). The study's findings on loss of life and ecology are accurate (Nwachukwu et al., 2017).

RECOMMENDATIONS

Considering the findings of this study, there is an urgent need for the three tiers of government to synergize in regulating further excavation activities, reclaiming, and upgrading the degraded site for sustainable economic use. This study, therefore, provides the following specific recommendations:

First, the State Government and the Local Government Authority should work together to establish a supervisory and regulatory framework for controlling excavation activities in the entire district, so that those that breach the rule will be prosecuted. Second, the two tiers of government mentioned need to mobilize the excavators into a cooperative for ease of regulation and control. Third, the government should encourage the cooperative to organize the installation of safety handrails in appropriate sections of the pathways. Fourth, the appropriate state ministry should liaise with the Local Government Area and the Cooperatives to pave necessary sections of the important paths while closing the less important ones. Fifth, the State Government should liaise with the Federal Government to provide sustainable water infrastructure to the community; and sixth, the three tiers of government should work together to reclaim and turn the abandoned portions of the borrow pits into agricultural land for organized farm business.

CONCLUSION

This study concludes that the existence of the Batagarawa borrow pit constitutes a source of danger to the members of the community, although it also offers some socioeconomic benefits to the community. The risk factors associated with the borrow pit are largely a result of the merging of the borrow pit with human residences. Moreover, the fact that the pathways leading to various parts of the borrow pits from the settlement areas are unprotected and slippery increases the risk. Notwithstanding the risk involved, the absence of an alternative source of water in the area compels the residents of Batagarawa to always traverse the dangerous pathways to fetch water trapped in the open cast holes for domestic use. This is an indication that potable water is a scarce commodity in Batagarawa town.

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