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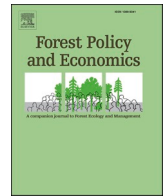
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Customary power, farmer strategies and the dynamics of access to protected forestlands for farming: Implications for Ghana's forest bioeconomy

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ABSTRACT

In the last decade, multiple scientists and policymakers have been promoting bioeconomy for decarbonisation and as a way to tackle the ongoing socio-ecological crises. An effective transition to the bioeconomy in developing countries, which are predominantly agrarian, depends partly on its amenability to existing land access regimes and how actors in such countries are able to manage competing claims and needs associated with land use for biomass production. However, this is sparingly examined in the bioeconomy-politics literature. Using a case study from Ghana, a Global South context aspiring towards a forest-based bioeconomy, we analyze how overlapping legal and normative institutions mediate forest-dependent communities' access to lands in forest reserves for their food and other livelihood needs. The study found that state and traditional institutions are racing to sanction forest communities' access to forest reserve lands in order to consolidate their authority over the area. In the emerging bioeconomy, the state employs plantation forestry as a tool to consolidate its control. Concurrently, traditional authorities contend this by facilitating farmers' access to the same area for cocoa production to establish claims to the land. Amid this contest, forest communities have constructed a robust discourse centred on their 'right to food', enabling them to apply their rich local knowledge to cultivate food and cash crops in forest reserves without deference to state institutions and traditional authorities. State forestry officials react by cutting down these 'illegal farms', causing periodic food insecurity in the study localities. Some farmers respond by adapting their access mechanisms, cultivating deeper into the reserve to evade forestry officials. The dynamism of this conflict makes sustainable resource use challenging in the study localities. But it also indicates that without proper safeguards and a coherent rural development policy, the bioeconomy will become an approach for reproducing oppressive land accumulation, impeding forest communities ability to address their food and livelihood needs. Thus, while the findings bring to date the growing struggle over land in Sub-Saharan Africa, it cautions that governments need to recognize that the bioeconomy, despite its promise of sustainability, is no quick fix for entrenched structural problems in rural Africa.

1. Introduction

In 2012, the European Commission (EC) published its Bioeconomy Strategy to enable the European Union reduce its dependence on fossil fuels and improve its competitiveness globally. The strategy noted that the European bioeconomy is worth 2 trillion euros per year. Besides, each euro invested in the bioeconomy, the Commission argues, returns ten euros of added value across multiple sectors and new employment opportunities (EC, 2012: 4). Since 2012, multiple EU member states and emerging economies have advanced designated bioeconomy strategies,

and many developing countries are also integrating bioeconomy strategies in their development (Wesseler and Von Braun, 2017).

Bioeconomy means different things to different actors. The EU, when introducing its bioeconomy strategy defined it to encompass 'the production of renewable biological resources and the conversion of these resources and waste streams into value-added products, such as food, feed, bio-based products and bioenergy. This includes agriculture, forestry, fisheries, food, pulp and paper production, as well as parts of chemical, biotechnological and energy industries' (European Commission, 2012:9). In revising the 2012 strategy, the EU reflected on the

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diversity of its member states' national bioeconomy policies to aver that:

“there is no single ‘bioeconomy blueprint’ to be followed. Instead, there is rather a variety of ‘bioeconomies’ to be developed at national and regional level, depending on the type and form of biomass available, infrastructure, markets, know-how and investment capacity” (European Commission, 2018).

An observable trend is that developed countries, especially those with limited natural resources focus their bioeconomy on knowledge, technology and innovation to use their infrastructure network and human capital (Wesseler and Von Braun, 2017). In contrast, developing countries perceive bioeconomy as a tool to unlock the value of their natural resources and create jobs and economic opportunities for their large rural populace (El-Chichakli et al., 2016; Hale, 2020).

Across Sub-Saharan Africa, where infrastructure and know-how is largely under-developed, many forest rich countries are working towards a forest-based bioeconomy, which focuses on developing forest biomass as a renewable biological resource (Rosa and Martius, 2021). For example, in 2016, Ghana launched an ambitious 25-year forest plantation strategy, aiming to invest over US\$ 4 billion to rehabilitate 3.1 million ha of forestlands while integrating trees into another 4 million ha or 75% of its arable land (Forestry Commission, 2016). This grand plan is expected to produce over US\$5 billion in returns on investments and create around 2.9 million jobs over the 25-year period. While the plan is also expected to provide multiple environmental benefits, multiple studies indicate that forestry-related investments can lead to dispossessions and affect the welfare of forest communities if they are not well planned or executed (Kansanga and Luginaah, 2019; Massarella et al., 2018; Sobeng et al., 2018).

Thus, one way to improve the chances of success of Ghana's ambitious forest-based bioeconomy aspiration, and make it work for nature and the country's rural people, is to understand how previous forestry-related interventions affected forest communities' access to land and how the communities responded. This is because land is essential for constructing livelihoods in the countryside (FAO, 2016). However, few studies have delved into how a growing forest-based bioeconomy aspirations by the state affect local communities' access to arable lands in Ghana. Alternatively, many studies demonstrate that deforestation is accelerating in rural areas due to the conversion of forest to farmlands (Ankomah et al., 2020; Brobbey et al., 2020a, 2020b). Some studies indicate that the conversion of forests is accelerated by a growing struggle between customary actors and the state to gain control of land and by extension people in the countryside (England, 1993; Kotey et al., 1998) while others attribute farming in forest reserves to the weak capacity of the state to implement forest laws (Acheampong et al., 2019). Throughout these debates, why and how forest communities' access and secure rights to farm in forest reserves, and how it might affect the implementation of Ghana's ambitious forest rehabilitation plans is left in the margins. We address this knowledge gap based on fieldwork carried out in six forest communities in Southwestern Ghana.

We find that forest communities use multiple means to access and secure their farmlands within forest reserves, cultivating food crops and cash crops through multiple schemes that involves customary and state institutions. What emerges from the case study is that attempts to accelerate forest biomass production is likely rekindle the perennial struggles for control over forestlands in the countryside between customary and state actors. In this case, and as has been indicated elsewhere (Kansanga and Luginaah, 2019; Mudombi-Rusinamhodzi and Thiel, 2020), plantation forestry has become a tool for the Ghanaian state to strengthen its grip and control over forestlands in the countryside even when such actions are at odds with the needs and welfare of forest communities. We demonstrate that communities find creative ways to meet their pressing needs when their access to forestlands is restricted and this may impede the successful implementation of Ghana's ambitious forest-based bioeconomy plans. Overcoming this

dynamic struggle requires finding new ways to improve productivity in forest communities while strengthening the recognition of communities' right to forestlands. Besides this, emphasis needs to be placed on developing the forest-biomass value chain to create upstream jobs and reduce the pressure and demand for land at the grassroots. Such a multi-faceted approach has a better chance of creating an equitable forest-based bioeconomy that meets forest communities' needs, rather than one that exploits forest communities and deepens socio-ecological conflicts and injustices in the countryside.

Before detailing the analytical approach and methods used for the study (Section 3), we provide a review on forest preservation, the state of dispossession and forest governance, highlighting key knowledge gaps (Section 2). Our research findings are presented in Section 4, after which we reflect on them in Section 5, and draw some broader conclusions for instigating equity in forest-based bioeconomy.

2. Forest ownership, conflicts and the forest-based bioeconomy

Forest ownership in many parts of Africa is characterized by legal and normative pluralism, leading to multiple contestations and struggles to control forest land between state and customary institutions. In this section, we review this literature, highlighting its embedded conflicts and knowledge gaps. We focus our analysis on Ghana and also provide some information on the country's plans to significantly increase forest biomass production within the next 25 years.

2.1. The origin of forest reservation and dispossession

Most African societies are organized around ethnicities, clans and families. These units are led by chiefs and family heads who extend land usufructs to their kinsmen and adjudicate related conflicts (Boni, 2005). However, colonialism and international trade introduced new actors with competing interests and claims to forestlands in the region (Barrow et al., 2016; Gyasi, 1994). On the one hand, multiple customary leaders and native elites began to engaged in trade deals, negotiating timber and mineral concessions with European merchants (Agbosu, 1983). On the other hand, the British colonial rulers, who colonised the Gold Coast (today: Ghana) from the early 1820s until 1957, sort to introduce reforms to consolidate their control over forest rents and secure their long-term interest in the colony. Pursuant to the latter, the British colonisers introduced the Native Jurisdiction Ordinance in 1883 to empower chiefs to formulate byelaws to protect water bodies and forestlands. However, many native chiefs did not take up this offer as they perceived it as an impediment to their trade. Between 1899 and 1908, the colonial government tried to introduce three separate laws to enable it exercise management rights and access revenue from forest resources in the colony. For example, with the Timber Protection Ordinance of 1907, the British colonisers sort to regulate timber extraction by introducing minimum felling girths. However, the native chiefs, local elites, and European capitalists with business interests in the colony vehemently opposed the legislation on the grounds that it criminalizes 'landowners' for using their own resources (Agbosu, 1983: 175).

In 1909, the British colonial government invited H. N. Thompson to conduct an assessment on the status of forest resources in the Gold Coast and provide guidance to improve forestry in the country. Thompson was the conservator of forests in Southern Nigeria at the time. Thompson's work is lauded for its impeccable level of detail, including his classification of timber species and forecast of their growth rates. Some of his many contributions include the recommendation to establish a forestry department, the creation of forest reserves to stop the advancement of the Sahara Desert and the establishment of a conducive environment for sustainable cocoa production in the Gold Coast. Crucially, Thompson argued that the constitution of reserves should not alter existing land rights (cf. Hansen and Lund, 2017).

The publication of Thompson's report coincided with the release of another report commissioned by the British colonial ruler, the Justice

Pennington Commission, inquiring into the dynamics of logging in the Gold Coast. The Pennington Commission reported that many timber merchants operated without licenses and recommended some level of state intervention to reduce the wanton destruction of forests in the country (Agbosu, 1983). Armed with the recommendation from both reports, the colonial government proposed the Forest Bill, 1911. The Bill argued for the creation of forest reserves to be managed under one of three conditions: either by the owner(s) under guidance of the governments' Forest Department for the benefit of the owner(s), or the government under lease from the owner(s). It also advanced multiple restrictions, including limiting the ability of the natives to collect forest products and farm in placed under reservation (Ibid, 1983).

Native chiefs, local elites and European merchants strongly resisted the Forest Bill, as they had done previous legislative proposals. The natives expressed concerns that the Governor intended the Bill to appropriate lands in the Colony for the British Crown. J. E. Casely Hayford, a leading lawyer and educationist summed up the native elite's concerns, asking (cf. Agbosu, 1983: 183):

“Are we going to suffer ourselves to be reduced to the miserable status of the proletariat for exploitation purposes by foreign settlers to enrich themselves and make us landless people in the land of our birth?”

Hayford and other members of the Aborigines Rights Protection Society, a civil society organized to protect the natives' right to self-determination, vehemently opposed the bill. Their efforts combined with a strong lobby from the British capitalists, who had vested interests in the Gold Coast, led the government to rethink the Forest Bill. Thus, it was not until 1927 that the colonial government promulgated the Forest Ordinance, 1927 (CAP 157), a watered-down version of the Forest Bill. In CAP 157, the state clarified that forest reservation shall not alter land ownership (Section 17). Besides, it reaffirmed the ability of traditional authorities to constitute forest reserves through bylaws (Section 6) and recognize any reserve that was under the Native Jurisdiction Ordinance, 1883 (Section 21). Where the state leads the reservation of forests, CAP 157 provides for the appointment of a Reserve Settlement Commissioner to verify and settle existing claims to farmlands in the proposed forest reserve. All farmlands that the Commissioner allows to remain within forest reserves are referred to as admitted farms. Admitted farms are also used to characterize farmlands alienated when chiefs used bylaws to create forest reserves; however, it is unclear how the boundaries of such farms were demarcated and documented.

Invariably, forest reservation transformed power relations and forest benefit distribution in the countryside. First, it empowered the state to exercise greater control as opposed to customary leaders. Second, it changed the allocation of forest rents, with the majority of the benefits being accrued by the state. Customary leaders also received benefit in the form of royalties. Forest communities came out on the worst side of forest reservation because it reduced their access to farmlands. Besides, they were banned from farming or collecting forest products in commercial quantities in forest reserves (CAP 157, Section 29). With population growth and lack of employment opportunities, resistance appears an inevitable path in many forest communities.

2.2. Forest governance challenges and deforestation

The divergences of actors' interests around forestlands and its centrality for negotiating statehood in postcolonial societies makes forest rights a particularly hot topic in the forest governance literature. Two overlapping research strands are discernable within this literature: contestations of forestland, and governance strategies to manage the divergent interests. On contestations, scholars argue for more attention to be given to the informal strategies actors use to impose or resist domination over forestlands. The literature speaks to conflicts, the politics of everyday forms of resistance to dispossession in forest

communities (Dell'Angelo et al., 2017; Julia, and White, B., 2012; Li, 2010). The contestation literature also points out typologies for better understanding the factors that enable communities to benefit from resources even when their rights are unrecognised (Ribot and Peluso, 2003), and their linkages to authority and state building (Agyei et al., 2019; Mudombi-Rusinamhodzi and Thiel, 2020). With growing forest conversion and the need for reforestation, recent studies on contestations are also beginning to question how reforestation can be used by the state to recentralize its control over forestlands while frustrating local efforts (Kansanga and Luginaah, 2019). Reflecting on these developments, some authors have called for more studies to connect “domestic development, governance and practices in forestland use with global politics, in other to find meaningful solutions to issues of social inequality in the forestland sector (from access to use or preservation)” (Ongolo et al., 2021:3).

The second strand of literature on forest governance focuses on the multiple approaches for improving cooperation among forest sector actors for sustainable forestry. Debates have focused on the strengths and pitfalls of top-down as well as community-led approaches. Issues of corruption, elite capture and lack of competence are identified as stumbling blocks to either approach (Ankomah et al., 2020; Arts, 2014; Brobbey et al., 2020a, 2020b; Marfo, 2010). A synthesis of these debates emphasises the need to recognize contextual peculiarities rather than imposing generic models of forest management on local actors (; ; ; (Essoungong et al., 2019; He et al., 2021; Kusters et al., 2020; Lescuyer et al., 2019; Nchanji et al., 2021). This literature also indicates that mutual respect among forest stakeholders, effective participation and equitable benefit sharing are essential for effective forest governance. The latter manifests in, reduced deforestation, buoyant forest livelihoods, transparency and effective communication among forest sector actors.

Forest governance is problematic in Ghana and this manifests partly in how rapidly the country is losing its forest resources. From 8.2 million hectares, the country's original forest cover reached 4.6 million hectares in 2000 and has continued to decline at 2% (315,000 ha) annually (FAO, 2010; World Bank, 2020). Multiple forest reserves are severely degraded from illegal logging and agricultural expansion (Forestry Commission, 2016). While a lot of researchers report that multiple factors, including population growth and land scarcity accelerate farming in forest reserves (Ankomah et al., 2020; Brobbey et al., 2020a, 2020b), few studies have delved into how farming in forest reserves occur. Studies that attempts to reveal the dynamics of these processes was conducted more than two decades ago. They reveal that cocoa farming is a key practice that is facilitated by local chiefs to subvert the aims of forest reservation, leading to multiple conflicts with forestry officials (England, 1993; Owubah et al., 2000). However, forest policy has changed tremendously since then. One main policy change is a growing attempt by the state to better engage forest communities and civil society in forestry. This is because the state recognizes that without the cooperation of these actors sustainable forestry is overwhelmingly challenging (Oduro and Marfo, 2011). In some cases, this has meant trying to make communities partners in rehabilitating degraded forests through partnerships known as the modified taungya system (MTS). The system promises farmers 40% of the trees they establish. Besides, the communities are entitled to food crops during the initial phase of rehabilitating the land. While the MTS has been critiqued for multiple governance challenges (see Acheampong et al., 2016; Ros-Tonen et al., 2013), it remains an integral aspect of the state's forest biomass production ambitions.

2.3. Efforts to improve the forest-based bioeconomy

Multiple studies speak to different aspects of Ghana's attempts to accelerate the rehabilitation of its depleted forest resources, i.e., challenges (Adane et al., 2016), past and recent efforts (Forestry Commission, 2020), and finance (Kumeh et al., 2019). However, the country's 25-year Forest Plantation Strategy is, perhaps, its most compressive

vision on how it intends to improve forest biomass production. Introduced in 2016, the strategy's object is to 'achieve a sustainable supply of planted forest goods and services to deliver a range of economic, social and environmental benefits' (Forestry Commission, 2016) and echoes 'the triple-win' verbiage so often used to promote the bioeconomy. Similarly, plans to establish and use biotechnology laboratories to produce genetically improved trees and to process outputs from these plantations resonates with the knowledge and technology arguments of bioeconomy.

On scale, the government intends to integrate trees in about 75% of the country's croplands (approximately 4 million ha) while drawing a further 3.1 million hectares of fallow land and degraded forest reserves for plantation forestry (Ibid, 2016). The forecast is to, inter alia, create at least 2.8 million jobs, generate over US\$ 5 billion dollars profits, plus additional income from payments for carbon storage (Forestry Commission, 2016). Besides, this strategy occurs next to plans to cultivate at least 238,000 ha of forest plantations under the country's Renewable Energy Plan (Ministry of Energy, 2019), and ongoing efforts to formulate a separate bioenergy policy to "develop and promote the sustainable supply and utilization of bioenergy to enhance energy security for Ghana whilst ensuring food security" (Ibid, 2019:19). While these plans are admirable, they also impose new demands on forestlands which are already constrained to the countryside, making it relevant to understand how forest communities currently access land for their livelihoods.

3. Methods

This research is a qualitative case study of how communities access lands in forest reserves for farming. In this section, we detail our approach. But first, we construct an analytical framework based on Ribot and Peluso (2003).

3.1. Analytical framework

Following Ribot and Peluso (2003), we understand access as actors' ability to benefit from things. This construct departs from the traditional understanding of access as a right conferred by property in the political economy literature (Sikor and Lund, 2009), and enables us to understand how and why actors and farmers can benefit from forest reserves where they may have no recognized property rights over forest reserve lands (Government of Ghana, 1962). Under such a situation, Ribot and Peluso (2003) have pointed out that actors may employ multiple structural and relational means to benefit from the resource, including access to capital, markets, technology, labor and labor opportunities, authority and social identity. For example, Hill (1961), in her seminal work, *The migrant cocoa-farmers of southern Ghana*, shows that farmers make various kinds of payments (capital) to local chiefs to gain access to fertile lands for farming. Farmers also mortgage their labor through share-cropping arrangements with traditional rulers to gain access to land (Boni, 2005; Delville et al., 2002; Kasanga and Kotey, 2001). Many native farmers of southwestern Ghana draw on their ancestral roots and social ties with traditional rulers to secure lands for their farming activities (Amanor, 2008; Boni, 2006; Forestry Commission, 2020). More recently, other scholars, albeit in the charcoal sector, have pointed out that technology, innovation, and force are all means that farmers use to access tree resources from traditional rulers (Agyei et al., 2020; Brobbey et al., 2020a, 2020b). Many of these works examined farmers' ability to benefit from land and trees as a form of right-based access, where the farmers operate within prescribed norms and legislation. As a point of departure, this paper broadens access to include illegality. Illegality is a form of right-based access that runs converse to legal access, involving the subversion of socially prescribed laws and norms (Ribot and Peluso, 2003). And as highlighted in Section 2, unauthorized farming in forest reserves is prohibited under Ghanaian law (Forest Ordinance, CAP 157:29, 1b).

Another aspect of the ability to benefit question that this paper seeks

to analyze is the power relations that enable actors to employ the structural and relational means of access at their disposal. To account for the role of power in an actor's ability to benefit from a resource, Ribot & Peluso (2003,155) draw on the neo-Weberian view of power, defining it as 'some actors' capacity to affect the practices and ideas of others'. This view of power is rooted in agency, an individuals' capability to act and decide for themselves (Cleaver and Whaley, 2018). However, it remains unexplored by Ribot & Peluso (2003, 172), who note that their typology on access mechanisms are all different 'forms of social relations' (Myers and Hansen, 2019). Unlike Weberian view on power, Foucauldian notions of power portrays power as a relational concept that includes the construction and use of knowledge and discourses as a form of power, which can also be used to gain access and control over resources, as noted earlier (Peluso and Vandergeest, 2020; Svarstad and Benjaminen, 2017). In modern societies, how people exercise their agency is defined within laws and norms sanctioned by recognized socio-political institutions. In many other places, private property is the most secured mechanism of defining access because it guarantees holders total control over their resource. The Ghanaian context is characterized by legal plurality: customary actors have rights over land in forest reserves, while the state regulates operations on the same land (See Section 2.1). Within this plurality and history of contesting forest lands between state and custom, we also try to shed light on the 'bundles of power' that enable farmers to draw on the structural and relational means to farm in forest reserves.

3.2. Study area

We collected data from six communities in the Juabeso District of Ghana (Table 1). We selected these communities in consultation with forestry officials and NGOs working in the district to cover the different levels at which these communities farm illegally in the KHFR: high, medium, and low (Table 1). The KHFR, covering 481.61 km², was constituted with bylaws of the Sefwi Traditional Council on 2nd October 1934, and gazette in November 1935. It occupies about 35% of the Juabeso district (Forestry Commission, 2010). Fifty-one per cent (245.21 km²) of the reserve is under protection, while the remaining (236.39 km²) is for a production forest, used for timber production by the Ghanaian state (Ibid, 2010).

Economically, farming is the primary livelihood in communities around the KHFR with an estimated 76.7% of the inhabitants being farmers (Ghana Statistical Service, 2014). The region possesses a vibrant labor pool, with more than 70.2% of its inhabitant under 30 as of 2010 (Ibid, 2014). Farmers within the district, like cocoa households in other parts of Ghana, cultivate about 5 ha of cocoa, with mostly low input, yielding 423 kg/ha/year (Bymolt et al., 2018). Typically, a farmer owns or manages between two and five fragmented parcels of land. Most farmers have no separate lands for food crop production once their cocoa farms have attained canopy closure. Historically, people from Northern Ghana and several other areas immigrate to the Juabeso district to pursue fertile farming lands. The migrants typically engage in share-cropping with the locals. As of 2010, migrants constituted 23.6%

Table 1
Case study communities and the number of farmers interviewed.

Study communities	Level of farming in the KHFR	Number of farmers interviewed
Sankofa	High levels of farming in the KHFR, mostly	84
Enokrom	food crops for subsistence and commercial.	41
Kinbu	Medium levels of farming in the KHFR.	19
Juansa	More cocoa than food crops.	32
Adwoakrom	Low levels of farming in the KHFR, mainly	42
Manase	food crops for subsistence.	72
Total		290

Names changed to protect the identity of the communities.

farming activities in the KHFR (see Raabe et al., 2010). The mapping enabled us to identify the actors involved in the forest encroachment, their roles, and benefits accrued to them from the process (Fig. 1). We started the mapping with older farmers who possessed a rich historical knowledge of their communities. These initial maps were then used as an entry point for interviews and focus group discussions (FGDs) with farmers in all six villages. Before the interviews and FGDs, in each community, we conducted transect walks through some of the illegal farms in the KHFR to make a first-hand observation of the farmers' practices.

Drawing on earlier works that detail how social identity can influence how people access land for farming (Amanor, 2008; Boni, 2006), we selected and interviewed migrants, natives, women, men, and young people. In total, we engaged 290 farmers from the six communities (Table 1). The interviews were conducted in local languages: Twi and Ewe. During the interviews, we asked open questions about the farmers' experiences with farming the KHFR, how they acquired lands in the KHFR, the types of crops they cultivate, farming practices they conduct, and the measures they employ to protect their farms in the KHFR. We also collected data on their monetary and labor investments in farming and their outputs; however, this information is not presented here. In addition to the interviews, we also conducted 12 FGD. Three of the FGDs focused explicitly on local chiefs and elders, giving us a first-hand account of the village histories and social norms associated with land acquisition, both in and outside the KHFR. The remaining nine focus groups were conducted with farmers on their food crops and cocoa farms in the forest reserve, usually alongside farming activities, i.e. breaking cocoa pods or aggregating harvested plantation bunches. Each focus group had five to eight participants and was useful for delving deeper into farmers' struggles in cultivating the KHFR and eliciting their social relations with other actors, including local chiefs, merchants and laborers.

In the final stage of our data collection, we interviewed forestry officials, district assembly officials, COCOBOD officials, NGO staff, cocoa buying companies, and food crop merchants to understand their perceptions and experiences about farming in the KHFR. Throughout our interviews, we only recorded data from 136 participants who voluntarily gave their consent. We assured respondents that they could opt-out of the interviews whenever they wished to. Overall, four farmers pulled out, citing that researchers always collected information from their communities but gave them no concrete benefits in return.

We employed content analysis to analyze our data. First, we listened to, translated and transcribed the tape recordings from our field interviews. Inductive coding was then conducted in MAXQDA 2020 to characterize the structure and relational means the farmers use to access the KHFR. We clustered the various sub-themes that emerged from our initial coding into broader themes to pull together the main issues revealed in our coding. For example, multiple forms of payments that migrant farmers make to chiefs at different stages of acquiring and securing their lands in the forest reserve are clustered together as payments and fees (capital). However, we provide an expanded narrative to highlight the relevant issues. In presenting our findings, we also use specific quotes to depict the farmers' experiences. We presented an earlier version of the results to a group, including farmers, academics, NGO workers, and forestry officials, in February 2020 to validate the findings, which we turn to in the next section.

4. Structure and relational means for different modes of farming in the KHFR

Property, capital, labor opportunities, access to authority and technology are among the diverse mechanisms farmers used to access the KHFR. The farmers employ these mechanisms within four modes of farming in the KHFR (Fig. 1), which are elaborated on below.

4.1. Admitted farms

As noted in Section 3, some farmers operating in the Krokosua before its reservation could keep their farms, i.e. they possessed property rights over the area and are therefore referred to as admitted farms. Within the KHFR, the Forestry Department allocated such rights to farmers in the 1940s. Typically, farmers with knowledge that their ancestors possessed admitted rights need to adduce evidence to the state, after which such lands were allocated to them. At the time of data collection, most admitted farms had been assigned to their owners, except in Sankofa, where the chief's claim to four admitted farms, with an area of 125.7 ha, remains unresolved after more than 15 years of petitioning the state. This was astonishing because the Chief and Sankofa's subjects are listed as owners of two of the farms in question in the current KHFR management plan (Forestry Commission, 2010:61). The third owner is 'unknown', and the fourth is listed under only a first name. Forestry officials pointed out that they were investigating the claims, which was also surprising given that admitted rights were enumerated and should have been allocated to their respective owners over eight decades ago.

In multiple instances, farmers cultivate beyond the boundaries of their admitted farms illegally. Many respondents indicated that migrant farmers, who had emigrated from the Bono and Northern regions, were responsible for the expansions. Many migrant farmers stressed that they make four distinct payments to village chiefs and their associates to acquire land in the forest reserve (Table 2). Firstly, the migrant farmer pays a path clearance fee, *Akwantwadee*, of GHS 300–500 (USD 50–90) to view the forestland. This amount is equivalent to what an unskilled labourer receives for 15–25 days of work in the study localities. Secondly, the farmers pay GHS 300–350 (USD 50–60) to the village chief per acre of land they intend to cultivate in the forest reserve. The migrant farmers pointed out this was a 75–100% rise from the GHS 150–200 (USD 25–35) paid per acre in the 2000s. Often, the quoted prices are exorbitant, with the final amount heavily dependent on the

Table 2
Mechanisms of access control and maintenance for admitted farms in the KHFR.

Actors	Means to gain, maintain and control access to forestlands		
	Gain	Maintain	Control
Local chiefs (Odikros)	<ul style="list-style-type: none"> • Property • Access to authority • Knowledge of ancestral lands • Head of village economy 		<ul style="list-style-type: none"> • Fees and rents
State institutions (FSD and district assembly)			<ul style="list-style-type: none"> • Access to state authority • Force • Unofficial payments – bribes
Native farmers	<ul style="list-style-type: none"> • Property • Social ties with chiefs (submission of drinks) 	<ul style="list-style-type: none"> • Farming know-how • Ties with purchasing clerks 	
Migrant farmers	<ul style="list-style-type: none"> • Capital for land acquisition • Farming skills • Share-cropping labour 	<ul style="list-style-type: none"> • Periodic rents • Ties with purchasing clerks • Legal redress • Ties with farmers • Access to technology (bicycles and motorbikes) 	
Laborers (mainly weeding and carting of farm produce)			
Cocoa (PCs) and food crop merchants	<ul style="list-style-type: none"> • Ties with farmers 	<ul style="list-style-type: none"> • Ties with farmers 	<ul style="list-style-type: none"> • Credit arrangements with farmers

migrant farmer’s ability to lobby for a reduction. After paying the agreed amount, the migrant farmer bears all costs for clearing the forestland and establishing a cocoa farm. The highest cost, the respondents indicated, is hiring a chainsaw machine and paying an operator to fell timber trees on the acquired forestland. Many migrant farmers secured cocoa seeds from their relatives. Their labor in establishing the farm was often not valorized but counted as a means that enabled them to benefit from the forestland (Table 2).

When the cocoa trees mature, usually after about 2–3 years, the migrant farmer shares half (*Abumu*) with the village chief that enabled their access. Afterwards, the farmer posts a guarantee, known as *Ntaase*, to consolidate their access to received farm. There is no fixed rate for the *Ntaase*, and it depends on the bargaining power of the migrant farmer. The agreed amount is shared between a set of witnesses and the village chief, who attest that the matured cocoa farm belongs to the migrant. Typically, there are no receipts for any of the capital outlays.

Ideally, the payment of the *Ntaase* means that the matured farm is now a property of the migrant farmer. However, this did not happen in practice because we found several cases where forestry officials had cut down cocoa farms beyond the original boundaries of admitted farms. Many migrant farmers pointed out that when forestry officials intensify the cutting of illegal farms, they bribed the officials so that they skip their farms (Table 2). Some forestry officials accept this capital while others denounce it to control the migrant farmers’ access to the forest reserve. During our interviews, forestry officials indicated that they were overwhelmed by the scale of admitted farm expansion in the forest reserve:

“In 2019, we conducted an extensive operation to cut down illegal cocoa farms in the forest reserve. We delineated the boundaries of existing admitted farms to avoid conflicts. After several days of cutting the farms, we had no option but to stop. Honestly, the farmers have cultivated deep into the reserve and are beyond our control. For example, one admitted farm that is on our records as 8 ha is now over 136 ha in practice.” (G3).

For one case in Juansa, as the forestry officials were cutting the illegally extended admitted farm, the village chief called on them to stop because it was his farm. The officials stopped in deference to the chief’s authority. However, for many poor migrant farmers, this did not apply. One migrant farmer whose farm was cut by the forestry officials in March 2019 pointed out that:

“There is nothing to do when forestry officials cut the cocoa farm in the forest reserve. We have lost money and wasted our energy. Should the village chief offer us another land as compensation, we will accept it. But if not, there is little we can do. After all, you can see for yourself [points to the farm], the farm is ‘over the bar’. That’s our ordeal here, and it is pervasive in our community”. (A2-K3).

The situation was quite different in Kinbu, where many wealthy migrant farmers organized themselves to challenge the forestry officials’ actions in the law court. In the case docket, “E1/29/12 – Francis Adum & Or. Vrs. Forestry Commission & Ors.”, the farmers argue that forestry officials had trespassed by cutting down their legitimate farms in the forest reserve. According to them, they have the rights to the farmlands because it was allocated to them by the chief, who holds allodial rights to the forestland. The Forestry Commission contends that the farms cut were beyond legal admissible admitted farm area. The case remains unresolved after more than eight years. Meanwhile, the farmers continue to benefit from their established farms because the court imposed an injunction against further cutting of the cocoa farms in question until the case is resolved.

Unlike migrant farmers, native farmers within the communities use their social ties with village chiefs to access admitted farms for cocoa production in the KHFR (Table 2). These native farmers do not pay path clearance fees or post any *Ntaase*; instead, they present drinks to their

kin as gratitude for enabling their land access. We noted that the chiefs were less likely to allocate areas outside the legally demarcated admitted farms to native farmers. This is because the natives indicated that their chiefs redistributed all the admitted farms to their communities between 1989 and 2008. Therefore any claims to new admitted farms by their chiefs were contestable.

Laborers benefit from admitted farms in the KHFR by using vehicles, mostly bicycles and motorbikes, to transport cocoa and food crops from admitted farms and their extensions to merchants. Many laborers were landless and engaged in other modes of farming in the KHFR, notably Taungya (Section 4.2) and Kalabule (Section 4.4). Cocoa buying companies benefitted from admitted farms and their expansion by providing credit to farmers, especially to procure agrochemicals to protect their cocoa from the black pod disease, organize labor for harvesting, break their cocoa pods, and carting fermented cocoa beans from cocoa farms within the KHFR to their villages (Table 2). By providing these services, the cocoa buying companies establish a social contract that obliges farmers to sell their cocoa beans to them instead of their competitors.

4.2. Taungya farms

Since 2002, the FSD in Juabeso occasionally allocates degraded portions of the KHFR to fringe communities for food crop production as part of a forest rehabilitation scheme called Taungya farming. Primarily, farmers in the villages use labor and monetary payments to secure Taungya farm allocations (Table 3). Each farmer pays GHS 40 (USD 7–8), the equivalent of a two-days wage for an unskilled laborer, to acquire a half-acre plot of degraded forestland to farm food crops. The FSD provides the farmers with the seedlings of fast-growing trees, predominantly *Gmelina arborea* and *Cedrela odorata*, to integrate with their crops. The farmers are under strict rules regarding which crops to cultivate with the trees on their plots. Plantain and cocoyam were the dominant crops, with some farmers also growing vegetables such as pepper, tomato, garden egg and okra. The FSD strictly forbids cassava cultivation, an important staple food crop in the study localities, and any farmer who grows them loses their Taungya plots. When asked why farmers are not allowed to grow cassava, one forestry official pointed out that ‘cassava has a strong regenerative ability. Allowing the farmers to cultivate cassava makes it difficult to evict them when the trees

Table 3
Mechanisms of access, control and maintenance of Taungya farms in the KHFR.

Actor	Means to gain, maintain and control access to forestlands		
	Gain	Maintain	Control
State institutions (FSD)			<ul style="list-style-type: none"> Setting the rules for Taungya based on access to state authority Taungya clearance fee Threat of using force
Native and migrant farmers	<ul style="list-style-type: none"> Taungya demarcation fees 	<ul style="list-style-type: none"> Planting and nurturing of trees Ties with crop merchants 	
Labourers (cropping and transport)	<ul style="list-style-type: none"> Ties with farmers 	<ul style="list-style-type: none"> Access to technology motorbikes Credit arrangements with farmers 	
Food crop merchants	<ul style="list-style-type: none"> Credit arrangement with farmers and labourers Access to means of transport 	<ul style="list-style-type: none"> Credit arrangement with farmers and labourers 	<ul style="list-style-type: none"> Access to retail markets

mature, usually after two years' (G3, 2020).

Many farmers pointed out that the Taungya was an excellent way to grow crops in the KHFR without harassment from forest guards in the district. Several farmers also stated that without the Taungya plots, they would have no other option to cultivate food crops:

“All our lands are family lands, and we have used them for cocoa production. We have no other lands. So, we petitioned the FC to grant us some of the degraded parts of the KHFR for Taungya farming. We were fortunate to get some Taungya plots in 2019. If they do not allocate us plots for next year, we are dead.” (F9-S1).

During our field transects, we observed that some farmers had planted and were tending trees in the Taungya plots. However, there were also many instances where they refused to plant the trees. Such farmers indicated that their Taungya plots were too small in size. They also pointed out that the trees provided by forestry officials grew too fast, impeding crop performance. Many also noted that the Taungya gave them an excellent cover to cultivate new illegal farms in the reserve.

“My sister and I were walking home one evening from the forest reserve when we heard that the forestry officials were coming. She attempted to flee and broke her leg. She suffered. We have suffered in this town. Over time, we also developed new strategies. For example, when they allocate the Taungya to us, we find other areas to clear. When you are working there and hear that the forestry officials are coming, you quickly run to your Kalabule to your Taungya farm and pretend to work there. That way, nobody can arrest you. (A1-J12).

Forestry officials confirmed a lot of the farmers' experiences with Taungya farms. During our interviews, one forestry official noted that:

“Many farmers are only interested in the crop component of the Taungya and are non-cooperative with planting the trees. We allocated some areas to them a couple of years ago that they never planted. Our investigations revealed that many had gone beyond their Taungya plots to cultivate a lot of illegal farms.” (G3).

In some cases we found that farmers sold surplus food from their Taungya plots. These farmers hired laborers to cart plantains from the various farms to an assembly point. The porters charged GHS 1–3 per bunch of plantains depending on the distance between the assembly point and the Taungya plot. In a few cases, there were merchants on hand to buy the plantains. These merchants also pointed out that they provide credit to farmers for a guaranteed supply of plantain from the farmers to their consumers in the cities: Kumasi and Accra (Table 3).

4.3. 'Lotto' farms

'Lotto farming', according to the communities involve cultivating cocoa in random areas within the KHFR. Farmers start their *Lotto farms* by planting food crops. After that, they intersperse the crops with cocoa, which they plant at stake. Unlike the admitted farm extensions (see Section 4.1), both migrants and native farmers engaged in lotto farming and do not defer to customary leaders for their access. Instead, they act on their own agency and at their own risk, preferring to pay occasional bribes to forestry officials (Table 4). Many pointed out that they simply try their luck because cocoa is a source of bulk revenue compared with other livelihood activities, thus the name *Lotto farms*.

“Cocoa brings us bulk cash, which is difficult to raise through other livelihood activities so, you simply try your luck. It is like the lottery. If you win, you win; otherwise, you lose.” (A1-J11).

Under the *Lotto mode*, many farmers like to farm areas in the KHFR with cell phone reception so that a friend in the village can warn them whenever the FC staff are conducting an operation. Based on their in-

Table 4

Mechanisms of access control and maintenance for 'Lotto' and 'Kalabule' farms in the KHFR.

Actor	Means to gain, maintain and control access to forestlands		
	Gain	Maintain	Control
State institutions			<ul style="list-style-type: none"> • The threat of violent eviction • Acceptance of unofficial monies, bribes
Native and migrant farmers	<ul style="list-style-type: none"> • In-depth knowledge of forest reserve 	<ul style="list-style-type: none"> • Unofficial payments • Access to mobile phone technology • Housing as an innovation • Moral Economy right to subsistence • Violence and force* 	
Labours (cropping and transport)	<ul style="list-style-type: none"> • Supply of labour to farmers and merchants 	<ul style="list-style-type: none"> • Credit arrangements with farmers and migrants 	
Cocoa and food crop merchants	<ul style="list-style-type: none"> • Credit arrangement with farmers and labourers 	<ul style="list-style-type: none"> • Access to means of transport 	<ul style="list-style-type: none"> • Access to retail markets

*The use of violence by farmers has been episodic and applied solely to Kalabule plots.

depth knowledge of the KHFR, some farmers pointed out that they preferred to farm inaccessible forest areas to evade apprehension. For example, one desired destination, due to the ruggedness of the terrain and its distance is “*Ekosuasan*”, which translates to “stay home if you intend to cry along the way”. From our transects, we observed that a few farmers had also established cottages on their lotto farms in the KHFR. These farmers pointed out that they live on the farm during the cocoa harvesting season (September to January) to protect their mature cocoa pods and dried beans from being destroyed by forestry officials or stolen by thieves.

4.4. 'Kalabule' farms

In the study localities, *Kalabule* involves producing only food crops in random areas within the KHFR. *Kalabule* farming was particularly prevalent in communities that had no active Taungya allocations (Section 4.2). In Ghana, *Kalabule* originates from the 1970s, when it was used to characterize the Ghanaian economy under the Provisional National Defence Council (PNDC), military regime. During this period, the PNDC introduced price controls to prevent private entities from charging exorbitant prices on essential commodities such as sugar and milk (Huq, 1989). Military officials were at liberty to ransack entities that were suspected of breaching the price controls. As a result, such entities operated latently to avoid detection by the military officers. In the study villages, many farmers pointed out that they neither talk nor go into their *Kalabules* with children because they did not want to attract forestry officials' attention. Others preferred to go into their *Kalabules* at unusual hours; for example, farming in the forest reserve with torchlights from 4 am and returning home before 10 am to evade forestry officials.

From the transect walks, we observed diverse food crops in the *Kalabules*: cassava, plantain cocoyam, maize, rice, and vegetables. Many farmers pointed out that they encountered a lot of resistance from forestry officials, but they had no option but to farm *Kalabules*. Some farmers saw it as their right, pointing out that “they have a right to eat from the KHFR given that fisher communities eat from the sea”. We found this association surprising given that the forest is in a landlocked

area and more than 360 km from Ghana's coast in Sekondi-Takoradi (Ghana Statistical Service, 2014). Further inquiries revealed that this anecdote was first used by a regional manager from the Forestry Commission in Takoradi, a coastal city, during a visit to the KHFR area between 2008 and 2009 to observe the scale of farming the forest reserve. Perhaps, the official used the anecdote to empathize with the communities and create common ground for finding a workable solution to farming in the KHFR. However, farmers in the villages appear to have misconstrued this, employing it as their tagline to cultivate *Kalabules*.

Of all four modes of farming in the KHFR, we found that those involved in Kalabule had the most encounters with forestry officials. Many were beaten, jailed, their farm tools confiscated, and crops cut down, but this did not deter them.

“The soldiers beat my husband severely. His eyes and face were all swollen, and our kids were even laughing at him when he got home. The younger asked him, dad, why is your cheek swollen like that?” (F9-S9).

“I was going to get food from my Kalabule, but sadly, the soldiers and forest officials caught me. They beat me thoroughly with the side of the machete. But I still go there because when a bird does not fly to pursue food, it starves.” (F9-S27).

Many of the farmers' experiences were confirmed by the forest guards, who live within the communities and are more attuned to their experiences:

“The forest reserve is the only land available for food production to this community. We arrest farmers, we beat them, we sack them, but they would not stop encroaching. We arrest and jail them, but immediately after they are released, you will go and find encroaching again. The reality is that a lot of them have no other option.” (G1).

To prevent their Kalabule farms from being cut, some farmers told us that they ‘incentivise’ the forest guards with bribes. One man in his 50s noted that:

“The FC cuts our Kalabule farms. However, the forest is big; so, some of us can dodge. They might cut yours and not see mine. When the forest guard meets you in the Kalabule, and you agree to give him some money and honour your promise, he will never cut your farm. Kalabule! If not, they will monitor you and cut down your farm.” (A1-J6).

We observed differences in the scale of Kalabules in the research communities. For example, in non-taungya communities like Adwoakrom and Manase, farmers' engagement in Kalabules were relatively small, and food access was usually problematic in these communities. Often, they had to rely on Enokrom and Sankofa, where *Kalabule* is an everyday practice. We observed that the people in these two communities had a shared understanding of farming in the KHFR, and they were willing to back each other up. They even organized themselves to fight forestry official and military officers when they perceived that the soldiers' operations were a nuisance to their farming activities in the forest reserve. Besides, farmers in Sankofa acknowledged and owned up to the reputation of being perceived as a ‘stubborn’ community by other communities and forest regulators alike.

“If it is illegal to farm in the KHFR, why don't the soldiers destroy the crops and leave? Why do they have to benefit from our sweat and hard work by harvesting our crops and selling them? We got tired of them, and so last year, we barricaded their cars and stoned them when they were returning with our crops.” (F9-S9).

“Things in our town are a bit different because even some forestry officials are afraid of us. After we beat the soldiers last year, they

realized that we would not allow ourselves to be taken for granted.” (F9-S20).

The situation was quite different in other communities. For example, in Juansa, many farmers noted that they were unorganized, pointing out that some villagers snatched on others to the forestry officials. They referred to this as *Kankama*. Many farmers indicated that their peers use *Kankama* against arrogant community members; for example, those that flaunt their wealth by buying motorbikes or building a fancy house.

“We all farm in the KHFR, but there are a lot of gossips here. If you live in mud houses, people will not envy you, and your farms will be safe. As soon as you put up a concrete house, people begin to envy you, and they do *Kankama* so forestry officials to cut your farms.” (A1-J5).

There were also differences in the scale of *Kalabule* farms. Typically, more impoverished farmers farmed mainly for their subsistence while the richer ones engaged laborers on a credit basis to cultivate large swaths of the KHFR for food production. In some cases, food crop merchants, mostly from Kumasi and Accra, also funded Kalabule farmers on a credit basis. The farmers repay the credit with food crops, mainly plantain from their Kalabule plots, and merchants pay laborers, mostly women, to cart the crops.

In Sankofa, we came upon a case of resistance where the locals acted in unison to drive out soldiers and forestry officials to prevent them from destroying their Kalabule farms in 2018. The farmers indicated that they had grown tired of the soldiers because they often brought vehicles and laborers to harvest the crops from the *Kalabules* to sell in the bigger towns.

5. Discussion

This paper sought to unravel how local communities access land in forest communities for farming in rural Ghana in order to provide guidance towards implementing Ghana's ambitious forest-based bioeconomy plans. We have demonstrated that forest communities employ many structural and relational means to farm and benefit from food crops and cocoa in the KHFR. These include their use of capital, labor opportunities and force, reinforced by farmers' risk-taking attitude. We have also established that these access mechanisms depend on farmers' relations with customary rulers and the type of crops they seek to cultivate. We discuss these findings and explore their implications for institutional reforms amidst growing competition for land in forest communities for food, timber, and biomass production within Ghana's growing forest-based bioeconomy.

5.1. Disentangling factors mediating farmers' access

In Ghana, land is usually allocated ‘through the agency of chiefs, whose authority derives from their people’ (Hill, 1961: 38). Many scholars have documented how migrant farmers use capital and labor to secure lands from chiefs for cocoa farming in Southern Ghana (Berry, 2018; Boni, 2005; Delville et al., 2002). Our findings show that this practice prevails and has been extended into forest reserves, where property rights are different from outside reserve areas. Historically, forest reservation was presented as a means to protect the environment and create a good microclimate for cocoa production in Ghana (Hansen and Lund, 2017). While forest communities at the time perceived and expressed concerns about how forest reservation threatens native rights and future access to farmlands, such concerns were largely ignored. Knowledge, primarily from Thompson's seminal forest inventory, became an indispensable basis for discrediting native chiefs' capability to sustainably manage forests in the country. The state advanced a vision that it was better suited to manage the country's forest resources. Yet the current state of forest resources in the country indicates that the state has not lived up to this vision. Contrastingly, most of the country's forest

resources have been lost since the state assumed the reigns of forest management (FAO, 2010). Amidst this loss, it appears that the state is reinventing its role by drawing on discourses of green growth and bioeconomy e.g. rehabilitation, job creation, food security and the reappropriation of the spaces it had promised but failed to conserve. Invariably, the state's structural positioning gives it the ability to generate such knowledge and gain discursive hegemony to make the reinvention possible without much questioning. By positioning itself as the 'savior of forests' and contrasting itself with 'environmentally destructive' forest communities (Kansanga et al., 2017), the state strengthens its grip on degraded forest reserves. And upon following up to allocate degraded forests to a few communities for taungya, the state creates contractual relationships that exploit the labor of forest communities to service its authority.

Nevertheless, the results suggest that local communities subvert the state's authority by situating their right to food and self-preservation in the same spaces that the state seeks to reappropriate. Invariably, the state recognizes the communities' rights to food, however, it is unable to meet the land demands of the forest communities, for example, through consistent taungya allocations. Besides, some sections of the communities want more than food, they want to create wealth. Thus, the communities draw on their local knowledge, labor and capital to farm inaccessible areas of the KHFR. The farmers know that they cannot convert such areas into property. Therefore, they do not defer to either the state or customary leaders for any form of formal recognition as revealed under the *Kalabule and Lotto modes of farming*. Alternatively, they use capital to bribe forestry officials in order to maintain their access for as long as possible.

As farmers move from the realm of food crops to cocoa production, especially in areas close to admitted farms, it appears that the extent to which they infringe upon statutes against farming in forest reserves blurs. This is because many chiefs with admitted farms use their agency to exert some form of control over such areas. These chiefs invite migrant farmers to cultivate such areas in order to establish a claim to the area. Kronenburg García and van Dirk (2019) argue that a claim is the junction between access and property. The chiefs gain multiple benefits, including free labor, rents, extended legitimacy and authority over the migrants. In what von Benda-Beckmann (1981) refers to as 'forum shopping' in the property literature, it appears that the migrant farmers choose this arrangement because chiefs promise to convert their access right into property within three years. This is not possible with the state because farming in areas outside admitted farms is prohibited by law (Forest Ordinance, CAP 157: 29, 1b). The results indicate that chiefs and rich farmers choose litigation to contest the legitimacy of the state in order to legitimize their claims to these 'illegal farms', especially when forestry officials attempt to disrupt their activities in the contended areas. Here, the chiefs argue that they possess allodial rights to such lands; thus, it is within their prerogative to exercise control over the areas in question, not forestry officials (Agyei et al., 2019). Again, capital, which both chiefs and migrant farmers accumulate from farming such spaces becomes an important tool in navigating such cases, e.g., procuring legal services. In many instances, poor documentation makes it challenging to determine the right boundaries of the 'admitted farms' in question. Many of the cases mentioned in the results continue to drag in the courts for more than a decade. How the outcomes of such cases affect property rights and broadly the legitimacy of either the state or customary leaders in controlling access to contested areas within forest reserves is an area for future studies.

Access to authority and knowledge opens the possibility for farmers to farm in the KHFR. However, this potential is utilized differently depending on the people's access to labor and capital. For poorer farmers with little capital, 'the birds that starve, unless they fly', labor is their main mechanism for accessing farmlands in the study area. And their urge to survive partly explains why they continue to expend their labor on farming in the KHFR, knowing very well that forestry officials could arrest, beat, jail and cut down their farms at any time. In the next

section, we reflect on the implications of the findings for forest-based bioeconomy policy and practice in Ghana. We give attention to poor farmers, who appear to be pawns in this high-stakes game of fighting for control over forestland between the state and customary leaders.

5.2. Implications of the findings for forest-based bioeconomy policy and practice

The current approach of cutting down food crops and farms as well as beating and jailing poor farmers in the study localities raises questions about how marginalized actors' interests can be protected as Ghana steps up effort to increase forest biomass production under its ambitious plantation strategy. As noted earlier, agroforestry and plantation forestry are key components of the bioeconomy in Ghana and many developing countries (Rosa and Martius, 2021). While countries may not explicitly use bioeconomy in discourses or policy documents, this study has shown how some of the main storylines of bioeconomy are used by political actors to reproduce exploitative regimes that enable them to retain control over the countryside. Whose voice, whose needs, whose lands, are key questions that forest-based bioeconomy needs to confront in developing countries (Backhouse et al., 2021). Surely, sparing forests reserves and other lands for timber and forest biomass production is good. However, should it be supplanted for food production in rural areas? The obvious answer is no. And while there is a tendency to argue that food and biomass production are not mutually exclusive, the results from this case suggest that for many forest communities, there is a very limited room to meaningfully accommodate both objectives.

Yet, when the issues of community rights and access emerge, many actors hasten to direct attention to the need for safeguards to protect the poor and vulnerable, and Ghana is no different. However, most discussions about safeguards misrepresent the problem of these communities by portraying them as nuisance actors that state the needs to accommodate somehow. For example, in safeguards developed under Ghana's REDD+ program to protect forest communities, the state acknowledges that there is 'increasing demand for forest lands for farming/settlements by fringe communities because productive lands are not available' and "several farmers have extended the boundaries of their admitted farms" (Forestry Commission, 2016a:30, *emphasis by authors*), all of which may undermine the success of forest rehabilitation activities and cause further deforestation. Thus, the Ghanaian government seeks to 'support local communities to restore and protect their forest lands in a way that meets their [the communities] needs'. As a strategy, the government seeks to "compensate and expel farmers who have extended the boundaries of their admitted farms" and "provide employment and other opportunities to local communities as much as possible" (Forestry Commission, 2016a:34). Such framing is problematic because it fails to acknowledge forest communities as the true owners of forestlands. Besides, it also fails to acknowledge the role the state has played in dispossessing these communities and how forest extraction by the government sparingly benefit forest communities.

Farming is the main employment opportunity available at the moment to most forest communities, and limited availability of arable land is a major constraint to their operations. It appears that safeguards are mentioned to reproduce the prevailing forest reserves management regime that largely limits forest communities ability to benefit from their forests. A more meaningful approach would be to invest in improving agriculture, mainly increasing productivity so that farmers achieve more on the limited lands available to them on the one hand. In addition, the government needs to rethink forest reserve management in a way that recognises forest communities right to subsist from their environment. This will require recognising forest communities as equal partners, not subordinates in forest reserves management. To achieve this, the government can, for example, introduce *food security corridors* to enable communities trapped within and around blocks of forest reserves to engage in permanent agroforestry for food and livelihoods (Kumeh et al. submitted manuscript). Targeted investment of REDD+

payments within the study localities could fund the multi-stakeholder governance institutions required to develop and manage *food security corridors* effectively.

Undoubtedly, land is a crucial resource for the forest-based bioeconomy. Unless radical structural reforms are made, the traditional authorities' ability to control access to land in Sub-Saharan Africa will remain (Capps, 2018). As demonstrated in our results and indicated elsewhere (Boamah, 2014; Campion and Acheampong, 2014), many traditional rulers have a predisposition to abuse their power for personal gains and do not seem particularly concerned about the interests of their constituents. The government is in no way different because it also allocates large tracts of degraded forest reserves, for example, to private companies for large-scale forest biomass production (Forestry Commission, 2020). And when it does not, it uses creative agroforestry schemes like to taungya to exploit communities, "reducing them to the miserable status of the proletariat for exploitation in their own land of birth" (Agbosu, 1983: 183), just like Casely Hayford had avowed when calls for forest reservation were made in the early 1900s. If the state and traditional authorities are overlooking the interests of the forest communities: who speaks for these communities? Besides, what can be stakeholders do to limit power abuse by traditional authorities and the state in negotiating land deals in and outside forest reserves in the emerging bioeconomy?

One answer may lie with the third sector. There is ample evidence of how strong social movements can help grassroots communities secure some basic rights, including their 'right to food' by having them enshrined in legislation (Deere, 2017; Martin et al., 2016). While this study did not directly examine the state of environmental movements in the study context, Gyapong (2020) points out that in Ghana, many of the NGOs who could take up this role, remain far from the experiences of grassroots communities and do not adequately represent communities interests and concerns. For now, the only strategy the communities use is the everyday forms of resistance they employ, as elaborated in the results. Development partners and other others should support building stronger grassroots organizations if forest communities are to be integrated and properly representing in the growing forest-based bioeconomy.

6. Conclusions

Meeting the food and fuel needs at the time resource scarcity, and the onset of climate impacts has stirred many national and regional governments' interests in the need to transition towards an economy built upon renewable biological resources: a bioeconomy. While this emerging approach aims to solve one problem, its appears to create another, imposing new demands on the limited land resources. This study sought to provide insights into possible barriers and opportunities for Ghana's growing forest-based bioeconomy by analyzing how forest-dependent communities' access forest reserves for farming in South-western Ghana. While the choice of the case was selective, it has nonetheless been sufficient to show the struggle between different actors over forest land for diverse needs: food, income, secure future claims to land, and the authority to control the countryside. Although the contest between state and customary institutions to control land has been widely noted, this analysis goes a step further to demonstrate how food insecurity drives local communities to find creative ways to subvert forest reservation, including forest-based bioeconomy strategies introduced by the state to reproduce their exploitation. What broad conclusions could be drawn regarding the land question and the interactions between customary and state institutions in the politics of bioeconomy in the global South?

Well, noting the complexity of the conflicts and interests at stake, we make three tentative inferences. First, the purpose of forest reservation in Ghana needs a rethink. In the case presented, it is apparent that the forest reserve is being transformed from a natural forest to plantation forests of exotic timber species by the state, drawing on farmers as a

source of cheap labor. Given that this change contradicts the original rationale of forest reservation and emerging demands for food in the study localities, it is imperative that actors explore alternative ways to manage forest reserves to ensure that Ghana's growing forest bioeconomy does not deepen inequalities in forest communities.

Second, customary institutions and their overlaps with state institutions appears conflictive, exploitative of vulnerable farmers, and ineffective, creating a fertile ground for unsustainable resource use in the study cases. Several authors have recently drawn attention to the chieftaincy's exploitative powers and how it increases inequalities by inter alia diminishing women's and youths' access to land as a productive resource (Capps, 2018; Tsikata and Yaro, 2014). Quick fixes and talks of safeguards as advanced under REDD+ and related investments would not fix the structural challenge. Therefore, substantive changes may be required, which is addressed in the final point.

The study notes that land struggles between traditional authorities, the state and citizens has been raging for over a century (Amanor, 2008). Forest reservation in Ghana and many other Sub-Saharan countries has dispossessed local communities, squeezing them onto small parcels of land. With population growth and over-cultivation, many of these fragmented land parcels can no longer meet the locals' needs in forest-dependent communities. Moreover, employment opportunities in the countryside are minimal, partly because forest rents accruing to state and traditional authorities are rarely reinvested in developing the countryside due to corruption and elite capture (Kumeh et al., 2019; Kumeh and Abu, 2019; Marfo et al., 2012). Thus, sub-Saharan African governments need to put these issues into perspective and recognize that the bioeconomy, despite its promise, cannot be a quick fix to the underlying problems in the countryside. Doubling up attempts to establish plantation forestry in the countryside may exacerbate inequalities by denying local communities' access to arable lands. Consequently, governments need to create the enable conditions for developing comprehensive rural development policies that are not only ambitious for biomass production, but justice and equity, where rural agriculture is guaranteed. and combine plantation forestry with rural agriculture investments. Without such reforms and visions, any attempts to implement a forest-based bioeconomy will experience backlashes and resistance from ever more marginalised forest communities.

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Credit authorship contribution

Eric Mensah Kumeh: Conceptualization; Methodology; Investigation; Data curation; Roles/Writing - original draft; Writing - review & editing. *Kyereh Boateng*: Conceptualisation, Methodology, Writing – review & editing; Supervision. *Athena Birkenberg*: Conceptualisation, Writing – review and editing. *Regina Birner*: Conceptualisation, Methodology, Writing – review & editing; Supervision.

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