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ORIGINAL PAPER

Local perspectives on the adverse environmental effects and reclamation of illegally mined degraded landscapes in North-western Ghana

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Abstract

In Ghana, there is a consensus that all the artisanal and small-scale mining (ASM) degraded landscapes should be restored to ecologically functionable limits after the small-scale mining ban. Restoration of the mined degraded landscapes will replenish lost ecosystems and contribute to the socio-ecological wellbeing of the nearby communities. Despite the government's effort to reclaim these degraded landscapes, the cost and resources involved make the agenda a forlorn hope. Yet, few studies have explored the local communities' perspectives towards reclaiming the galamsey degraded landscapes. This study investigates the perspectives of the local dwellers concerning the environmental consequences, roles, and commitment towards reclaiming the galamsey degraded landscapes. A concurrent cross-sectional mixed methods design was employed in administering 342 household questionnaires across 14 communities, which was supported with key informant interviews. Results reveal that the majority of the dwellers of the galamsey communities showed little regard for the environmental destruction caused by the galamsey operations — reduction in quantity and quality of water resources (63.2%), compromised ambient air (60.8%), destruction of ancestral homes and sacred groves (57%), and modification of the entire landscape (54.4%). In light of these findings, we posit that the local communities' dwellers have limited knowledge of the value of the environment and future consequences of the destruction caused by the mining activities. This calls for thorough environmental education and sensitization in artisanal and small-scale mining communities.

Keywords Local communities · Illegal mining · Galamsey · Land degradation · Land reclamation · Ghana

Introduction

For centuries, the extractive sector has played a pivotal role in the transformation of global economies—governments over the years have been challenged with identifying and applying the best measures to leverage and sustain the continued extraction of precious minerals such as gold, diamonds, bauxite, and hydrocarbons (Darimani et al. 2013; Adu-Baffour et al. 2021; Poelzer et al. 2021; Franken and Schütte 2022). This has resulted in the establishment of international, national, and local regulatory institutions, policies, and laws to effectively govern the extractive societies (Darimani et al. 2013; Antabe et al. 2019; Franken and Schütte 2022). In most countries, a greater proportion of the mineral policies and laws are constructed along state ownership, control, and appropriation of these mineral resources (Ayee et al. 2011; Johnson and Ericsson 2015; Narankhuu 2018; Baddianaah et al. 2022b). In the Global South, particularly in countries such as Peru Brazil,

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Mongolia, Burkina Faso, and Ghana, state control of the mineral resources has worked largely in favour of large-scale mining activities (Ouoba 2017; Narankhuu 2018; Matlaba et al. 2018; Bazillier and Girard 2019; Pokorny et al. 2019; Mamani et al. 2022; Baddianaah et al. 2022a). However, artisanal and small-scale mining, which remains the oldest form of mining in developing countries, continues to receive a chunk of the local miners, and a major livelihood trajectory to the indigenous people (Ouoba 2017; Hausermann et al. 2020; Mamani et al. 2022). Following the boom in the global price for minerals and metals, particularly from the last decade onwards, coupled with unemployment hurdles, local communities have increased participation in mining activities with increased adverse environmental, health, and social implications (Antabe et al. 2017; Bazillier and Girard 2019; Mamani et al. 2022).

Ghana has more than 1 million out of its approximated 31 million population directly employed in the artisanal and small-scale mining (ASM) sector and 4.5 million indirect beneficiaries (Mcquilken and Hilson 2016, 2016; Hilson 2016). Ghana's ASM sector operates in two distinct forms: the registered small-scale miners (officially and legally captured in the Constitution) and the galamsey operators (unregistered, illegal, and criminalised by the Constitution of Ghana) (Ofosu-Mensah 2010; Tuokuu et al. 2020). Galamsey is a common word in the local dialect in Ghana, framed from the English phrase "gather or get them and sell" (Aryee et al. 2003:139; Ofosu-Mensah 2011). In Ghana, legal miners are identified by certificates (licenses) of registration that are attached to a designated mineralised area called a concession, which must not exceed 25 acres (see Afriyie et al. 2016; Obeng et al. 2019; Hausermann et al. 2020). A license to mine in a designated concession could last between 3 and 5 years (Hilson 2001). However, the galamsey operators chose to operate on a "hit and run" mode because the entire process is illegal (Tuokuu et al. 2020), and some scholars claim that the majority of illegal miners are doing so because of the bureaucratic nature and high cost involved in registering a small-scale mining enterprise in the country (Tuokuu et al. 2020; Adu-Baffour et al. 2021; Baddianaah et al. 2022b). The effect of politics, corruption, favouritism, sidestepping, and weakening of the responsible state institutions are likewise highlighted in the literature (Botchwey and Crawford 2018; Eduful et al. 2020).

The majority of about 85% of the ASM operators choose to remain in the galamsey sector (Ofosu-Mensah 2010). This is largely attributed to the drawbacks associated with registering with the responsible state institutions such as the Minerals Commission and Environmental Protection Agency, and the host Metropolitan, Municipal and Districts Assemblies (MMDAs). Consequently, the unregistered ASM sector is the focus of this study. As the majority of the local miners are attracted to the illegal mining sector, the environmental and social ramifications including the destruction of forest landscapes, pollution, siltation and diversion of rivers and streams channels, school drop-out cases, armed robbery and petty theft, prostitution, and child labour skyrocketed in the country around 2016 (University of Ghana Business School [UGBS] 2017; Botchwey and Crawford 2018; Baddianaah et al. 2022b). Some studies blamed the involvement of foreigners, particularly the Chinese, and their innovative and technological drive in mechanising the ASM sector as the cause of the surge in the illegal mining's adverse consequences in the country (Hilson et al. 2014; Botchwey and Crawford 2018; Hausermann et al. 2020).

Away from the blame games, the Government of Ghana, through the Ministry of Land and Natural Resources and civil society organisations, have recently put in place measures, initiatives, commitments, and reactive strategies towards addressing the adverse ramifications of local mining activities in the country. In 2016, institutions, governmental and non-governmental organisations, civil society organisations, farmers, and media groups waged a serious protest ("war") against galamsey in Ghana (Hilson 2017) and called for a moratorium on all ASM operations, irrespective of legality, in March 2017 (Owusu et al. 2019; Tuokuu et al. 2020; Adu-Baffour et al. 2021). In connection to this, various military groups ("Operation Vanguard" and later, "Operation Halt") were constituted to enforce the ban and flush out all recalcitrant illegal miners (Hilson 2017; Adu-Baffour et al. 2021). In addition, the government of Ghana, under the Multi-Sectoral Integrated Mining Project, came up with a road map to restore all galamsey degraded landscapes in the country to ecologically functionable limits, committing an amount of US$100 million to the reclamation agenda (see CSIR-Forestry Research Institute of Ghana 2017). In the process, a pilot reclamation project was commenced in the Eastern Region in 2017, but could not be sustained because of the cost involved in the reclamation agenda (Baddianaah et al. 2021): vast areas of destroyed galamsey lands are recorded across local mining communities in Ghana including the Upper West Region.

This paper informs a second thought of getting the local communities involved in working towards reclaiming the degraded areas under their sphere of influence. Indeed, the extraction of precious minerals is surrounded by an array of actors (state institutions and local level actors) who equally have diverse and opposing interests. Thus, in remedying the adverse implications of mining activities in local communities, it is imperative to understand the perspectives and interest of all the actors and — strike a balance through collaboration and effective participation in governing these natural resources (Suopajärvi et al. 2016; Caripis et al. 2018; Baddianaah et al. 2022b). According to Darimani et al. (2013:47), effective natural resource governance underpins not only balancing the actors conflicting interest, but "between them

and nature." Thus, addressing the various actors' interests is a significant pathway to producing effective environmental outcomes in Ghana's ASM landscape. In light of the above, the impetus of the paper is to investigate the extent to which the local communities evaluate and appreciate the adverse effects of ASM activities on the physical environment and the commitment to address them, and the level of collaborative engagements between them and the state institutions in reclaiming mined degraded areas.

The adverse environmental effects of ASM activities are locally created (Darimani et al. 2013; Suopajärvi et al. 2016). In an attempt to resolve these effects, the dwellers must play key roles and commit to the environmental restoration agenda. However, few studies have attempted to investigate the local communities' perspectives and commitment towards resolving the environmental ramifications caused by ASM operations in mineral-rich societies. We posit that the dearth of involvement of the local communities in mineral resources decision-making, poor quality of the regulatory institutions, and the lack of collaboration between state and local institutions contribute to the irresponsible ASM activities currently ongoing in Ghana. The study contributes to the extant literature through igniting the sense of environmentalism in local mining communities for the attainment of sustainable mining operations. The next section of the study presents empirical and theoretical literature on the effects of institutional and stakeholder engagement in the ASM sector, followed by the materials and methods, results and discussion, conclusion, and policy implications for reclaiming galamsey degraded landscapes in Ghana and related ASM dominated areas in developing countries.

Empirical and theoretical overview

Stakeholders, including governmental institutions, have devoted significant attention to the formalization of ASM activities worldwide. It is generally believed that the formalization of the ASM sector will provide opportunities to effectively govern and get the best out of the sector (Salo et al. 2016). According to Ayee et al. (2011), the mineral sector in Ghana has been strongly influenced by several institutions. At the apex of the mineral policy framework is the president of the Republic of Ghana. The president is the topmost stakeholder and custodian of all mineral resources. Thus, the power of the executive supersedes all other individuals with the right to own and extract mineral resources in Ghana. Article 257 (6) of the Constitution of Ghana (1992:51), as cited in Agbesinyele et al. (2016: 109), vests in the President of the Republic of Ghana: "Every mineral in its natural state in, under or upon land in Ghana, rivers, streams, watercourses throughout Ghana, the exclusive economic zone and any area covered by the territorial sea or continental shelf is the property of the Republic and shall be vested in the President on behalf of, and in trust for the people of Ghana." The Minerals and Mining Act (Act 703) of 2006 further strengthened Article 257 (6).

In addition, the Act vests the compulsory acquisitions of land to the president as stated as follows: "[w] here land is required to secure for the development or utilization of a mineral resource, the President may acquire the land or authorize its occupation under an applicable enactment for the time being in force" (Republic of Ghana, 2006, cited in Ayee et al. 2011). Because of the aforementioned, all major decisions concerning mineral resources in Ghana are dealt with at the national level. The core institutions with designated responsibilities in the mining sector (Fig. 1) include the Ministry of Lands and Natural Resources—through the Minerals Commission, the Geological Survey Department (GSD), and the Precious Minerals Marketing Co. Ltd. (PMMC) (Akabzaa and Darimani 2001; Ayee et al. 2011; Opoku-Antwi et al. 2012; Agbesinyele et al. 2016).

The Minerals Commission (Fig. 1) is mandated with the power to sanction the exploration of mineral resources by granting permits for mining concessions. The Geological Survey Department (GSD) keeps geological information, acting as a repository of geoscientific data. The PMMC is tasked with marketing the minerals extracted. The EPA ensures that the relevant environmental standards are put in place and adhered to (Debrah et al. 2014; Yankson and Gough 2019).

Of great interest to this study is the position of local actors in mineral resource decision-making and issues relating to the granting of small-scale mining permits. This is because these local actors (chiefs and landlords) relate directly to the activities of miners within their jurisdictions (Botchwey and Crawford 2018). Thus, they could easily track and halt any illegal engagement momentarily. But the opposite is often reported across the extant literature as most chiefs and landlords appear to be strongly networked in illegal mining operations (Hilson 2017; Botchwey and Crawford 2018). This is a worrying development that needs an integrated and holistic examination. Pursuant to the revised Minerals and Mining Act, 2006 (Act 703), the first step to obtaining a small-scale mining license is to acquire customary and legal rights from the traditional authorities upon whose lands the gold is found for permission to use these lands. Thus, it is when all these protocols are fully addressed that a formal application could be sent to the Minerals Commission for the registration processes to be initiated (see Debrah et al. 2014: 916).

Rehearsing the roles played by local-level stakeholders in the ASM sector of Ghana, a large body of literature has emerged strongly pointing to the lack of coordination between local stakeholders and institutional actors, creating a dearth in clear-cut roles for local stakeholders (such

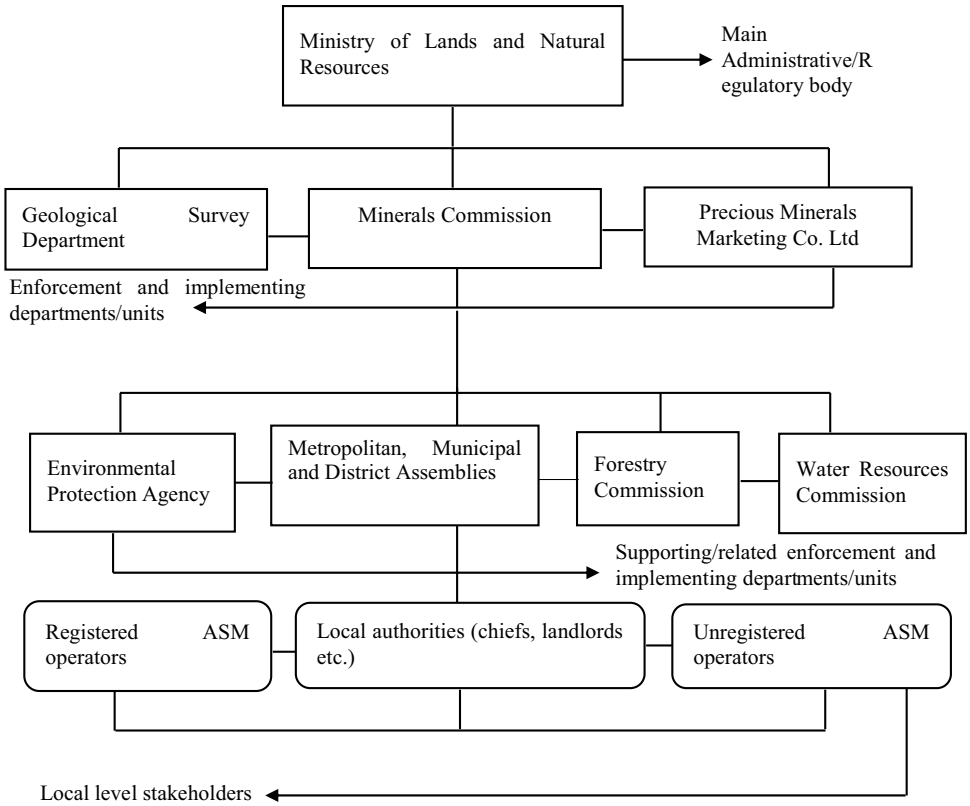

Fig. 1 The ASM Stakeholder Framework. Source: Authors

as the chiefs and landlords) in mineral resource decision-making (Osei-Kojo and Andrews 2016; Que et al. 2018). As such, the Ghanaian illegal mining landscape is being fuelled and shielded by chiefs and landlords (Botchwey and Crawford 2018). A very sensitive spectacle is the manner in which these traditional authorities are collaborating with and condoning the nefarious activities of illegal foreign miners in the ASM sector of Ghana (Botchwey and Crawford 2018).

Institutional theory

This study explored the dynamics of ASM activities across local communities—a mineral resource extraction under a multitude of institutional linkages and shaped by a plethora of formal and informal rules, regulations, and norms (Crawford and Botchwey 2017a; Hausermann et al. 2020; Hilson and Maconachie 2020a). North (1990) posited that institutions are formal, and it is informal rules and norms that facilitate and guide societal co-operation. The institutional theory offers researchers the wider platform to interrogate why some practices are adopted in natural resource extraction by focusing on the economic prospects (Meyer and Rowan 1977). In spite of the fact that the overarching aim of the extractive sector is to leverage the economic outcomes, developing nations have had to battle with key strategies to extracting natural resources: projecting the economic gains while enhancing environmental quality (Tuokuu et al. 2019).

The discovery and extraction of mineral resources, such as gold, diamond, bauxite, manganese, and hydrocarbons, are associated with a plethora of positive and negative ramifications, and fuels the debate as to whether these resources, when found in a particular geographic context, are a blessing or a curse to the host country or local community. This notion has resulted in the theorization of the "Resource Curse" by earlier scholars (see Auty 1993; Sachs and Warner 1995; Ross 2015). While considerable knowledge, counter debates and gargantuan sets of rebuttals have been generated over time to affirm (Ross 2015) or refute the resource curse hypothesis (Davis 2009), recent debates are moving away from the tangent of whether mineral resources are a blessing or a curse to societal growth and development, and are now centring on the dynamisms connected with the outcomes of resource extraction and the underlying factors that trigger these outcomes (see Bebbington et al. 2018).

On this premise, the extant scholars have argued that institutional quality cannot be isolated as a major catalyst of the diverse outcomes recorded in the extractive sectors particularly in developing societies. Thus, in their scholarly contribution, Humphreys et al. (2007) noted that "getting the institutions right" must be the focal point of escaping the widely discussed resource curse. In this work, critical attention is apportioned to how Ghana's institutions have shaped the extraction of mineral resources in the context of a developing country to help identify major gaps that need

to be bridged for the country to make development gains out of its vast mineral endowments. A major sector that has been aligned with the resources curse debate over the years is the illegal mining sector (galamsey), and because of the high frequency of its adverse environmental and social effects, it is the focal point of the discussion.

Institutional theory highlights that environmental problems, by their outlook, are not necessarily economic or technological but aptly induced by behavioural and cultural foundations: formal institutional rules and informal or societal norms (Yuldashev and Sahin 2016). According to the institutional theory scholars, though economic and technological shifts may contribute to the destruction of the environment, it should not be the focus of policymakers in finding solutions to the causes of environmental problems. However, attention should be given to the culture, beliefs, social norms (including taboos), and the social institutions mandated to guide the extraction of the environmental resources (Bazerman and Hoffman 1999). Thus, it is pertinent for scholars to begin to interrogate why, what, and how the extraction of these environmental resources by ASM activities are shaped by institutions.

Poor development and growth outcomes in mineral-rich countries are attributed to the weakness and/or poor quality of institutions that have long existed in this era of increased investment in the extractive sector. The negative consequences of a growing mining-induced economy on institutional quality are highlighted by Robinson et al. (2006) and Ross (2015). Thus, the adverse effects of the extractive sector orchestrated by weak and poor institutional quality suggest that any attempt to better the extractive sector must have strong recommendations for improving the institutions. While greater weight is placed on changing institutions' capacity to enable them to function appropriately in natural resource governance, it also demands identifying, profiling, and critically analysing the factors that make institutions weaker and poorer (Yuldashev and Sahin 2016). The burgeoning literature have highlighted issues such as corrupt political and governance systems, ideational, and the long chains of bureaucratic penchants as drawbacks to having functional institutions (Mahoney and Thelen 2010; Bebbington et al. 2018). In addition, although the effect of exogenous drivers of change in institutions is cited, the effects of endogenous drivers to institutional and social change cannot be downplayed (Mahoney and Thelen 2010).

Three major drivers of the institutional theory are central in creating what DiMaggio and Powell (1983) describe as isomorphism within organisational framings, strategies, and processes and are sine qua non in achieving a unity of purpose among institutions in the ASM sector. According to the aforementioned scholars, these drivers include (i) coercive, (ii) normative, and (iii) mimetic. The coercive driver refers to those at the helm of affairs with power and who exert pressure to influence the system. The state institutions including ministerial and political heads, key traditional rulers, landlords, and assembly members plus the unit committees are alluded to in this regard. Scholars have reported that the poor law enforcement capacity due to the weak state institutional framework is responsible for the growing galamsey operations in the country (Aubynn 2009; Teschner 2012; Crawford and Botchwey 2017b; Botchwey and Crawford 2018). On this note, state institutions are not able to proportionally disseminate their powers to rural communities where these illegal mining activities are done. However, Aubynn (2009) highlighted a lack of political will to fight the galamsey operators, while Teschner (2012) settled on "institutional ambivalence" to discredit the nefarious behaviours of politicians and law enforcement agencies in fighting galamsey in Ghana. The coercive pressure is a significant pitch to enhance environmental management within the Ghanaian ASM landscape if effectively exercised.

With respect to the organisational outlook, Bai and Sarkis (2010) have asserted that the normative driver's position ensures that societies conform to rules, regulations, and norms, taking collective actions on a legitimate course. Here, responsible institutions ought to share the mandate of collectively fighting galamsey in the country. It imbibes in the actors the collective responsibility and awareness of promoting environmental quality, inculcating the spirit of obedience to social rules such as observing and valuing ethical standards alongside ecological thinking (see Ball and Craig 2010): an aspect that is rare in the academic discourse regarding restructuring and eradicating galamsey activities in Ghana. The majority of the scholars have found that those who were supposed to team up to fight the illegal miners rather turned around to collude, collaborate, corroborate, and promote galamsey operations (Crawford and Botchwey 2017b, 2017a; Botchwey and Crawford 2018; Hausermann et al. 2020; Hilson and Maconachie 2020b). Hence, all the interested parties, including the formal and informal institutions, share the blame (Crawford and Botchwey, 2017b; Botchwey and Crawford 2018). The mimetic driver deals with the ability of institutions to imitate or replicate best practices of like ones (Bai and Sarkis 2010). Therefore, best practices in line with ASM regulations in other geographies like South Africa that involves the codification of rules and regulations and strict enforcement of these regulations in tandem with the local people's commitment and willingness to comply (Debrah et al. 2014) are sine qua non to be adopted in restructuring ASM operations in Ghana.

Materials and methods

Study area

The Upper West Region, located in North-western Ghana (see Fig. 2), is one of the hotspots of illegal mining

(galamsey) activities. Indeed, the region has recorded vast areas of land degradation as a result of the surge in galamsey activities (Agyemang and Okoto 2014; Baddianaah et al. 2021), making it paramount to investigate the local communities' perspectives on the adverse environmental effects and commitment towards reclaiming the galamsey degraded landscapes. Geographically, the Upper West Region lies between latitudes 9°35′ N and 11° N, and 1°25′W and 2°50′ W, and shares a boundary with the Republic of Burkina to the north and the Republic of La Côte d'Ivoire to the southwest. The southern part of the region is bordered by the Northern and Savannah Regions.

Upper West Region covers a total land area of about 18,476 km^2 (12.7%) of the total area of Ghana (Ghana Statistical Service 2013). The region is dominated by the guinea savannah vegetation, hosting several economic trees such as the shea (*Vitellaria paradoxa*), neem (*Azadirachta indica*), baobab (*Adansonia digitata*), and dawadawa (*Parkia biglobosa*). The topography is averagely flat with few isolated hills. The Pre-Cambrian rocks consisting of metamorphic and granite are rich in mineralised gold and have been a major source of attraction for exploring and mining of gold by artisanal miners across several communities in the Wa East, Wa West and Nadowli-Kaleo Districts. The region hosts an international mining company-Azumah Resource Limited-operating under the JULIE Concession.

Study design and data collection

The study commenced with a review of relevant literature focusing on four major thematic areas as follows: (1) environmental effects of artisanal and small-scale mining activities, (2) land reclamation in artisanal mining areas/communities, (3) stakeholder roles in land degradation and reclamation, and (4) local community perspectives and contribution to land reclamation in artisanal and small-scale mining areas/communities. This was paramount as it enabled the researchers to identify major gaps in the literature and structure the

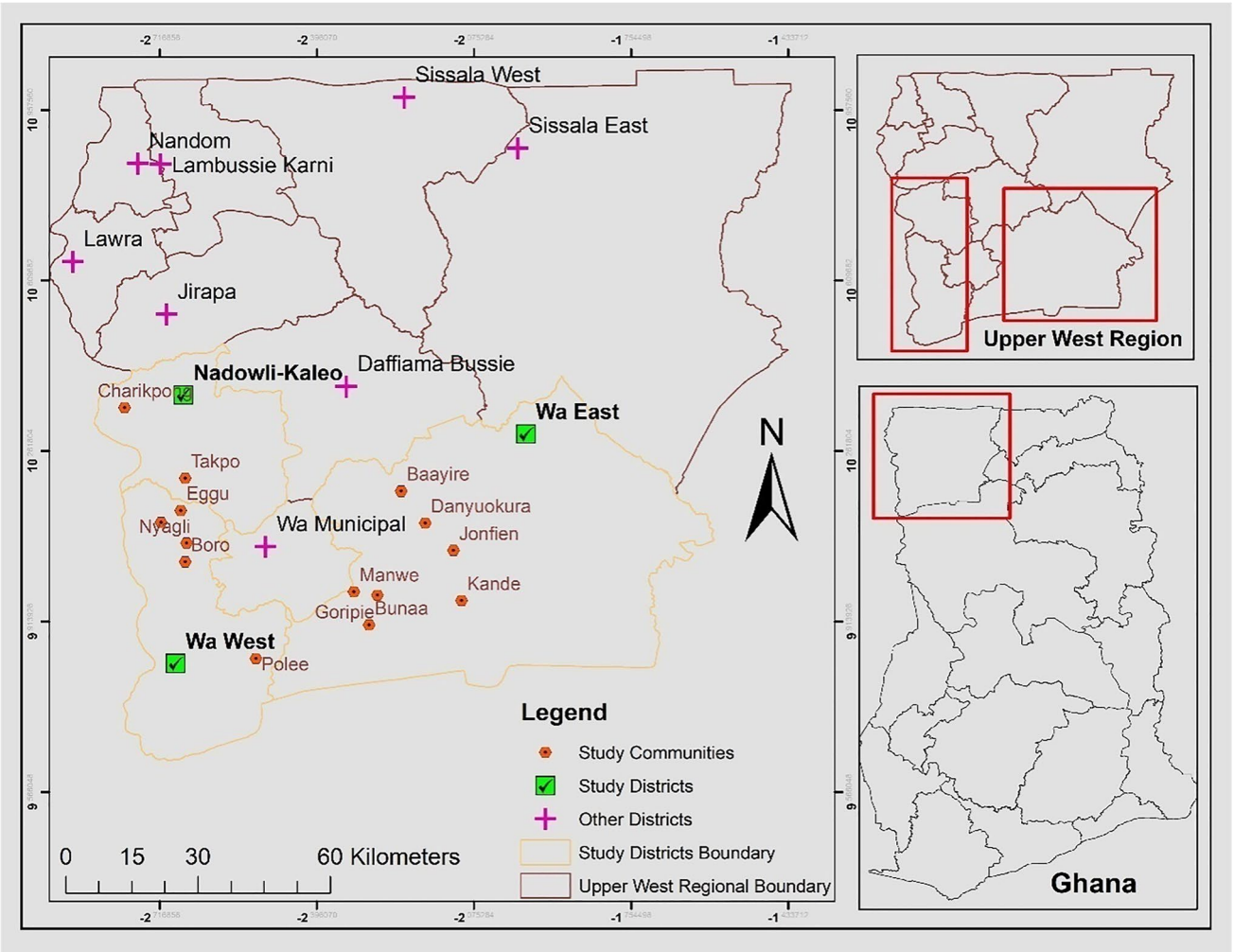

Fig. 2 Map of Upper West Region Showing Study Communities. Source: Authors

study to address these gaps. It also helps the researchers to redesign the survey instruments to make them reliable, attainable, and able to achieve the study aims. Based on the revelation from the literature, a concurrent cross-sectional mixed methods approach was employed in collecting household (quantitative) and key informant (qualitative) data.

The actual data collection began in May 2021 in a two-phased approach and ended in September 2021 covering a timeframe of approximately 5 months. Phase one involved the collection of the household data using a semi-structured questionnaire. The questionnaire was structured using three major sections. The first section sought data on the household heads' concerns and perspectives regarding a list of the adverse effects of ASM activities. The adverse environmental effects of ASM activities that dominate the extant literature were presented in a 5-point Likert scale. The second section detailed questions regarding household heads' perspective of roles, commitments, and activities that are undertaken by the major stakeholders such as the chiefs, landlords (*tendanba*), assembly members, and the miners towards the reclamation of ASM degraded landscapes in their communities, while the third section of the questionnaire captured the respondents' personal characteristics including whether they participate in the illegal mining (galamsey) operations or not.

Multiple sampling methods were deployed in reaching out to the target respondents. Thus far, based on the proliferation of galamsey activities in the Upper West Region as reported in the literature (see Agyemang and Okoto 2014; Laari et al. 2015, 2016), three districts were selected, namely the Wa East District (seven communities), Nadowli-Kaleo District (two communities), and five communities in the Wa West District (see Fig. 1 and Table 1). The researchers endeavoured to cover all the mining communities in the selected districts; however, a few communities were left out in Wa East and Wa West District because of the inaccessible nature of those communities at the time of the data collection. For the Nadowli Kaleo District, only two communities host galamsey activities and they were both accessible (see Table 1). Household heads were sampled through a simple random sampling procedure. Using the Ghana Statistical Service (2013) report as a guide, the lists of households in the study communities were sourced and computed to obtain the sampling frame. Following this, random numbers were generated in an excel tool pack and followed in administering the household questionnaires. The household heads were the prime respondents because they are the major decision makers at the household level; hence, their decisions and influence could be extrapolated to the larger community including natural resource extraction (see Baddianaah and Baaweh 2021). Moreover, in the absence of the household heads, who are mostly males because of the patriarchal nature of household headship in Northern Ghana (GSS 2013), the wife or any responsible adult knowledgeable on the demands of the study was involved. Indeed, patriarchy affected the equal distribution of the questionnaire since females were the least (36.3%) in the survey. However, the sample size determination follows that of Yamane (1967:886):

$$n = \frac{N}{1 + N(e)^2} \tag{1}$$

$$n = \frac{2352}{1 + 2352(e)^2} = 342 \tag{2}$$

Table 1 Composition of study communities and house size

Region	District/Municipal	Study community	Household number	Community proportion
Upper West	1. Nadowli-Kaleo	1. Tarkpo	258	38
		2. Charikpong	367	53
	2. Wa East	3. Goripie	325	47
		4. Baayiri	248	36
		5. Danyuokura	145	21
		6. Kande	88	13
		7. Bunaa	93	14
		8. Jonfien	95	14
		9. Manwe	254	37
		10. Tandabore	54	8
		11. Boro	78	11
	3. Wa West	12. Eggu	105	15
		13. Nyagli	101	15
		14. Polee	141	20
Total			Sampling frame ($N=2352$)	Sample size ($n=342$)

Source: Authors

Table 2 Distribution of key informants

Region	District	Description of respondent	No. of respondents
Upper West	Nadowli-Kaleo	Local community Level	
		(a) Chiefs	2
		(b) Landlord(s)	2
		(c) Lead miner(s)	2
	Wa East	(a) Chiefs	7
		(b) Landlord(s)	7
		(c) Lead miner(s)	7
	Wa West	(a) Chiefs	5
		(b) Landlord(s)	5
		(c) Lead miner(s)	5
	Institutional Level		
	District Environmental Unit		3
	Minerals Commission		3
	Environmental Protection Agency		3
Total			51

Source: Authors

In the formula, n = sample size (342), N = total household population (sample frame) = 2352, e = margin of error (0.05) or 95% confidence level. The simple size was proportionally shared among the study communities (see Table 1).

For phase 2 of the data collection, the local level and institutional key informants (Table 2) were purposefully sampled because of their in-depth knowledge and assigned roles in their communities as well as involvement in the ASM sector: the chief, *tendana* (landlord), and assembly member within each community were involved. Chiefs and *tendanba* (plural for the landlord) play significant roles in the ASM sector. They sometimes grant concessions based on the customary tenure of land to local miners (Andrews, 2015; Osei-Kojo and Andrews, 2016; Botchwey and Crawford, 2018). Assembly members are direct representatives of the decentralised governance system and may play a role in fighting illegal mining activities as well as reclaiming degraded lands, necessitating their inclusion in the study.

Likewise, lead miners (*ghetto* bosses) were reached out to through snowballing coupled with field visits. Snowballing was adopted in selecting *ghetto* bosses because they may not be easily identified by the researchers who needed the assistance of individuals who were well-grounded in the communities to be able to reach out to them. Heemskerk (2002) pointed out the difficulty and risk involved in reaching out to artisanal miners in local communities to obtain data. In a related study, Tuokuu et al. (2020) opined that the continued criminalization of ASM activities has made it difficult to reach out to artisanal miners during data collection. A similar submission was given by Kala (2015) who assessed the entrepreneurial engagements of the youth in ASM across local communities in Kui and Kenyasi. Additionally, one institutional staff/director from each of the Minerals Commission, Environmental Protection Agency (EPA), and the District Environmental Officer of the study districts who directly influence ASM activities were involved.

Furthermore, in addressing ethical issues—a key requirement in social science research (Creswell, 2014), the survey instruments were vetted and approved by the Research Ethical Committee of the University for Development Studies, Tamale, Ghana, and verbal consent of the respondents (household heads, and key informants) was duly sought before administering the survey instruments to them. All the interviews for the local level key informants were conducted in the native language, tape-recorded and transcribed into the English Language. The interviews lasted between 30 and 45 min for each respondent.

Data analysis

The quantitative data were coded and entered into Statistical Package for Social Sciences (SPSS) version 20. Appropriate editing and enhancement were done before quantitative tools involving cross-tabulation and frequency distribution were employed in analysing the data. Furthermore, the transcribed key informant responses were screened and categorised according to the most occurring themes (see Hausermann et al., 2020; Tuokuu et al., 2020) to avoid duplication of data and presentation of irrelevant issues (Charmaz and Belgrave, 2012). Thus far, the dominant themes were identified and presented using direct and indirect quotes. Additionally,

Table 3 Socio-demographic characteristic of respondents ($N = 342$)

	Frequency	Percent
Age		
30 years and below	190	55.6
31–40 years	118	34.5
41–50 years	22	6.4
51 years +	12	3.5
Gender		
Male	218	63.7
Female	124	36.3
Household size		
1–5 members	148	43.3
6–10 members	188	55.0
11 members +	6	1.8
Educational status		
No formal education	66	19.3
Basic education	228	66.7
Senior high school (SHS)	34	9.9
Diploma	12	3.5
First degree	2	0.6
Employment status		
Formal sector	6	1.8
Informal sector	336	98.2
Type of formal sector job		
Teaching	6	1.8
Type of informal sector job		
Food crop farming	104	30.4
Artisanal and small-scale mining	146	42.7
Other artisan work	92	26.9

Source: Field Survey (2021)

data integration was done in which both the qualitative and quantitative data were presented synchronously.

Results and discussion

Socio-demographic characteristics of respondents

Table 3 presents the respondents' socio-demographic characteristics. The results showed that the majority (55.6%) of the respondents were in the age group of 30 years and below while respondents within the age group of 51 years + were the least represented (3.5%). By implication, artisanal mining operations are youth dominated because of the limited job opportunities in local communities (Guenther, 2018). Artisanal and small-scale mining has become an important livelihood option in local communities. For instance, in Peru, Mamani et al. (2022) established that ASM contributes to the monthly per capita family income of about 207.42 soles between 2003 and 2019. In addition, ASM best suits the youth population considering the energy demanding nature of the operations. Male household heads (HH) dominated the survey (63.7%). Male dominance in terms of household leadership is shaped by patriarchy and, largely, males remain supreme in decisions concerning natural resource extraction in the Ghanaian social setup (Hausermann et al., 2020). Respondents' educational qualifications showed that the majority of them have attained some level of formal education but with the basic education category dominating (66.7%). The low level of educational attainment of the respondents may have implications with respect to their understanding and appreciation of the environmental consequence of ASM operations. Scholars have argued that the low level of educational attainment of mining communities' dwellers largely pushed them to the extractive sectors since they may not be able to find jobs in the formal sector (Baddianaah et al., 2022a).

Furthermore, an overwhelming majority (98.2%) of the respondents depend on the informal sector for employment with jobs such as food crop farming (30.4%) and artisanal mining (42.7%) employing a recognisable proportion of the inhabitants. Moreover, the few respondents that had jobs in the formal sector were found to engage in teaching (1.8%). The results are consistent with the literature (e.g. Obeng et al., 2019; Osumanu, 2020) who opined that the majority of the dwellers in ASM communities are employed in the informal sector — they are engaged in job streams such as mining, lumbering, and fishing.

In addition, the majority (55.5%) of the households surveyed contain a membership population of 6–10. Large household size is a common characteristic of developing societies and the Upper West Region is no exception (GSS, 2013; Osumanu, 2020). Therefore, there is no doubt that such a large household size with a low level of educational attainment (66.7%) is more likely to find jobs in the informal sector (98.2%). Thus, some of these local dwellers are expected to secure jobs in the artisanal and small-scale mining sector (42.7%) with concomitant effects on environmental degradations and associated social effects (Fearon et al., 2015; Obeng et al., 2019). However, recent studies have demonstrated that the ASM sector presents opportunities for reducing poverty and developing local communities (Matlaba et al., 2018; Guenther, 2018; Bazillier and Girard, 2019; Pokorny et al., 2019; Yankson and Gough, 2019), all things being equal.

Local communities' perspectives on the environmental effects of galamsey

Restoration of galamsey degraded landscapes is a major policy objective for Ghana Government (Abaidoo et al., 2019; Obeng et al., 2019). However, the success of the

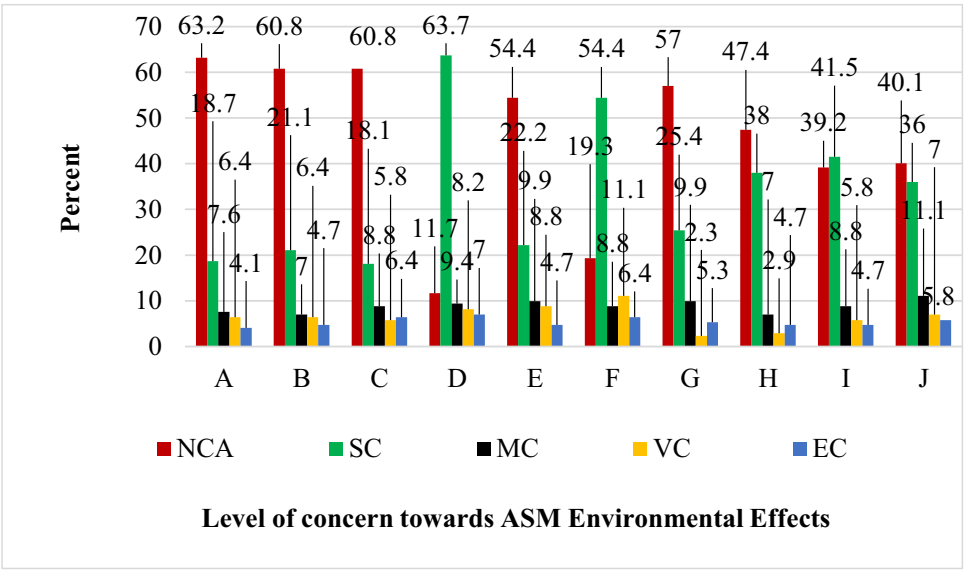

Fig. 3 Level of concern towards ASM effects on the physical environment. Source: Field Survey (2021). Likert scale key: A = Reduction in quantity and quality of water resources. B = Reduction in soil quality. C = Compromise air quality. D = Destruction of tree resources. E = Modification of the entire landscape. F = Frequent floods caused by abandoned pits and mining waste. G = Destruction of ancestral heritage sites/sacred groves. H = Decline in the aesthetic value of the environment. I = Decline in quantity and quality of non-timber forest products. J = Decline in quality of grazing lands

restoration agenda in the country lies in the local community's knowledge of the future impacts of galamsey on the environment and commitment to push the restoration agenda ahead (Obeng et al., 2019). On this note, the respondents' knowledge and concern about the adverse effects of ASM on the physical environment were explored—the respondents were presented with a 5-point Likert scale (NCA = not concerned at all, SC = somehow concerned, MC = moderately concerned, VC = very concerned and EC = extremely concerned) to indicate their level of concern about the under listed negative effects of ASM in their communities (Fig. 3). The results showed a very disturbing development as the majority of the dwellers of the galamsey communities appear not to show any major regard for the environmental destruction caused by the galamsey operations.

From the results, the majority (63.2%) of the respondents indicated that they have no concern at all regarding the reduction in quantity and quality of water resources caused by the galamsey activities, with just a handful (4.1%) of them indicating that they were extremely concerned. Moreover, it must be noted that the effects of mining activities are experienced locally (Darimani et al., 2013; Suopajärvi et al. 2016) — the local dwellers may be placed in a better position to apply appropriate measures in addressing the adverse environmental effects. Similarly, the majority of the respondents have no concern at all regarding the mining operations compromising the ambient air (60.8%), modification of the landscape (54.4%), and destruction of ancestral homes and sacred groves (57%). Thus, the general attitude of the respondents regarding the environmental tragedies of galamsey was appalling—the ill-effects such as the destruction of tree resources (63.7%), frequent floods caused by abandoned pits, and blockage of mining waste (54.4%) all appear to be somewhat of concern to the survey respondents. Across the board, none of the issues posed made the respondents very concerned or extremely concerned (Fig. 3).

The results have several implications. For instance, it appears that the respondents are acclimatised to the above negative consequences of the galamsey operations to the extent that they do not see them as being a problem at all in their lives. The literature highlighted that dwellers of artisanal mining communities at a certain point in time can devise coping mechanisms in living with the adverse consequences (Mihaye, 2013; Hilson, 2016). Moreover, this nonchalant attitude demonstrated by the local people towards the adverse effects of ASM in their communities suggests limited efforts would be adduced by them towards addressing the galamsey environmental menace. The results further suggest that the dwellers lack an in-depth understanding of the long-term effects of these environmental havocs in their communities. Undoubtedly, the results failed to concur with the findings of Obeng et al. (2019) in a related study conducted in the Western Region of Ghana in which the respondents showed great concern regarding the environmental harm caused by illegal mining activities.

Moreover, the respondents appear to have mixed levels of concern regarding environmental ramifications such as the decline in quantity and quality of non-timber forest products (NTFPs), the decline in the aesthetic value of the environment, and the decline in the quantity and quality of grazing lands (refer to Fig. 3). This suggests that the respondents appear to have some level of regard for the loss in environmental goods that they directly depended upon. Non-timber forest products such as mushrooms (Agaricus bisporus), the shea (Vitellaria paradoxa), and dawadawa (Parkia biglobosa) form the daily lives of inhabitants of rural communities in the Upper West Region (GSS, 2013). The shea in particular is a major economic tree often likened to cocoa in Southern Ghana with promising significance as a source of alleviating poverty in Northern Ghana. The nuts are collected, processed and sold directly, and/or in some instances, they are processed into shea butter. Shea butter occupies a major position in the global commodity market as a raw material for the cosmetic and pharmaceutical industries (Baddianaah and Baaweh, 2021). Thus far, the main objective of the local people appears to be tilting towards poverty alleviation rather than promoting environmental quality. Several studies projected artisanal miners as groups of individuals seeking to alleviate poverty (Hausermann et al., 2020; Osumanu, 2020; Mabe et al., 2021). However, the quest to alleviate poverty with no regard for environmental quality in artisanal mining communities often ultimately affected their wellbeing and worsened their poverty (Hilson and Pardie, 2006; McQuilken and Hilson, 2016, 2016).

To further understand how the issues of environmental degradation and the commitment of local communities towards reclaiming degraded landscapes are projected in the study communities, interviews were held with relevant stakeholders who are expected to play lead roles in pushing the reclamation agenda forward. The local stakeholders, namely chiefs, landlords, and assembly members, all confirmed that the destruction of economic tree resources (particularly the shea) is something they are strongly against, not only in artisanal mining operations but across all land use activities. These stakeholders indicated that the shea is the only economic tree that is resilient to climate change and must not be allowed to be a subject of anthropogenic destruction. A chief explained:

> Our only gift from God that has been able to withstand natural and anthropogenic disturbances such as drought, bush fires among others is the shea and I have decreed to subject anyone who fell the shea to the greatest punishment of our land (Source: Key informant interview, June 2021).

The above results seemed to suggest that local level rules and regulations can be activated and applied in fighting the environmental destruction of galamsey activities across local communities. According to Franken and Schütte (2022), one of the challenges to effective governing of the extractive societies is the misalignment of local reforms with national and international regulatory efforts. Thus, a careful incorporation of local rules and regulations into the Ghana mining framework is substantial in sustainably governing the sector. Studies conducted in Burkina Faso and Ghana have all come to a converging position that artisanal mining has the proclivity of pushing societies out of abject poverty provided the associated environmental consequences are curtailed (Aboka et al., 2018; Pokorny et al., 2019), and that key local level reforms are imperative in reforming the sector. Thus, the role of local stakeholders in the galamsey fight in Ghana cannot be downplayed if any success is to be achieved (Osei-Kojo and Andrews, 2016).

Local stakeholder roles on the restoration of galamsey degraded landscapes

In Table 4, the respondents' perspectives were sought concerning how their communities and the major stakeholders such as the chiefs and landlords (*tendanba*), assembly members, and the galamsey operators shaped and project issues of land reclamation. This was done using a six-point Likert scale (as in DS = disagree strongly, D = disagree, NA/DA = neither agree nor disagree, AS = agree strongly and DK = don't know).

From the results, the majority of the respondents (50% and above) either disagreed or disagreed strongly with any significant measure taken by an individual or groups to restore the mining degraded lands to ecologically functionable levels when responses on the two scales are combined. For instance, the majority (63.7%) of the respondents disagreed with the assertion that land reclamation has been prioritised in their localities. Similar scores were recorded across the board, with the majority of the respondents disagreeing with the notion that chiefs and elders play lead roles in reclaiming the land (72.5%). Others include landlords and clan heads contribute towards land reclamation (71.3%), while assembly members and unit committees play lead roles in land reclamation stood at 54.7%. In addition, the respondents disagreed with the notion that the artisanal miners willingly initiate and participate in reclaiming the land after mining (60.2%) and whether the miners respect local beliefs and regulations regarding land degradation (61.2%). The results suggest that the responsible stakeholders in the local communities have not demonstrated enough commitment regarding reclaiming the illegal mining degraded lands in the Upper West Region. This may aggravate the spate of land degradation in the region. The aforesaid results are not surprising because the state-centred

Table 4 Perspectives of stakeholder roles on land reclamation

Perspectives on land reclamation	Disagree strongly	Disagree	NA/DA	Agree strongly	Agree	Do not know
A	171 (50%)	47 (13.7%)	2 (0.6%)	64 (18.7%)	30 (8.8%)	28 (8.2%)
B	10 (2.9%)	6 (1.8%)	6 (1.8%)	145 (42.4%)	122 (35.7%)	53 (15.5)
C	146 (42.7%)	102 (29.8%)	20 (5.8%)	52 (15.2%)	12 (3.5%)	10 (2.9%)
D	144 (42.1%)	100 (29.2%)	30 (8.8%)	44 (12.9%)	14 (4.1%)	10 (2.9%)
E	78 (22.8%)	109 (31.9%)	55 (16.1%)	70 (20.5%)	6 (1.8%)	24 (7%)
F	20 (5.8%)	186 (54.4%)	50 (14.6%)	66 (19.3%)	8 (2.3%)	12 (3.5%)
G	28 (8.2%)	131 (38.3%)	73 (21.3%)	36 (10.5%)	60 (17.5%)	14 (4.1%)
H	111 (32.5%)	98 (28.7%)	59 (17.3%)	48 (14%)	14 (4.1%)	12 (3.5%)
I	107 (31.3%)	73 (21.3%)	20 (5.8%)	54 (15.8%)	60 (17.5%)	28 (8.2%)
J	65 (19%)	135 (39.5%5)	28 (8.2%)	50 (14.6%)	46 (13.5%)	18 (5.3%)
K	184 (53.8%)	58 (17%)	22 (6.4%)	36 (10.55%)	24 (7%)	18 (5.3)
L	180 (52.6%)	76 (22.2%)	20 (5.8%)	38 (11.1%)	6 (1.8%)	22 (6.4%)
M	92 (26.9%)	146 (42.7%)	22 (6.4%)	56 (16.4%)	8 (2.3%)	18 (5.3%)
N	150 (43.9%)	52 (15.2%)	26 (7.6%)	88 (25.7%)	10 (2.9%)	16 (4.7%)
O	120 (35.1%)	117 (34.2%)	16 (4.7%)	22 (6.4%)	24 (7%)	43 (12.6%)

Source: Field Survey (2021). Likert Scale Key: A = Land reclamation has been a major priority. B = Most community members share the belief that the degraded lands should be reclaimed. C = Chiefs and elders play a lead role in land reclamation. D = Landlords/clan heads play a lead role in land reclamation. E = Assembly members and unit committees play a lead role in reclamation. F = Miners willingly initiate and reclaim the land after mining. G = There are customs and tradition emphasizing the need for land reclamation after mining. H = Artisanal miners respect local beliefs and regulations regarding mining. I = Some forest areas are preserved and protected from mining based on the general belief of obtaining non-timber forest products. J = Prospecting for gold along scared groves is prohibited. K = Major stakeholders have taken time to assess the extent of degradation caused by ASM activities on the environment. L = There has been constant engagement between miners and major stakeholders land in reclamation. M = There is social cohesion between miners and the chiefs in reclaiming the land. N = There is social cohesion between miners and the landlords in reclaiming the land. O = ASM should be abolished

nature of mining operations and decision-making has caused the local actors to feel powerless in influencing decisions in the extractive societies (Darimani et al., 2013; Suopajarvi et al. 2016).

The results (Table 4) further showed that the respondents (58.5%) disagreed with the assertion that some forest areas are preserved and protected from mining based on the general belief of obtaining non-timber forest products. In addition, the respondents disagreed on the questions of whether the major stakeholders in the communities have taken time to assess the extent of degradation caused by ASM activities on the environment (70.8%) and whether there has been constant engagement between miners and major stakeholders on land reclamation (74.8%). This finding has refuted the scholarly work of Gifford and Nilsson (2014) who opined that staying close or associating with adverse environmental consequences imbibed in individuals the sense of environmentalism/pro-environmental perspectives and that such people may willingly participate in restoration activities. The results showed that the local communities lack the sense of environmentalism, which is a critical requirement in environmental resource governance (Darimani et al., 2013; Franken and Schütte, 2022). The dearth of knowledge and involvement of the local actors regarding the extent and future implications (risks) of land degradation caused by the mining activities (Caripis et al., 2018) transitioned into the low commitment towards land reclamation in these communities. To buttress this notion, a recent study by Franken and Schütte (2022) maintained that meaningful stakeholder dialogue and inculcating in the populace the sense of local ownership of environmental resources are pertinent issues needed to remedy the challenges facing the extractive societies. Nevertheless, the results confirmed the arguments put forward by relevant scholars that dwellers of mining communities largely focus on the economic gains of the sector at the expense of environmental consequences (Ofosu et al., 2020; Adu-Baffour et al., 2021).

The issue of whether there is social cohesion between miners and chiefs as well as between miners and landlords in reclaiming galamsey degraded lands all received massive disagreement (69.6% and 59.1%, respectively). But relevant studies have argued that illegal mining activities flourished across local communities because the local authorities such as the chiefs, elders and the assembly members collaborate with the illegal miners (Hilson et al., 2014; Botchwey and Crawford, 2018; Hilson and Maconachie, 2020a). The pertinent question this study therefore asked is: why the sudden lack of cohesion by these groups

of actors in reclaiming the mined degraded areas in these same communities? The respondents appear to be indifferent in responding to the question of whether customs and traditions emphasised the need for land reclamation after mining since no definite decision was arrived at by them.

Recent studies have argued that the fallout of the African Traditional Religion (ATR) with fewer believers has eroded the position of customs and traditional beliefs that hitherto were employed in environmental conservation in local communities (Ofosu-Mensah, 2011; Baddianaah et al., 2021). The only point of massive agreement (78.1%) hovers around the perspective that the degraded lands should be reclaimed by the government of Ghana. Obeng et al. (2019) reported from their empirical study that local communities have expressed great concerns and willingness to participate in the reclamation of galamsey degraded landscapes in the Western Region of Ghana. Interestingly, for this study, the respondents (including the galamsey operators) think the galamsey degraded lands should be reclaimed by the government. A lead miner explained:

> Reclamation of the galamsey landscape is not our duty. Already none of us is licensed to mine, so how can a thief end up being a good person? Our interest is to extract the gold and quickly leave the site. Since the government has failed to dialogue with us for a good way out…they should bear the cost of reclaiming the land for treating us as illegal miners…after all, what is illegal is illegal (Key informant interview, June 2021).

Indeed, the government of Ghana has spent an enormous amount of dollars in reclaiming galamsey degraded lands. For instance, in 2016, Boadi et al. (2016) reported that an amount of US$ 6424.1 was spent by the government to reclaim and flush out illegal miners within the Offin Shelter Belt consisting of only a small forest enclave of about 56.67 km^2 that was destroyed by the illegal mining activities. Fast forward in 2017, an amount of US$ 100 million was committed to reclaiming illegally mined degraded landscapes under the Multi-Sectoral Integrated Mining Project (see CSIR-Forestry Research Institute of Ghana, 2017), and in 2018, the then Minister of Environment, Science, Technology and Innovation, Professor Kwabena Frimpong-Boateng hinted that as high as US$ 29 billion was required annually to reclaim the galamsey degraded landscapes in Ghana (Frimpong-Boateng, 2018). But what about empowering and committing the local communities to the reclamation drive that may come at a reduced cost or no cost to the government?

On a similar tangent, the majority (69.3%) of the respondents disagreed with the notion that artisanal mining operations should be abolished in their communities. The finding is consistent with the literature highlighting that most rural dwellers do not endorse the idea of banning galamsey in their communities despite the plethora of negative effects associated with the operations (Hilson and Maconachie, 2020a; Tuokuu et al., 2020; Zolnikov, 2020; Mabe et al., 2021). This is because artisanal mining activities induced greater positive economic impacts in local communities than the widely acclaimed large-scale mining operations (Ouoba, 2017; Guenther, 2018; Bazillier and Girard, 2019; Pokorny et al., 2019; Yankson and Gough, 2019).

Collaborative stakeholder engagement on reclamation of ASM degrade landscapes

Interviews with the respondents revealed that no chief, landlord or the assembly members across the 14 communities covered in the survey sanctioned reclamation of the galamsey lands after mining. Field observations including transect walks showed no land reclamation agenda has been called for by either the local authority or the state institutions responsible for regulating illegal mining activities in the study communities. Chiefs and landlords explained that they lack the power to make decisions regarding gold mining activities. They only have "the right to farm, build or lease the land out for other development projects but not mining issues." This finding confirms the finding of a study conducted in Northern Europe by Suopajarvi et al. (2016) who indicated that local stakeholders often feel they have no power with respect to mining projects being undertaken in their communities. While this notion is been held by the local rulers, the state institutions, particularly the Minerals Commission and Environmental Protection Agency, are of the view that the local authorities should have been the ones leading the fight against galamsey because their lands are being destroyed by the galamseyers. A response from a staff member of the Minerals Commission was captured as follows:

> Our outfit is fighting a national course–the growing illegality in the sector that is destroying our water bodies. We all depend on these rivers…we were all here when the Ghana Water Company Limited threatened to shut down all its processing plants because of the cost involved in processing potable water for us as caused by the illegal mining operations. A majority of the chiefs are not looking forward to the future and are collaborating and profiting massively from the galamsey activities. They have outlived their value as traditional rulers (Source: Key informant interview, August 2021).

The above submission seemed to suggest that state institutions are discontent with the activities and roles exercised by the traditional authorities in fuelling the galamsey

menace. But the pertinent question asked is: how are these local authorities represented at the national level discourse on eradicating illegal mining activities in the country? A chief poured out his frustrations when asked to explain their roles and representations at national platforms concerning the illegal mining fight in Ghana. He intimated:

> Which national level platform? With who? The last time they called us to Nadowli–the district capital for the first stakeholder consultative meeting, it turned out that nothing fruitful was discussed. You wouldn't believe it! The Minerals Commission boss started by blaming me for allowing the illegal miners to operate within my territory and I got annoyed. I realised it was not going to be a dialogue but just to apportioned blame on the traditional authorities…as old as my age, so that small boy expects me to be chasing these energetic miners in the night while he sleeps in his house because he is the boss, come on! (Source: Key informant interview, June 2021).

The above submission signalled that there is a great disconnection between the state institutions and the local authorities in fighting galamsey in the region although the best alternative towards addressing the challenges of mining operations is through a well-defined stakeholder dialogue (Franken and Schütte, 2022). Local authorities also blamed the state institutions for "taking their share from the illegal miners but pretend to be fighting their operations" and confirmed the extant studies pointing to collusion and collaboration by all the actors, particularly the state and local authorities, in promoting illegal mining activities in Ghana (Hilson et al., 2014; Osei-Kojo and Andrews, 2016; Botchwey and Crawford, 2018). Along similar lines, Caripis et al. 2018) argued that corruption is the major destroyer of the entire mining cycle; with corruption inducing unethical mining practices. Galamsey threatens the life of every Ghanaian and should be a subject of interest to everyone including the miners. All the illegal mining bosses were of the view that land reclamation is not prioritised by them because they lack the necessary tools such as excavators to refill the pits after mining; however, they are not under any force to do so. A *ghetto* boss (lead miner) reported: "We were here when the military confiscated some excavators belonging to the Chinese and set them ablaze. These machines could have been given to the assemblies of which they could mobilise us to always pay some amount for them to come in and refill the pits after mining" (Key informant interview, June 2021).

The results suggest that the illegal miners may be willing to reclaim the land after mining if their operations are regularised under the respective MMDAs. Many studies shared similar sentiments and condemned the burning of excavators and other mining equipment by the military in Ghana (Hilson, 2017; Eduful et al., 2020; Hilson and Maconachie, 2020b). The results further showed that most chiefs and landlords who give out their lands to mine gold mostly take ad hoc decisions without weighing the future repercussions, probably under the influence of cash. Nba Dakurah (pseudo name), a landlord whose 20 acres of farmland has been given out to miners in return for a three-room house, had this to say when asked about the future implications of the mining on his farmland:

> Um, um, um, it is not easy at all–deciding between mining prospects and farming. You know the mining money is quick…like the house, I received from them (He turned around and points to the house), this would have taken me my entire life savings to build from the smallholder agriculture I do…frankly, the entire farmland is destroyed and I am beginning to think about where to farm and what to live on if gold is no more found on my land (Source: Key informant interview, June 2021).

The results suggest that some of the local stakeholders lack an in-depth understanding of the future consequences of the destruction being caused by the mining activities. Furthermore, a 57-year-old chief in whose community illegal mining operations were ongoing was disturbed when the research team had a discussion with him concerning the environmental destruction at the site. He lamented:

> As for me, I don't want their money, the environmental quality is my objective. They started the whole arrangement with the tendana (landlord) though I was informed and consented. They indicated it was going to be purely dig and check, no gullies, and use of water or mercury… I will make it a point to visit the site regularly and ensure that any abandoned excavated area is duly reclaimed no matter the cost involved or they stop operations. We cannot pretend to be making money under this kind of environmental destruction (Source: Key informant interview, June 2021).

The above results suggest that not all the stakeholders in the local communities are naïve regarding the effects of illegal mining operations on the environment and thus, do not encourage this kind of mining. However, the dearth of collaboration between the stakeholders has continued to promote illegal mining operations in these communities (Osei-Kojo and Andrews, 2016). In addition, the customary land tenure regime practiced in northern Ghana in which individuals and families decide how to put their land to use has conditioned illegal mining operations (Baddianaah et al., 2022b). In fact, despite the galamsey ban in 2017, illegal mining operations are still going on in the local communities with discoveries and galamsey sites opening up. Therefore, proper education and integration

of the traditional authorities into the small-scale mining framework is a major step to reducing the ill-effects of galamsey by committing local miners to reclaim mined degraded landscapes after mining. Similar views have been expressed by relevant studies emphasising collaborative stakeholder engagement as the way forward to ending illegal mining and associated adverse consequences in local communities (see Osei-Kojo and Andrews, 2016; Tuokuu et al., 2020; Franken and Schütte, 2022).

Conclusion

The objective of this paper was to investigate the perspectives of the local community dwellers concerning the environmental consequences, roles and commitments towards reclaiming the galamsey degraded landscapes in Ghana. The results showed a very disturbing development because the majority of the dwellers of the galamsey communities have limited regard for the environmental destruction caused by the galamsey operations. The dwellers appear to have adapted to the negative consequences of the galamsey operations. It was revealed that the local dwellers lack an in-depth understanding of the long-term effects of the environmental havoc of galamsey activities on the study communities. The low sense of environmentalism among the local dwellers contributed to the irresponsible mining operations carried out in the communities. The responsible local level stakeholders (chiefs, landlords and assembly members) show limited commitment regarding reclaiming the illegally mined degraded landscapes. This is because they felt they were being left out of the mineral resource governance framework in Ghana. In so doing, they lack the power to prevent illegal mining operations or sanctioned reclamation of the mined degraded lands in their communities. Moreover, the responsible state institutions are poorly resourced and empowered to apply drastic measures in fighting illegal mining activities in the country. In addition, corrupt practices by both the state institutions and local level actors significantly contribute to stimulating illegal mining in local communities. The disconnection between the state institutions and the local authorities in fighting galamsey in Ghana has implications on the overall environmental performance of illegal mining operations in Ghana. The study calls for a strong collaboration between governmental institutions and local stakeholders in reclaiming the galamsey degraded landscapes. In addition, the responsible state institutions should be supported with the necessary logistics and empowered constitutionally to exercise their regulatory roles in the mining sector; and a well-organised environmental literacy programme across local radio stations and the print media is pertinent for inculcating environmentalism in the local dwellers towards addressing the environmental ramifications of illegal mining operations in local communities.

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Author contribution Issah Baddianaah: conceptualization, methodology, software, validation, data curation, writing—original draft preparation, visualization, investigation. Bernard Nuoleyeng Baatuuwie: supervision, writing—reviewing and editing. Raymond Adongo: supervision, writing—reviewing and editing.

Declarations

Ethical approval As required in every social research, when conducting a study of this kind, there is the need to consider the ethical codes guiding the study (Creswell 2014). For the purpose of this study, at the stage of data collection, the study took into consideration all ethical issues that brought about the success of the study.

Informed consent Artisanal miners, traditional authorities, and assembly member consent were sought and were assured that whatever so information that was provided will be treated very confidential and that the information was only and only for academic purpose.

Competing interest The authors declare no competing interests.

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