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“When Will the Tree Grow for Me to Benefit from It?”: Tree Tenure Reform to Counter Mining in Southwestern Ghana

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ABSTRACT

In 2021, Ghana was Africa’s largest gold producer and sixth largest producer worldwide. However, mining wrecks tremendous environmental havoc and poses significant human health risks. Efforts to mitigate these impacts have focused exclusively on regularizing mining, with little recognition of the crucial role farmers play in mining, particularly as agents that lease their land for the same. Ghana’s new tree tenure policy allows cocoa farmers to acquire individualized, allodial rights to commercial timber species on their farms, which permits farmers to capture forestry sector payments. We examine farmers’ impressions of tree tenure reform as a potential counter to mining in eleven communities in Western and Western North regions, using focus group and individual interviews. While the concept of tree tenure is enthusiastically embraced, practical difficulties encountered by smallholders attempting to navigate the bureaucratic registration system limit the sway of tree registration and ownership as a means of limiting mining proliferation.

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Introduction

The economic importance of mining to Ghana’s national economy is evidenced by mining revenues received. The value of gold exported in 2021 was US \$5.08 billion (Bank of Ghana 2022). Ten of the largest gold mining companies relayed US \$305.7 million in payments to Ghanaian government entities in 2017 (Malden and Osei 2018). Licensed, small-scale artisanal mining (ASM) is an equally vital contributor to the economy, and along with unlicensed *galamsey*¹ mining operations, employs an estimated one million people either directly or indirectly (Okoh and Hilson 2011; Hilson 2001; Crawford and Botchwey 2017). At the same time, mining operations are environmentally destructive and can have deleterious effects on human health (Boadi et al. 2016; Donkor et al. 2009). Efforts to mitigate these impacts concentrate mostly on legitimizing the small-scale mining sector (Amankwah and Anim-Sackey 2003). However, we suggest that

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recently introduced tree tenure reforms in the forestry sector, aimed at reinforcing smallholder farmers' rights to commercial tree species, might also provide an effective counteractive to mining.

In 2012 Ghana's Forest and Wildlife Policy articulated a different tone and direction with respect to tree tenure and smallholder farmers, with language and intent described as a "paradigm shift" (Ghana Ministry of Lands and Natural Resources 2012, 7). The policy advocated for legislation supporting the devolution of rights to planted trees for smallholder farmers (Ghana Ministry of Lands and Natural Resources 2012). The national government's most recent position on this issue is articulated in the 2020 *Final Benefit Sharing Plan for the Ghana Cocoa Forest REDD+* (Ghana Forestry Commission 2020), which endorses a cadastral tree registry to operationalize tree tenure. These moves emit from the national government's keen awareness of the critical role farmers play in environmental remediation and climate mitigation. While studies have looked at various aspects of the "farming-mining interface," we are not aware of efforts, policy wise or empirically, that consider how the liberalization of tree tenure laws might also reduce farmer reliance on mining as either a supplemental or as an alternative income source, thereby reducing negative environmental impacts from the same (DeJong 2019, 5; Aggrey, Ros-Tonen, and Asubonteng 2021; Ofosu et al. 2020). Responding to this research gap, we designed a study to elicit data from smallholder cocoa farmers relating to their perceptions and or experience with tree registration and ownership as a possible mining offset.

Theoretically, the study is framed within the property regularization literature in the Developing World, focusing on the orthodox view that well-defined and individualized property rights alleviate poverty by conferring real property ownership (Bromley 1989; De Soto 2000). Specific to Africa, the evolutionary theory of land rights (ETLR) explains Sub-Saharan land systems as embryonic, as part of an inevitable change from communal tenure to private property systems, aided by state policy and procedures necessary to formally document private ownership (Platteau 1996). This dynamism is compelled by population growth, resulting in increased competition for land, which in turn leads to increases in land prices and associated resources. This tension creates a "growing demand for (more specific and more secure) property rights in land" (Platteau 1996, 35). Heretofore customary owners reach a point where they clamor for more explicit ownership backed up by statutory, as opposed to customary law because of the increasing number of nagging externalities (i.e., threats, encumbrances, disturbances, annoyances) impinging on their land. Rural landholders become willing to bear the costs (financially, socially, etc.) of absorbing, internalizing, or formalizing their rights via statutory means. ETLR addresses landownership; however, we extend the argument to security of rights to resources *on* land (i.e., trees), rights which are distinguished from the land itself in Ghana. We explore the extent to which the absorption (i.e., tree registration and subsequent ownership) of externalities specific to cocoa farming (e.g., elite capture of timber harvest payments and routine crop damage sustained from harvesting) might dissuade farmers from selling or leasing their land or otherwise engaging in mining activities for profit (Marfo, Acheampong, and Osae 2006; Marfo, Acheampong, and Opuni-Frimpong 2012).

Factors Intensifying Ghana Small-Scale Mining

When worldwide gold prices increased sharply in 2008, interest by foreign nationals in Ghana's gold deposits intensified. Hilson, Hilson, and Adu-Darko (2014, 292) estimates that "tens of thousands" of Chinese nationals migrated to rural Ghana between about 2004 and 2014 in search of gold. Importantly, the Chinese imported mining technologies which transformed the historically low impact, "pick axe [sic], shovel and pan" ASM extraction into higher tech methods employing "Chang Fa" excavators capable of penetrating to deeply stored, alluvial and hard rock deposits (Crawford et al. 2016, 4; Hilson and Pardie 2006).

Chinese amplification of mining in Ghana has been criticized by the Ghanaian media and populace, not only because of its association with environmental destruction, but more fundamentally because the Ghana-Sino relationship seems to be tilted in favor of the Chinese (Hess and Aidoo 2016). However, Hilson, Hilson, and Adu-Darko (2014) and Crawford and Botchwey (2017) argue that prior to the Chinese entrée into the Ghanaian mining sector, the state had allowed ASM to flounder, despite ostensible efforts to regularize the sector. Hilson, Hilson, and Adu-Darko (2014, 293, 294) calls the Ghanaian government's approach to formalizing ASM "pedestrian," accusing the government of not creating sufficient "space," i.e., not prioritizing the needs and conditions of the mostly poor, small-scale miner and not allocating sufficient or affordable lands to mine. Also, Crawford and Botchwey (2017) contend that the neopatrimonialism endemic to Sub-Saharan Africa created fertile ground for Chinese exploration and exploitation. The state's lack of attention to the needs of small-scale producers (contrasted with its support for large-scale miners) created extensive opportunities for entrepreneurial Chinese individuals, companies, and subnational actors to forge both legal and illegal partnerships with equally entrepreneurial Ghanaian miners and cocoa farmers desperate for cash (Okoh and Hilson 2011; Hess and Aidoo 2016).

Land and resource tenure arrangements in Ghana have also contributed to small-holder gravitation toward mining, due to the capture of forestry and other raw material benefits by the state, customary authorities, and private interests (Nyame and Blocher 2010). This exploitation is linked to legislation formulated during Ghana's transition to an independent state in the early 1960s, specifically the 1962 Concessions Act, which transferred rights of both state-owned forest reserves (and related concessions) and privately-owned forests to the president. The 1974 Trees and Timber decree and 1992 Constitution fortified the earlier law by emphasizing the state's vested interest in commercial tree species. In particular, the 1992 constitution distinguished planted trees from naturally regenerated ones. Farmers own rights to the former on customary land (although these rights are often infringed upon because it can be difficult to prove ownership), while the state controls and profits from the latter.

Thus, government appropriation of commercial tree species incentivized the expansion of both legal timber concessions and illegal timber harvesting, which again, can destroy nearby cultivated crops when timber species are extracted. Farmers are often-times not compensated for damages (Ayine 2008; Marfo, Acheampong, and Opuni-Frimpong 2012). This kind of routine and widespread appropriation by elite actors or those otherwise seeking rents, alienates poor farmers from potential revenues.

This seizure compels farmers to search for alternative and more immediate income sources, such as that provided by mining (Okoh and Hilson 2011; Hess and Aidoo 2016).

The cumulative and intensified activities of both large-scale and ASM producers have resulted in unprecedented, environmental degradation, mostly of freshwater bodies (Hilson 2017; Antabe et al. 2020). For instance, in 2001, a dam burst, which held a reservoir containing mining “tailings” or waste. The rupture released thousands of cubic meters of cyanide laden and other heavy metal effluent into the Asuman River, a drinking water source for numerous communities (Awuah-Nyamekye and Sarfo-Mensah 2012). Also, a 2017 study found that mining activity proximal to the country’s southwestern Pra Basin rendered the Pra River and its tributaries unsafe for domestic uses (Duncan, de Vries, and Nyarko 2018).

Less data exists on deforestation associated with mining although Boadi et al. (2016) estimate that 4.4 percent or 2.5 km² of the Offin Shelterbelt Forest Reserve were degraded by illegal mining within just a five-year timespan. Also, approximately 16,000 ha of the Oda River Forest Reserve, located in the Amansie Central District, have been completely cleared by illegal miners. Less visible but equally destructive are chemical reactions associated with gold mining operations. Mercury (Hg), when mixed with excavated sediments, clings to gold pieces allowing them to be identified. The resulting amalgamation is especially harmful to human and ecosystem health, as the heating of these amalgams releases elemental Hg into the air (Hilson and Pardie 2006). When this interacts with air, water, and soils, the very dangerous, neurotoxic Methylmercury (MeHg) is formed, which is readily absorbed into living organisms and the food chain (Donkor et al. 2009).

Study Area

The study area includes four districts in the Western region: Wassa Amenfi East, Wassa Amenfi West, Jomoro, and Ellembele. Also included are two districts in the Western North region, Bia West and Juaboso, all in southwest Ghana. Our eleven study communities are in these districts: Wassa Akropong, Adesu, Asankrangua, Asankranbreman, Kwaben,² Kunkumso, Elluokrom, Asempanaye, Frenchman, Navrongo, and New Sanfo (Figure 1). We selected these communities as study sites because of the proliferation of both pit/hard rock and alluvial mining in these areas. Frenchman and Navrongo are Community Resource Management Areas or CREMA designated, where local inhabitants are empowered to govern local natural resources. Mining is prohibited in CREMAS. Of the eleven communities, five (Wassa Akropong, Adesu, Asankrangua, Asankranbreman, and Kwaben) had active mining sites in 2020, and one (Asempanaye) had an inactive ASM site that had not been reclaimed at the time of data collection. Also, tree registration had occurred in Kunkumso, New Sanfo, Frenchman, Navrongo, Elluokrom, and Asempanaye (See Figure 1).

Methodology

Data were collected in September 2020. We employed a rapid appraisal (RA) method for data collection, the goal of which is a comprehensive understanding of interrelated

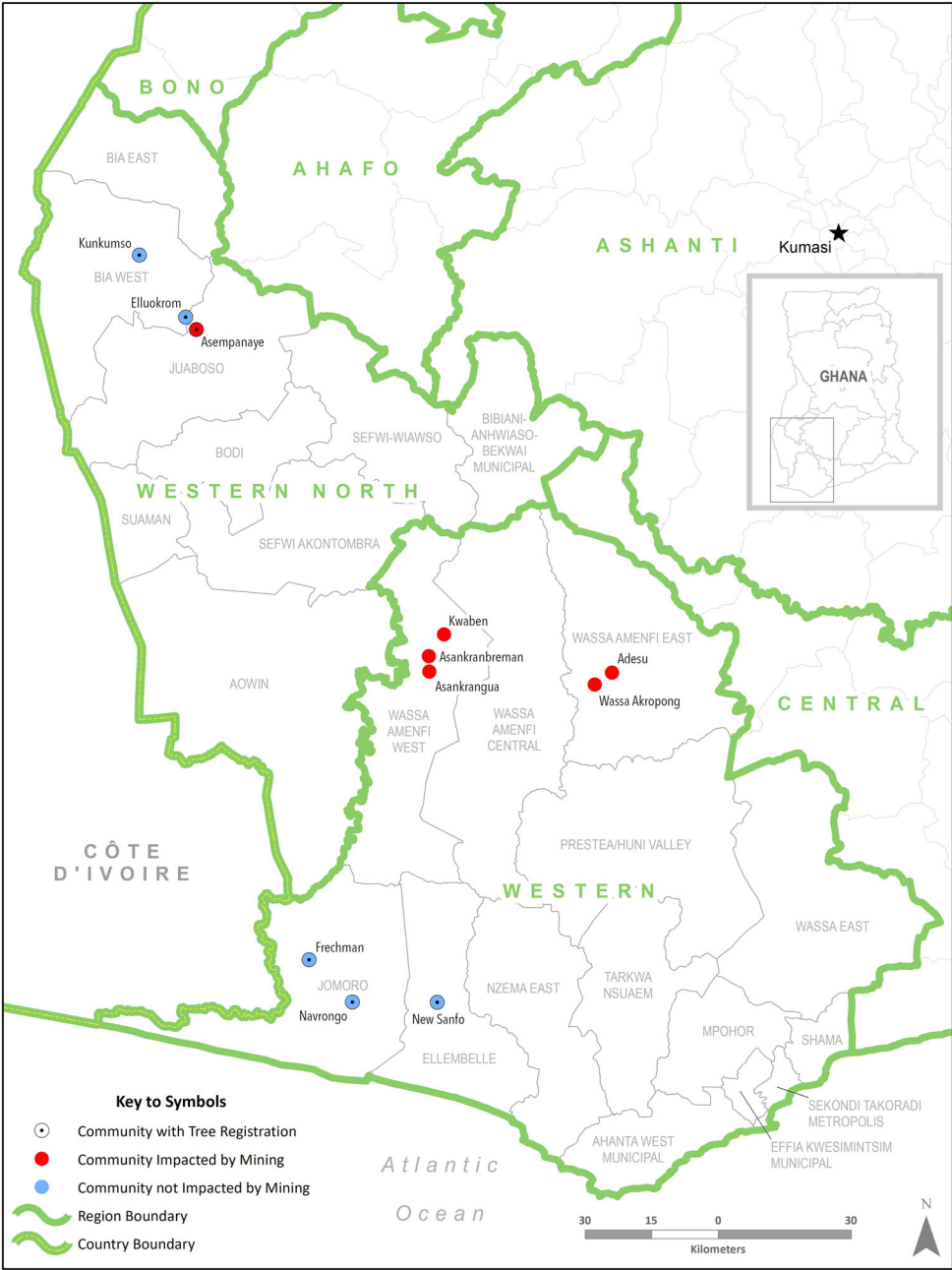


Figure 1. Project communities in Western North and Western Region, Ghana.

social and ecological processes in a short amount of time (Russell and Harshbarger 2003). As specified by RA methodology, a two-person scientist-technician team conducted open-ended interviews in the field (Hildebrand 1981). The interviewers were a Development scholar from the University of Ghana and a forester with the Council for Scientific and Industrial Research-Forestry Research Institute of Ghana (CSIR-FORIG). They interviewed farmers only, farmers who mined intermittently (mostly as mining

scavengers who went to sites after the main mining work was completed³), miners, and miner sponsors and financiers. The first author had contacts in all communities and from these individuals, other participants were recruited using a snowball methodology. On May 8, 2020, we obtained research ethics clearance to conduct this study through the University of Calgary Conjoint Faculties Research Ethics Board. The Research Ethics Board file number is REB19-1944.

We conducted ten focus groups with farmers, ranging in size from five to eleven participants. Of these ten farmer groups, three consisted of women only, by design, because we wanted to capture the perspective of women farmers contending with mining. Another group consisted of miners only. Nine individual interviews were also conducted, including seven with mining sponsors/financiers, one with a woman farmer, and one with an individual affiliated with a national mining organization. Data analyzed in this paper are from the ten focus groups with farmers and the one farmer interview. All focus groups and interviews except one interview (administered in English) were conducted in the various dialects of the Akan language. Audio recordings of interviews and focus groups were translated and transcribed by a native Twi speaker.

Data from farmers included information on farming activities, including length of time farming; indigene/migrant status; types of crops grown; farm size, and whether land was held under some type of tenant sharing arrangement; farmer knowledge of mining in their own or nearby communities; and impressions of associated environmental/ecological impacts. Farmers were also provided with a verbal definition of tree tenure and then asked to respond to several questions concerning their experiences with mining activities, knowledge of tree registration, and their opinions about the effect of tree registration on mining. These questions and explanations follow:

1. Have you had any experience around your farm that is related to mining activities?
 - 1a. What happened and how has that affected your farm?
 - 1b. How was your livelihood affected?

Recently, the government initiated a “tree registration” program that allows cocoa farmers to obtain ownership of commercial timber species they plant on their land. The idea is to provide farmers with more rights to resources on land they farm.
2. Have you heard of tree registration?
3. What do you think about this approach?
4. Do you think farmers like yourself would be interested in this program?
5. Would they be able to register on their own?
6. If farmers had ownership of commercial timber species on their land, do you think that would affect the way they view mining work? ⁴ If so, how?

Responses to these questions were analyzed using thematic analysis, explained by Braun and Clarke (2006) as type of data reduction or pattern seeking analysis similar to grounded theory and other qualitative methodologies. However, thematic analysis does not involve the constant comparative process of multiple and iterative data collection cycles aiming for thematic saturation. Rather, all or most of the data, are collected prior

to analysis, but like grounded theory, data are coded and then classified by the researcher into themes, and these are linked theoretically (Braun and Clarke 2006; Castleberry and Nolen 2018). Thematic analysis also offers the flexibility of either theoretical (deductive) or inductive methods for data sorting. Because our study has its theoretical basis in ETLR, we utilized a deductive method of first coding and then classifying responses according to salient themes (Braun and Clarke 2006; Castleberry and Nolen 2018; Lepoša and Knutsson 2022).

All interviews were read repeatedly and coded manually and independently by three research team members. They then discussed coding to arrive at a consensus on the codes and respective themes. We were especially interested in terms participants used to talk about the nexus between individual ownership of commercial timber species and mining; so where possible, we also employed “In Vivo⁵” coding, which assigns codes to text that is verbatim from the participant (Castleberry and Nolen 2018). We identified thirteen codes and reached an agreement on seven codes which were retained (Table 1). A given code achieved saturation if it was discussed extensively or mentioned in at least one-third of the farmer interviews.

A total of 89 respondents participated in the research: 71 were either farmers, farmer/miners, or farmer with some other occupation (but all primarily farmers); 12 were miners exclusively; and 6 were mining financiers or sponsors. Table 2 shows that farmers represented a large majority of the sample (79.8 percent) and that the average age for miners/sponsors was considerably lower than that for farmers. Although our sample was not randomly selected, this finding is similar to prior studies reporting younger ages among ASM producers compared to farmers (Boateng, Codjoe, and Ofori 2014; Afriyie, Kuumuori Ganle, and Afua Abrafi Adomako 2016; Johnson Gaither, Yembilah, and Brefo Samar 2019). Roughly 47 percent of total respondents were migrants; 45 percent of farmers were migrants; and just over one-half of miner/sponsors were migrants. Migrants hailed from various regions of the country outside of Western and Western North. These were the Central, Volta, Greater Accra, Bono East, Bono, Upper East, Northern, Upper West, Ashanti, Eastern, and Ahafo regions.

Table 1. Coding categories and related themes (in bold).

“It is not something I would agree to today or tomorrow”: trees as a renewable alternative	“There is no government that can collapse the <i>galamsey</i> business”: limits of tree registration as a mining counteractive
Eventual revenues from tree harvesting preferred over immediate mining payments.	Parochial interests and political interference hinder the fight against <i>galamsey</i> .
Trees provide raw material for household needs.	Sharecropping and farm boundaries constrain individual decision-making.
Trees mitigate climate change.	“We are tossed to and fro”: Farmers need assistance registering trees.
	Mining payments are too large to resist.

Table 2. Farmer and miner characteristics.

	Sample size	Percent occupation	Mean age	Percent female	Percent migrant
Farmer (includes farmer/miners)	71	79.8	55.3 (s.d.=14.5)	38.0	45.1
Miner/sponsor	18	20.2	32.3 (s.d.=10.5)	0	55.6
Total sample	89	–	50.7 (s.d.=16.0)	30.3	47.2

n = 89.

Thematic Analysis

We assessed the extent of farmer absorption of externalities with the six questions referenced above. Coding of responses to these questions revealed two themes, which were assigned verbatim language from the research participants, reflecting either support for or doubt about the efficacy of tree registration and ownership to combat mining. The themes are in Table 1. The first theme reflects support for ETLR, that is, the contention that farmers are willing to absorb externalities via titling. The second theme recognizes obdurate impediments to registration and tenure for smallholders, which weakens the assumption that small producers could actualize absorption, even if they desired to do so.

“It is Not Something I Would Agree to Today or Tomorrow”: Trees as a Renewable Alternative

Eventual Revenues from Tree Harvesting Preferred over Immediate Mining Payments

Farmers from four focus groups and one interview felt strongly that ownership of commercial tree species would limit mining’s appeal for them. They emphasized the future benefits of having trees, in both financial terms and with respect to environmental services provided such as wood and fiber and climate mitigation. The eventual payments and material derived from commercial tree species were contrasted with short-term mining receipts. For instance, a Navrongo focus group participant who had registered trees on his farms displayed understanding of the monetary value of timber species, stressing how mining was antithetical to efforts he had expended to nurture and register such trees. His forward-thinking analysis allowed him to position mining revenues within a larger context of possible, eventual forestry sector payments. The participant voiced this opinion amid passionate assertions by other members of the focus group that farming, rather than mining, was their economic mainstay:

For me, I will not agree that you come and do mining on my land.... Because the trees that I have planted, the benefits I will get in the future are big, even as the profit now is also big. Last time we went to Samreboi, [Western Region town], there was one tree in a certain man’s farm—Someone came to buy that tree. The man said the lowest price he would accept is 20,000 Ghana cedis [~US \$2,000], for just one tree! The contractor said he will pay 10,000 Ghana cedis [~US \$1,000]. The man didn’t agree to the price, and he did not give his tree to the contractor...If my trees would be destroyed [by mining], it means all my labor including the [tree] registration will go to waste. It would not go to waste for me alone, who planted them, but my children, grandchildren who would have also benefited. It [mining] is not something I will agree to today or tomorrow. Migrant

The interviewers encouraged other members of the Navrongo group to respond to or rebut this one farmer’s views. There was unanimous support for the position that formal ownership of trees would lessen their interest in mining. An indigene Elluokrom focus group respondent conceded that in the absence of statutory rights to trees, farmers would enthusiastically give their lands to be mined because “the mining payment is bulk and instant.” But like the Navrongo participants, he argued that with state

protection (in the form of documents that legitimated tree ownership), farmers would choose to plant trees in anticipation of future timber payments: "...it is because of money, that is why you have planted the trees. ... future is all because of money. If you plant for 30 years or 100 years, it is all because of money."

Trees Provide Immediate Raw Materials and Mitigate Climate Change

Participants in the Asempanaye women's focus group were members of a women farmers' tree planting collective and were very aware of the benefits of tree planting. They had registered their trees and had also planted about 1,500 timber trees,⁶ motivated by their desire for grass roots climate mitigation. Their discussion of tree registration and mining also revealed that they were concerned with securing rights to trees that provide the necessary materials for building and repairing their homes and other structures. Respondents' everyday needs for basic materials incentivized their support for policy that reinforced this access (i.e., private ownership of trees):

Participant 1: What makes us like the registration is that, with this we will have ownership right over the planted trees which will enable us to fell some when we need some for domestic use. Right now, if you are caught with lumber, they will send you to police station But right now, if it belongs to me with the registration document, when I need it, nobody has power over it. Migrant

Participant 2: We suffered to get the trees in place, and we are nurturing them for future benefits ... Migrant

After these comments, the interviewer appealed to the financial enticement of immediate mining revenues. Interviewer: "But isn't the *galamsey* too profitable to resist?" to which participant 2 replied: "Trees will give us more good air, but the *galamsey* won't give us air but will rather kill us." The interviewer continued with hypothetical probing: "But what if the miner brings about 10,000 Ghana cedis for just one acre of land?" All participants remained firm in their position that they prioritized the prospect of receiving *renewable* resources over one-off mining payments. In an individual interview with an Asempanaye woman farmer, we heard a similar focus on the future. She had worked for about six months doing the typically gendered work of rummaging through tailings left at deserted mining sites and washing these in search of overlooked sediments that might contain gold. The farmer was aware of tree registration and understood that it privatized ownership of trees but unlike the women in the focus group, she had not registered trees. As a single mother in dire financial straits who had benefited from immediate mining payments, her views were especially illuminating as she was able to weigh short-term against long-term benefits:

Interviewer: And so, if you have trees that you have registered and some people come to you, and say that they want to acquire your land for *galamsey*, would you agree?

Participant: I will not give it out to the person.

Interviewer: So, why won't you give it to the person?

Participant: I will not give it to him because I know that it's my futureand then also for the land, once they destroy it, it's completely destroyed. Indigene

Along similar lines, when asked about tree ownership and mining, Kunkumso focus group participants offered that secure access to building materials was more important than mining revenues:

For our view on that, if you give the land to miners, the money that you'll get is immediate compared to taking time to nurture the trees ... but then, after receiving the money from them, and you want to roof your building, where will you get the wood from to roof your building? And so, it will interest me to keep my trees for the future ... Migrant

“There is No Government That Can Collapse the *Galamsey* Business”: Limits of Tree Registration as a Counteractive to Mining

Parochial Interest and Political Interference Hinder the Fight against Galamsey

A subtext embedded in all interviews was the relatively powerless context in which subsistence farmers live and the continual imposition of the state and other hegemonic actors on their livelihoods. These power imbalances were evident between local people and non-locals but were also reflected at the local level, especially in power differentials between smallholder farmers and traditional authorities. Two Kunkumso respondents offered the following exchange:

Participant 1: Some people didn't give their land out to the miners. Indigene.

Participant 2: But then if the chief agrees, no matter what you do as a person, they will definitely mine it. Indigene

Similarly, an Elluokrom farmer commented:

Let's assume in this town that the chief agrees to mining, and about ten opinion leaders accept it, and they then move to the site to mine. “Why won't you agree to it?!” So, it is the DCE [District Chief Executive⁷], MP [member of parliament], chief, and the opinion leaders we should monitor closely. The miners always bribe them—for instance, you will be there, and the miners will give you 200,000 Ghana cedis [~US \$25,000]. If you happen to be a traditional ruler, you will allow them to mine. Indigene

These comments suggest that an implicit constraint on tree tenure as a buffer to mining is respondents' recognition of their relative position within their respective societies. There was a sense of futility expressed by these farmers who averred that individual rejection of mining can hardly alter ingrained patterns of inequality that dictate everything from the distribution of revenues to cultural mindsets and values. Despite increased protections from the statutory side, traditional leaders and deference to the same authorities still hold sway. This discussion recognizes plural governance regimes in Sub-Saharan Africa and the balancing or reconciliation necessary to navigate both systems. If the haunt of customary behavior and local level political maneuvering circumvent state attempts to devolve tree tenure to the local level, then regularization may have minimal impacts on mining.

Sharecropping and Farm Boundaries Constrain Individual Decision Making

Tree registration piloting in the Western Region was instigated in large part by migrant farmers like the Navrongo participants from the Volta Region, who were especially

interested in registration as a way to reinforce their tenancy. All seven Navrongo families represented in the focus group had registered planted trees through the joint assistance of the International Tropical Timber Organization (ITTO) and CSIR-FORIG. Navrongo is also a CREMA community; but as non-indigenes, they were able to hold land only under one of the tenancy arrangements, either *abusa* or *abunu*.⁸ Perhaps because of their relatively tenuous status as non-indigenes, they insisted that they would assert their rights as tenants in cases where a landowner sold or leased their land for mining. For instance, one Navrongo participant referenced his *abusa* agreement and insisted that his share of the land would not be mined in the event the landlord allowed mining. Although customary rights of *abusa* tenants are much leaner than those under *abunu* arrangements, recently issued policy from Ghana's Ministry of Lands and Natural Resources allows both *abunu* and *abusa* tenants cultivating land for at least one year to register and own trees—although tree tenure has not traditionally been included in negotiated agreements between landlords and tenants (Dohmen, Muilerman, and Toose 2018). In the case of this Navrongo farmer, it appears that official policy would support his right to retain trees he has registered if the land were leased or sold for mining. However, the potential for conflict between the landowner and tenant in this scenario is clear, given that mineral deposits do not conform to neatly demarcated, surface level administrative boundaries. Even if such an agreement between landowner and tenant farmer could be established before mining occurred, the effects of mining activities could inadvertently disturb the non-consenting tenant's farm.

Related, many farmers pointed out that individual decision-making related to mining was constrained by not only tenant agreements but also by the physical connectivity of land. Activities on one farm, if proximal to another farm, necessarily impacted adjacent farms. Some participants even suggested that miners deliberately compromised nearby farms as a way to force reluctant farmers to agree to mining. So, even if an individual farmer eschewed mining and registered his or her shade trees, that farmer's land could be negatively impacted by mining occurring around the farmer's land. One farmer relayed the following, with staunch support by others in the focus group:

Because, for the mining communities, when the miners approach you to express their interest in your land, you may say that you won't agree; but then if the people whom you share boundaries, the surrounding farm owners agree to give their land to them [*miners*] If they all agree, then the miners will deliberately excavate your surrounding farms such that all the water then becomes stagnant at the excavated site thereby causing it to become a wetland so that you'll not be able to go to your farm. So, what will happen is that they will destroy your land in the process of excavating the surrounding farms. Hence, you will then willingly ask them to mine yours as well. Kunkumso, migrant

An Asankrabreman farmer added:

As some of my colleagues here have been saying, it wasn't our will to allow them [*miners*] to destroy our lands. Because the work that I was doing, I was also cultivating rice in addition. And it happened that I share a farm boundary with the people of ____.⁹ Their lands were in front of mine, and my land slopes into the wetlands.

And so it happened that they mined their portion of the land and made my land to flood, and at the time the maize that I have planted died, and I went into difficult times. And so it happened that when they finished mining and got to my boundary, and they said they wanted my land, and so they bought it and mined it in addition. Indigene



Figure 2. Mining adjacent to cocoa farm in Asankranbreman, Ghana, April 2022. Source: Francis Tease.

The environmental degradation in these overflow situations should not be underemphasized (See [Figures 2 and 3](#) supplemental files). As discussed, the flooding referenced here and in all such cases is chemical laden water used in the extraction process, which poisons vegetation and water sources.

“We Are Tossed to and Fro”: Farmers Need Assistance Registering Trees

Another important factor limiting tree titling’s sway is a practical one involving small farmers’ inability to register without assistance. Registration in cocoa farming areas has been occurring since the early 2000s (See O’Sullivan et al. [2021](#) for a list of piloted projects). In terms of our study, trees had been registered in Kunkumso, New Sanfo, Frenchman, Navrongo, Elluokrom, and Asempanaye, although just thirteen farmers we interviewed had registered trees. Ten farmers had been assisted by ITTO/CSIR-FORIG in 2014/2015 and three by the Conservation Alliance and the United Nation’s Food and Agriculture Organization. Assistance by NGOs or CSIR-FORIG was the only means by which farmers had been able to register. Tree registration in a given place is not conducted universally for all farmers, apparently only for those selected or who somehow encountered registering organizations.

Like respondents in Johnson Gaither, Yembilah, and Brefo Samar’s ([2019](#)) research, participants in our study also stressed that they could not achieve registration without the assistance of outside entities with clout. Farmers preferred the assistance of NGOs



Figure 3. Mining effluent and flooding, Asankranbreman, Ghana, April 2022. *Source:* Francis Tease.

rather than the Ghana Forestry Commission because they said their attempts to register via the state agency were routinely ignored by local-level bureaucrats staffing these offices. Farmers attributed their lack of success to their low social status. One farmer even doubted that the Ghana Forestry Commission desired to facilitate registration. The farmer reasoned that tree ownership would reduce the number of trees available for

timber concessions on “off-reserve” or privately owned farms, something he believed forestry officials do not sincerely want because it would reduce the agency’s revenues.

Farmers also feared that they would be required to pay illegal “access” fees when attempting to register, which they could hardly afford. One Elluokrom farmer offered that because the registration process was fraught with so many barriers, the government should abandon its tree tenure policy and simply convey ownership of both planted and naturally occurring trees to those who work farms. Also, many respondents from the tree registration focus groups said they had planted additional trees after the initial registration but were not able to register the trees because the NGO-assisted projects had ended. Thus, for all respondents who had trees registered, the process so far has been a one-time event not followed up by continual feedback or support from the state or the organizations that assisted with the registration. Some respondents implored our research team to provide them with more shade tree seedlings so that these could be planted and the mature trees registered. An Asempanaye farmer commented: “With the tree registration, everyone in this community is serious about it. If you bring truckloads of timber tree seedlings to us, it won’t even be sufficient for us.”

Mining Payments Too Large to Resist

Kwaben women farmers/mining scavengers were obviously among the most marginalized farmers with whom we spoke. Farmers from one of these two Kwaben women groups viewed cocoa farming as a dying enterprise ravaged by degraded farmland and disease, low prices, and dishonest cocoa purchasing clerks. No one in either of these groups had registered their trees, and they had mixed views on the efficacy of registration, with some saying it could deter mining and others doubting that it could. One woman’s comments illustrate how she compared the financial benefits of mining to potential tree revenues:

So, for me, if the price the *galamsey* operator is offering me is higher than that of the trees, I will sell [the land]. Kwaben women’s group 1, Indigene

After further consideration, the same respondent then added:

No, no—the tree registration can’t reduce *galamsey* activities... I may be renting a house, and I may also have a plot of land on which I want to build. And so, when the *galamsey* operator buys my land, I will get bulk money to build my house. When will the tree grow for me to benefit from it? Kwaben women’s group 1, Indigene

Women in the second group did not respond to the question of whether tree registration could constrain the mining allure, but their strong statements about the economic benefit of mining compared to cocoa farming suggested that they would prefer to mine:

Because for so many years, about ten years now, I have been farming. I have a farm of about one acre. With that one-acre farm, for the whole year, when I harvest it, I get only about three bags.¹⁰ However, if I should go to work at the *galamsey* site for a day, I can make about 1,500 Ghana cedis [~US \$190] or maybe 500 Ghana cedis [US \$60]¹¹. Then, certainly I will stop doing the cocoa farming to join the *galamsey*. (Nativity status unknown)

These women’s stories illustrate the complexities and burdens of subsistence agriculture, specifically how their pondering of real time payments appear more relevant to

their survival than environmental considerations. Farmers from the Kwaben men's only group were supportive of the idea of tree tenure for individual farmers and strongly embraced the concept of ownership. Like the Kwaben women, they also lamented the declining influence of cocoa farming in the region and the lack of registration assistance. However, when asked about tree ownership as a mining deterrent, their sentiments were like their female counterparts. As one farmer commented: "I don't think having these cash crops [revenues from titled trees] would less motivate farmers from going into mining because the miners pay more. People will want to still benefit from mining, regardless." Indigene

Discussion

There is fierce debate about the appropriateness of transferring western-style titling programs to the Global South (Galiani and Scharroodsky 2010). Property rights scholars such as Unruh (2002), Bromley (2009), and Benjaminsen et al. (2009) argue that such imposition contributes to the erosion of traditional land use practices and relations among community members. Theorists stress that westerners fail to recognize the importance of implicit and de facto land rights. To this point, Meinzen-Dick and Mwangi (2009) emphasize that resource ownership in Sub-Saharan Africa needs to be understood in terms of people's relationship *to each other*, rather than their relationship to the resource. When Western conceptualizations and practices of ownership are grafted onto traditional cultures, the unstated rights that marginalized members of a community have to resources are interrupted, leading to conflict and the breakdown of those customs.

These cautions notwithstanding, our findings are unequivocal with respect to farmers' support for securing statutory rights to trees. All farmers who offered commentary, regardless of whether they believed titling would counter mining, expressed strong support for regularization because of the belief that this would guarantee that their future access to trees would not be infringed upon by outside commercial agents, traditional authorities, the state, or their neighbors. No participants talked about the possible dissolution or disruption of tradition catalyzed by regularization. But while the popular will to title trees seems clear, this enthusiasm is not met with a bureaucratic or technological infrastructure sufficient to conduct efficient and effective registration. Not only do poor farmers in Sub-Saharan Africa face impediments to registration, but also the various national governments aspiring to institute such programs. Writing about difficulties endemic to the region, O'Sullivan et al. (2021, 38) stress: "tree registration efforts will be costly to implement and maintain over time as trees die and ownership of land or trees change, and it will be difficult and costly to establish and maintain a function[al] tree registry, especially in the absence of a land registry."

Also, the emphasis in policy circles and among smallholders seems to fixate on tree ownership exclusively, rather than the broader context which makes private ownership desirable in the West. For instance, Ghana's policy statements on tree tenure offer no discussion of insurance markets to mitigate loss. The numerous examples study participants gave about their farms being damaged by adjacent mining and timber concessionaires highlights the truth that the registered, but uninsured tree, is of little value if it is

destroyed by wildfire or poisoned by mining effluent and is not replaced. The emergence of insurance markets is implied in one of the latter stages of ETLR, but the timing of that appearance is not clear and is not in step with efforts to convey ownership.

Recommendations and Conclusions

ETLR was supported to the extent that demand for formalization of tree rights appears high although this finding cannot be generalized to the larger cocoa farming populace because we were constrained by the limited number of communities from which we sampled and our choice of nonrandom sampling within those communities. Data limitations also do not allow us to estimate the likelihood that formalization would impact mining because we did not quantify attitudes or actual behavior. As a follow up to the present study, we recommend a purposeful sampling and surveying of farmers who have registered trees in a community where mining is active or was recently active. Respondents would be asked about their attitudes and behavior toward mining before and after registration and how they may have or expect to capture forestry sector benefits from tree harvesting.

As conceptualized, the present study presented the tension between tree tenure and mining as a polarity; that is, once title is secured mining interest would cease or at least be reduced. However, additional sampling may reveal that these activities are not offsetting. For instance, it may be that farmers sell or lease old cocoa farms for mining, while continuing to grow cocoa on productive land. Farmers in such situations may be able to reap shorter-term revenues from mining while seeking to title trees, with the expectation of future forestry revenues.

Notes

1. *Galamsey* is the familiar name associated with small-scale gold and other mineral mining, both legal and illegal. It derives from colloquial terms meaning “gather them and sell” (Owusu-Nimo et al. 2018).
2. An alternative spelling for Wassa is “Wasa.” The latter is used more often by locals, whereas the former is more common on official mappings of the area.
3. From this point on, farmers who mine intermittently will be referred to as farmers.
4. To ensure that the meaning of this question was understood by Twi speakers, it was rephrased in colloquial terms or administered as multiple questions using phrases more familiar to respondents. Researchers were careful to maintain the intent and meaning of the question in all of its iterations.
5. This coding method should not be confused with the software package “NVivo.”
6. Provided by Tropenbos Ghana, Conservation Alliance, and the Wildlife Division of the Forestry Commission of Ghana.
7. A District Chief Executive is an appointed position within Ghana’s statutory governance system. Although appointed, the position is analogous to that of a mayor in the United States.
8. Abunu tenant sharing provides for more secure rights to land, compared to abusa arrangements. For the abunu, the (typically) cocoa farm is split 50/50, with the landowner/landlord retaining one-half of crop revenues and the farmer the other half. Abunu farmers may alienate or sell the land as well as make improvements, either with or without the owner’s approval, while the land is being used to cultivate cocoa. No annual rent is paid to landlords. In contrast, abusa agreements are more akin to the American sharecropping system where few rights of tenure accrue to the sharecropper/caretaker. The tenant receives

one-third to two-thirds of the crop yield. The sharecropper or caretaker may be dismissed summarily (Roth et al., 2017).

9. Name withheld for anonymity.
10. The reference is to the unit of measure, one bag or sack of harvested cocoa beans. The standard weight of the bag is 64 kg or roughly 141 U.S. pounds.
11. Compare these earnings to the roughly \$0.40–\$0.45 per day that the typical cocoa farmer earns (International Cocoa Initiative 2017).

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