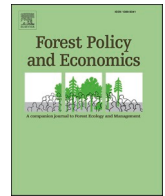


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Understanding actors' power through conflict dynamics: Insights from small-scale mining on cocoa farms

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ABSTRACT

Artisanal and small-scale gold mining at the forest-farm nexus remains a contentious issue due to the diversity of actors and competing interests surrounding it. Using the actor-centered power (ACP) approach, it has been theorized that actors leverage power resources, combining coercion, (dis-)incentives, and dominant information, to influence less powerful actors to act against their preferred interests. How an actor's power resources evolve during conflicts and its impacts on their preferred interests and goals over time are, however, open questions. Drawing on wave theory, this paper introduces a novel framework to analyze how actors employ power resources and interactions across conflict episodes. We apply the framework to examine how ARTGOLD, an ASM company, used power resources to establish mining operations on cocoa farms in Apesika, a forest-fringe farming community in Ghana, despite local opposition. Initially, ARTGOLD used false information and promises of incentives to gain the support of traditional rulers and state institutions. These alliances enabled it to benefit from applying different forms of coercion, including police raids on protesters against its mining operations, and discharging mining effluents onto the farms of resistant cocoa farmers. Village level traditional rulers who opposed mining operations faced sanctions from higher-ranking chiefs, ultimately silencing local resistance and enabling ARTGOLD to expand mining on cocoa farms in the study localities. Our analysis reveals shifting power dynamics over time and underscores how actors' power resources evolves in response to the strategies of others. Our theoretical approach enables a better analysis of temporality within the ACP approach. This dynamic approach precipitates the need to pay attention to power resources that may improve the relative power of important but marginalized actors, especially if conflicts over mining on farmlands are to be managed in a manner that safeguards local norms and environmental sustainability.

1. Introduction

In February 2017, the youths of Apesika,¹ a forest fringe and cocoa-growing village in Southwestern Ghana, self-organized to destroy excavators and mining machinery of ARTGOLD, an artisanal and small-scale gold mining (ASM) firm. The company had moved into Apesika to initiate surface gold mining on cocoa farms and along the bank of River Asubone – the village's primary water source. Many of Apesika's youth engaged in violent protest after months of propaganda by their traditional ruler about accommodating surface gold mining in the village. ARTGOLD began operating in the broader landscape around Apesika in 2016. It was widely believed to be using illegal avenues to procure and

mine cocoa farms and water bodies across three villages in the landscape. ARTGOLD employed some of Apesika's youths during those operations. However, in this case, many of Apesika's youths were fiercely against the company's expansion into their community, citing two reasons. Firstly, they argued that surface gold mining would destroy River Asubone, depriving their people access to water. Secondly, having partaken in the company's activities, in other villages, some of the youths described different aggressive tactics ARTGOLD uses to break the will of people who opposed its mining operations. Despite the youths' concerns, which they had registered on multiple occasions with their village chief and political leaders, within weeks of the protest, ARTGOLD brought new equipment into Apesika, clearing several hectares of

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¹ Throughout the paper, we have pseudonymized to protect the identity of the people, communities, traditional rulers, and company involved in the conflict.

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cocoa farms and discharging mining waste into River Asubone, as the youths had feared.

We open with this vignette to set the scene for an analysis of how power resources competing actors use power resources to access land and water resources for ASM, sometimes against the will of marginalized actors in rural areas of low-income countries. By ASM, we refer to the low-tech, labor-intensive extraction of minerals from the earth. Over the last decade, debates about ASM in many low-income countries have drawn attention to various actors, who tend to be embedded in unequal power relations. These actors, including state institutions, financial organizations, traditional rulers, mining enterprises, non-governmental organizations (NGOs), and local communities, have different perspectives and priorities regarding ASM. ASM is a source of livelihood to over 45 million people globally, 10 million in Sub-Saharan Africa, and over one million in Ghana (MESTI, 2014; Osei et al., 2021; World Bank, 2019, 2020). Despite the positive livelihood contributions, ASM can have devastating social and environmental impacts, especially where it displaces people from their homes and farmlands (Siaw et al., 2023), or destroy water bodies and forests that are typically safety nets for the rural poor (Owusu et al., 2019; Ros-Tonen et al., 2021). The conflicting contributions and impacts make navigating access to limited land resources for ASM a keenly contested issue in many countries, with various actors likely to use different power resources to legitimize or resist ASM operations. In Ghana, ASM is widely perceived as a national crisis due to its mounting socio-environmental impacts. Much is written about the state's banning and use of military officials to clamp down on ASM in 2006, 2013, and 2017. This includes deploying security personnel to arrest and prosecute ASM operators, seize and destroy their excavators and other equipment (Adu-Baffour et al., 2021; Eduful et al., 2020; Hilson, 2017). The conflicts ASM operations raise provide a useful opportunity for unpacking power, including understanding how actors use different power resources to influence conflict processes and outcomes.

The Actor-Centered Power (ACP) Approach (Krott et al., 2014) provides a robust, coherent lens to understand the role of different actors in mediating ASM operations. Power within this approach is understood as the ability of a potentate to achieve their interest despite resistant from a less powerful actor or subordinate. Krott et al. (2014), in advancing the ACP approach, theorize that actors may use power elements such as coercion, (dis)incentives, and dominant information to realize their interests in conflict situations. Power is often hidden (Gaventa, 2006), becoming arguably more visible amidst resistance (Garcia and Burns, 2022). The capability of actors to use various power strategies to navigate conflicts denote their power resources, shaping their chances of winning or losing out on their interests (Juerges et al., 2021). However, insights into the use and evolution of power resources among various actors within ASM contexts over time remain an open question. Indeed, temporality remains an unresolved critique of the ACP approach which is highly cited for its utility in pinning down actors power in the “present”, or “now” (Kimengsi et al., 2022, 2024; Ongolo and Krott, 2023).

This paper contributes to these debates, arguing that conflicts can fruitfully be understood as a “wave”, with peaks and valleys that illuminate how actors' deployment of power resources changes over time and how ensuing dynamics improve or weaken their ability to have others recognize their preferred interest(s) amid diverging alternatives. The ability of a winner or loser to retain their relative position is not given. Instead, it is contingent upon how effectively they mobilize further power resources to service their interest(s) during successive episodes of the conflict. This shift in understanding indicates that the ACP approach's typical application to study the power dynamics of the “present” can be enhanced to elucidate a more dynamic analysis and understanding of power. It provides, on the one hand, an avenue to further explore how actors continually mobilize power resources over time, and, on the other, an opportunity for scrutinizing what power resources may serve as levers for change or transformation, particularly where the outcomes of a preceding conflict ‘episode’ are perceived to be

inequitable.

To advance these arguments, the remainder of the paper proceeds as follows. Section 2 explores and draws on wave-theory to bring greater dynamism to applying the ACP approach. The case study, of the introductory vignette, is expanded and methods used to collect and analyze data clarified in Section 3. Section 4 “follows the wave” tracing the power resources various actors employed during different episodes of the ASM conflict process. Specifically, we draw on the Apesika case study to address the following questions: i) What access procedures and power resources enable the interplay of state, ASM enterprises, and traditional authorities to legitimize access to farmlands for ASM operations? and ii) How do the power resources influence resistance mechanisms of local communities embedded in unequal power relations around land access with traditional rulers and the state over time? We conclude by discussing the implications of our findings for struggles over natural resources more broadly, and in particular how relevant but marginalized actors may strengthen their power resources, i.e., their ability to draw on different power elements such as coercion, (dis-)incentives and dominant information, to achieve redress over time.

2. Powerful waves: accommodating dynamism in the Actor-Centered Power Approach

Power has been defined and engaged in the literature in multiple ways. This includes structural, discursive and actor-orientated approaches (Svarstad et al., 2018), each engaging relations between different actors, and/or an agent's ability to influence such relations, or other actors differently. Whereas discursive power approaches focus on framing and more broadly the role of language and knowledge in shaping relations between actors, the Actor-Centered Power (ACP) approach (Krott et al., 2014) pays attention to how agents employ various power elements to influence others to behave in ways they would otherwise be averse to. Central to this is the notion of access to power resources, an actor's ability to draw on various power elements – a combination of coercion, material incentives, or dominant information – to have their way, or realize their interest despite opposition from other actors.

The ACP approach was inspired by the works of power theorists, e.g., Weber, Dahl, and Lukes, and has garnered attention and application across sectors and scales. The approach has been used to: demonstrate how village actors may influence project outcomes in comparison with powerful actors like state authorities who wield greater control in formulating policy and projects (Ba et al., 2020; Juniyanti et al., 2021); illustrate how projects aimed at decentralization may introduce new power differentials and competition that undermine the goal of such reforms (Garcia and Burns, 2022); and explore actors' proclivity to leverage more power resources when economic interests are at stake (Brodrechtova, 2024; Juerges et al., 2021), or where they seek to take advantage of crises to have their interests entrenched in policy (Thomas and Hubo, 2024). The various applications illuminate different aspects of the ACP approach, including how power influences and is influenced by various actors and its impacts on institutions for the governance of the relations between people and nature (Charmakar et al., 2024; Kimengsi et al., 2022, 2024; Ongolo and Krott, 2023).

While the literature on ACP has advanced an understanding of the relational nature of power, its engagement with temporal dynamics of conflicts remains an open question (Krott et al., 2014). Temporality within the ACP may be understood through a dynamic conflict model where actions and their corresponding effects (re)shape the power resources actors may draw upon to change their power position in order to realize their preferred interests. One way to navigate temporality in the ACP approach involves parsing out the phases of policy or conflict development to decipher how various actors' power changes over time. For example, in a study on human-wildlife conflicts, Ba et al. (2020) identified three useful temporalities in the conflict: i) creation of the protected area, ii) introduction of restrictions on local communities'

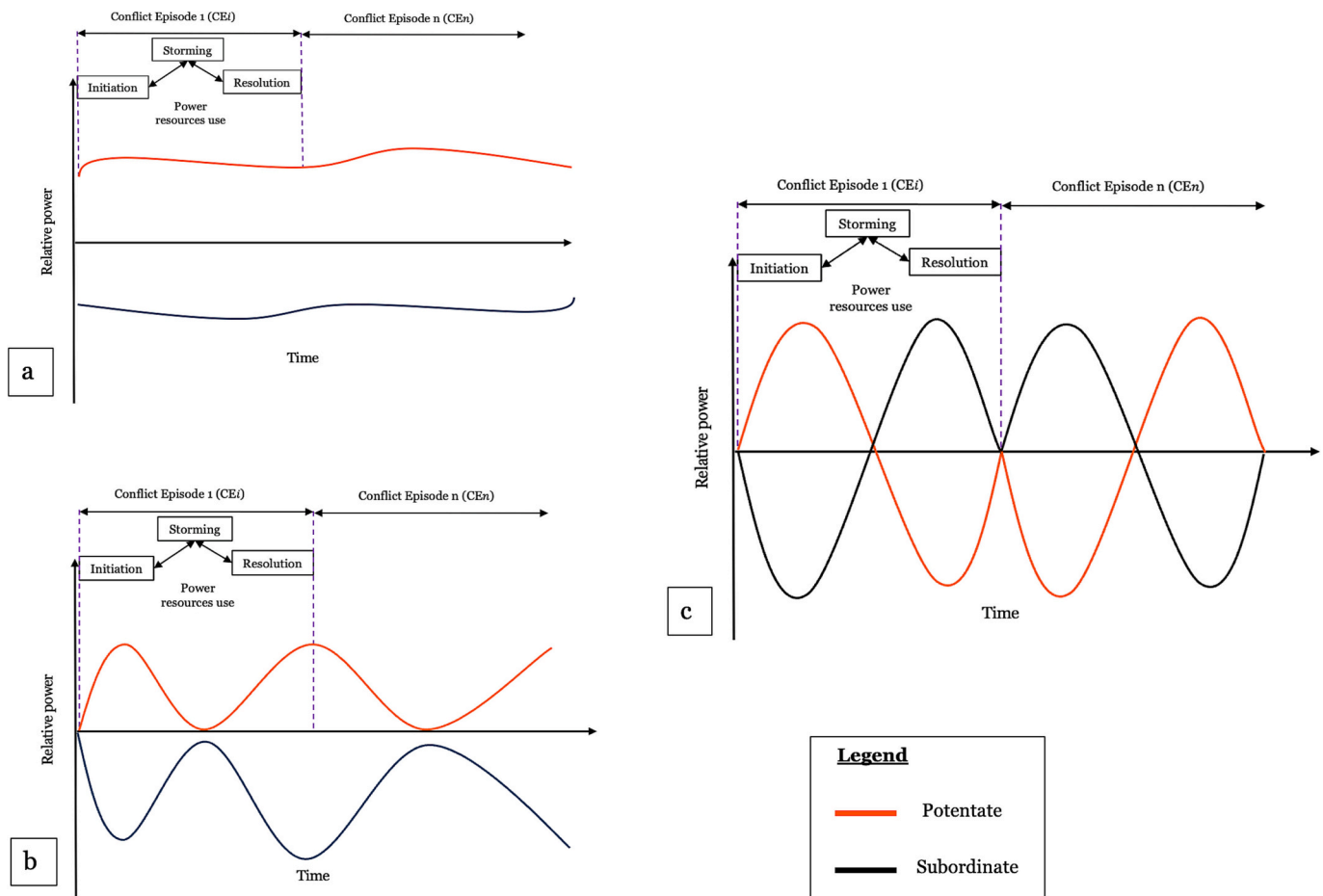


Fig. 1. Relative power within a temporal ACP framework, a. relative power between potentate and subordinate remains fairly the same despite their use of different power resources over time, b. relative power changes between potentate and subordinate with the use of power resources but neither’s power position changes significantly, c. Significant changes in relative power between potentate and subordinate with the use and encounter of each other’s power resources over time.

rights to enter forests, and iii) destruction of crops by wildlife. While useful, we argue that the contexts and nature of conflicts, as well as timelines may vary, indicating that a more robust conceptualization of the temporality of power in the ACP approach is germane.

We embrace this challenge, arguing that wave theory provides some inspiration for approaching temporality in the ACP approach more consistently. Originally proposed by Robert Hooke in the 1600s, wave theory holds that light acts as waves as opposed to only particles. As with light, conflicts – typically used to illuminate the ACP approach – we propose, may be understood as a wave, consisting of different “episodes” that flow into each other, whereby the outcome(s) of a preceding episode (CE_i) serve as inputs to be contested among actors in the next cycle (CE_{i+1}) (Fig. 1). Each episode may comprise of distinct stages, corresponding to the changing intensity of the conflict. We conceptualize the stages as tripartite: initiation, storming, and resolution (Fig. 1). Initiation is when a dormant conflict situation garners contestation, owing to differences in interests among different actors, or the emergence of new actors. Storming is characterized by a visible manifestation of struggle among the diverging actors while resolution marks a marked decline or an ostensible end to the conflict episode. A conflict may also

either revert to further iterations of storming within the same conflict episode, or proceed to dormancy, and/or initiation of a succeeding conflict episode.

This dynamic model improves the resonance of the ACP across timescales, liberating it from the “now” to “whenever”, which is very useful for authors interested in pinning down the power of actors as their involvement in a conflict progresses. The “whenever” in question may be more related to the past and present than the future, mainly due how challenging it is to predict the future. Nevertheless, this shift in understanding provides a basis for conflict modelling or stimulation over time. Meanwhile, another use of this dynamic model for studying power elements within ACP approaches is its potential to enable stakeholders to better understand how actors’ power resources change over time, and the gap in power resources between various actors within a given conflict cycle. The latter may be elicited by examining the amplitude, or the depth of the wave, of a given conflict cycle to understand emergent winner(s), loser(s), or whether a stalemate has been achieved (Fig. 1). The final power position of an actor, their relative power, may be understood as the aggregate of wins and losses an actor accumulates as the conflict moves through the initiation-storming-resolution phases of the

conflict episode(s). Ultimately, a winner implies an actor has increased their relative power while a loser has lost or diminished theirs, with stalemate meaning there is no net change in the position of the actor over the conflict circle. Some of the different power configurations that may be achieved among actors over a conflict episode are illustrated in Fig. 1a-c.

We apply our proposed model to the conflict episodes observed in Ghana, defined as the period between when ARTGOLD declared its intentions to mine in Apesika (initiation) and the actual time it began mining on cocoa farms in the village (resolution). Our analysis focuses on the power elements various conflict actors employed to stake their claims in their quest to improve their power position in order to realized their declared positions, i.e., to mine, or not to mine in Apesika.

3. Case description and methods

3.1. Apesika: Overview and administration

To parse out the power resources various actors employed within the struggle to mine cocoa farms and how it influenced their power positions, we focus our analysis on Apesika, an agrarian community in Southwestern Ghana. Cocoa production entered Apesika in the late 1890s as part of broader shift and in response to global cocoa prices at the time (Kumeh, 2023). Local farmers produce cocoa on multiple plots, typically less than 2 ha per household. Several households in Apesika rely on encroaching into neighboring protected forests to grow food crops due to limited space on their matured cocoa farms (Ajagun et al., 2022; Kumeh, 2024). This is recognized by the state as illegal; however, without it, most households in Apesika are unable to meet their year-round food needs with income from cocoa production. June and July are widely recognized as “the hunger” period, whereby several households either take on debt to buy food or reduce the number or quantity of food they consume in order to survive (Kumeh, 2024). Apesika is populated by indigenes (the Sefwi people), migrant farmers (from across Ghana), and (seasonal) laborers, typically from Northern Ghana.

In Apesika, lands outside protected forest belong to the indigenes and are administered by traditional rulers (custodians). Daily administration of land is handled by their village chief (odikro) who answers to a divisional chief, with both answerable to the paramount chief of their traditional area. By convention, the indigenes of Apesika possess customary use rights to land; they do not pay rents. Migrants farmers pay rents, or allegiance fees to the traditional rulers or stool (Boni, 2006); the stool is the symbol of a traditional ruler’s authority. Depending on whether migrants gained their access to land through share-cropping or outright purchase, their rent, or allegiance fees may comprise either an established fraction of cocoa beans from their harvest, monetary payments, or both (Gyapong, 2021; Kumeh et al., 2021).

As noted in the introductory vignette, Apesika has one main open water source – the River Asubone. The inhabitants use it for domestic purposes and farming, including applying agrochemicals to their cocoa farms. River Asubone is also drinking water for the vast majority of the inhabitants who are unable to afford filtered, sachet water. Public administration of the area is conducted by the district assembly, represented in the village by an assembly member. A few cocoa and chocolate companies such as Touton and Cargill, and NGOs provide various services, including inputs and extension, to cocoa farmers in Apesika. These services tend to be sporadic, with farmers relying on their local, internal networks and groups to secure village-level financial services and other forms of social support.

There are some historical indications ASM occurred in Apesika albeit in its most rudimentary form. The oral history of the village chief

(odikro) and his council of elders corroborates ground-truthing of intermittent open shaft pits on multiple cocoa farms. Such pits were reportedly used by the early settlers for *galamsey*.² The pits typically had narrow shafts, were fenced off or covered to protect cocoa farmers and laborers during their operations. While several inhabitants of Apesika held that their land was rich in gold ore, as we will demonstrate, they differed on what to do with it.

3.2. Data collection and analysis

Our analysis draws on data collected by the first author during extended ethnographic fieldwork in Apesika and other surrounding communities between September 2019 and February 2020, and January and February 2022. Given the sensitive nature of the conflict associated with ASM operations in the village, snowball sampling was used to identify and interview: farmers/community members (14), traditional rulers (Odikro 3, Divisional Chief 1), ASM operators (foremen 2, laborers 2), cocoa-purchasing clerks (3) and the assembly member of Apesika. The farmers included five respondents who supported ASM from the onset and had had their cocoa farms mined out over the course of the data gathering. The remaining opposed ASM in their community, with three held behind bars for several days for allegedly inciting the youth to protest and destroy ARTGOLD’s machinery. We triangulated information from the interviews with participant observation of active mining on cocoa farms and media reports on the ASM-driven conflict and resistance in Apesika. While we had aimed to record all interviews, only eight respondents allowed us to record their interview due to an overwhelming fear that had gripped the communities from multiple episodes of the conflict, including the rounding up, beating, and jailing of people who resisted mining in their communities by local police officials. This issue emerged within broader doctoral research on the sensitive subject of farming food and cocoa in protected forests, which had institutional ethical clearance from the University of Hohenheim. Drawing on guidance from that and the authors’ experiences in researching sensitive subjects such as illegal logging, all interviews were preceded by oral consent from the interviewees. The names of villages and the various respondents have been pseudonymized to conceal and protect them and others who were involved in this contested, sensitive and caustic issue.

We analyzed our interview transcripts and field notes, using the ACP power elements typology, i.e., coercion, incentives/disincentives, and dominant information, across three stages of the conflict episode: i) the introduction of ASM in the village (initial phase), ii) the intensive conflict that ensued (storming phase), and iii) state of affairs during our data gathering (resolution phase). We pay attention to the dynamics of social relations, including changes in power position that occurred among the various actors involved in the conflict, across the three stages as illustrated in the next section.

4. The evolution of ASM in Apesika

The conflict between ARTGOLD and different actors in Apesika was characterized by multiple episodes, with various actors losing or improving their power position in response to the power elements they employed, and those used by their opponents. Fig. 2, developed from interviews with the various actors, is a schematic of the overall conflict trajectory, which is elaborated through findings sections.

² Galamsey, short for “gather them and sell”, was historically used to refer to a very rudimentary form of mining involving basic tools and equipment such as pick axes and shovels. Today, the term is often used to characterize informal artisanal and small-scale mining, which now include heavy duty equipment such as bulldozers and excavators.

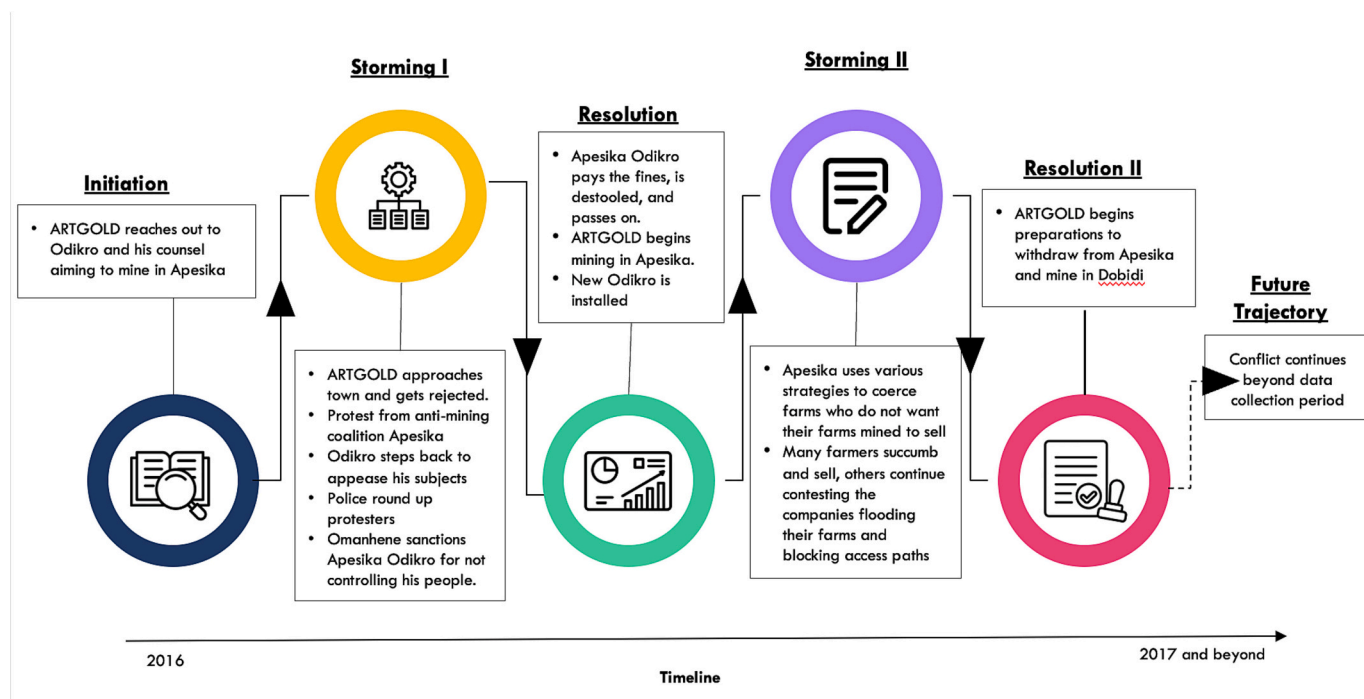


Fig. 2. A timeline showing stages of the ASM conflict episode that unfolded in Apesika. Authors construct based on interviews with farmers, traditional rulers and ARTGOLD staff.

4.1. Initiation phase: mid to late 2016

Krott et al. (2014: 39-40) theorized that potentates may use unverified information to alter the behavior of subordinates within social relations to incite actions from subordinates when the latter would otherwise not have undertaken such actions; they referred to this as using dominant information with the ACP approach. In assembling ASM within Apesika, unverified information played a vital role. Ghana's statutes require ASM enterprises acquire permits before they operate [Act 703, Section 82, Clause 1]. Depending on their scale, ASM operations need an environmental and social impact assessment (ESIA). ESIA requires holding public consultations whereby ASM proponents provide verified information to local communities about the impending mining project, potential social and environmental risks and remedial actions. Proponents must give local communities ample time to make an informed decision on whether to accept or reject the proposed ASM project. Interviews with two ARTGOLD's foremen indicated that the company did not fulfill these requirements. Essentially, it did not have permission from the state to mine. Thus, the company was operating illegally and clandestinely, with the tacit support and authority of some

village, divisional and paramount rulers in the study localities.

ARTGOLD started mining in the broader landscape, moving from village to village in 2016. The company was managed predominantly by Chinese nationals although national statutes provide for only Ghanaians to own ASM enterprises (ACT 703, Section 83[a-c]). Having decided to extend its mining operations, citing reduced gold output in its prior operational village, ARTGOLD's managers contacted the *odikro* of Apesika to negotiate a deal, recalled one of its foremen:

First, we did some tests on a few cocoa farms. After positive results, we called on the *Odikro* with drinks and some money. [Interviewer: How much money are we talking about?] I will not go into details. What I can tell you is that we had an agreement that our company would build a brand-new palace for him and the village. Additionally, as the leader of the community, we proposed he would get a 20 % share of the money we pay to any cocoa farmer that agreed to sell their cocoa farm to us for mining. (ARTGOLD Foreman 1, December 2019).

In a separate interview, another foreman recalled that whereas the village chief was open to the terms, he had reservations about the impact

Table 1
Key actors, main ACP elements used during the initial phase of assembling ASM, and their deduced/intended goal.

Power elements	Potentate	Subordinate(s)	Reported/Observed action	Intended goal
Incentives	ARTGOLD officials	Apesika chief	<ul style="list-style-type: none"> Drinks and lump sum of money Share of money associated with land sales Offer to build a palace for the village chief Offer to build boreholes to be used as enterprises 	Create an advantage that sways the village chief to support ARTGOLD's ASM activities in Apesika
	ARTGOLD Official	Village aristocrats		Sway family heads and other landowning families to support mining operations
Dominant information	ARTGOLD Officials	Apesika chief and farmers	<ul style="list-style-type: none"> Promise to pay good prices for cocoa farms Providing lands for mining will generate cash benefits to farmers and the decision lies with them. 	Persuade local communities to be receptive of the ASM enterprise's mining operations
	Village Chief (Odikro)	Opinion leaders, e.g., assemblymen, family heads	<ul style="list-style-type: none"> Locals will be prioritized for employment Piecemeal provision of information about the true nature of ARTGOLD's proposals 	Immobilize any potential resistance by the community by keep

Table 2

Key actors, main ACP elements used during the storming phase of the ASM, and their outcomes.

Power elements	Potentate	Subordinate	Reported/observed action	Outcome (intended)
Coercion	Inhabitants of Apesika	ASM enterprise, Apesika chief	• Protests and destruction of company machinery	• Deter ARTGOLD from mining operations in Apesika.
	Paramount chief	Apesika chief	• Threat to destool village chief of Apesika	• Alter village chief's behaviors to accommodate ASM
Disincentives	Police officers	Apesika chief, youth and protesters	• Arbitrary arrest and jailing of all suspected protesters and their backers	• Restrained youth and local actors from protests • Made several people desert the village, allowing ARTGOLD to initiate mining
	Paramount chief	Apesika chief	• Denial village chief's access to paramourcy's court • Withdrawal of village chief's right to regulate access to lands • Prohibition from administering traditional rites	• Induce the Odikro of Apesika to control his people and enable ARTGOLD to mine
Dominant information	Paramount chief	All village chiefs and subjects	• Issuance of media statements, claiming to ban mining	• Not clear, but options may be to: a) portray and image of the paramount chief being tough on mining, b) garner greater and more direct control over villages in the traditional area.

of the ASM operations on River Asubone, the main source of water for his village:

To overcome the water situation, we agreed to build electric-powered boreholes for the community. There were concerns about who would manage the boreholes. In the end, it was decided the borehole would be used to appease key members of the aristocracy, who would sell the water to the people in the community. (ARTGOLD Foreman 2, December 2019).

Three main points are worth elaborating with regards to the foreman's comments. Firstly, they illustrate how ARTGOLD designed and used diverse incentives to mobilize village-level traditional rulers to align with its desire to mine in Apesika (Table 1). The second point concerns the nature of the incentives used. The foremen's report suggests that the incentives included monetary payment and drinks, which are direct material incentives. The promise to offer a 20 % share of proceeds paid to acquire cocoa farms is a material incentive but also a dominant information mechanism. This lies with the promissory nature of such an incentive given that it may be used to alter the behavior of the village chief (potentate/subordinate, depending on how one looks at it) in the short-term irrespective of whether ARTGOLD intends to honor it or otherwise. Thirdly, and related to the second point, the *odikro* and ARTGOLD officials did not hold public forum(s) to convey information about the nature of the company's intentions to the community, as required by law.

In the absence of a formal information outlet, rumors became the main source of information in Apesika. Some community members reported "being skeptical about impending ASM operations in their village", noting rumors and gossip were an aspect of their daily lives, "and are not necessarily true". During our interviews, a family head (*abusuapanyin*), who self-identified as anti-ASM, recounted calling upon their chief a couple of weeks before Christmas, in 2016, for clarity on the rumors:

When I called on our *odikro*, he informed me the company had called on him but there was no decision on whether or not to accept them. Frankly, I relaxed afterward and went about telling other people it was not true. In hindsight, our chief was not honest with me. He misled me because, in less than four weeks, the *galamsey* people made their move on our village. (Native Male, late 60s, November 2019).

This *abusuapanyin* was not alone. A youth leader, who organized his people for the protests, also recalled being misinformed by their *odikro*: "our *odikro* not only lied to us. He ignored all our warnings against mining in our village. Protesting was the only weapon we had left to deploy." Overall, the initiation phase of ASM in Apesika was

characterized by the perception that the *Odikro* lied and misled his subjects,³ becoming subservient to the interests of ARTGOLD. In the process, the *Odikro* and the company, on the one hand, skirted national laws instituted to protect local communities from irresponsible mining. On the other hand, it contributed to people, especially those against ASM in their village, lowering their guard, setting them up for exploitation by ARTGOLD, as will be argued in the next section.

Regarding the relative power of the various actors, the initiation phase did not appear to change much. What it did, however, was to pivot actors involved in the conflict into two polarizing coalitions. On the one hand, was a pro-ASM coalition, comprising ARTGOLD, a section of the inhabitants, particularly farmers with old and diseased cocoa farms, and the *Odikro*. The other coalition was anti-ASM, which was made up of several youths in Apesika, cocoa farmers with young and vibrant farms, and a few family heads (*abusuapanyin*) who objected to ASM on the grounds that it will destroy their local environment and create multiple social problems over time. In the next section, we unpack how interactions between the opposing coalitions played out during the storming phase and the power resources each group employed to justify and realize, or lose out, on their interests.

4.2. Storming phase: February 2017; March 2020

Amid debates about rumors concerning ARTGOLD's potential ASM operation in Apesika, beginning in February 2017, the village's inhabitants woke to the rumbling sound of bulldozers and excavators, gliding towards some cocoa farms in their vicinity. Unknown to them, ARTGOLD had secretly concluded the acquisition of a few cocoa farms from people in the pro-ASM coalition in order to clear them and establish a base for mining operations in Apesika. Weeks earlier, rumors about the potential entry of the ASM enterprise reached a crescendo when the company pitched camp on the outskirts of Apesika. No sooner had the first bulldozers entered Apesika than the village's youth self-organized, protesting vehemently against, firstly, the authority of their chief, widely seen to have "brought the Chinese to mine our farmlands", and secondly, the operations of the company. Those involved in the protests reported destroying some of the company's excavators, beating their operators in the process. What followed in the succeeding days, weeks, and months was an interplay of power elements deployed by different actors in Apesika to achieve their interests. This included coercion involving the use of direct (and threatened) use of force, and

³ It is challenging to determine whether the chief did this on purpose or otherwise. However, among various respondents who were against mining in the community, the dominant view was they chiefs was dishonest to his people.



Fig. 3. A farmer who continues to resist ASM on his cocoa farm watches as ARTGOLD operators mine his neighbor's cocoa farm, discharging mining effluent into his farm. Picture used with the consent of the farmer who explicitly asked that his experiences be highlighted by the researcher.

reliance on unverified information through the articulation of multiple narratives by the most powerful and invisible actors within the pro-ASM coalition, including public officials, traditional rulers, and ARTGOLD's managers (Table 2). The combination of the various power resources, as would become apparent, aimed to silence dissent and intimidate members of the anti-ASM coalition, and produce disciplined subjects across the board to enable ASM in Apesika.

To illuminate the various power elements, it is essential to recount some of the key events that occurred, with two standing out due to their effectiveness. Firstly, ARTGOLD relied on local state institutions, particularly the Ghana Police Service, to arrest, intimidate, and undermine resistance of the protesting youths. For example, on Tuesday, 21st February 2017, the police invaded Apesika around 2 am, arresting local leaders and youths suspected to be initiating the protests. A woman in her mid-thirties, who was arrested during the raids, recounted:

The police were very indiscriminate. My husband had a hint they were coming and absconded into the forest reserve. However, the police officers did not have mercy, they pulled out our door, beat and dragged me into their car; I was not alone. In the end, they molested and arrested more than 30 of us, putting us behind bars for days. (Migrant, Female, mid-30s, October 2019).

By using force to arrest suspects of the protests without diving into the merits of ARTGOLD's permit and due diligence required by laws regarding participation, and free, prior, and informed consent by host communities, the police prioritized ARTGOLD's interests and sustenance over addressing the concerns of local actors. A key narrative that enabled this was the police's established mandate and recognized authority to protect lives and property. A male respondent, arrested during the raids, reflected on his experience with the police officials, pointing out: "the Police told us that we had no right to destroy the company's property". After a short pause, he continued:

When I responded by asking: So, we cannot destroy the company's property but they have the right to destroy our property? He hit me with the back of his gun. I could not do anything but kneel on the floor helplessly. After all, he is the one with the gun, he wields the authority. (Native Male, mid-40s, October 2019).

According to the assembly member of Apesika, the ransacking, intimidation, and beating of his people marked a significant turning point in the struggle against ASM in their community:

Many of my people, including myself, were afraid for our lives. We deserted the village before and after police raids. Leaving the town was a big mistake because it gave the ARTGOLD the confidence to start mining. But what else could we have done? We were all scared and chose our freedom over persecution. (Assembly member, Apesika, January 2020).

Some of the people rounded up argued they were released in batches on the condition that they would not instigate further "trouble" but allow the company to conduct its activities peacefully.

The second main incidence involved traditional rulers' use of power resources during the storming phase of the conflict. Following the protests, the Apesika *Odikro* is argued to have changed his position, attempting to side with the protestors in order to calm the situation. Many respondents argued that this change did not sit well with higher-ranking chiefs. Consequently, such chiefs were reported to use their authority to sanction the *Odikro* on three counts. Firstly, the *Odikro* was barred from visiting the seat of the paramountcy and performing traditional rites on behalf of and in service to the stool on behalf of his people. Secondly, the paramount chief extinguished the *Odikro*'s rights to administer lands in Apesika. Third, the paramount chief fined the *Odikro* seven rams and three cartons of schnapps, threatening to destool him were he to default on any of the sanctions. It is not very clear whether the use of force was to make the paramount chief appear as being tough on a rogue *Odikro* who was enabling mining in his village, or as a mechanism for him to secure further powers to govern affairs in the Apesika directly.

The *Odikro* who originally negotiated the mining deal with ARTGOLD was eventually destooled and died shortly afterwards. During our data collection, his successor spoke in awe of the sanctions his predecessor faced from the paramountcy, arguing: "I am very careful about the ARTGOLD mining company. They know many powerful traditional rulers and I cannot afford to do anything contrary to supporting them." The newly enstooled *Odikro* was widely reported to have belonged to the anti-ASM coalition at the onset of the storming phase, and was arrested for his views. His professed shift to the pro-ASM coalition, albeit reluctantly, demonstrates and illustrates how an actor's power position can change when it encounters the power resources of more powerful actor(s).

This narrative shows how applying a wave-oriented lens to the ACP approach enables a dynamic pinning down of power among competing actors of a conflict over time. Within our case study, it reveals how actors and alliances may change based on subordinates' experience of the power elements, or resources by potentates over time. This shift occurred within pro- and anti-ASM coalitions who leaned on institutional and social structures of unequal power relations to bend members of the anti-ASM coalition to the will of the pro-ASM coalition. Starting with ARTGOLD, a pro-ASM actor with strong economic power and social connections, the company did not directly use any forms of coercion during the storming phase per se. Alternatively, appears to have it relied upon authoritative institutions – i.e., the police and powerful traditional rulers across the divisional and paramountcy levels – to banish grassroots resistance and coerce local communities to accommodate its operations against their will. Coercion, as applied by the state police and traditional authorities, was extensive, including actual and threatened use of force which not only turned local farmers but also both village chiefs from potentates to subordinates over time. Overall, these dynamics accentuate how the application of various power resources may transform social relationships to benefit a few powerful actors at the expense of the masses.

Table 3

Key actors, main ACP elements used during the resolution phase of the ASM, and their outcomes.

Power elements	Potentate	Subordinate	Reported/observed action	Outcome
Coercion	Police officers	Farmers, youth of Apesika	<ul style="list-style-type: none"> Threat of arrest if any of the company's machinery or operations were disrupted 	<ul style="list-style-type: none"> Restrained youth and local actors from further protests
Incentives	ARTGOLD officials	Landowners and farmers	<ul style="list-style-type: none"> Payment of GHS 15,000–45,000 per acre of cocoa farm Construction of boreholes for local opinion leaders and aristocrats Commencement of village chief's palace 	<ul style="list-style-type: none"> Appeased various actors to allow ASM operations to continue
Disincentives	ARTGOLD officials	Landowners; cocoa farmers	<ul style="list-style-type: none"> Discharged of mining effluence into cocoa and food crop farms Construction of roads and blocking farm access paths 	<ul style="list-style-type: none"> Forced landowners and cocoa farmers to sell their farms for mining Made farming challenging for farmers, forcing many to sell their farms
Dominant information	Paramount chief	All village chiefs and subjects	<ul style="list-style-type: none"> Issuance of media statements, claiming to ban all illegal mining 	<ul style="list-style-type: none"> Convey a positive image that absolves the paramount chief, shifting blame to village chief(s).

4.3. Resolution phase: post-February 2017

At least three main developments occurred after the tumultuous exercise of power by various authoritative actors against people within the anti-ASM coalition in Apesika. Firstly, ARTGOLD began its operations when Apesika became what several respondents, including the Apesika's assembly member, referred to as a "ghost town". Within this period, the company used multiple, and often, unscrupulous strategies to secure cocoa farms for excavation and extraction of gold ore. At the onset, ARTGOLD procured cocoa farms, especially old and diseased farms, at GHS 30000–45,000 (USD 6540–9800)⁴ per acre. This figure reduced to GHS 15,000–20,000 (USD 4180–4360) by the end of the first month of the company's operations. ARTGOLD facilitated this through several strategies, including discharging mining effluent onto the farms of people who hesitated, or resisted "selling" their farms to them. During a field observation at one of the mining sites (Fig. 2), involving a farmer and his mother who were struggling and frustrated with ARTGOLD's antics, the woman pointed out:

These *galamsey* operators have been a thorn in our flesh since arriving. Initially, they wanted to construct an access path through our cocoa farm, but we disagreed. Before we realized, they constructed the path through the edge of the farm, destroying some of our cocoa trees in the process. They discharged the waste from mining our neighbor's farm into ours, threatening us frequently. I am too old and should not be on the farm. But I always come here with my son because I am afraid the miners may hurt or even kill him. (Female farmer, late 70s, December 2019).

Her son showed the interviewer several gutters ARTGOLD's operators had carved out to discharge the effluent onto their farm (shown in Fig. 3). Walking through their farm was challenging. The water levels had risen, with some of the cocoa beginning to turn yellowish. Towards the end of the interview, he remarked:

We no longer weed, prune, or apply pesticide on our farm because it is mostly waterlogged, as you saw for yourself. Our farm is our main source of food crops and income. How are we going to survive in this village if we take the GHS 24,000 [USD 4220]⁵, they are forcing down our throat? That money will run out in no time. Our elders have said: eating in bits is better than eating everything at once. (Native, male farmer, late mid-40s, December 2019).

Ghanaian legislation, specifically the Economic Plant Protection Act, 1979 (AFRC 47), proscribes the destruction of cocoa trees. Nevertheless, the farmer above and his mother's experience were commonplace in Apesika. In several instances, ARTGOLD staff cajoled, incited, or

forced farmers to relinquish access to their cocoa farms. Over time, the inhabitants were also forced to relinquish access to their river because it was heavily polluted by mining both directly in the river and discharges from mining sites into it. Consequently, some people in the village relied on buying water from the aristocrats, who had sunk boreholes through an alliance with ARTGOLD. This placed considerable burden on women and the youths who needed to wake at dawn to join long queues for several hours in order to buy the water. Worse still, the water supply from the boreholes was erratic, failing completely whenever there was an electricity outage. This left many of the inhabitants' water insecure during the data collection period. Ultimately, the ability of ARTGOLD to realize its interest to mine, at the expense of several others, derived from its ability to combine several power resources.

The second issue illuminated by applying the ACP lens to the conflict concerns ARTGOLD's non-fulfilment of its promise to build a palace for the *Odikro*. This demonstrates how a potentate may use dominant information to achieve its interest at the expense of their subordinate(s). It is useful to recall that during the initiation phase, ARTGOLD had promised to build a "brand-new palace" for the *Odikro* (Section 5.1). The company initiated the building at the start of its mining operations. However, it abandoned the project midway while signaling it was on the verge of exiting the village, as revealed by one of its foremen:

Our company's promise to build the palace was contingent on the success of our mining operations. So far, we have not gotten as much gold as we anticipated. Mining in this village has generally been problematic but it would not be long before we leave. Our investigation indicates Dobi⁶ has better gold deposits and we will start mining there by the end of this month (Foreman 1, ARTGOLD, December 2019).

The research team could not validate many of the points raised in this narrative, including whether the company's operations were, or were not, profitable. Generally, there was poor transparency around the operations of the company. Unlike large-scale mining companies who are legally obliged to declare their mining output, ASM enterprises are not under similar obligations. This gives tremendous power to ASM enterprises such as ARTGOLD because once they initiate their operations, there is no regularized way of ensuring they fulfill the various promises they may use to persuade people into giving up their farmlands for ASM operations.

A final observation with regards to the resolution phase concerns the impact of ARTGOLD's operations on social relationships within Apesika and surrounding communities. The company's operations have caused significant fractures among neighboring farmers, families, and village traditional rulers. In several instances, family heads had sold the rights to their family lands to ARTGOLD without consulting their family

⁴ 1 USD – GHS 4.591 as of 28th February 2017, using historical exchange rates from Oanda.

⁵ 1 USD = GHS 5.60708, using historical exchange rate from Oanda.

⁶ Name pseudonymised to protect the identity of the people engaged in the research.

members. In other cases, migrant cocoa farmers sold their cocoa farms to secure “bulk money” to relocate without involving their landowners. A frequent destination some of these migrants cited was the Bono East region of Ghana where they hope to acquire lands for cashew production.⁷ By allowing ARTGOLD a foothold, such farmers opened the floodgates for the company to use force to create negative externalities for their neighboring farmers – see example highlighted in Fig. 2. Also, there was wide spread concern about the death of past Apesika *Odikro*. Other village chiefs interviewed cited it to justify their willingness to accommodate ARTGOLD to mine in their villages without resistance. For example, the *Odikro* for Dobidi, ARTGOLD’s professed next destination, observed that:

“The happenings in Apesika is a cautionary tale for all of us. If a mining company approaches you as *Odikro*, requesting to mine in your community, it is in your interest to take whatever money they offer you and support their cause. Otherwise, apart from losing your stool, you may end up losing your life. I would not lie to you. My record on protecting the environment and our forest reserve speaks for itself. However, on the matter of ARTGOLD, I took the money they offered me, with two caveats. Firstly, they cannot intimidate my farmers into selling their cocoa farms. Secondly, our village will establish an independent land restoration task force to ensure all mined farms are refilled.” (Chief Dobidi, February 2020).

This quote highlights how rumors and fears from ARTGOLD’s operations in Apesika creates a self-reinforcing threat, where unverified information creates a disincentive for the local leaders of succeeding communities to condone or align with the company’s interest to mine on cocoa farms. Through this, village chiefs who naturally are potentates in their communities appear to be transitioning into subordinates of ARTGOLD over time. Whether such chiefs are genuinely acting out of fear or feigning their response is another matter. What is clear, however, is that the resolution phase of ARTGOLD’s operations in Apesika was characterized by various power elements that weakens the relative power of the *Odikro*. This included the expressed fear of being sanctioned by the paramount when they protest ARTGOLD’s operations. This was surprising given multiple statements in the media by the paramount chief that he was against mining in his jurisdiction (Table 3). Such statements ring hollow when juxtaposed with the burgeoning of mining in several communities within the landscape without any form of direct intervention from the paramount chief to support the local communities. This is especially the case when one considers the power resources available to paramount chiefs within chieftaincy, as a state-recognised, authoritative, and largely popular institution, particularly in rural Ghana. Some of the power resources documented to be used by paramount chiefs to safeguard their interests include sanctions, banishments, fines and prosecute actors who misuse lands and resources in their jurisdiction (Agyei et al., 2019; Tseer et al., 2024; Yeboah et al., 2024). We found no evidence of the use of such power resources by the paramount chief to protect the people of Apesika.

ARTGOLD’s machines moved from Apesika to Dobidi in January 2020. Unlike in Apesika, the youth and people of Dobidi did not mount any resistance. The talk of Dobidi was that its people need to steer clear of the company if they do not want to be ransacked like Apesika. One thing was clear: ARTGOLD who started the conflict episode as a subordinate had emerged as a powerful potentate over time.

5. Discussion and conclusions

This section begins by reflecting on the findings, positioning key observations concerning the dynamics in the application of power elements by different actors during various phases of the struggle to mine amid resistance in Apesika. In the process, we highlight how the ACP approach enables a coherent disentangling of the application of power by various actors, including the latent, hidden but highly powerful. It concludes with some policy recommendations on how lessons from the case can be used to navigate equitable land use options that protect the poor and marginalized where ASM enterprises emerge.

5.1. Discussion

This paper set out to examine the power resources different actors employ to facilitate ASM on farmlands and maintain such activities against the will of local communities. Engaging an actor-centered power approach (Krott et al., 2014), our analysis points towards dynamic social relationships and alliances within the ASM-cocoa nexus. The discussion will focus on four points raised by using wave theory to enable a more robust and dynamic application of the ACP approach. Our approach conceives conflicts as a continuous process characterized by successive episodes that influence and are influenced by the choices of power resources actors use to pursue their interests. This orientation enables us to extend thinking about temporality within the ACP approach while providing new insights for understanding resource conflicts in a manner that identifies and raises the concerns of important but marginalized, subordinate actors.

Our first argument concerns ARTGOLD’s ability to impose ASM operations on the people of Apesika thrived at the intersection of a tripartite state-sovereign-subject relationship that is characterized by unequal voices and power relations. In Ghana, state and customary institutions operate in parallel, intersecting and interacting in synergistic but also highly contradictory ways. The state benefits enormously from ASM, with the sector accounting for a third of all gold exports in the country between 2010 and 2019.⁸ The state recognizes the social and environmental impacts of ASM. This has contributed efforts to formalize, regularize, and sanitize the ASM sector. Some measures within this policy package are streamlining ASM permitting processes, putting ASM operations predominantly within the preserve of Ghanaian nationals, and mandating post-mining restoration (Adu-Baffour et al., 2021; MESTI, 2014). Recognizing these, it may be argued that the starting point of any discussion about ARTGOLD’s operations is whether it had the legal documentation or permits required to operate in Apesika. The company, as highlighted in our findings, had no permit and was thus operating illegally. Despite this, ARTGOLD was able to liaise with state institutions, notably the police, to intimidate and lacerate the local people who appeared to be rightfully fighting for their rights when they protested against mining in their village. Such an occurrence suggests a breakdown in state-citizen relations or a potential neglecting of responsibility by the state. Such concerns has led multiple authors to question the veracity of ASM formalization claims by the government and whose interest it serves (Hilson et al., 2022; Ofori et al., 2021). Besides, it casts a shadow on multiple task forces formulated by the government to clamp down on illegal mining, including Operation Vanguard, a joint military-police task force established by the President of Ghana to tackle illegal mining in 2017. Under Operation Vanguard, public officials were reported to have shot at illegal miners and burn the excavators of illegal companies (Hilson, 2017; Hilson and Maconachie, 2020; Ofori et al., 2024). If the police were supposed to be clamping

⁷ A cashew boom has been underway in Ghana over the last decade, especially in the Bono, Ahafo, and Bono East regions of Ghana over the last decade. Several tracts of food crop farms are being converted by enterprising farmers to cashews, as was the case with cocoa from the late 1890s in Ghana (see: Hill, 1961; Ruf et al., 2015)

⁸ Computed using data from the Ghana’s Minerals Commission. ASM accounted for 13.8 million ounces of the country’s reported total output of 41.6 million ounces, 2010 and 2019. The ASM sector’s contribution to national gold output has risen steadily over time, averaging 21.5 %, using data from 1990.

down on illegal mining during the period, why were they arresting local communities who were expressing their agency by confronting ARTGOLD directly and with what implications for growing discussion on the need to formalize the ASM sector in the country? This is an area open for future research. For now, and on account of how ARTGOLD's operations has created multiple social and environmental problems in Apesika, it appears that the brute, and perhaps misplaced, exercise of power by the police undermined local agency, putting the people of Apesika in a lower, weaker power position than before ARTGOLD emerged in the area.

The second point concerns the power and role of traditional rulers in accommodating ASM against the will of their subjects. Traditional rulers are widely recognized as powerful; however, they are infamously largely unaccountable to their subjects (Ahmed et al., 2018; Boamah, 2014; Eggers, 2020; Kim, 2022; Kirst, 2020; Mihaylova, 2023). This occurs despite a national statute that mandates family heads as custodians of land to be accountable to their kins (PNDCL 114). Applying the ACP approach, it has been possible to demonstrate how different levels of traditional rulers exercise power over others. The role of rulers at the topmost hierarchy, such as the paramount chiefs, is not clear or transparent and it is difficult to make definitive claims regarding their role. However, our analysis suggests that their actions, such as sanctioning subordinate chiefs who fail to suppress protests, or actively resist ASM, makes a difference to power relations and, ultimately, impacts the landscape. This was evident when the paramount chief sanctioned the former *odikro* of Apesika for allegedly failing to control his subjects and facilitate ASM operations on their farmlands. Paradoxically, the paramount chief simultaneously issued public statements opposing illegal mining within their jurisdiction. This duality underscores the paramount chief's ability to leverage dominant information that less powerful actors cannot easily contest due to the significant power imbalance between them.

A further insight provided by how ASM unfolds in Apesika concerns the power dynamics and transmutation of power elements over time. From the onset, dominant information and incentives played a significant role in enabling ASM in Apesika. For example, ARTGOLD appears to have skillfully targeted the various actors it considered to matter the most, at least from a village power hierarchy perspective: the village chief and key opinion leaders. By targeting these actors and providing them with various incentives, the company sought to gain a foothold in the community and work through them to sway public opinion about mining in the village over time. As demonstrated in the results, such opinion leaders had sought to achieve this with various forms of dominant information, especially through the use of "half-truths", which enabled them to blind side the masses, at least until the company's machines rolled in. Although dominant information and incentives continued to play further roles as the ASM enterprise sought to gain a foothold – in the case of the latter, through ARTGOLD's paying of comparatively high prices per acre to farmers who initially gave the company guarantees for it to access their lands for mining – it waned during the storming phase. The storming phase became characterized by multiple forms of coercion across different actors, e.g., the police and paramount chief (Table 2). ARTGOLD was the driving force behind the use of force to silence dissent and enable its operations. Yet, the ASM enterprise remained primarily behind the scenes, except where its workers directly discharged mining effluence on farmers to force farmers to relinquish control over their lands. The main conclusion from this observation is that more than what various powerful actors articulate publicly, it is important to pay attention to what they do or hide behind others to do (Lester and Hutchins, 2012).

The final point, also about temporality, concerns the changing power positions of various actors in response to the power resources of more powerful actors over time. Whereas local communities within the anti-ASM coalition, the *Odikro* and ARTGOLD appear to have been a latent power position during the initiation of conflict, the storming phase revealed how various actors leveraged power resources to transform

their relative power and position along the potentate-subordinate axis as the conflict progressed. A main takeaway from this is the transient nature of actors' relative power. We see this temporality as an invitation to deliberate over the kinds of power resources that could be used to transform the relative power of essential but marginalized actors in land-use conflicts. For example, given that there was a state moratorium on illegal mining when ARTGOLD was imposing its will on the people of Apesika, it may be argued that power resources such as legal action or prosecution and media campaigns, to name a few, could have created a disincentive for the company to operate in the first place. Future studies that draw on the ACP approach to decipher power resources configurations that enable relative power transformation in favor of important but marginalized groups could be instrumental for environmental justice struggles across space and time.

5.2. Policy implications of findings

Our findings raise a few concerns, including the social relationships between local communities, the police, and traditional authorities where ASM emerges. Our analysis indicates that powerful actors may form alliances to undermine the interests of local communities members who disagree with ASM on their cocoa farms. Apart from access to farmlands, such interests, in the context of the evidence presented include water, security, and safety. Recognizing this, how should ASM operations be managed to mitigate the potential for undermining such public goods? One starting point would be for public institutions, including security agencies, to pay proper attention to the legal aspects of mining and engender accountability. For example, given that ARTGOLD had no permits to operate in Apesika, it should never have been allowed to mine there or in any of the surrounding communities in the first place. Moreover, where serious concerns about village water supply is at stake, we believe safeguarding the public good should have been the first point of call as opposed to oppressing dissenters. Where opportunities have elapsed, there is a need for rigorous investigation, followed by investment in redress through various community-level investments either by the ASM enterprises found to be culpable or the state to protect the lives of the marginalized.

Finally, we recognize the limits of our analysis given that it is based on a single case study. Nevertheless, ASM remains a major challenge across in many Sub-Saharan African countries such Burkina Faso, Kenya, Liberia, Sierra Leone, Democratic Republic of Congo and Zimbabwe (Bester, 2023; Kalokoh and Kochtcheeva, 2022; Lanzano and Arnaldi Di Balme, 2021; Nkomo and Nkomo, 2023; Ondayo et al., 2023), as well as Latin American countries such as Colombia, Guyana and Peru (Gasparinetti et al., 2024; Laing et al., 2023; Perdomo and Furlong, 2022). To further discussions on ASM formalization in across various contexts, it is important to pay attention to not only institutional factors but the power wielded by specific actors in such contexts. As with our case, support and accountability mechanisms are required for local communities who chose to resist decisions taken by powerful local actors such as traditional rulers, especially where resistance is perceived to be in the interest of the broader public good. Such mechanisms therefore add to the list of a critical but under-addressed barriers to building just or equitable land use relations at the forest-farm nexus in mineral rich countries of the Global South.

CRediT authorship contribution statement

Eric Mensah Kumeh: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Mark Hiron:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.

Declaration of competing interest

The author declares no known conflict of interest.

Data availability

The data that has been used is confidential.

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