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ORIGINAL ARTICLE

Mining-induced displacement and resettlement in Ghana: an assessment of the prospects and challenges in selected mining communities

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Abstract
Mining-induced displacement and resettlement is an important development issue because it significantly influences the livelihoods and sustainability of mining communities. This study seeks to assess the effects of mining-induced displacement and resettlement on the livelihoods of households in selected mining communities in Ghana. The mixed-method approach was used to conduct this study, permitting the collection of both quantitative and qualitative data. The quantitative data were collected through the interview of 195 household heads, while the qualitative data involved the interview of six representatives of relevant institutions. The results of the study showed that mining-induced displacement has both positive and negative effects on indigenous mining communities. In terms of the positive effects, there was an improvement in access to social infrastructure such as health, education, and potable water in the study communities. The results of the study also showed that there is an increase in the disposable income of the respondents, and this can be attributed to the increase in service-related activities. In terms of the negative effects of mining-induced displacement and resettlement, there was loss of social and human capital, alterations in economic activities, lower satisfaction with life (SWL), and loss of natural capital in the indigenous communities. The lack of awareness of the regulations that guide resettlement and displacement among indigenous mining communities has adversely affected their ability to effectively participate in the resettlement process. There is therefore the need to educate mining communities on the regulations that guide the resettlement process. Additionally, mining companies should conduct impact assessments in the resettled communities to assess the effects of the resettlement process on the indigenous communities.

Keywords Mining · Resettlement · Displacement · Social capital · Natural capital · Mining-induced displacement and resettlement · Sustainable livelihood framework

1 Introduction

Mining-induced displacement and resettlement (MIDR) involves the involuntary movement of people from one geographic area to the other due to the destruction caused by mining activities to their original settlements. The quest for personal and national fortune leads to mining-induced displacement and resettlement (MIDR). MIDR has been witnessed in many countries worldwide, even though the state of knowledge around MIDR is limited (Owen and Kemp 2014). MIDR can lead to a critical social disturbance in the socioeconomic conditions of displaced persons; arguably, it is an unavoidable outcome of continuous mineral exploitation (Owen and Kemp 2014; Kemp et al. 2017). The phenomenon of MIDR is not limited to countries in the Global South. Terminski (2012) noted that the development

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of lignite mines in Germany has contributed to the displacement of thousands of people who lived around these mining sites before the establishment of the mines. In Africa, the removal of people from their settlements due to mining activities is evident in the displacement of many households and hundreds of ancestral graves by Murouwa and Chiadzwa diamond mining companies in Zimbabwe (Terminski 2012). In Ghana, mining is one of the production sectors that contributes significantly to the nation's Gross Domestic Product (GDP). According to Sasu (2023), in the second quarter of 2021, the mining sector contributed an estimated 809.4 million US Dollars to GDP. After independence, Ghana's mining industry underwent transformational and structural changes. Many existing mining companies, which were state-owned under various divestiture programmes, are now in the hands of private investors (Ghana Investment Promotion Centre 2020).

In many cases, the state uses its powers of eminent domain. The government uses the Mining and Minerals Act, 2006 (ACT 703) to acquire land that contains significant mineral deposits for mining companies. Mining companies are expected to negotiate and pay fair and adequate compensation to individuals who may have surface rights because they have landed property or interest on the land. Private mining companies tend to pay property owners amounts that are not sufficient and further destroy sources of their livelihoods by destroying fertile land in search of more minerals to maximize profits (Baddianaah et al. 2022). Viitanen and Kakulu (2009) note that owners or lawful occupiers can be deprived of their property rights for a public interest, purpose, or benefit. The lack of precise legislative instruments identifying who can receive compensation and how compensation can be calculated and used leaves property owners worse off than they were, thus making it difficult for them to make an honest living (Kidido et al. 2015).

Despite this, key stakeholders worldwide, such as the International Finance Corporation (IFC) and the World Bank, have developed best practices to alleviate the complex impacts of mining-induced displacement. The International Financial Corporation's Performance Standard 5 on land acquisition and involuntary resettlement and the World Bank's Operational Practice 4.12 call for the complete reduction of adverse effects on displaced persons, be it social or economic impacts caused by land acquisition or limitation of land use by compensation of assets at replacement costs (World Bank, 2001; IFC, 2012). These international bodies advocate for projects to help affected persons advance their livelihood or reinstate it to pre-displacement levels. However, the extent to which these best practices have contributed to minimizing the potential adverse outcomes of mining-induced displacement and resettlement leaves much to be desired. The over-reliance on broad social safeguards for involuntary displacement while refusing to manage issues of relationships and community participation in the design, planning, and implementation of resettlement action plans results in the marginalization of affected persons' views, opinions, and interests (Conde and Le Billon, 2017).

Mining-induced displacement and resettlement can positively or negatively impact displaced or resettled persons. Such impacts include employment opportunities, local contacts, and social infrastructure. Evidence suggests that mining-induced displacement and resettlement adversely affect mining communities, as affected households are the recipient of all environmental costs of mining and face an unfavourable socioeconomic condition, often exacerbated by unproductive livelihood reconstruction programmes (Aubynn 2003; ActionAid 2008; Madebwe and Mavusa 2011; Human Rights Watch, 2014).

In conventional literature, many scholarly works have been done on mining-induced displacement and resettlement and livelihood reconstruction programmes. Notable studies on the impacts of mining-induced displacement and resettlement in Africa have been documented by Downing (2002), Fernandes (2007), and Terminski (2012). On the development and improvement of international standards and safeguards, scholarly works such as Cernea (2000), Scudder (2005), and Mathur (2013) have been well documented. Other studies also focus on the effect of policy on mining and displacement (Szablowski, 2002; Nambiza, 2007; Wilson, 2013; Hemer, 2016). However, despite the great strides made in this notable area of research, particularly in the West Africa sub-region on mining-induced displacement and resettlement, little has been done on the dynamics of MIDR in a particular local context. The levels of awareness of property owners about resettlement and displacement regulations and how mining activities alter the livelihoods and choices of individuals and households remain limited in the conventional literature. Therefore, this study's overarching objective is to assess the prospects and challenges of mining-induced displacement and resettlement on the livelihoods of Manso Nkran and Tetrem Communities in the Amansie South and West Districts in the Ashanti Region. Some community members have been displaced due to activities of Asanko Gold Mine, one of the top ten largest private gold mining companies, which affects the livelihoods of local households, especially those engaged in agriculture (Peprah et al. 2017).

2 Theoretical and conceptual review of mining-induced displacement and resettlement and livelihoods

Mining-induced resettlement is the overall process of planning, designing, and implementing the relocation package of people, households, and communities from one location to

another because of mining projects and all the related activities such as the provision of compensation, livelihood restoration, and restoring or improving the social condition of the community (Vanclay, 2017). Mining-induced displacement encompasses the involuntary movement of affected people from their former locations to another location and socioeconomic activities (Wilson, 2019). Mandishekwa and Mutenheri (2020) noted that mining-induced displacement and resettlement is primarily an economic event associated with the loss or substantial reduction in access to essential resources by resettled communities. Mining activities including mining-induced displacement and resettlements adversely affect the natural environment of mining communities. Mining companies and investors are most often primarily interested in the return on their investment rather than the sustainable development of the local communities. All these enumerated factors make mining-induced displacement problematic, especially for developing countries.

Mining activities are primarily undertaken globally by private and multinational companies. Through mutual agreements or executive instruments, mining companies acquire land for mining purposes. In Ghana, for example, the Mining and Minerals Act, 2006 (ACT703) allows the president of the republic to acquire land that it deems to have valuable mineral deposits for the benefit of the state. However, it has been noted that the lack of legislative instruments that guide the identification of the right people due to compensation is a significant challenge (Kidido et al. 2015). The old-age question of who decides how much a property owner's property is worth and how much they must be paid is another challenge that lingers since there has been a lack of legislative instruments establishing a method of valuation and payment of compensation. These challenges create room for ambiguity during the compensation process and thus make it easy to displace people when a significant amount of minerals is identified near their settlement. Due to the weaknesses in mining regulations, it is easier for multinational companies to cheat property owners by paying low compensations to people who are unqualified to receive compensations on behalf of households by using corrupt practices (Baddianaah et al. 2022). The Mineral Commission in 1984, enacted the minerals and mining code in 1986, and the enactment of the Minerals and Mining Act (Act, 2006) and the Legislative Instrument (LI) (2175, which regulates and directs all involuntary resettlement in the mining industry (Akabzaa and Darimani, 2001). Despite the establishment of the Minerals Development Fund, the 20% fund of the government makes available from royalties from mining companies paid into the Minerals Development Fund ends up in a few local elites (Lujala 2020). This, therefore, denies legitimate property owners the compensations that they are due and thus worsens the socioeconomic and ecological conditions in Ghanaian mining communities. Even though there are some forms of legislation and regulations, there still exist gaps in mining legislation in Ghana. Poor institutional capacities make the situation worse since the enforcement of local regulations on mining and the relocation of displaced people in mining communities are poor (Lujala 2020). For instance, laws barring foreigners from engaging in mining in Ghana are not effectively enforced, thus encouraging some notorious foreigners to engage in illegal mining and thus displacing people living in mining communities without paying them adequate compensation for relocation (Baddianaah et al. 2022).

Mining-induced displacement and resettlement (MIDR) can have significant social consequences and impact the socioeconomic condition of resettled persons, yet it is an unavoidable outcome of continuous mineral exploitation and mining (Kemp et al. 2017; Owen and Kemp 2014). Mining-induced displacement and resettlement may be vastly injurious to mining communities as affected households would have to endure the environmental costs of mining and face other unfavourable socioeconomic conditions, often aggravated by unplanned livelihood reconstruction programmes (ActionAid 2008; Adjei 2007; Aubynn 2003). According to (Twerefoo 2021) and Owen and Kemp (2014), mining-induced displacement and resettlement create challenges in displaced communities. Some members of the affected community face significant challenges such as landlessness, joblessness, homelessness, marginalization, food insecurity, loss of access to common property and services, and social disarticulation.

Figure 1 focused on the effects of mining-induced displacement and resettlement on the livelihoods of affected mining communities. Therefore, the framework shows the drivers of mining-induced displacement and resettlement, the impact of MIDR, and the households' livelihood assets. The study is based on the Sustainable Livelihood Framework of DFID 1999 (Department for International Development 2001). It also showed the predicted effects of mining-induced resettlement and resettlement on livelihood assets, strategies, and outcomes. Figure 1 further shows livelihood assets that enable community members to make a living and reduce their level of poverty and vulnerability. These assets include natural capital, human capital, and financial capital. National policies and processes affect the livelihood capital or assets of community members; for example, poor mining and relocation policies enable mining companies and corrupt individuals to steal possession of lands.

Government policy shocks on human, financial, and capital assets can lead to food insecurity, joblessness, and landlessness. The framework concludes with the likely adaptive livelihood strategies that households and individuals will adopt in response to mining-induced displacement and resettlement effects. Some of these livelihood strategies adopted include farming and working in mining-related jobs. It is

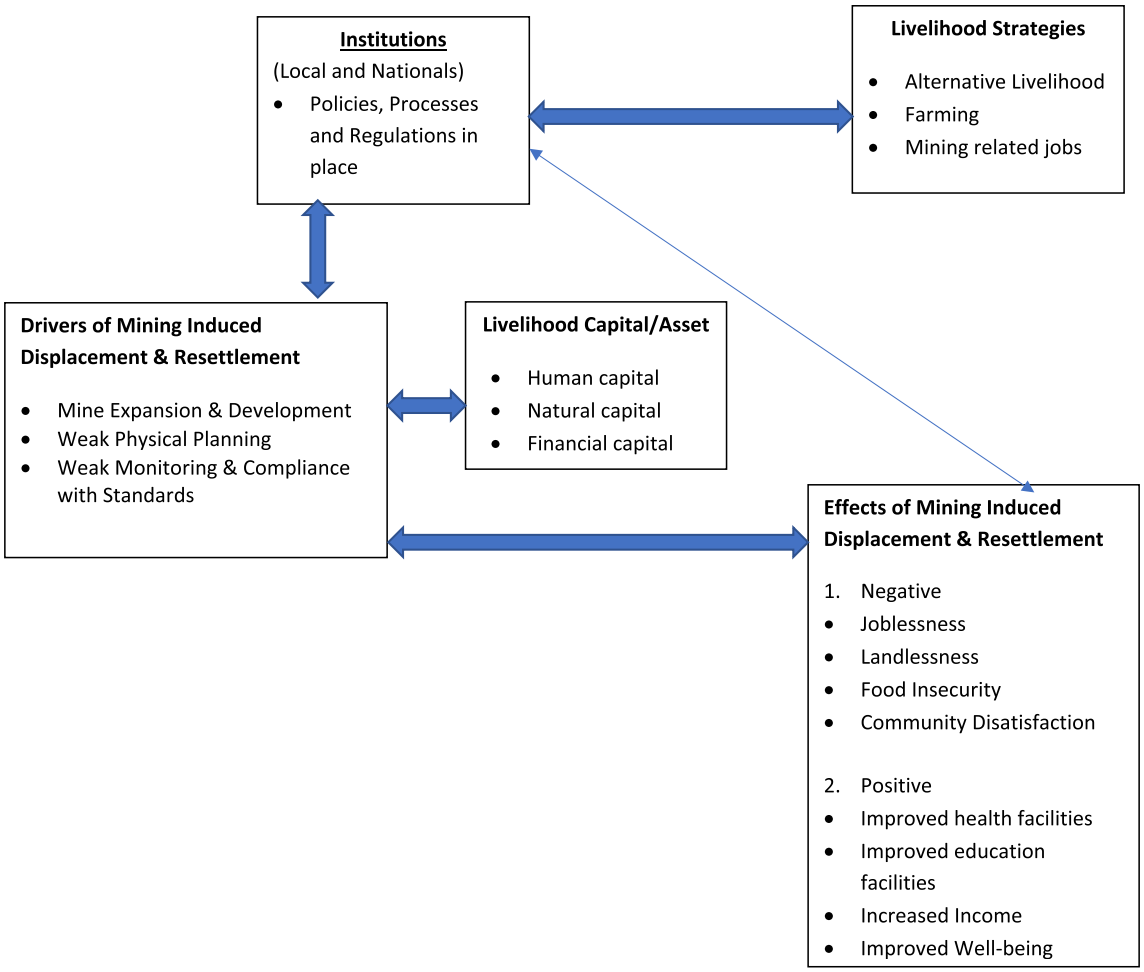

Fig. 1 Conceptual framework

important to note that access to livelihood assets determines livelihood strategies or activities people choose. Strategies shown in the conceptual framework of this study can be an alternative livelihood, agriculture, or short-term/long-term outmigration, depending on existing circumstances. Institutions, policies, and processes can also mediate access to livelihood assets and the choice of livelihood strategies, which may be opportunities or threats that affect livelihoods. The income level achieved through the livelihood strategies adopted is the primary livelihood outcome evaluated in this study. The conceptual framework is shown in Fig. 1.

3 Materials and methods

3.1 Study setting

Geographically, the study was carried out in the West and South Amansie Districts of the Ashanti Region. The Amansie West District is one of the forty-three (43) Districts in the Ashanti Region. The district shares administrative boundaries with six districts: Atwima Nwabiagya and Atwima Kwanwoma to the north, Atwima Mponua to the west, Bekwai Municipality to the east, and Amansie Central and Amansie South to the south. The district has a total land area of approximately 1,364 square kilometres.

The Amansie South District was also carved out of the former Amansie West District in 2018 with Legislative Instrument 2325. It shares administrative boundaries with Amansie West to the north, Atwima Nwabiagya, Atwima Mponua to the east, Amansie Central and Obuasi Municipal to the west, and Upper Denkyira to the south. The district also shares boundaries with Central Region. The district has a total land area of about 1,364 square kilometres. The district is endowed with natural resources such as gold. Communities with such deposits include Tontokrom, Datano, Manso Nkran, Adubia, and others.

According to Ghana Statistical Service (2010), agriculture, forestry, and fishing are the predominant livelihood activities in the Amansie West District and the Amansie

South District. In Amansie West District, 59.2% of the population depends on agriculture as their main source of their livelihood. In recent years, the discovery of a significant deposit of gold in the districts attracted the Asanko Gold Mining Company to the selected communities in these two districts. The Asanko Gold mines have started operations in the two selected study areas in 2015. The selection of study sites for this research was therefore based on the operations of Asanko Gold Mines in the study communities. This helped the researchers to effectively investigate issues that relate to displacement, relocation, and the interruption of local livelihoods in the selected communities. The involuntary resettlement of the communities allowed the construction and development of the mines and other infrastructure facilities at the current Manso Nkran and Tetrem locations. The resettlement was also aimed at obviating and eliminating any potential adverse impacts resulting from economic displacement that may impact the Project Affected Persons (PAPs) as stipulated in Regulation 176 of the Minerals and Mining Explosive Regulations,2012 (L.I. 2177).

Mining operations have resulted in the displacement and resettlement of these affected communities. Therefore, the purposive selection of Manso Nkran and Tetrem as study sites for this research helped in assessing the effects of displacement and relocation on indigenous communities (Figs. 2 and 3).

3.2 Data collection process

The study adopted a quasi-experimental design to establish cause-and-effect relationships of interventions using non-randomization criteria. The quasi-experimental research design helped the researchers to investigate the prospects and challenges of mining-induced displacement and resettlement on the livelihoods of the selected indigenous communities. The quasi-experimental research design helped the researchers to accurately capture different sets of data for different periods studied in terms of the actual state of living conditions of households before and after mining-induced displacement. The research, therefore, focused on the period between 2015 and 2020. This helped in data comparison over the periods, allowing researchers to draw well-informed conclusions. This study adopted the mixed-method approach, including collecting and using both qualitative and quantitative data. The mixed-method approach enabled the researchers to consider the shortfall of a single method (Creswell et al. 2004). This approach is often used in research to appreciate better the social, economic, cultural, and environmental parameters important in measuring the standard of living (Ozawa and Pongpirul 2014), which this study sought to explore in terms of the status of the livelihood and the well-being of households.

The qualitative data were collected through face-to-face interviews. Interview guides were used to interview eight key informants. The face-to-face interview technique was selected because it allowed researchers to probe outstanding

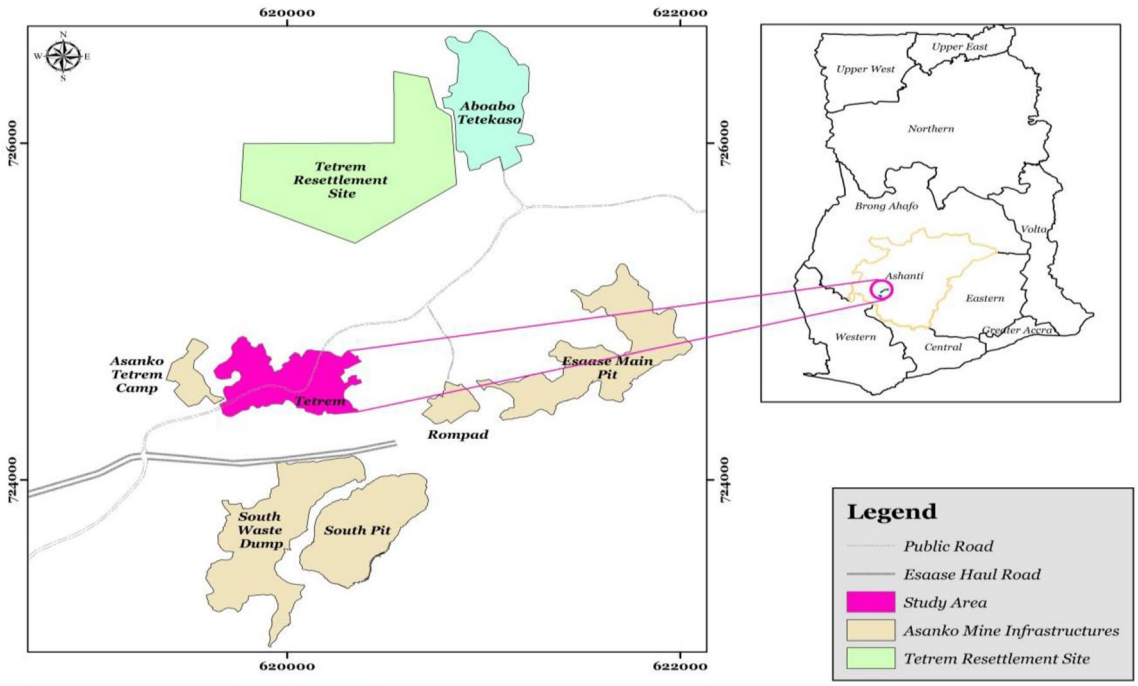

Fig. 2 Map of the study area

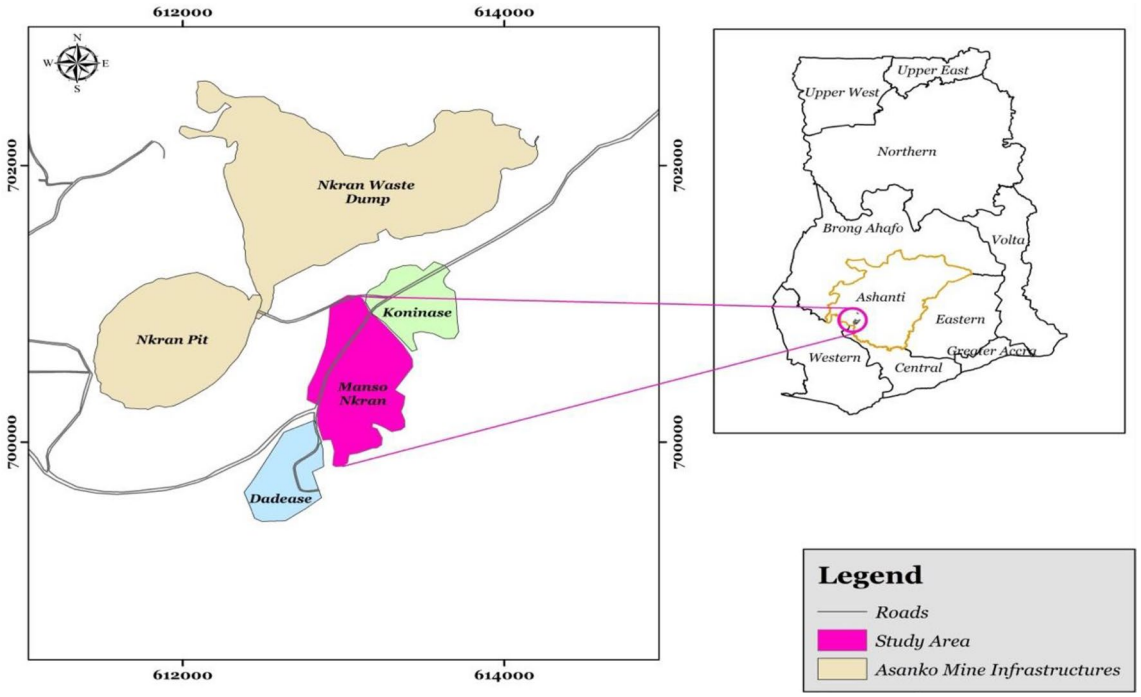

Fig. 3 Map showing the location of the study area (Manso Nkran)

issues further using follow-up questions. The key informants who provided the qualitative data included the Unit Heads of Works, Development Planning, and Physical Planning departments in the District Assemblies and representatives of Asanko Gold Mines within the two districts where the study communities are located. Focus group discussions and observation were also used to collect qualitative data. The Focus Group Discussions (FDGs) consisted of 8 respondents in a group. Participants were encouraged and allowed to talk about how the mining activities undertaken by the Asanko mining company have affected their lives and the strategies they have adapted to mitigate the effects of displacement and relocation. The researchers were aware of gender issues that could have cultural roots that can prevent each participant, especially women, from fully participating during focus group discussions. To mitigate this issue, the researchers organized single-sex focused groups to ensure that women would feel comfortable contributing to the discussion in the absence of men. On average, FGDs lasted 30 min and were conducted in an open space.

The quantitative data, on the other hand, were collected using semi-structured questionnaires. Respondents to the cross-sectional survey were heads of households in the study communities. The sampling frame for the two communities was determined from secondary data from the Amansie West and South District Assemblies and Asanko Gold Mines. The number of households for Manso Nkran was 93, and that of Tetrem was 302. Based on these household numbers obtained, the sample size for the two study communities was scientifically determined using the Dilman (2007) method to calculate an appropriate sample size. This formula uses two means of calculating the research sample size. One of the means is the 50/50 split, meaning that the population is completely divided in their response. Therefore, researchers would expect 50% of the respondents to answer in one way and the other 50% in the other. The other means of estimating the sample size is the 80/20 split, which means the answers are less variable. This shows that most of the respondents have similar characteristics.

If researchers have very little information or no knowledge about the diversity of characteristics and behaviour of the study population, the conservative 50/50 split is recommended. In contrast, if researchers know the diversity of characteristics and opinions among the population, 80/20 is also recommended. This study adopted the 80/20 split to estimate the sample size. This was adopted because, before data collection, the researchers undertook a reconnaissance survey to test the robustness and reliability of research instruments and obtain the total number of households in the study communities. The survey revealed that responses were less variable, and the population shared similar characteristics. Therefore, this called for adopting the 80/20 split, which the study used. The

following is Dilman's (2007) sample size determination formula and sample sizes for study communities.

$$\mathrm{Ns} = \frac{(\mathrm{Np})(\mathrm{p})(1-\mathrm{p})}{(Np-1)(B/C)^2 + (p)(1-p)}$$

where

*N*s = completed sample size needed (notation often used is *n*).

*N*p = population size of population (notation often used is *N*). *p* = proportion expected to answer a certain way (80% or 0.8 is the most conservative)

B = acceptable level of sampling error (0.05 = ± 5%).

C = *Z* statistic associated with confidence interval (1.960 = 95% confidence level).

4 Manso Nkran

Total number of counted households = 93

$$\mathrm{Ns} = \frac{(93)(0.8)(1-0.8)}{(93-1)(0.05/1.96)^2 + (0.8)(1-0.8)} = 67$$

$$Ns = 67$$

5 Tetrem

Total number of counted Households = 302

$$\mathrm{Ns} = \frac{(302)(0.8)(1-0.8)}{(302-1)(0.05/1.96)^2 + (0.8)(1-0.8)} = 135$$

$$Ns = 135$$

Therefore, the total sample size for the study is = 202.

However, during the cross-sectional survey, two (2) house heads declined to participate in Manso Nkran. Another five (5) also declined to participate in Tetrem, making seven (7) household heads who declined to participate in the survey. A total of 195 [(Manso Nkran (65) and Tetrem (130] surveyed household heads, therefore forming the basis of the analysis of the study. Table 1 shows the sample sizes and response rates of the study communities.

The quantitative data collected for the research were sorted, edited, and coded before data entry using Statistical Package for Social Sciences (SPSS) version 20.0. Cleaning the data helped detect faulty data entries that were corrected before analysis. Quantitative data were descriptively analysed. The qualitative data were processed by transcribing the interviews, which were recorded. The transcribed recordings were then subjected to content analysis. The interview schedule was guided by themes such as the extent of mining-induced displacement and resettlement in the study areas, the effects on the livelihoods of households, and the strategies adopted in response to mining-induced displacement and resettlement by households in the study communities. Direct quotes and paraphrases of the interviewees' responses were used to present the qualitative data. The study results were displayed in tables and charts based on relevant statistical analyses, which gave a clearer understanding of the results.

6 Results and discussion

6.1 Demographic characteristics of respondents

The field survey showed that respondents who have attained basic education comprised of 29.2% and 36.2% from Manso Nkran and Tetrem, respectively. Also, 23.1% of the respondents from Manso Nkran and 36.2% from Tetrem had attained Junior High School Level Education. The results further indicated that 13.8% of the respondents from Manso Nkran and 10% of the respondents from Tetrem had attained Senior High School education. The respondents who have received tertiary education consisted of 3.1% and 5.4% in Manso Nkran and Tetrem, respectively. The respondents who have no formal education comprised of 30.8% and 22.3% in Manso Nkran and Tetrem, respectively. Regarding the employment sector, the study result indicated that in Manso Nkran, 10.8% of the respondents were engaged in the formal sector, while 89.2% of the respondents worked in the informal sector. Of the respondents of Tetrem, 12.3% of the respondents worked in the formal sector, while 87.7% are engaged in the informal sector.

6.2 Number of years stayed in the community

Given that the study aims to assess the prospects and challenges of mining-induced displacement and resettlement in

Table 1 Summary of sample sizes and response rate of study communities

No	Name of community	Total households number	Sample Size	Sample number	Response rate (%)	Total response rate
1	Manso Nkran	93	67	65	97.01	96.66%
2	Tetrem	302	135	130	96.30	

Table 2 Number of Years Stayed in the Community

Number of years	Number of respondents	Percentage of respondents (%)
Manso Nkran		
6–10 years	9	13.8
11–15 years	21	32.3
15 years and above	35	53.8
Total	65	100
Tetrem		
6–10 years	16	12.3
11–15 years	42	32.3
15 years and older	72	55.4
Total	130	100

Source: Field survey, October 2021

selected communities in Ghana, it is essential to know the number of years respondents have spent in their communities of residence to determine the degree of familiarity with the issues being examined. Overall, majority of the respondents comprising 53.8% and 55.4% in Manso Nkran and Tetrem, respectively, have lived in these communities for more than 15 years. This helped in enriching this study since they were able to share their experiences. The number of years spent by respondents in the study communities has been presented in Table 2.

6.3 Assessment of the level of awareness of the regulations governing displacement and resettlement

According to Downing (2002)**,** there is a need to ensure that residents affected by displacement and resettlement activities resulting from resource extraction activities are well informed on all the national and international regulations governing such activities. This goes a long way to ensure active participation in the decision-making process and cooperation during resettlement. The level of awareness of the regulations guiding the involuntary resettlement caused by the mining activities in both Manso Nkran and Tetrem was assessed. The research results showed that only 3.2% of the respondents from Manso Nkran are aware of regulations that govern displacement and resettlement in their community. On the other hand, only 4.6% of the respondents in Tetrem were mindful of the rules governing their displacement and resettlement.

Overall, the results of the study showed that the respondents who were not aware of the regulations governing involuntary displacement and resettlement comprised 96.8% and 95.4% from both Manso Nkran and Tetrem, respectively. The low level of awareness of the regulations can be attributed to the technical nature of the regulations. According to a respondent, "*I am conversant with the English language. When the mining activities were about to start, we knew that there were general laws and traditional customs in Ghana that ought to protect our interests concerning our mining situation. We just lacked pinpoint knowledge of specific regulations on how displacement and resettlement should be done"*. The low level of awareness of the regulations among these key stakeholders adversely affects their ability to make well-informed inputs in the decision-making process and effectively negotiate for their rights and interests (Table 3).

Table 3 Level of awareness of Manso Nkran and Tetrem respondents about the regulations governing displacement and resettlement

Awareness of MIDR regulation	Frequency	Percentage (%)
Manso Nkran		
Aware of regulations	2	3.2
Not aware of regulations	63	96.8
Total	65	100
Tetrem		
Aware of regulations	6	4.6
Not aware of regulations	124	95.4
Total	130	100

Source: Field survey, October 2021

6.4 Assessment of the challenges of mining-induced displacement and resettlement

The challenges mining communities face due to displacement and resettlement was examined from three thematic perspectives. These themes were generated from the coded responses of the household respondents and key informants. From the interviews, it was realized that the adverse effects of mining-induced displacement on the study communities include loss of social and human capital, alterations to economic activities, lower satisfaction with life (LSWL), and loss of natural capital.

Cernea (1997) notes that residents in mining communities are displaced and resettled and have been subjected to circumstances where they would have to rebuild their social connections. The thematic analysis identified the loss of social capital as a significant challenge experienced by the displaced and resettled respondents. A key informant, for example, noted that aspects of their social lives that were directly related to their emotional well-being were lost in the transition. Some respondents also indicated that they felt that relocating from where their deceased family members had resided for generations symbolized detachment from these family members. Additionally, some of the key informants noted the cultural and emotional significance that community

members ascribed to the graves of their family members. In line with this, Twum et al. (2016) have acknowledged that indigenous communities make sacred places such as shrines and graveyards an essential part of their social system. The results of this research further showed that the loss of this social capital has adversely affected their productivity and well-being. A household member reported that "the decision to resettle continues to hover over my conscience and this can be likened to the abandonment of my loved ones who had passed away". Mandishekwa & Mutenheri (2020) noted a direct association between social capital, individual strengths, and productivity growth. Therefore, the results of this study imply that the feeling of detachment of these respondents may have trickledown effects on their productivity, thus limiting their access to physical and monetary resources. The results of this study further indicated that 41% of the respondents of Manso Nkran and 46.9% of the respondents of Tetrem are living further away from some of their relatives. Like the findings in Ayelazuno's (2014) study, the results showed that the respondents felt they had lost a great deal of social capital, especially relatives and friends who usually sought assistance. An interview respondent noted that "*I had a friend whom I had planned a business with. We were about to execute it, but we were resettled. Shortly after, I lost contact with him, and everything we discussed has gone down the drain*".

Additionally, majority of the respondents comprising 63.1% and 69.2% of the respondents in Manso Nkran and Tetrem, respectively, attested to some form of cultural change following the resettlement activities. Out of this, 21% of the respondents noted that improved access to electricity and other physical infrastructure, such as a recreation centre in Manso Nkran, has altered their way of life. With time, most people can purchase electronic devices such as television sets and mobile phones, which usually take up most of their time. An elderly respondent during a focus group discussion indicated that *"there has been a decline in community living since the relocation as people remain indoors watching their televisions and using their phones. The absence of electricity before resettlement created an atmosphere of togetherness since people were more attached and committed to developing and maintaining their social capital"*. Ayelazuno (2014) recorded a growing change in identity and social relationships within resettled communities and attributed this change to urbanization and modernization. The changing social dynamic due to modernization may have altered their culture. Resettled communities currently possess a different identity due to the introduction of new members and the reconfiguring of their social norms.

Researchers such as Downing (2002) argue that the events that result in the displacement and resettlement of residents most often come along with changes in economic activities**.** The study showed that the majority of the respondents consisting of 78.5% and 83.8% of the respondents from Manso Nkran and Tetrem, respectively, were employed before the resettlement. After the resettlement, the respondents who were employed in Manso Nkran constituted 50% while those employed in Tetrem were 56.9% after resettlement. A respondent indicated that "after the resettlement, I struggled to find gainful employment; for *months and even years, most of us were in and out of jobs"*. As indicated by Mandishekwa and Mutenheri (2020), some respondents who had previously engaged in large-scale farming before the resettlement have now lost their land. The results of his research confirm the work of Cernea (1997), who used the Impoverishment Risks and Reconstruction (IRR) model to argue that the absence of common property resources due to resettlement initiatives impoverishes resettlers.

Furthermore, 33% of the respondents in Manso Nkran indicated that the resettlement led to competition in the use of resources. One respondent claimed that the pursuit of resources within the area has led to conflict amongst former friends and family members as people with enough financial capacity attempt to control most of the resources to neglect those with limited financial resources. This occurrence could be likened to Hardin's (1968) assessment of the 'tragedy of the commons', where competition for resources forces individuals to put their needs above the well-being of society. Most interviewees pointed out that they would have been better off economically if they had remained in their former communities.

The result of the study further showed that 32.3% of the respondents from Manso Nkran and 36.2% from Tetrem had access to fertile land, medicinal plants, and rivers before the resettlement. After the resettlement, 80.3% and 72.1% of the respondent from Manso Nkran and Tetrem who indicated earlier that they had access to resources such as fertile land before mining activities began in the communities indicated that after establishment of the mines they no longer have access to those fertile lands and medicinal plants. The respondents claimed they had lost access to these natural resources that support their livelihood. The government gave the land that was supposed to have been the inheritance of the community members as concessions. A community member whose brother's land was affected noted, "*My brother was a farmer but lost his land to AGM. Although my brother is no longer alive, I could have been farming on it to help support my family if we still had the land. Our house was sold to enable me to travel abroad. Though I had a job in the mining company, due to the retrenchment, I am now home. I could be farming to support my family if we still had access to my brother's land*".

The results imply that the resettlement programme did not consider the loss of wage employment, leasehold access, and opportunities for shared cultivation. Consequently, the

situation forced some beneficiaries to sell their new homes at low prices and migrate for other employment opportunities. In the context of low human capital recovery, the study identified that some resettlers had to engage in business activities other than farming and mining. This implied that these persons had to acquire the requisite skills for their new line of operations. About sixteen of the interview respondents had to undertake off-farm activities such as petty trading, dressmaking, hairdressing, and auto engineering. These jobs required further training through apprenticeships, in which some people enrolled. However, the respondents who were petty traders indicated they had to acquire marketing skills.

6.5 Assessment of the prospects of mining-induced displacement and resettlement-infrastructural capital

Downing (2002) argues that multinational corporations that engage in mining activities significantly invest in infrastructure development in their mining communities. The study results showed that the two study communities' physical and infrastructural capitals have improved after the resettlement. All respondents indicated they had experienced better housing conditions and access to schools, health facilities, and a community centre. In Manso Nkran, the residents of the community benefited from the construction of a Junior High School block and the renovation of the CHPS compound. The residents of Tetrem have also benefited from the refurbishment of the community health centre, the construction of additional classroom blocks for the Senior High School, and the renovation of the community centre. The respondent at AGM indicated that the facilities were not necessarily intended to attract resettlers but to make living conditions more suitable and conducive for them. The respondent indicated, "*Aside from the planning standards used to resettle the community. We performed needs assessments to identify their needs, not their wants. We provided a suitable living space for these people by assessing, setting standards, and budgeting"*.

This finding confirms studies by Downing (2002), where improved access to infrastructure is reportedly a generic outcome of resettlement initiatives since the resettling organization tends to invest more into improved infrastructure for the resettled community members. Although there were a few indications that the houses provided did not meet the expectations of some community members, 75.4% of the respondents from Manso Nkran and 77.7% of the respondents from Tetrem attested to the dwelling units being better than those they had before. In addition, residents of Tetrem indicated that improved access to roads has made it relatively easier to commute to neighbouring communities and even the city centre. Similarly, respondents at Manso Nkran reported that the road infrastructure was a positive outcome of the resettlement process.

6.6 Examining the effects of MIDR on the livelihood of affected households

6.6.1 The effects of MIDR on the occupation of affected residents

According to Terminski (2012), mining-induced displacement and resettlement can positively and negatively affect the livelihoods of affected persons within mining communities. This study assessed the effects of mining-induced displacement and resettlement on livelihood assets such as portable water, education, healthcare, land, employment, and income levels. Concerning occupation, evidence from Agbley (2019) and Afriyie et al. (2016) has suggested that residents in mining communities impacted by mining activities are likely to have their financial situation negatively affected. This often manifests in changes in occupation and an increase or decrease in disposable income (Agbley 2019)**.** The study results showed that farming was the predominant occupation among residents of the two communities impacted by mining-induced displacement. Before the mining-induced displacement, 63.1% of the respondents in Manso Nkran were farmers, while respondents engaged in farming in Tetrem were 70.7%. This finding aligns with Afriyie et al. (2016) research, which noted communities in the Amansie South and West Districts, which both Manso Nkran and Tetrem belong are predominantly agrarian and have most of their workforce working on their farmlands.

The results of the study further showed that 12.3% of the respondents from Manso Nkran and 6.25% of the respondents from Tetrem were engaged in petty trading before the resettlement. Additionally, 4.6% of the respondents from Manso Nkran and 8.5% from Tetrem were involved in food vending economic activities. The results of the study also showed that 10.8% of the respondents from both Manso Nkran and Tetrem were civil and public servants. The proportion of respondents who worked as artisans in Tetrem and Manso Nkran before the resettlement was 13.8% and 2.3%, respectively.

Evidence suggested by Mandishekwa and Mutenheri (2020) points to situations of occupation change amongst residents in communities where displacement and resettlement have impacted their livelihood. In sub-Saharan Africa, where mining communities are primarily agrarian, evidence suggests that the loss of land to mining activities causes farmers to switch to other agricultural-related occupations or completely take up new crafts to stay afloat. This situation was evident in the case of respondents from Tetrem and Manso Nkran. In the case of Manso Nkran, the number of respondents who were engaged in farming after the

resettlement reduced to 47.7%, while those engaged in petty trading, food vendoring, and artisanship increased to 18.5%, 9.2%, and 13.8%, respectively. The changes were associated with the loss of arable farmlands to mining activities, the construction of shops on farmlands to serve commercial purposes, and the profitable opportunities the presence of the mining activities has presented to the displaced residents. According to a respondent "*having lost my farmland to mining activities, I decided to take a construction job. When I got the compensation for my land, I used the money to start a business for my wife and then went into construction, managed by the mining company. The construction jobs paid very well, compared to what I was getting from farming*". In the case of respondents of Tetrem, the proportion of respondents who engaged in farming activities, petty trading, and artisanship increased by 78.5%, 8.5%, and 3.8%, respectively.

6.6.2 Average monthly income before and after MIDR

According to the Ghana Statistical Service (2013), the average monthly income of households can be used as an indicator to measure the wealth and well-being of households. As shown in Figs. 4 and 5, it is evident that there has been a decrease in the respondents who are low-income earners. The results of the study showed that respondents in Manso Nkran who earn less than GHs 500 reduced from 18.5 to 7.7%. On the other hand, low-income earners in Tetrem have reduced from 20.8 to 13.8%. Furthermore, workers who earned between GHs 500 and GHs 1000 saw a decline in number, from 50.7 to 46% for residents of Manso Nkran while in the case of Tetrem low-income earners reduced from 53.1 to 40.8%. Respondents who earned GHs 1,001 to GHs 2,500 increased after the resettlement, with the respondents of Manso Nkran recording an increase of 30.8% from 20% and the respondents of Tetrem experiencing an increase of 22.4% from 14.9%. Similarly, respondents of both Manso Nkran and Tetrem who earned between GHs 2,501 and 5,000 saw an increase of 10.8% from 7.7% and an increase of 10.3% from 9.2%, respectively. In terms of respondents who earn over GHs 5000, respondents from both Manso Nkran saw an increase from 3 to 5% and those in Tetrem saw an increase in numbers from 2 to 5%.

From the survey, it was seen that the increase in disposable income of the respondents could be attributed to the increase in service-related activities such as food vending and opportunities for residents to participate in blue colour jobs in both communities. Furthermore, the results of the

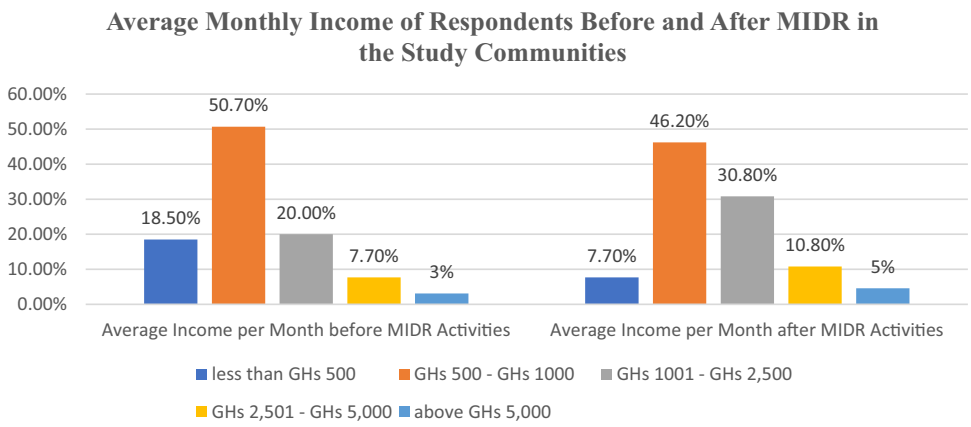

Fig. 4 Average Monthly Incomes of Respondents in Manso Nkran. *Source:* Field survey, October 2021

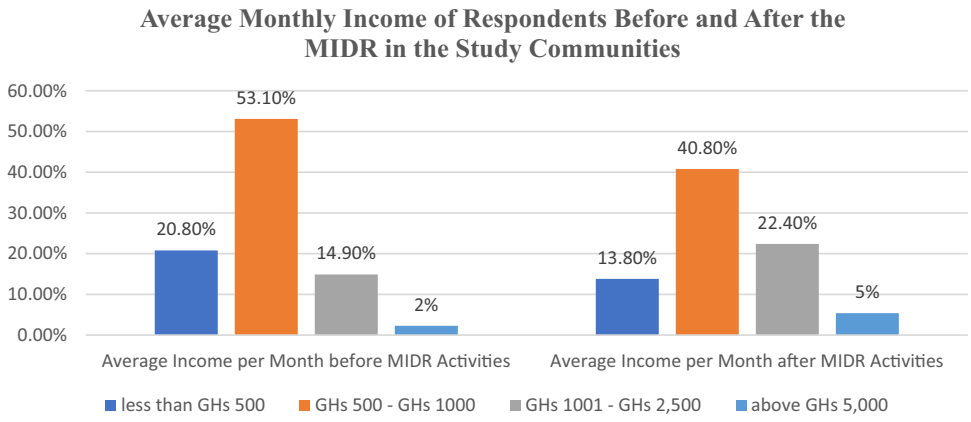

Fig. 5 Average Monthly Incomes in Tetrem. *Source:* Field survey, October 2021

study showed that there has been a relative increase in the cost of living due to the presence of the mining company, its workers, and the influx of migrants seeking to make a fortune due to the mining activities in both communities. Some of the respondents indicated they engage in multiple economic activities to supplement their incomes.

6.6.3 Access to drinking water in the study communities

According to Mandishekwa and Mutenheri (2020), accessing quality portable water is often challenging for mining communities. The discovery of such extractive resources mainly stimulates the destruction of water bodies which often serve as the primary water source for domestic activities. Even if these sources of water are accessible to residents of such mining communities, the poorly regulated activities of the mining companies make such sources of water dangerous for human and animal consumption. From the data analysis, 93.3% of the respondents from Tetrem and 87.7% of the respondents from Manso Nkran indicated that before the mining-induced displacement and resettlement took place, they had access to potable water from the community boreholes, wells, and streams located within the township. According to a respondent from Manso Nkran, "*Before the displacement, we had access to the natural water bodies for our water supply. The wells also complimented what the water bodies provided us. Currently, most of these bodies cannot be relied on for water since many people in the community and the private mining company's operations have polluted our water bodies*".

Also, 97.1% of the respondents from Tetrem and 92.3% from Manso Nkran reported having access to clean and consumable water after the mining-induced displacement and resettlement. This can be attributed to constructing of a small-town water supply system and operationalizing the mechanized community wells. The interviews showed that these interventions in the water supply situation were implemented to prevent residents from covering long distances and address the challenges of accessing water from natural sources due to illegal mining activities. According to an interview respondent, 'the *good thing is that while we were relocated from our last place of residence, arrangements were made for us to have a centralized location where water is available when and when we need it, and we do not have to travel long distances to access it* (Fig. 6).

6.6.4 Access to education in study communities

According to Agbley (2019), access to quality education relates to how educational institutions and lawmakers make it possible for their citizens to have equal and equitable chances to learn about opportunities for their development. Access to education is considered an essential aspect of human development and has been designated as one of the critical Sustainable Development Goals to be achieved globally. On the other hand, a study conducted by Aboagye (2014) suggested that in developing countries where resource extraction takes place, the ability of policymakers and law enforcers to leverage both the financial and non-financial opportunities has not facilitated the development of the educational sector of such countries. The same situation was observed in the case of Manso Nkran and Tetrem.

In the case of Tetrem, 56.9% of the respondents indicated that they had access to quality education before mining-induced displacement, whereas 43.1% noted that they did not have access to quality education. When probed further, it was revealed that before the advent of the mining activities, community residents had access to educational facilities that helped in the academic development of the children in the community, from kindergarten to JHS 1. A respondent explained that: *Before the mining activities, we had good teachers who attended to the academic needs of our wards. The school block in our community ensured that our children received education up to JHS1, then had to continue their high school education in other communities.*

The data analysis showed that the lack of competent teachers and facilities continues adversely to affect the academic performance and completion rate of Junior High School students in the study communities. This accounted for the main reason 43.1% of the respondents opined that

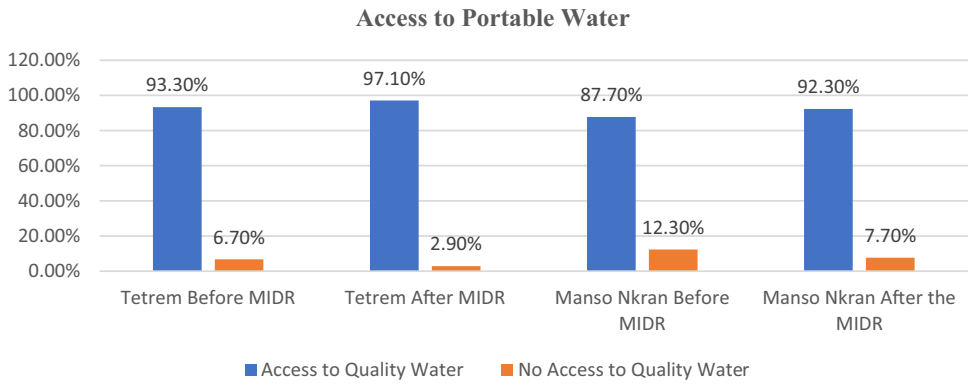

Fig. 6 The Situation of Access to Portable Water Before and After MIDR in the Study Communities. Source: Field survey, October 2021

education was not the highest quality before the mining-induced displacement and resettlement. In the opinion of a respondent: *Before all these mining activities became operational in this community, I made sure that my children enjoyed full-scale primary education in the nearby communities. The facilities permit primary education, and parents must send their children to other schools in other communities to finish their primary education. In some instances, the teachers posted here were not helping our children. Most of them had a poor work attitude and preferred to spend their time in the big cities, given that our community was not as developed as the cities.*

Regarding access to education after mining-induced displacement, evidence from the field data demonstrates that 90.7% of the respondents agreed to improved access to education. A further probe indicated that despite the displacements associated with mining activities, various interventions such as providing bungalows for teachers and constructing classroom blocks to accommodate the growing number of students in the community were carried out in Manso Nkran. These interventions helped in promoting access to quality education. An interview respondent indicated that "*As part of the corporate social responsibility of the mining companies, they were required to contribute to the development of the unique aspects of the community, which in this case is education. For example, after the displacement and resettlements occurred, we witnessed the construction of a 6-unit classroom block of one number to support the basic school enrolment program being run in our district. The facility was set up in this community. In addition, the senior high school developed after mining activities in the community has also benefited from mining activities, ensuring that students do not have to travel the distance to access senior high school education in other communities. Teachers' quarters are being completed to complement the existing ones at the Koninse-Nkran D/A JHS located at Manso Nkran".*

On the contrary, 9.3% of the respondents indicated that access to quality education has not improved even after the mining-induced displacement. During the focus group discussion, a respondent stated: "*Now that we have been moved to another area in the community, the distance to the educational facilities has increased accordingly. Now we travel long distances to send our children to school before we reach our occupation. In addition, we have to deal with the large numbers of students trooping in from other communities who also seek to use our educational facilities. I do not see this situation improving without appropriate intervention".*

Figure 7 represents the respondents' opinions about access to quality education before and after MIDR in Tetrem.

In the case of Manso Nkran, 93.8% of the respondents indicated that educational facilities were in a deplorable state before the displacement and resettlements. This resulted in students living in the community benefiting from facilities located in neighbouring communities. Only 6.2% of the respondents expressed satisfaction with quality education before mining-induced displacement and resettlement. An interview respondent noted that "*when it comes to our communities, we had not had the best educational facilities, especially when you look at the time before mining activities were present in our community. Most of our classrooms required renovations, restocking classroom and teaching furniture and items, and deploying competent teachers".*

Garvin, MeGee, Tomic, K., and Aubynn (2007) note that in the typical African community where extractive resources are abundant, it is customary to see situations where education is underdeveloped. In most cases, mining activities do not entirely lead to the full-scale upgrade of education in these communities. After mining activities in the Manso Nkran Community, 87.7% of the respondents indicated there is an improvement in their community's access to educational facilities. They based their opinions on the infrastructural developments of the school that have taken place in the community, as well as the provision of books and furniture for the students' use. An interview respondent indicated that "*although the changes are not that great, we acknowledge the effort of the mining company and the authorities in promoting education in our community. We have seen a regular effort by various stakeholders to donate books, build more*

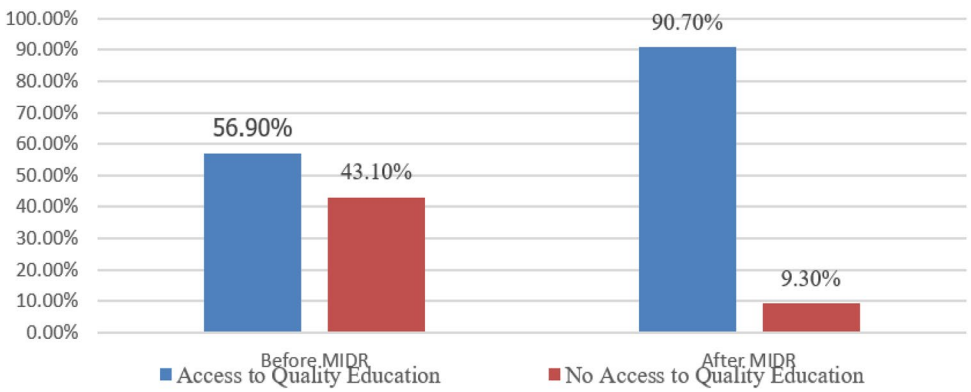

Fig. 7 Situation of Access to Education both Before and After the MIDR in the Study Communities. *Source:* Field survey, October 2021

classrooms for our children and help us get access to quality teachers who will teach our children".

For the 12.3% of the respondents who stated that there was no improvement in access to education after the mining-induced displacement and resettlement, it was revealed that parents having to send their wards to other communities for their wards to enjoy high education was the main reason they did not believe that access to education has improved after mining-induced displacement and resettlement. One interview respondent pointed out that "*After the mining-induced displacement and resettlement, we were promised that significant projects would take place in the community regarding education. Our school structures are still deplorable, even after the mining company came to operate in our community. On top of that, the lack of teachers and the need for more learning materials has contributed to students not attending their classes to participate in the trade their parents are engaged in. even our performance in the BECE attests to how mining activities have rather aggravated our situation".*

6.6.5 Improvement in health care delivery in the study communities

Mandishekwa and Mutenheri (2020) argued that in countries where national regulations ensure that mining companies operating in the extraction industry ensure that the health of the residents of mining communities is adequately taken care of; mining companies tend to make a significant contribution to the health and wellness of the residents. This situation was observed in the case of the two study communities. Figure 8 shows the respondents' opinion on whether there has been a difference in access to quality health care before and after mining activities displaced and resettled them. This section examined how mining-induced displacement and resettlement have affected access to health facilities in both Manso Nkran and Tetrem. Comparing the situation of access to health facilities in Tetrem before the mining activities to the situation after the mining-induced displacement, 96.3% of the respondents indicated that the mining activities have contributed to improved access to health facilities in the community. An interview respondent noted that "*before the displacement and resettlement, our community had access to only a CHPS compound that was lacking in equipment. In addition to that, the building was in poor condition and required renovations. Now the facility that caters to our health needs is a health centre provided to complement the efforts of the CHPS compound".*

In the case of Manso Nkran, they attributed improving access to health care to upgrading the CHPS compound's facilities in the community. The results of the study showed that 95.4% of the respondents agreed that compared to the situation before the mining-induced displacement and resettlement occurred, there is an improvement in access to quality healthcare. It was revealed in an interview that "*As part of displacement and resettlement, we requested that, if not for anything, the health care facility that cares for our basic health needs should be well equipped for our benefit. We have witnessed donations being made in that regard. For example, the Asanko Gold mines Limited and other NGOs donated medical supplies to strengthen healthcare delivery in our community and others".* From this, it could be inferred that there is a considerable effort by the mining company, the traditional leaders, and the district assembly to ensure that mining-induced displacement and resettlement do not expose community members to health hazards and that residents of both communities enjoy quality primary healthcare.

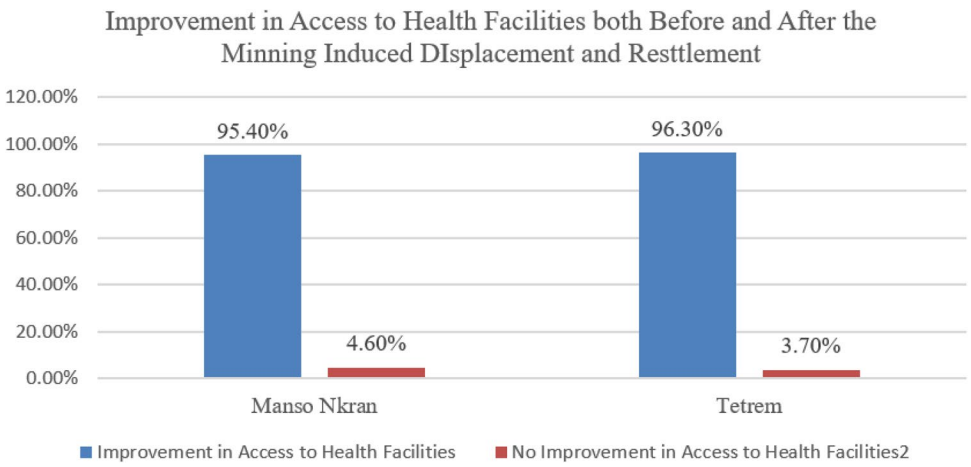

Fig. 8 Improvements in access to health facilities both before and after the MIDR in the study communities. *Source* Field survey, October 2021

7 Conclusions

The availability of mineral resources coupled with the increasing demands and prices of precious minerals makes mining-induced displacement and resettlement (MIDR) an important development discourse. Mining-induced displacement and resettlement (MIDR) is a phenomenon that will always arise when mining activities are undertaken in communities. There is therefore an urgent need for researchers to access the complexities involved in MIDR, especially in the global south. In this study, the researchers assessed the prospects and challenges of MIDR in indigenous mining communities in Ghana. The study showed that majority of the respondents in the study communities have limited knowledge about the legislation and regulations that guide involuntary displacement and resettlement in Ghana. The results of the study further showed that MIDR provides positive benefits which have prospects to accelerate development in indigenous communities. The results also indicated that MIDR led to an increase in the disposable income of community members. Additionally, it improved social infrastructure, including health, education, and water infrastructure. The researchers also found that although MIDR provides benefits and improves the prospects of accelerated development, issues such as loss of social and human capital, alterations in economic activities, lower satisfaction with life (SWL), and loss of natural capital. The lack of awareness of displaced community members about resettlement regulations makes them unable to participate effectively in the resettlement process. Therefore, the researchers recommend the need to educate mining communities on the regulations that guide the resettlement process. Furthermore, the researchers suggest that the executive and legislative arms of government in Ghana collaborate closely in developing a legal instrument/ legislation which will explicitly indicate how compensation to displaced community members will be calculated and who specifically qualifies to receive compensation in various scenarios. Last but not least mining companies should conduct an impact assessment in the resettled communities to assess the effects of the resettlement process on the indigenous communities. This will help assess the socio-economic and cultural challenges associated with displacement or resettlement.

Author contributions Mr. Rich Ofori and Dr. Stephen Appiah Takyi collected data and wrote the main manuscript text.Dr. Owusu Amponsah and Mr. Desmond Gagakuma helped in the the review of the manuscript.

Declarations

Conflicts of interest There is no conflict of interest. The research team funded this research.

Ethical approval This article does not contain any studies with human participants performed by any authors.

Informed consent Informed consent was obtained from all individual participants included in the study

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