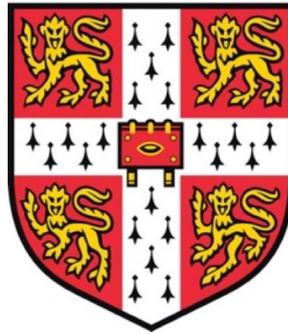


Roots of Enquiry

Farmers, Forests and Tree Cover Change in Kwahu East, Ghana



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This dissertation is submitted for the degree of
Doctor of Philosophy

Clare College

August 2021

In memory of Dad

Personal Declaration

I hereby declare that this dissertation is not substantially the same as any that I have submitted, or, is being concurrently submitted for a degree, diploma or other qualification at the University of Cambridge or any other University or similar institution except as declared in the Preface and specified in the text. I further state that no substantial part of my dissertation has already been submitted, or, is being concurrently submitted for any such degree, diploma or other qualification at the University of Cambridge or any other University of similar institution except as declared in the Preface and specified in the text. This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface and specified in the text. I confirm this dissertation contains fewer than 80,000 words, in line with the regulations of the University of Cambridge Department of Geography Degree Committee.

Clare Bissell

August 2021

Roots of Enquiry

Farmers, Forests and Tree Cover Change in Kwahu East, Ghana

Clare Bissell

Abstract

The Royal Society for the Protection of Birds (RSPB) has been monitoring bird populations and habitat changes in Ghana out of concern for migratory wood warblers since 2011. Based on a small field site in the forest-farm landscape of Kwahu East, Ghana, their research concluded that tree cover is declining. They hypothesised that this could be affecting the birds' wintering habitat and wanted to understand better what social and economic factors are impacting on trees in the local area. They were also interested in exploring how farmers could be supported to keep more forest trees on their farms.

In response to this context, this thesis explores the multidimensional factors affecting the number and types of trees in the landscape. The interdisciplinary, participatory methodology was inspired by the researcher's desire to communicate the value of a political ecology approach to conservation scientists working in Kwahu East and further afield. The thesis is structured with four empirical chapters, which each reveal a new layer of understanding about the complexity of tree cover change in Kwahu East, Ghana. Starting at the farmer level, it outlines the diversity of smallholders who cultivate the forest-farm, recording how their livelihood practices, adaptations and limitations interact with forest trees. It demonstrates that trees are present in the landscape in part due to the presence of the farmers and shows how farmer agencies are constrained by broader economic and political factors.

Immersion in daily livelihood creation uncovered local narratives of forest decline, leading the researcher out of the forest-farm and into the towns where more overarching decisions about tree management and land use are made. Turning attention to local authority institutions and influential actors, the research reveals how management of the forest for timber production and the district-wide vision for development are impacting on tree cover. Different narratives about farmers and forests are made visible, as well as various large-scale infrastructure and tourism development schemes. These will determine the trajectory of change that affects the extent and composition of tree cover.

Through an unfolding story of ambition, collusion and vested interests, it becomes clear that tree cover change is far more complex an issue to address than it appeared at the beginning. Providing ethnographic detail of livelihoods and an exploration of the constraints faced by farmers, this thesis shows how taking a political ecology approach provides both a holistic understanding of a landscape and possible pathways towards alternative futures. This is useful for informing ongoing research and design of locally relevant conservation interventions, particularly in relation to forests and trees on farms in Ghana.

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Acronyms

DA	District Assembly
DACF	District Assembly Common Fund
DCE	District Chief Executive
EPA	Environmental Protection Agency
EU	European Union
FAO	Food and Agriculture Organization
FBO	Farmer-Based Organisation
FC	Forestry Commission
FDMP	Forestry Development Master Plan
FLEGT	Forest Law Enforcement Governance and Trade
FMNR	Farmer-Managed Natural Regeneration
FPIC	Free Prior Informed Consent
FORIG	Forestry Research Institute of Ghana
FPP	Forest Peoples Programme
FRA	Forest Resources Assessment
FSD	Forestry Services Division
GDP	Gross Domestic Product
GoG	Government of Ghana
GFW	Global Forest Watch
ghs	Ghana cedis (national currency)
GPS	Global Positioning Service
GWS	Ghana Wildlife Society
HFZ	High Forest Zone
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
MLNR	Ministry of Lands and Natural Resources
MOFA	Ministry of Food and Agriculture
MP	Member of Parliament
NDCs	Nationally Determined Contributions
NGO	Non-Governmental Organisation
NYDF	New York Declaration on Forests
NTFP	Non-Timber Forest Products
OASL	Office of the Administrator of Stool Lands
PRA	Participatory Rural Appraisal
REDD+	Reducing Emissions from Deforestation and forest Degradation
RRI	Rights and Resource institute
RSPB	Royal Society for the Protection of Birds
SAP	Structural Adjustment Program
SDGs	Sustainable Development Goals
SES	Socio-Ecological Systems
SRA	Social Responsibility Agreement
STS	Science and Technology Studies
SZ	Savannah Zone

TA	Traditional Authorities
TIDD	Timber Industry Development Division
TUC	Timber Utilisation Contract
TZ	Transition Zone
UK	United Kingdom
UN	United Nations
UNFCCC	United Nations Forum
UNWTO	United Nations World Tourism Organisation
USA	United States of America
VPA	Voluntary Partnership Agreement
WD	Wildlife Division
WRI	World Resources Institute

1 Introduction

1.1 The forest-farm of Kwahu East, Ghana

My first visits to the area of mixed forest and farms where this research took place were with bird conservationists. In early October 2017 I joined a dawn birdwatching expedition with four men, three British and one Ghanaian. Together, we were a professor in Plant Sciences, his latest PhD student, a conservation scientist from the Royal Society for the Protection of Birds (RSPB), a wildlife officer from Ghana Wildlife Society (GWS), and me, a human geography PhD researcher. The trip wasn't only for pleasure – the four men were also doing a reconnaissance of a pre-existing RSPB study site in Kwahu East, Ghana in advance of the plant sciences PhD student beginning his own empirical data collection about tree cover. The RSPB, in partnership with GWS, has been carrying out bird population surveys and habitat assessments at this study site since 2011 (see map in Figure 1.5).



Figure 1.1 Birdwatching in Kwahu East forest-farm. We have stopped on a logging track to view a bird. The man at the front is setting up his telescope, the rest use binoculars. Photo taken in October 2017.

At 5.30am, just before the sun rose, we bundled into a GWS and RSPB branded four-by-four vehicle. At six people, including the driver, this was a squeeze. Since we had stayed overnight in Abetifi, the small town district capital, we took the road north along the Kwahu escarpment to Pepease village and then descended the hillside on a craggy dirt road into the forested valley (see map in Figure 1.5). At the bottom, we took a right-hand turn onto a well-worn logging track that led into the forest-farm, and eventually parked somewhat obtrusively at the edge of someone's palm wine farm. From here we walked for four hours, quietly stepping, looking upwards with our binoculars, listening intently for bird calls (see Figure 1.1). At first, the logging track took us alongside small plots where farmers were growing a mixture of crops. Soon we ventured into the farms themselves – taking smaller trails along the edge of fields and into more bushy areas. We were following a transect line of GPS points that are used in the RSPB surveys. Our Ghanaian colleague used a machete to reopen and widen overgrown paths that had likely been cut by hunters or farmers originally.

About half-way through our excursion, we stopped at a GPS point which had thicker undergrowth and numerous tall trees. One of the British men talked passionately about this 'forest' area, contrasting it to the neater, more obviously farm plots we had walked through before. He proclaimed the need to protect it from smallholders. His bulky telescope kept getting tangled in vines as he tried to set it up to gaze into the canopy. I looked around and noticed in amongst the 'forest' various mature food and domestic tree crops including plantain, cocoyam, cassava, papaya and palm.

Four months later in February, I walked a similar route with two of the same men – the PhD student and wildlife officer from GWS. They were carrying out a habitat assessment on behalf of the RSPB to assess its quality for migratory birds. I asked if I could join as a participant observer, as I was interested to see how the habitat assessment was done, and they agreed. Their aim was to categorise sections of land according to what vegetation it contained using standardised categories based on ecological structure. There were different layers to the categorisation process. First, they assessed whether the area within a 25m radius was open or closed forest based on the number, height and canopy of the trees. Then they chose another descriptive category to indicate what kind of vegetation accompanied the trees: for example, arable field, plantation, fallow, clearing, grassland and so forth.

When we got to the GPS point where we had stood birdwatching in October, we found something quite different to the 'closed forest' it would have been labelled before: the area had been cleared, many trees cut, and the vegetation burnt. It was being prepared for farming. Dutifully, the habitat mappers recorded the section as 'clearing'. A conversation – using words like 'destruction', 'deforestation', and 'wasteland' – ensued on the striking difference a few months had made to how this area was categorised. From closed forest in October, to clearing in February: I wondered, what did this snapshot in time suggest to the RSPB about tree cover change and how did it depict farmers? Some trees remained standing, but they were hard to focus on with the land looking so bare.

Three months later, in late May 2018, I visited the same place again, this time with the smallholder farmer who makes his livelihood there. To little surprise, the area looked entirely different again. Indeed, if we had been carrying out a habitat assessment, it would now have been classified as 'arable field', and an ornithological surveyor might even have commended the farmer for the number of trees within it. The farmer showed me how he had left what he described as 'the important trees' in place – *odum*, *kyenkyen*, *mahogany*, *onyina*, *bese*, and *emire*¹ in particular – choosing to cut only those which were 'unnecessary' in order to make space for farming. These had not been wasted either – some had been made into timber boards and most into charcoal (Figure 1.2).

¹ These trees are listed with scientific names in Table 4.3



Figure 1.2 Charcoal bags and still-standing trees behind them. Photo taken in May 2018.

As we walked around his farm, which extended far beyond this most recently cleared field, the farmer showed me how different crops were organised into rotating fields. The groundnuts and yams were grown together, with a few cocoyam (Figure 1.3); maize and young plantain shared a field, alongside several palm trees; there were two fields of three-year old plantain and two-year-old cassava waiting to be harvested; and the small vegetables like aubergine and tomato were planted together, their seedlings having started life in an on-farm nursery patch rich from charcoal production. He also had several fields currently in fallow, with mature cocoyam, cassava and plantain that could be picked when needed.

The farmer pointed out the remains of *onyina* and *okoro* trees that had been cut without his permission. Their debris – including large sections of abandoned trunks and leftover brash – now littered his farming area, causing obstruction. He also pointed out the compacted and hardened gashes in the soil made by the timber truck wheels. The farmer told me how he has protected another *onyina* from meeting the same fate by sending timber contractors away empty handed twice, successfully arguing that the tree was too young to cut and would

damage his farm. “It pains me to see trees cut like this” he said, “when they are so small and will give so few boards”. I asked how he had acquired the land and he explained that it was rented, so the landowner was ultimately in charge of whether it was farmed or not. As the current occupier, this farmer chose to carefully weed around young trees. After three years farming, he will allow the ‘forest’ to regrow once again as he leaves the land to rest in fallow for five years. Even then, he will continue to pay rent so that the land is not taken over by another farmer.

It struck me that far from being an example of ‘deforestation’ or ‘tree cover loss’ caused by farming, as perceived when I was walking the land with the conservationists, this area could instead be seen as an example of sustainable forest-farming. Pragmatically, there has to be some tree clearance to grow crops, but this selective clearing and nurturing is better for tree cover than indiscriminate and irreversible clearing that other land uses, like real estate development or intensive agriculture, entail. The area *felt* like forest in October because it had been left to fallow for so long, which had enriched the soil, making it extremely fertile for planting crops. In February, it had *looked* like deforestation because of the dramatic change and my lack of knowledge about smallholder farming. Now, in May, it appeared as forest-farm – which is perhaps what it always was.



Figure 1.3 A field of a smallholder's farm. This shows his groundnut field, with standing trees at the edges. Photo taken in May 2018.

1.2 Forests and deforestation

The health of forests is critical to the function of the earth's biological and ecological systems, upon which human society depends. According to the United Nations (UN) Sustainable Development Goals (SDGs)² an estimated 80% of terrestrial plants, insects and animals are found in forests, making them crucial for biodiversity. Around the world, 1.6 billion people utilise forests, at least in part, for livelihood activities. In developing nations, up to 80% of rural people depend on forest plants for medical purposes and basic healthcare. Timber and other wooden products make important contributions to the local and national economies of forested countries. Healthy forests, especially more well established old-growth areas, hold significant carbon sinks – which in the age of climate breakdown are becoming even more valuable. However, despite all these socio-cultural, ecological and economic roles, forests around the world are under threat from land use changes, resource extraction and agricultural expansion. Given the multidimensional value of forests, understanding the trajectories and drivers of these changes has been a key area of study for political ecologists, conservationists and development practitioners alike.

According to the UN Food and Agriculture Organization (FAO) 2020 global assessment, forests cover 31% of the world's land and over half is located in just five countries – Canada, United States of America, Brazil, China and Russian Federation (FAO and UNDP 2020:xvi). Of this, they estimate that almost half is 'relatively intact' and a third is 'primary forest' most of which is boreal coniferous forest and tropical rainforest. Areas where forests are more fragmented with little connectivity dominate in subtropical dry and temperate oceanic forest areas. The same report estimates that whilst rates of deforestation and forest degradation are decreasing in relation to figures recorded in previous decades, they are still taking place at unsustainable levels. Conversion of forests to other land uses is the main concern – and since 1990 it is estimated that 420 million hectares of forest have been lost in this manner. The rate of such deforestation was recorded as 10 million hectares per year between 2015-2020. This is significantly lower than the 16 million hectares of deforestation per year that was being recorded in the early 1990s (FAO 2020) and indicates the partial success of the global movement to curtail the clearance of forest areas.

² Figures from the UN SDG website, accessed on 18th July 2021:
<https://www.un.org/sustainabledevelopment/biodiversity/>

Whilst these figures give an indication of forest extent, they are not uncontested. For example, in contrast to the FAO, the New York Declaration on Forests (NYDF) reported an overall increase since 2000 in the rate of tree cover loss globally. Their figure was based on gross loss, which excluded any areas of tree cover gain, and including all kinds of trees and tree cover – e.g. native forest, domestic tree crops, and plantations (NYDF Assessment Partners, 2019). This demonstrates that there are numerous different definitions for and types of forest, tree loss, deforestation and degradation (Pearce, 2018). Furthermore, the definition one has of forest or tree loss usually informs the definition of deforestation or degradation – as was illustrated by the opening narrative in §1.1. Since these terms are not universally agreed, they are a key point of contention and discussion across various disciplines interested in forests and trees. This is explored at more length in Chapter Two. For now, tree cover change is the term used throughout this thesis.

Despite of the differences in statistics, intergovernmental platforms, environmental non-governmental organisations (NGOs) and most governments agree that the loss of and damage to forests globally remain a complex problem. Indeed, as the impacts of the climate breakdown, compromised ecosystem services and loss of biodiversity are becoming more difficult to ignore, these global actors are showing signs of prioritising the health of forests as part of their mitigation and recovery plans. This has been demonstrated most recently with the launch of the UN Decade of Ecological Restoration (2020-2030). The sustainable management of forests and farmlands – whilst always a key area of policy for economic and agricultural purposes – has become vital for the expansion and maintenance of carbon sinks. This was reiterated in the Intergovernmental Panel on Climate Change (IPCC) Land report (2019) and is written into many Nationally Determined Contributions (NDCs) which countries committed to under the Paris Agreement of 2015.

These policy instruments and international conventions have paved the way for an increase in tree planting initiatives, funded mostly by conservation NGOs and climate finance. Supported by policy mechanisms and generally under the banner of ‘forest landscape restoration’ or ‘nature-based solutions’, these projects are promoted as enabling win-win-win outcomes for carbon sequestration, biodiversity and rural livelihood sustainability. Despite these promises, early reports suggest that many of these programmes – particularly those led by the private sector – are failing to understand the multidimensional influences

behind tree cover change in their design and implementation (NYDF 2019). Furthermore, much of the finance being made available to these silver bullet solutions are too often going towards initiatives which have been found to have little positive impact in any of the three domains. Instead of protecting and rejuvenating biodiverse forests and forest-farm areas, these has been an eruption of monocultural tree plantation schemes (Bissell, 2020).

With this context in mind, the colliding global social and ecological crises have galvanised interest in tree cover on forest-farmlands. Whilst there is already a strong literature and practice base for understanding how farmers manage trees within their farms in tropically forested countries (see Chapter Two), there is a renewed drive to create conditions that enable farmers to keep more trees standing. Indeed, several large-scale forest restoration initiatives work directly with farmers. One of the most successful in terms of social and ecological benefits is the farmer managed natural regeneration (FMNR) method that has been used throughout the Sahel since the 1980s (Lohbeck *et al.*, 2020).

Ghana's tree cover changes are positioned within this global political and economic policy context. Environment, development and rights-based non-governmental organisations, intergovernmental institutions, and the Government of Ghanaian all assert that there is a problem with the current trajectory of tree cover change and forest loss in Ghana. Wide-ranging legislative reviews have assessed the drivers of tree cover change and promises from across private, public and voluntary sectors aim to reduce deforestation. To give a few examples, there has been a long multi-stakeholder consultation on ending deforestation in European Union (EU) cocoa supply chains, which began in 2019 and is still continuing in 2021 (Brack, 2019). This has led to renewed corporate declarations from cocoa industry actors. Similarly, since the early 2000s there has been ongoing timber industry reform through the national movement towards reducing illegal or unsustainable logging. Since 2008, a key instrument for this has been the Forest Law Enforcement Governance and Trade (FLEGT) license and the implementation of its accompanying Voluntary Partnership Agreement (VPA) (Ochieng, *et al.* 2013). Finally, there have been numerous government, private sector and/or NGO initiated reforestation and forest protection schemes. Despite these legislative efforts and multiple commitments, Global Forest Watch (GFW) assessments of tree cover change in Ghana point to accelerating tree cover loss. In 2019, the World Resources Institute (WRI)

concluded that Ghana had the highest rate of primary forest loss recorded amongst tropical countries (Weisse and Goldman, 2019). This context is discussed further in §2.4.

1.3 A bird's eye view

There are many different kinds of actors invested in understanding forest and tree cover change in West Africa. For this research project, as illustrated by the opening narrative, some of the main stakeholders are bird conservation non-governmental organisations (NGOs) and ornithological research scientists. Their interests stem from the role trees and forests play in providing habitat and sources of food for different species of birds. There were two NGOs actively involved in this research project – the RSPB and GWS – and another by indirect association – BirdLife International.

BirdLife International is the world's largest nature conservation partnership. It is the leading voice on global bird conservation science, working on both research and practical conservation initiatives through its network of over a hundred and twenty BirdLife Partners (other environmental NGOs) in countries around the world. Across the network, larger NGOs (generally from countries in the global north) are partnered with smaller NGOs who have less resources (generally in the global south). There is an obligation for the larger organisations to support the smaller ones with funding, training and other forms of capacity building. The RSPB and GWS are the BirdLife country partners for the UK and Ghana respectively. The two work closely together under a BirdLife Partnership arrangement – which means that when the RSPB has conservation interests in Ghana, they work directly with and through GWS.

The RSPB is an international bird conservation NGO based in the United Kingdom (UK). Established in the late 1800s as a campaigning organisation against cruelty to birds, it grew throughout the twentieth century into the UK's largest nature conservation charity. It has over two hundred reserves across the UK and works internationally to support conservation projects and research in other countries with partner NGOs. GWS is a small environmental NGO based in Ghana. With its offices in Accra, GWS project officers travel to sites around Ghana to implement conservation strategies, carry out data collection for conservation science research, and deliver community education and engagement activities.

One area of work for all three of these bird conservation organisations is migratory flyways. These are the routes that migratory birds take annually as they move between breeding and wintering grounds. Research suggests that migratory birds are more at risk from hazards presented by environmental changes than sedentary species because their bi-annual epic migrations expose them to multiple, complex jeopardies (Newton 2004). Furthermore, findings show that the populations of long-distance migrants are declining more steeply than those of short-distance migrants or resident species (Sanderson *et al.*, 2006). This has led to extensive research to understand what could be causing these declines.

There are eight major migratory flyways, depicted in Figure 1.4. This project about trees in the transition zone of Ghana is connected to the East Atlantic flyway (yellow), used by thousands of Afro-Palaeartic migratory birds.

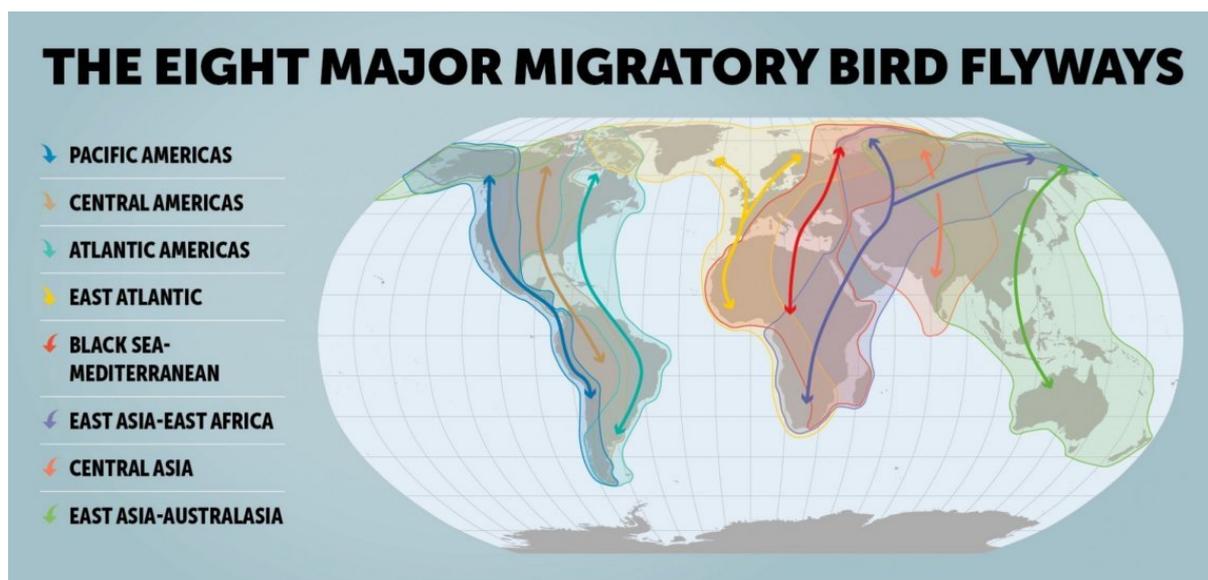


Figure 1.4 The eight major migratory bird flyways. Sourced from BirdLife International website, accessed 18th July 2021: <https://www.birdlife.org/worldwide/programmes/migratory-birds>

‘Afro-Palaeartic (A-P) migrant’ is the name for 126 bird species (BirdLife International 2004) who breed in the palaeartic ecozone – which includes most of Eurasia and some of north Africa – and then migrate to warmer climates in sub-Saharan Africa over the winter months (Berthold 2001). Species include the tree pipit (*Anthus trivialis*), yellow wagtail (*Motacilla*

flava), pied flycatcher (*Ficedula hypoleuca*) and various warblers, including the wood warbler (*Phylloscopus sibilatrix*). There is strong evidence to suggest that many of these A-P migrant species are declining in Europe, to the growing concern of ornithologists (Vickery *et al.*, 2012; Mallord *et al.*, 2016; Buchanan *et al.*, 2020). Of particular concern are four species who have previously been widespread in Europe – European turtle dove (*Streptopelia turtur*), whinchat (*Saxicola rubetra*), northern wheatear (*Oenanthe Oenanthe*) and common nightingale (*Luscinia megarhynchos*) – who have all seen a halve in their European breeding populations since 1980 (Vickery *et al.*, 2014).

These findings have given rise to wide-ranging research by bird conservation scientists, who are keen to understand what factors could be contributing to these declines to inform the implementation of practical solutions. Methodologies have included the monitoring of populations in European breeding grounds, tracking migrants on their journeys by fitting GPS location devices to birds, bird trapping to record information about health and body fat before and after migrations, and satellite image analysis to establish land use and tree cover changes along the flyway. Since A-P species undertake such long migrations, research has taken place in breeding areas, at staging sites (places where migrating birds rest and find sustenance during their journeys) and in wintering grounds.

These studies indicate that flyways are becoming more hazardous for migrant birds due to multiple, overlapping factors. In 2014, Vickery *et al.* collated a review of literature investigating A-P population declines and identified five broad drivers of change that are of most concern. Within these, some of the highest risk factors include the varied and complex impact of climate change in different locations along the flyway, intensified farming practices that negatively affect habitat quality in breeding and wintering grounds, expansion of agriculture in wintering grounds, increased hunting of songbirds in the Mediterranean, collision with infrastructure (for example, electric cables, wind turbines and tall buildings) and habitat loss at key staging sites due to land use or vegetational change (Vickery *et al.*, 2014). It is not yet clear which of these factors are the main cause of population declines, although the paper asserts that rapid expansion of agriculture into forest areas in wintering grounds is of particular concern (Vickery *et al.*, 2014).

Forests of different types are important habitats for many migratory birds. Some of the key wintering and staging sites in Africa are in the Sahel savannah and savannah woodlands. Research from several Sahelian countries document deforestation in savannah woodlands (Gonzalez, 2001; Oduori *et al.*, 2011; Yiran *et al.* 2012). In these areas, studies have associated livelihood activities, such as collection of fuelwood, animal grazing and agriculture, with habitat and tree cover change (Wilson and Cresswell 2006). Declines in forests and tree cover in Senegal has often been blamed on charcoal production (Tappan *et al.*, 2004). Where remote sensing data exists, it also supports these assertions of forest loss and habitat change (Vickery *et al.*, 2014). Importantly, numerous studies indicate that these perceived habitat and tree cover changes are impacting negatively on the populations of A-P migrants wintering there (Jones *et al.*, 1996; Wilson and Cresswell, 2006; Cresswell *et al.*, 2007). Others highlight the slightly different affect that habitat changes have for birds who use these areas as staging sites – where their priority might be refuelling on insects, for example, before or after crossing the Sahara. The extent of the impacts in both wintering areas and staging sites depends upon the habitat preferences, adaptability and refuelling strategies of different migrant species (Arizaga *et al.*, 2013). While many studies have focused on the Sahel, research based in the Guinea forest-savannah and Guinea moist forest zones have also reported declines in A-P migrants (Hewson and Noble 2009; Thaxter *et al.*, 2010). Some believe the extent and quality of forest may be a factor (Yiran *et al.*, 2012) and see the expansion of agriculture as a major cause of forest loss (Brink and Eva, 2008).

There have already been several projects designed and delivered to respond to some of the challenges named in the above studies. One BirdLife International project which has been hailed a success is the ‘Life on the Edge’ programme that ran from 2011-2015 at fourteen different locations in the Sahel. This was focused on protecting, enhancing and restoring both wetland and dryland habitat for migrant birds. It involved supporting communities to diversify their livelihoods, plant trees on farms and take part in conservation activities (Living on the Edge report, 2015).

Since these types of research go on to inform conservation practice and project design, it is important that location-specific root causes are well understood to minimise the risk of failure, or more poignantly, the risk of making matters worse. Whilst the literature points towards a scientific consensus that land use changes in Africa are negatively impacting on

most, but not all, migrant bird populations, there still remains a lack of conclusive field evidence to support these assertions (Adams, *et al.*, 2014). Furthermore, since migrant birds winter in areas that are used for farming, grazing and other rural livelihood activities, it is important to understand the multiple ways in which the land and trees are managed in any given location to establish which economic factors may also inadvertently be affecting birds (Adams *et al.*, 2014). This impetus paved the way for this research project in the transition zone of Ghana.

1.4 Research project origins

One species of concern to the RSPB is the wood warbler (*Phylloscopus sibilatrix*). As one of the A-P migrants, the wood warbler breeds in Europe and has a habitat preference of broadleaved woodland (Mallord *et al.* 2012). When temperatures drop, it makes a long migration to its wintering grounds in the forest zone of sub-Saharan Africa (Urban *et al.* 1997). Figures suggest that the European breeding populations of wood warblers have declined significantly since 1980 (Mallord *et al.* 2016a). Having carried out investigations into causal factors within breeding ground locations and eliminating these, the RSPB turned their attention towards the wintering grounds. Here, they hypothesised that the changing landscape and reducing tree cover may be negatively impacting populations (Mallord *et al.* 2016a). One of the places where wood warblers have been sighted annually is an off-reserve area of dry semi-deciduous forest, used predominantly for smallholder agriculture, in the transition zone of Ghana, near Pepease in Kwahu East district (see map in Figure 1.5). This became an RSPB study site for survey-based research into wood warblers' wintering behaviour, habitat selection and preference, and species distribution.

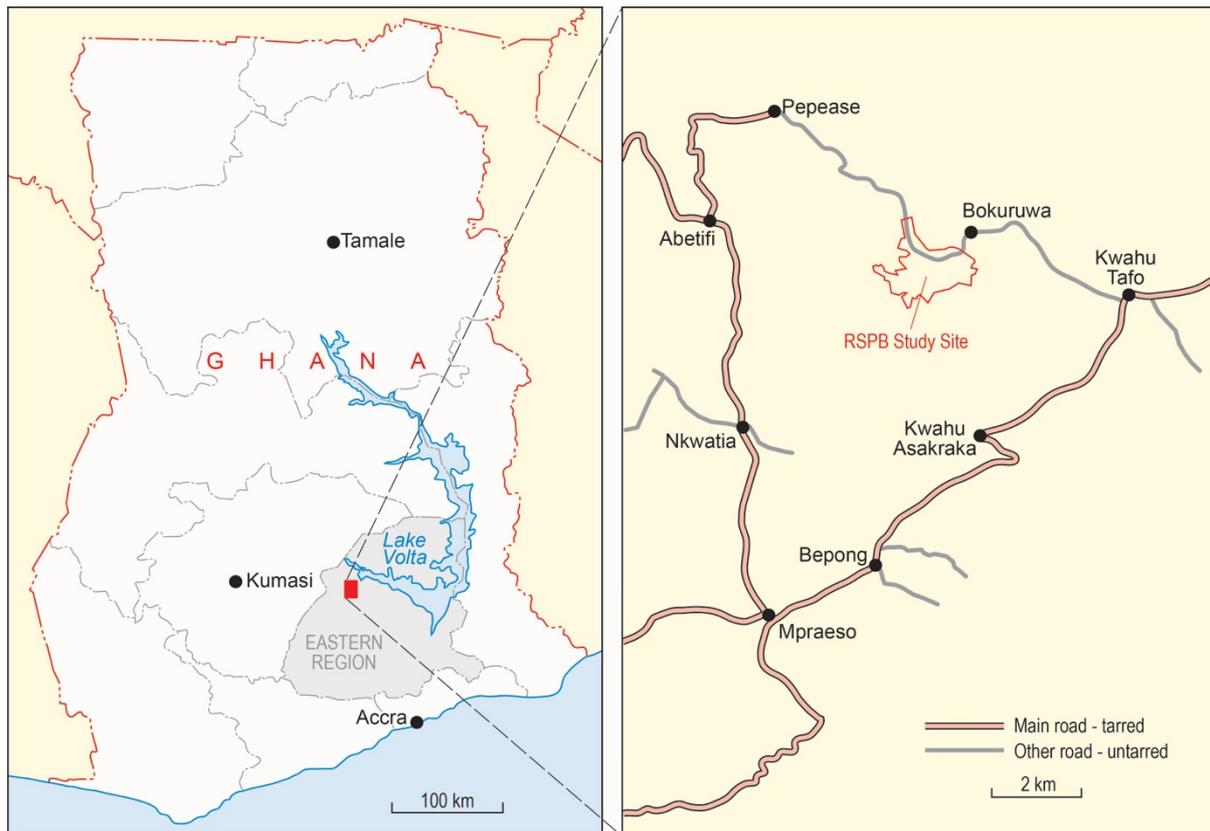


Figure 1.5 Map showing the location of the RSPB study site near Pepease, in Kwahu East. This map shows the study site in relation to the Eastern Region of Ghana, West Africa.

The RSPB surveys are organised along consistent transect routes, whereby the same GPS points are monitored every year. Working in partnership with GWS, the RSPB gather information about wood warbler behaviour, habitat quality and populations at several locations in Ghana, including the Pepease study site. Their methodology includes field surveys, mist-netting, ringing, radio tagging and tracking, tree species plotting and landscape grading. The Pepease field site was demarcated with transect lines that made use of cultivated field boundaries. Since this location also became the field site for my thesis research, more detailed maps and geographic contextual information about the area are provided in Chapter Three.

I was able to observe this survey data collection during my fieldwork, some of which was described in §1.1. The process involved two types of assessment. The first was a wood warbler survey. For this, field officers walked the transect lines stopping at each waymark to count

wood warblers. A recording of the wood warbler mating call was played using a speaker. After this, we listened to see if any wood warblers responded – which often they did. Some flew towards the sound and settled in trees above our heads or nearby. These calls and sightings were used to estimate the number of wood warblers at that GPS point. Several other pieces of information were also recorded for each waymark. Tree cover was estimated by looking at how much of the sky was visible through the canopy within a 25m² radius. To aid them, the field officers used an instrument called a densiometer, which is a curved mirror containing grid lines so that proportions of sky and canopy can be assessed. They also counted trees at every waymark on the transect, recording the number of trees between 3-7m, 7-14m and >14m in height within the 25m radius. Tree heights were measured using a laser distance meter (a handheld device which measures distance) pointed at a section of the high canopy from beneath the tree. All trees were counted – including domestic tree crops like palm and papaya, as well as native forest trees. These tree assessments were used to establish whether the location was open forest (less than 40% tree cover) or closed forest (more than 40% tree cover). This tree cover assessment is captured in Figure 1.6. The vegetation type was also recorded using six habitat categories: plantation, arable, recently cleared/burnt area, shrubland, fallow forb/grass and treeless rocky plateau/bare ground. This data is then analysed against the wood warbler count to understand their habitat and tree preferences.

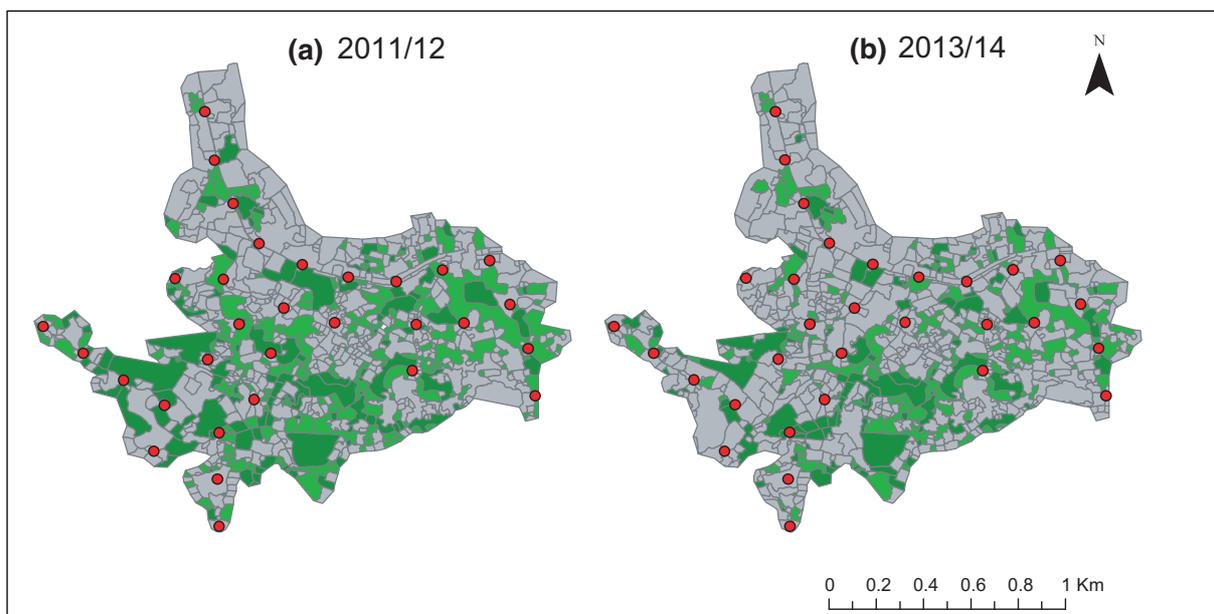
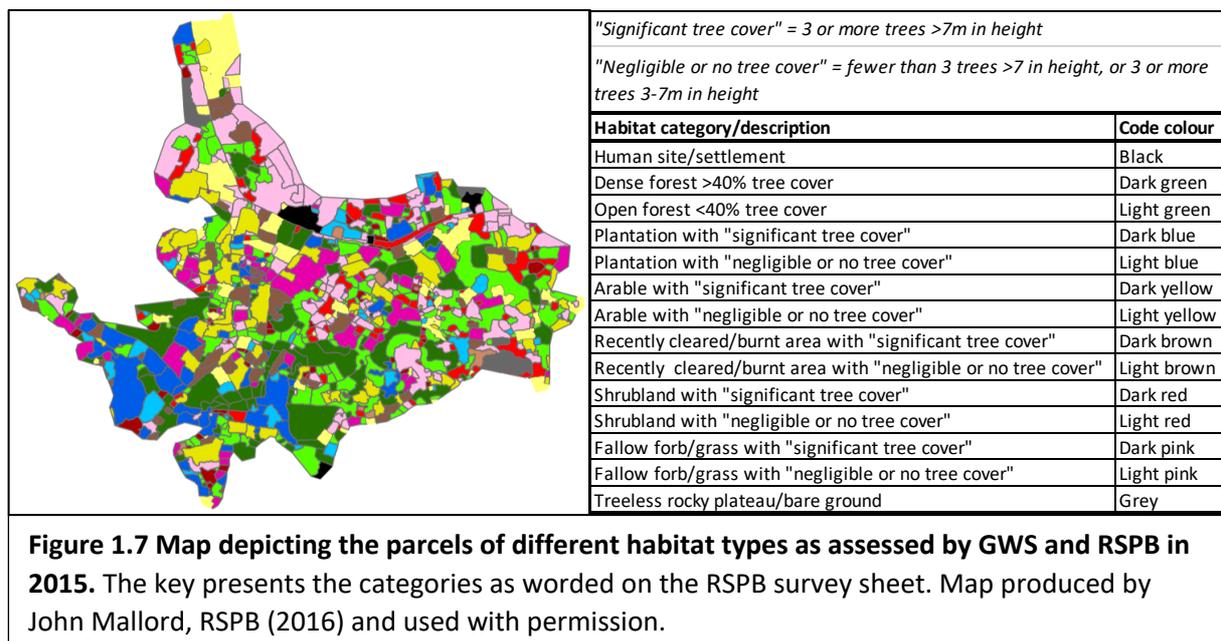


Figure 1.6 Map of the Pepease RSPB study site depicting tree cover change between 2011 and 2014. Map produced by John Mallord, RSPB, used with permission (Mallord *et al.* 2018). The red dots indicate GPS locations for survey points. Areas of dense forest (>40% tree cover) are dark green. Areas of open forest (<40% tree cover) are light green. The grey polygons represent all other land cover types, which are shown in Figure 1.7.

The second type of assessment was habitat mapping. This was done separately to the wood warbler survey but used the same habitat categories as above. Habitat mapping involved classifying the whole field site into categories to describe the landscape. This was done by a data collector identifying a section of land as a particular habitat type and walking around the edge of it with a GPS. This created a polygon shape on the GPS, which was labelled as the habitat type. They also recorded whether there was 'significant tree cover' (three or more trees 7m in height or over) or 'negligible or no tree cover' (fewer than three trees over 7m in height, or three or more trees 3-7m in height) for the whole section they had just mapped. Some areas were easier to distinguish than others and some required the cutting of a path to get around the 'edge'. This information was then compiled using an ArcGIS tool, resulting in a map made up of different polygon shapes that are colour-coded to represent the different habitat types (see Figure 1.7).



This fieldwork has provided ecological data about the forest-farm habitat and the way it is used by wood warblers. It showed that wood warblers have a habitat preference for 'well wooded' farmland areas with >50% tree cover, rather than dense forest (Mallord *et al*, 2016a). The birds were consistently recorded feeding on the *okoro* (*Albizia zygia*) tree – a

native, fast growing, pioneer tree that is common within farmed areas – and other tall trees. In 2016, the RSPB perceived a 25% decline in tree cover and therefore hypothesised that habitat degradation could be negatively affecting wood warbler populations (Mallord *et al.* 2016b). This was based on annual assessments of the birds' habitat and tree species preferences, and speculations about how these might be impacted by land use change. The RSPB is concerned that this may be indicative of broader deforestation and tree cover change across other parts of the transition forest zone. Given the rotational smallholder agriculture of the area, where patches of forest appear and disappear in cycles, the RSPB concluded that it was "important to understand the socio-economic drivers of these changes and the key factors that determine 'tree management' on farmland" (Mallord *et al.* 2016b:9).

This PhD project was conceived to address this identified gap in the RSPB's knowledge: they recognised the need to understand better how local people relate to trees and the socio-economic factors that could be impacting on tree cover. The RSPB was an integral part of the research from conception to completion, through both academic and financial support. Alongside Professor Bill Adams from the University of Cambridge Department of Geography, the Head of International Research at the RSPB, Dr Juliet Vickery, was a co-supervisor on this project. The RSPB were a partner on the original application to the Economic Social Research Council (ESRC) for research funding, contributed £2000 a year towards the studentship, included me in their monthly team meetings when I was in the UK, provided logistical support whilst I was doing fieldwork in Ghana, and gave me opportunities to present my findings at conferences and multi-stakeholder workshops about conservation interventions for migrant birds.

The research direction took shape in collaboration not only with the RSPB, but also with input and support from their collaborators at Ghana Wildlife Society (GWS), people living in the towns and villages surrounding the RSPB study site, the Kwahu East decentralised ministerial offices and national community forestry experts. I followed new routes of enquiry as they arose in conversations, workshops and high-level meetings, which meant that participants' knowledge, expertise and real lived experiences informed both the methodology and subsequent analysis of data. This process is described further in Chapter Four.

1.5 Seeing the wood for the warblers

The maps in Figures 1.6 and 1.7 represent the landscape as seen through the conservationists' lens, arranged into simplified categories that apply scientific order to what is a complex socio-ecological system. The assessment of habitat type and canopy cover percentages are susceptible to interpretation by those collecting the data. For example, a parcel of land might be categorised as 'overgrown farm' by one officer and 'fallow' by another, often depending on their prior knowledge of the farming system. This makes a difference – fallow land is usually left for a specific period of time, during which tree cover will expand, whereas an overgrown farm could be cleared at any time. Furthermore, integrated tree management and farming techniques are not represented on these diagrams; and neither are culturally significant areas, land ownership boundaries, logging histories, or recent building developments. The economic, social and political relationships between people and trees are absent: indeed, people and their farms are not viewed so much as a part of the forest-farm ecosystem, but rather an imposition on it.

One of the limitations experienced by those seeking to understand and address tree cover change stems from the way that socio-ecological systems are studied and understood. Chapter Two explores deforestation and forest-farming literature, discussing the power that narratives of environmental degradation have in shaping the political ecology of forest conservation and management (Fairhead and Leech 1998, Kansanga *et al*, 2017). Conservation literature focuses on aspects of ecology, rather than the complex relationships that a diversity of people have with these places. As a result, the influence of broader socio-economic and political factors behind environmental change are sometimes neglected, and conservation interventions can end up treating the symptoms of problems rather than addressing the deep-seated causes of them. In the case of tree cover in Ghana, this could lead to conservation efforts which inadvertently support inappropriate projects or policy reform, potentially reinforcing inequalities in land tenure and livelihoods that impact directly on trees in farming areas (as will be seen in Chapters Five and Six). Similarly, restoration projects may implement pre-defined projects which prioritise short term carbon capture over long-term, locally relevant and socially just solutions.

Political ecology has a rich history of challenging received wisdom about West African landscapes (Fairhead and Leach, 1996), which is explored in Chapter Two. One point of

departure for this project was questioning over why the dominant narratives deconstructed by previous political ecology studies continue to underpin conservation practice. Rocheleau (2008), Fairhead and Leach (1996) and others have found in their research that maps like those produced by the RSPB (Figure 1.6 and 1.7) have the power to create perceptions, leading to species-rich and culturally valued land being misunderstood and misrepresented as deforestation zones. The use of polygons to represent different habitats might appear neutral, but they can fuel common perceptions and narratives which continue to exist within conservation discourse that local farmers are harming the ecological health of an area. This is especially the case when the research they are attached to uses language which supports this prevailing narrative.

Rocheleau (2008:225) argues that we need to provide “a countervailing vision to the powerful images of forest and not-forest in neat polygons on standard maps of land use and cover at scales that erased these finely networked human ecologies”. With this call to action in mind, this research project looks at the same forest-farm landscape as the RSPB but through a different lens. It uses an ethnographic approach to detail the relationship between people and trees in Kwahu East, conjuring an alternative representation of the farming community. In so doing, it provides an analysis of the multidimensional factors affecting tree cover which the habitat mapping does not capture.

As will be described in Chapter Two, the approach I took was informed by a reflection on existing theoretical ideas within the fields of political ecology, Science and Technology Studies (STS) and more-than-human geographies. This led to me basing my enquiry around three interconnecting dimensions: practices, perceptions and agencies. The research questions were organised by these themes (Table 1.1) and influenced from three further directions. Firstly, in response to gaps in the knowledge of bird ecologists working in West Africa and centred on the staff of the RSPB in the UK, there is an emphasis on understanding how local livelihoods interact with trees – and specifically, learning what smallholder farmers do with trees on their farms in transitional forest areas of West Africa where migratory birds winter. Secondly, with current literature in mind, there is a focus on exploring the multidimensional factors influencing tree cover change, drawing on political ecology’s ‘chain of explanation’ framework (Blaike and Brookfield, 1987). Finally, as the practical fieldwork unfolded, attention was paid to local priorities and questions arising through conversations with

participants who hold different positions in the community. This project was, therefore, interdisciplinary from the beginning. It sought to bridge a gap between conservation science and political ecology, making the latter accessible to a researcher with conservation training. This presented theoretical challenges, which are discussed in Chapters Two and Nine.

In Table 1.1 the research aims and questions are arranged under the three routes of enquiry: practices, perceptions and agency. Whilst compartmentalised into separate spheres for the purpose of investigation and linearity, the three are inherently interconnected.

Theme	Practices	Perceptions	Agency
Research Aims	<i>i) Understand what farmers and other tree users do with forest trees and why.</i>	<i>ii) Explore how different local people view tree cover change and its causes over time.</i>	<i>iii) Identify what factors influence the decisions different people make about forest trees.</i>
Primary Research Question	What are different people <i>doing</i> with forest trees in Kwahu East, and why?	How do different people <i>perceive</i> what is happening to tree cover in Kwahu East and the causes of change?	What micro and macro forces are informing practices, perceptions and tree cover change in Kwahu East?
Secondary Research Questions	<p>What tree management practices are used by farmers and why?</p> <p>How do different types of farmers make decisions about what crops they grow, and how does this influence what forest trees are kept on their farms?</p> <p>What are other tree users doing with forest trees and what factors influence these practices?</p> <p>Which tree species are valued economically, by whom and for what uses/reasons?</p> <p>Which tree species are valued culturally, by whom and for what uses/reasons?</p>	<p>How do farmers and other local people understand what is happening to the forest trees in Kwahu?</p> <p>How do perceptions and narratives of change influence decisions people are involved in?</p> <p>How far do perceptions of tree cover change and its causes affect the individual and collective sense of agency in addressing it?</p> <p>How do different actors view the same landscape and in what ways does this inform/confound wider narratives about tree cover change?</p>	<p>How is land and tree ownership organised and what are the effects?</p> <p>What are the economic constraints and opportunities experienced by local people?</p> <p>How are decisions about land use made, who is represented in these processes and what is the impact on tree cover?</p> <p>What governmental policies and activities are influencing practices and perceptions which impact on tree cover?</p> <p>Who is driving development in Kwahu East and what impact is this having on livelihoods and tree cover?</p> <p>Whose priorities have greater influence and how?</p>

1.6 Thesis overview

This thesis is split into nine chapters, with this introduction being the first. Chapters Two to Four situate the research theoretically, geographically and methodologically. To start, Chapter Two provides an overview of relevant literature, focusing on political ecology studies of forests and farms in West Africa. The definitions of 'forest' and 'tree cover change' are discussed. It reviews insights from the extensive case studies relating to forest-farm areas, covering issues such as governance, access, farmer agency and degradation narratives. Contextual information is provided about forests of Ghana, state management and relevant legislation. This is followed by a reflection on different theoretical ideas within political ecology which inspired an approach that explores practices, perceptions and agencies.

The third chapter locates the research geographically, socio-culturally and politically in Kwahu East, Ghana. It gives the reader a sense of the research site, describing the vegetation, landscape, settlements, local history, culture, land arrangements and economy. It also introduces the two main governance structures – the traditional authorities and District Assembly – who took part in this research. Chapter Four gives an account of the research process and how it evolved during the fieldwork in response to issues of positionality and methodological challenges. It begins with a reflection on positionality and the challenges of working with research assistants. The case study research design is then described, explaining why this methodological approach was taken and giving detail about the choice, sampling strategy and implementation of each method used during data collection. Ethical considerations, consent, data storage and analysis are also outlined.

The empirical data is presented across four chapters, from Chapter Five to Eight. The methodological approach started within the forest-farm ecosystem, by getting to know the people who make their livelihoods there and followed their lead to the various other actors whose actions also influence land use and tree cover change (Brookfield and Blaikie, 1987). As such, the first two (Chapters Five and Six) are farmer-oriented, whilst Chapters Seven and Eight cover the broader economic and political context that farmers exist within.

Chapter Five outlines the smallholder farming economy in Kwahu East. Immersive methods uncover different types of farmers, multiple uses of trees within the farming ecosystem and complex livelihood challenges. This micro-political ecology shows that farmers have agency

in decision making about crop cultivation and tree management, but that these are constrained by the broader economic and political context. Sometimes the adaptations that farmers make in response to livelihood challenges can contribute to factors that affect trees. To explore this more, Chapter Six looks at farmers as tree managers. It shows that there are at least 31 tree species which farmers utilise on their farms and outlines the different uses. However, local narratives of forest decline show that smallholders are concerned about tree cover change and how it is impacting negatively on their livelihoods.

To gain a deeper understanding of factors constraining farmer agency, therefore, Chapter Seven reviews how the trees are managed by the Forestry Services Division (FSD) and other key actors for timber production. The chapter describes the complexity and contradictions of forestry regulation, in particular tree tenure and logging concessions. This leads into a discussion about unsustainable formal and informal logging, exploring how these affect tree cover and perceptions of agency. Since trees occur on land, Chapter Eight discusses the various decision-making processes and vested interests that determine how land is allocated and what for. It shows how key individuals have disproportionate power in directing trajectories of change, finding that infrastructural development, real estate and tourism pose significant risks to tree cover. The socio-political context behind these issues is discussed as social differences, government policy and market forces.

Finally, Chapter Nine concludes that causes of tree cover change can only be understood by looking at the social-ecosystem as a complex web of relationships between many different local actors, institutions, authorities, organisations and the ecologies they are part of. It shows that local constraints of distrust and uncertainty present challenges for addressing tree cover change in Kwahu East. The thesis argues that efforts to simplify or compartmentalise the landscape into itemised problems that can be solved individually lead to misunderstanding the social-ecosystem and potentially exacerbate factors that negatively affect tree cover. Taking a participatory political ecology approach in understanding problems prevents this and offers routes for redistributing power in decision making, tackling the social inequalities that underpin ecological problems. This presents opportunities for conservation practitioners and researchers working on forests and trees in Ghana and other parts of West Africa.

2 A Political Ecology of Forests and Farms in West Africa

2.1 Introduction

There are a multitude of ways to study the relationships between people and trees. Given the context of this research project and the collaboration with a conservation science partner (the RSPB), political ecology was the instinctive choice as the overarching approach.

Since the 1980s, political ecology has emerged as a field of study that straddles the academy and policy-making spaces, and which critiques the power relations that infuse the interactions between societal structures and environmental processes (Robbins 2012). The discipline studies how winners and losers are created through economic policies and the narratives which frame how these are constructed and communicated. Often through the use of case studies, political ecology draws attention to the complex relationships between ecologies and multidimensional societal structures. This challenges the basis upon which knowledge about the world is constructed (Castree 1995, Peet *et al.*, 2010).

One method regularly employed by political ecology is the ‘chain of explanation’. Developed by Brookfield and Blaikie (1987) in their study of soil depletion, this framework situates environmental issues within the constraints presented by the local and national political economy, and shows how resource value is lost from communities to external ‘sites of accumulation’ (Robbins 2012:88). The chain of explanation starts by looking at the direct relationships between land managers (e.g. farmers) and their land through their practices and techniques. It then considers the connection between land users and other groups that affect the decisions they make. Like peeling back layers of an onion, this usually leads to consideration of local institutions, national state policy and global markets – to create a ‘chain of explanation’ for the environmental change in question.

Whilst political ecology as a field has become more theoretically complex since the chain of explanation was developed, this technique remains a core component of many political ecology case studies. It also forms the basis for this investigation into the multidimensional

factors which affect the number, age and types of trees within the forest-farm landscape of Kwahu East, Ghana. I outline my approach to this in §2.5.

This chapter provides an overview of the extensive literature on the political ecology of forests and farms in West Africa. It begins with a discussion on forest definitions and how tree cover change is perceived, measured and narrated (§2.2). §2.3 then focuses on the people who make livelihoods in different kinds of forest and wooded areas. It reviews a selection of case studies and contributions to knowledge on forest governance, access, farmer agency, and inclusion of trees within farms. In §2.4 the forest-farm landscape of Ghana is introduced as the place where this research project took place. This provides some background information about ecological zones, history, state management of trees, forestry policy, and recent empirical findings from Ghanaian scholars interested in Ghana's forests. Finally, §2.5 reviews some theoretical influences from political ecology that shaped the research approach, showing how ideas originating in Science and Technology Studies (STS) and post-humanist thinking have informed the methodology and analysis.

2.2 Measuring forests

2.2.1 What makes a forest a forest?

Forests can be defined in multiple ways (Lund, 2002). Actors with different lenses see forests in different ways and therefore prioritise a variety of aspects in their forest management approaches (Chazdon *et al.*, 2016). For example, a forest could be seen as primarily a source of timber, an important ecosystem service, a place to grow food and make livelihoods, a diverse ecosystem, or a carbon sink. Whilst many of these overlap, the lens through which a forest is viewed alters the way it is managed and sustained, often by multiple actors at the same time in the same place. Some lenses influence national policies and inform the definitions that international bodies and intergovernmental agreements use (Sasaki and Putz, 2009).

One of the most prominent lenses in policy shows forests as timber resources. This worldview emerged in Germany in the 1700s when forests began to be associated with forestry as a form of land management only for timber resources (Schmithüsen, 2013). The priority was timber yield, so other defining features of forests were not important. This approach to forestry

spread throughout Europe and to European colonies – including America, parts of Asia and Africa – where forestry and definitions of forest continued to focus on timber (Neumann, 1997; Sarre and Sabogal, 2013). As Scott (1999:13) describes, “the forest as a habitat disappear[ed] and [was] replaced by the forest as an economic resource to be managed efficiently and profitably” (Scott, 1999:13). This served the interests of colonising forces who exported timber value. Overtime, colonial state approaches to forestry management contributed to increased control over rural areas whilst simultaneously undermining the pre-existing localised systems of forest access and utility (Neumann, 1997).

In the wake of the Second World War, when there was an increase in demand for timber due to the rebuilding of bombed European cities, the United Nations Food and Agriculture Organisation (FAO) adopted a new definition for ‘forested land’ as part of its international ‘forest resources assessments’ (Garzuglia, 2018). Again, this oriented around timber production as “lands bearing vegetative associations dominated by trees of any size, capable of producing timber or other products or of exerting an influence on the climate or on the water regime” (Garzuglia, 2018:10). Over the next seventy years, the FAO’s definition of forest evolved. In 2005, the FAO defined forest as “land spanning more than 0.5 hectares with trees higher than 5 metres and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use” (Garzuglia, 2018:11). Importantly, this excludes any form of agricultural land use, domestic tree crops (like fruit trees and oil palm) and agroforestry systems. It does include areas of shifting cultivation that have been ‘abandoned’ and where trees have grown back to a canopy of 10% and a minimum height of 5m.

The FAO definition is important because it has always been the most used definition for forest across policy and academia (Grainger, 2008). It is used by the United Nations Framework Convention on Climate Change (UNFCCC) and within the implementation of the Kyoto Protocol, within which individual countries are also able to specify their own definition of forest so long as the FAO minimum for tree cover (10%) are met (Sasaki and Putz, 2009). The definition does not make a distinction between native, biodiverse forest and industrial monocultural plantations. This means that areas of old growth or native forest are at risk of being razed without being recorded as deforestation so long as woody plants that grow up to 5m are allowed to grow back across 10% of the area (Nielsen *et al.*, 2002; Bekessy and Wintle

2008). This is an issue that many policy focused academics and environmental NGOs are lobbying to change, especially in the recent era of carbon forests and offsetting (Sasaki and Putz, 2009; World Rainforest Movement, 2017).

There are also different descriptions used for forests, for example, 'intact', 'pristine'/'primary', 'old growth', 'secondary', and 'degraded'. Again, definitions of these terms are unclear (Clark, 1996; Clement, 1999). Primary forest is defined by the FAO as "naturally regenerated forests of native tree species where there are no clearly visible indications of human activity and the ecological processes are not significantly disturbed" (FAO and UNDP, 2020:xvi). The United States Forest Service's National Old-Growth Task Group focus their definition of old-growth forests on the distinctive presence of old trees that embody mature stand development and structural attributes. These include ecosystem function, biodiversity, standing dead trees, and multiple layers to the canopy (Putz and Redford, 2010). These two types might also be described as 'intact'. There are several ways which these two types of forest can become 'degraded' or 'non-intact' (Clement, 1999). These include, wildfires, unsustainable logging, overhunting, and the loss of or change in biodiversity e.g. arrival of invasive or exotic species (Nepstad *et al.*, 1999; Terborgh *et al.*, 2008). Forests that regenerate after 'complete deforestation' are usually referred to as 'secondary' forests', although, as above, what constitutes deforestation is also debated (Putz and Redford, 2010).

2.2.2 *Tree cover loss and change*

Since there are various definitions of forest and multiple classifications of forest type, there are also different approaches to monitoring and recording changes to tree and forest cover (Chazdon *et al.*, 2016, Pearce 2018). The two most commonly used frameworks are the FAO's Global Forest Resources Assessment (FRA) and World Resources Institute's Global Forest Watch (GFW), which measure slightly different things. FRA uses government inventories and accounts to estimate the net forest loss. This approach means 'forest gain' from monocultural plantations or clear-cutting followed by planned replanting are recorded as forest without distinction from other types (Holmgren, 2015). Partly due to this imprecision, GFW uses the term 'tree cover change' in its analysis and utilises satellite images to estimate both tree cover loss and gain (Chazdon *et al.*, 2016). These datasets produce quite different, often contradictory, conclusions and have both been critiqued for not distinguishing between

permanent and temporary forest loss (Curtis *et al.*, 2018). Furthermore, both lack ground-truthing, to which several extensive studies into global and regional tree cover change have responded (Curtis *et al.*, 2018; McNicol *et al.*, 2018).

Political ecologists have long argued for more nuance in assessments of degradation and deforestation (Lambin, 1999; Ribot, 1999; Adams, 2009). The discipline has shown through multiple case studies that conservation disciplines and international development policy circles understood environmental problems through simplified framings that rest upon assumptions and ingrained narratives of degradation (Robbins, 2012). One of the most pervasive ideas is 'the tragedy of the commons' (Hardin, 1968). This theory argued that when an area is managed by local people who hold it in common, it becomes degraded over time because individuals do not take due responsibility and over-exploit it in some manner. This perception reinforces the social constructs of scarcity and competition: 'resources' are seen as finite and in need of correct management to prevent their depletion, while people are viewed as in competition with each other for these resources and are therefore assumed to hoard or overexploit. This understanding justified interventions that limit or control local access, like privatisation or state regulation (Neumann, 1997). For the management of forests, the latter option of state involvement was usually the preferred route as this fitted well with the colonial models of forestry that had already been imported (Scott 1999). Narratives such as these lead to complex socio-environmental problems being simplified and subject to the implementation of standardised blue-print solutions (Fairhead and Leach, 2016; Kansanga *et al.*, 2017).

In many ways, as Madge and Cline-Cole (1996) argue, the West African landscape has been constructed in the European 'geographical imagination'. During colonial times, these oriented around perceptions of 'wilderness' and disorder, which also made places ripe for cultivation, taming and ultimately exploitation (Madge and Cline-Cole, 1996). These narratives are still pervasive in neo-colonial and contemporary perceptions of African landscapes. Perceptions inform how knowledge about forest cover change is constructed and often puts disproportionate blame for perceived degradation onto people making livelihoods (Leach, 1994) – in the case of forests, especially farmers and forest-dependent Indigenous People.

One significant political ecology study that demonstrated this pattern was Fairhead and Leach's (1996) seminal historiography which challenged the deforestation narratives being

reproduced by governmental and conservation discourse in Guinea. Here, policy makers and influencers looked at islands of trees near towns in the forest-savannah transition zone and saw them as the remnant remains from what they assumed must have been expansive forest in the past. These “stories of apparently incontrovertible logic [therefore] provide scripts and justifications for development action” (Fairhead and Leach, 1995:1023). To counterbalance this, Fairhead and Leach (1996) used satellite images, historical accounts and oral history interviews to show that, in direct contradiction to what was perceived, people had nurtured these forest oases within dryland areas and *increased* tree cover over time. The trees were there because the people were there.

This examination of deforestation narratives was extended to other West African countries (Fairhead and Leach, 1998). Their investigation of Ghana argued that deforestation had been exaggerated and that the narrative was deliberately peddled to justify forest privatisation. Similarly to the Guinea study, their methods involved interrogating colonial data that have been used as baselines for measuring tree cover change. Their work also challenges the definitions given for closed and transition forest (Hall and Swaine, 1981). In these ways, Fairhead and Leach invite consideration about which perceptions and what kind of data are utilised in the creation of policy interventions that have disproportionate impacts on rural communities (Bissell, 2020).

Fairhead and Leach (1996), Madge and Cline-Cole (1996), Ribot (1999) and others illustrate the importance of what stories are told about landscapes and the people within them. They demonstrate how discourses become justifications for dispossession, exclusion and technocratic solutions implemented by outsiders (Kansanga, *et al.*, 2017). Furthermore, corresponding sustainability narratives become tools whereby exploitative forestry or mining companies can operate within the law (Bridge and McManus, 2000), but contribute much greater environmental damage than expelled communities could.

Through recognising the interconnection of social, political, economic and cultural aspects, political ecology questions the raw assumptions and narratives found in scientific literature. It therefore theorises land degradation in a different manner to the natural sciences by connecting the reduced productivity of land to the increasing marginalisation of people with least political power (e.g. subsistence and smallholder farmers) into ecologically vulnerable spaces whilst they rely on unstable markets (Robbins, 2012). This understanding of

degradation recognises the simultaneous social harm, as well as acknowledging the limited agency of those making livelihoods due to the context within which they are working. It shifts the blame away from individuals and shines light on unfair systems or circumstances that people are adapting to.

2.3 Farming the forest

2.3.1 Forest governance and access

There is a rich literature within political ecology that analyses forest management, use and ownership. Since the 1960s, concurrent with the capitalist expansion of natural resource exploitation and in response to state or private management of forests for timber, social movements have been organising across the world to recognise the knowledge, expertise and rights of Indigenous People and forest dependent communities, especially in the global south (Edelman and Borrás, 2016). Driven by an increasing environmental movement unfurling in developed countries and a heightened sense of the injustice and hypocrisy within international policy/finance, academics and practitioners began pushing for more community-based solutions to environmental issues from the 1990s onwards. Political ecologists used case studies to compile empirical evidence of locally managed commons and collective stewardship. This led to various theories to explain and understand common property successes (Ostrom, 1990; Ostrom, *et al.*, 1992), and the recognition that these approaches defy and discredit the ‘tragedy of the commons’ narrative. Using evidence from effective community-based resource management institutions around the world, Ostrom (1990) derived some design principles that form the foundation of successful commons governance. These include locally appropriate rules, monitoring and enforcement; participatory decision-making that includes resource users; conflict resolution pathways; and clearly articulated and delineated boundaries for the area under common governance (Ostrom 1990; Arts 2014).

Ostrom’s work has been particularly important for the development of participatory forest governance frameworks and critiques of state forestry (Wollenberg *et al.*, 2007). It is now accepted that effective forest governance is central to reducing deforestation and increasing forest cover (Agrawal *et al.*, 2008; Arts, 2014). Improving and democratising forest

governance has been a key area of both academic research and government policy in countries across West and Central Africa. This is in part due to global market pressures to reduce deforestation in timber supply chains, and the importance of timber export for these countries. Forest governance can take many different forms, however, in most cases it involves some combination of state, market and/or community mechanisms (Lemos and Agrawal, 2006). It is usually based around multi-stakeholder forum that aim to reduce corruption, increase participation, improve transparency, secure land rights, and ensure benefit sharing for local communities and indigenous people.³ Forest governance excludes the state operating independently, as this would still be referred to as ‘forest government’ (Arts, 2014).

This promotion of local institutions and participatory governance led to the adoption of ‘community-based natural resource management’ (CBNRM) by both conservation and development sectors from the late 1980s onwards. CBNRM took various forms depending on the local context and worked with traditional land managers, local resource users and sustainable development experts with the aim of achieving both livelihood and conservation outcomes (Ostrom, 1990; Western and Wright, 1994). There have been numerous CBNRM programmes around the world within a diversity of ecological environments (Dressler *et al.*, 2010; Balint and Mashinya, 2008) including forest-farmland areas in Ghana (Akamani, *et al.*, 2015). These have had mixed success (Leach, *et al.*, 1999). In general, decentralisation of decision-making has put more power in the hands of people close to the resources and able to ensure local communities benefit (Agrawal, *et al.*, 2014). On the other hand, some case studies have shown that CBNRM projects compound social inequalities and exacerbate environmental problems. For example, women, migrants, Indigenous People and poor people have not always had equal access to planning, design and implementation of CBNRM projects. In these cases, local elites dominate decision making spaces and their influence sets strict protection-oriented rules because of their vested interests in relation to private, state and donor agencies (Dressler *et al.*, 2010). Various CBNRM programmes pursued the sedentarisation and modernisation of subsistence livelihoods, deliberately targeting communities that were resisting displacement and dispossession (Dressler, 2006). In some

³ These principles are advocated by networks of NGOs and CSOs specialising in forest governance in tropical forests, for example Fern: <https://www.fern.org/issues/forest-governance/>

instances this has limited the local use of resources, prioritising instead conservation or biodiversity concerns and commodity production in the form of timber, wildlife tourism or agricultural yields (Dressler *et al.*, 2010).

An important area of forest and tree management in West Africa is the cutting of trees for fuelwood and charcoal. Cline-Cole (1994) traced the history of vegetation conservation for non-timber forest product (NTFP) use by localised commons governance systems in Kano, northern Nigeria. He showed how the impact of colonial forestry altered and undermined these systems because it was interested in revenue rather than sustainable use within local livelihoods. He argues that the resulting commercialised access which replaced communal regulatory systems eventually led to overexploitation and intensification as people were forced to respond to increased costs within their household economies (Cline-Cole, 1994). Ribot (1998) made a similar observation in Senegal. Here he found that a historical view of environmental scarcity, based originally on colonial misunderstandings of the landscape and more recently on the development discourse from the 1970s onwards, perceived mismanagement and unsustainable use of trees for woodfuels due to high demand from urban areas (Ribot, 1999). However, Ribot's research found that shortages were not due to deforestation but rather disputes within woodfuel markets over access and control (Ribot, 1990).

Ribot and Peluso's (2009) theory of access is also, therefore, useful for this discussion. Rather than thinking about access as a 'bundle of rights' associated with property, they argue that access is more holistically understood as a 'bundle of powers' that either enable or restrict particular people from being able to benefit from a given resource. This approach encourages the analysis of different power relations and their impact on access – for example, legality, technology, knowledge, capital, markets and social relations (Ribot and Peluso, 2009:162). Involvement in governance also increases access, since those in control of resources gatekeep to some degree who is able to benefit from them. Understanding access in relation to benefits rather than rights is crucial to recognising that people making livelihoods need access to multiple different types of resources and also multiple forms of capital – all of which shape their agency and 'capabilities' (Bebbington, 1999) in making decisions about their land, livelihoods and household economies.

2.3.2 *Farmers as villains and victims*

Throughout conservation science literature, there are two strong narratives associated with farmers in tropical forest-farm areas. The first depicts farmers as ‘villains’ causing degradation and deforestation with their farming livelihoods, and an enemy to both the biodiversity and economic productivity of forest landscapes. The second depicts farmers as ‘victims’ struggling with harsh livelihood circumstances and in need of interventions to modernise their farming approaches. The ‘victim’ and ‘villain’ characterisations are also seen in development and foreign aid discourse (FAO, 2011 see Kansanga *et al.*, 2017). These perceptions both inevitably lead to an outcome that removes farmers from forests or limits their access, livelihood practices, and ownership rights.

An example of the power that negative ‘villain’ narratives can hold can be seen in the long history of concern about the sustainability of swidden agricultural techniques for forest-farm ecosystem health. Used around the world, this practice involves clearing fallow areas of undergrowth, young trees and shrubs, and then burning the land before planting new crops. Once a field has been cultivated for a number of years, it is left to grow fallow – whereby trees, shrubs and forest undergrowth rejuvenate the land. The practice is based on local ecological knowledge that appreciates the nutritional value that is added to the soil through the fallow and burning process (Benneh, 1972). It is used by farmers not only to improve conditions for their crops but also as an active way to regenerate the forest (Carrière, 2002). Now a widely accepted method of cultivation in tropical countries, there has previously been a significant debate about whether this causes harm to forest-farm areas, and some narratives of degradation based on the use of fire by farmers persist. For example, the use of the term ‘slash and burn’ to describe this method remains prevalent throughout conservation and forestry literature and policy documents. This term has been rejected by political ecologists as a morally loaded and inaccurate way of describing local farming practices (Scales, 2011). Studies from different countries have shown that farmers have means by which fires are heat controlled and spatially contained (Kull, 2000, 2002b; Amissah, *et al.*, 2011).

Agrarian studies have consistently shown how “farming should be understood as coproduction, that is, the encounter between the social and the natural” (Douwe van der Ploeg, 2013:40). The balance smallholders strike between people and ‘living nature’ is based on a relationship of reciprocity – if a farmer works the land well, the land will give yield – and

this means that not only are people sustained but ecology is also enriched (Douwe van der Ploeg, 2013). This echoes Bookchin's (2005) social ecology thesis: that rather than ecology being based on competition and 'survival of the fittest' – an assumption he believes is made due to the ingrained narratives Western science is invested in reproducing – ecological relationships between different animals, plants, and humans are based on principles of cooperation.

2.3.3 Farmer economy and agency

This principle of reciprocity and cooperation has been argued in other ways too. In his renowned work 'The Moral Economy of the Peasant', Scott (1977) outlines how the inherent risks and challenges of smallholder livelihoods enable systems of reciprocity, informal economies and mutual benefit to emerge from the cooperation of farmers. These informal socio-economic structures can be used by farmers to redistribute surpluses and for help from others when they hit hard times. Farmer decisions and judgements are made with this in mind, therefore, "the moral economy is not external to the 'economic machine'; it is essential in making the machine perform" (Douwe van der Ploeg, 2013:40). This value base also means that a certain degree of exploitation is acceptable, or even obliged. The increased influence of market economics within these social and moral arrangements causes instability and vulnerability (Watts, 1983). This can lead to uprisings or acts of 'everyday resistance' which challenge over-exploitations. Various studies have documented these – not least Kull's analysis of protest fire-setting by smallholders and herders in Madagascar, in spite of extensive criminalisation and anti-fire regulations implemented by the state (Kull, 2002a). Acknowledgement of the moral economy is used throughout political ecology studies to counter-balance disproportionate blame put on farmers for perceived degradation. It depicts instead agrarian societies with their own agency that are adapting to intensifying livelihood challenges through cooperation, small-scale agriculture and informal economies based on reciprocity.

Other direct challenges to the 'farmers as victims' narrative come from scholars who have shown farmer agency and decision-making. Netting (1993) conducted research on this topic during a time which was heavy with negativity towards "peasant" farmers within Europe and in developing nations because they were conceived as both inefficient in their farming

techniques and difficult to control politically (Robbins, 2011; Douwe van der Ploeg, 2013). Netting (1993) sought to better understand the smallholder farming and household economy using case studies from around the world. His approach involved extensive fieldwork with smallholder farmers across three continents, meticulously recording farmer's practices, inputs, labour distribution, productivity and other information to get a detailed picture of how farmers make decisions about their land. With an unapologetic emphasis on empirical data rather than theory (Vincent, 1994), Netting demonstrated that globally, smallholder farmers successfully feed large populations through effective subsistence alongside small surplus yields. He argued, contrary to development practitioners and neo-colonial ideology, that smallholders do best without interventions or interference from the state, development agencies or others – and that this method of farming, far from being 'backward' or 'inefficient', repeatedly shows itself to be both a viable and efficient form of land management.

Similarly, Mortimore used various studies in West African dryland areas to illustrate how Europeans, both colonial and contemporary, have misunderstood the practices and techniques of smallholders by making assumptions of degradation rather than stewardship or expertise (Mortimore and Adams, 2001; Mortimore, 2003, 2005). His work amplifies local livelihood adaptation knowledge and farmer agency, demonstrating the need for researchers to understand localised smallholder economies when considering questions of environmental change in different types of forest-farm landscapes. One of the most important narratives in the latter half of the twentieth century was that of desertification, especially after unusually intense droughts hit parts of West Africa, including Ghana and Nigeria, in the 1980s. Mortimore and Adams (1999) responded to the simplified desertification narrative with a study of rural livelihood practices in the Sahel. They demonstrated that people's farming and herding practices were improving agricultural conditions, contrary to policy maker's assumptions of degradation. Similar to Fairhead and Leach (1996), they challenged the perceptions and received misunderstandings of historical events or circumstances that were influencing policy. Since then, the Sahel has continued to be represented in world media (and especially by development agencies) as a place of famine and drought, through racialised and paternalistic images that elicit emotional reactions, even whilst rural communities have shown the resilience and adaptability of their livelihood practices to often unpredictable and

extreme climatic conditions (Mortimore and Adams, 2001). This is relevant for this thesis since one of the themes arising from the data is conflict between herders and farmers, and degradation narratives being attached to pastoralists' livelihood practices (see §6.8.3).

These studies are important for this research project because they challenge the narratives which blame farmers and other livelihood practices for (perceived) tree cover change. These narratives see farmers as victims or villains, separate them from the forest they farm within, make assumptions about the smallholder economies, and detach farmer decision-making from broader political, economic and cultural contexts. In contrast, Mortimore and Netting show that farmers do have agency in the ways they structure their farms, the trees they do or don't nurture and how livelihood decisions are made. These studies show that to understand tree cover change in an area where farmers cultivate food within forest, it is important to first understand the farm household decision-making process, and secondly the institutional and economic frames within which these people making livelihoods operate.

2.3.4 *Trees on farms*

A critically important dimension of tree and forest management is the question of the role of trees within agricultural and forest-farm landscapes (Arnold and Dewees 1995, 1997). However, trees on farms have often been neglected in policy spaces, as governments traditionally treat forestry and agriculture as two separate areas of expertise and economic interest – with forests managed primarily for timber extraction, whilst farm areas are managed mainly for maximum yield of food crops and therefore only interested in tree crop species rather than other trees (Miller, *et al.*, 2017). Since the early 2000s, interest in trees on farms has been boosted by greater awareness of the benefits that trees bring to agricultural settings and livelihood stability, more academic appreciation of agroforestry techniques, and the ever-increasing concerns about mitigating climate change (Ashraf *et al.*, 2015).

There have been a number of studies of trees on farms in sub-Saharan Africa. It was estimated by Miller *et al.* (2017) that almost a third of rural smallholders in five African countries incorporate trees into their farms. It is likely that this is true of other sub-Saharan African countries too. These are a mixture of fruit trees, timber species, tree crops (like cocoa and

rubber), and other non-timber forest products (NTFPs). In West Africa, smallholders often carefully select, protect and utilise ‘farm trees’ within both forest-farm and wooded savannah dryland areas (Mortimore and Turner, 2005). A study in Senegal found that contrary to expectations and narratives of degradation, tree diversity in cultivated land was almost as high as in forests, and the presence of trees that are useful in agroforestry or for food were higher in farmland than in forests (Sambou, *et al.*, 2017). This echoes Fairhead and Leach’s (1996) findings that trees are not eradicated by farming, but rather are often found growing in fertilised farmlands.

The motivations of farmers to leave, nurture or plant trees varies depending on many factors. In Malawi, Dewees (1995a) found that farmers incorporate standing trees into their farms and plant new trees, choosing species that are low cost and low risk. Similarly, in Cameroon, research has shown that farmers leave remnant forest trees to grow because they are seen as giving the soil fertility, provide enabling conditions for land to regenerate during fallow periods, are culturally important and provide multiple uses to household economies (Carrière, 2002). Degrande *et al.*, (2013) highlight the difference that access to quality tree saplings and technical advice makes to farmers’ interest in and ability to successfully nurture trees on their farms. Several studies have made the connection between the impetus to grow trees and secure land tenure arrangements – in Cameroon (Gyau *et al.*, 2012), Kenya (Dewees 1995b), and Ghana (Oduro *et al.*, 2018). Studies of trees on farms and farms among trees in Ghana are discussed in the next section.

2.4 Ghana’s forest-farm landscape

2.4.1 Ghana’s ecological zones

Ecologists and national government policies typically split Ghana into three main ecological zones (Ghana REDD+ strategy): the High Forest Zone (HFZ) is made up of evergreen and moist semi-deciduous Guinea forests in the south-west of Ghana; the Savannah Zone (SZ) is the dry wooded savannah area that dominates the north of the country, and stretches south in the east (indicated in light yellow on Figure 2.1); and the Transitional Zone (TZ) is where the HFZ and SZ meet and overlap, creating an environment which exhibits features of both the HFZ and SZ to differing degrees, beginning in the dry semi-deciduous forest areas.

The most commonly referenced map of Ghana's vegetational zones of Ghana was created by Hall and Swaine (1981) (see Figure 2.1). This is used throughout government policy (for example, the Ghana Forest and Wildlife Policy 2012), in planning documents by non-governmental organisations (PROFOR, 2011) and by academics who study forests in Ghana (Dei, 1990; Hawthorne, 1990; Amanor, 1994; Derkyi *et al.*, 2014).

As Figure 2.1 shows, there are six main types of forest that occur in Ghana. These are within the HFZ and TZ areas. Moving from the south-west to the north-east, these are wet evergreen, moist evergreen, moist semi-deciduous (north west subtype and south east subtype), dry semi-deciduous (inner zone and fire zone), southern marginal and south-east outlier. Each area has slightly different forest composition, as originally assessed by Hall and Swaine (1976), and variable socio-economic pressures. Rainfall and forest height declines to the north east. My field area is within the TZ ecological zone and has dry semi-deciduous forest cover.

Wet evergreen forest grows in the wettest area of Ghana, experiencing as much as 2000mm of rain a year (Ghana REDD+ strategy). This has a high diversity of forest trees that reach a canopy of 40m, with more sparse undergrowth. Since 1990, this area has been subject to expanding cocoa agriculture (Amanor, 1994). Moist semi-deciduous forest is split into two sub-types – north-west and south-east. This forest often exceeds 50m in height and is made up of a forest-farm mosaic with farmers mainly growing cocoa since the start of the twentieth century. Rainfall here is between 1250-1750mm per annum (Afriyie-Kraft, *et al.* 2018). Between these two distinctive forest areas (north of the wet evergreen and south of the semi-deciduous), showing characteristics of both, lies the moist evergreen forest.

Dry semi-deciduous forest, the location of this research project, forms a transitional belt between the three HFZ types and Savannah ecological zones. Hall and Swaine (1981) split it into two sub-types – the inner zone and the fire zone. The annual rainfall in these areas is between 1000-1250mm and the canopy varies between 35-45m (Amanor, 1994). Since the 1980s, wildfire has been a key issue in the fire zone as it devastated cocoa cultivation and continues to present risk to the staple food crop smallholders who now dominate in these areas (Amissah *et al.*, 2015).

The southern marginal and south-east outlier areas of forest occur in only small, fragmented relics in areas that have lower rainfall (1000-1250mm and 750-1000mm respectively). The

canopies are also lower, under 35m, with some emergent trees and a thick understory (Amanor, 1994).

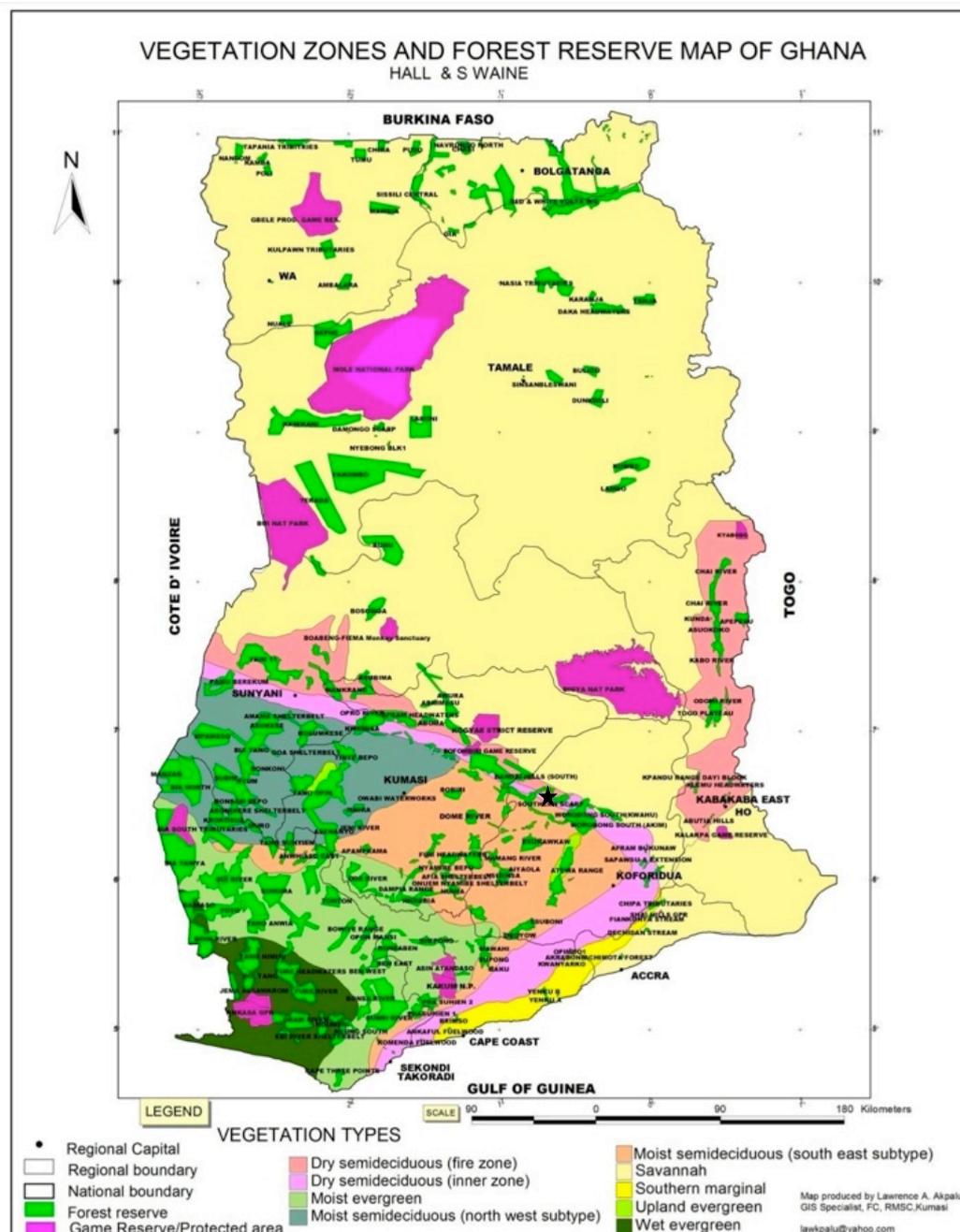


Figure 2.1 Vegetation zones and forest reserve map of Ghana. This was delineated by Hall and Swaine (1981). This image is taken from the Ghana Forest and Wildlife Policy (2012:i), produced by Lawrence A. Akpalu, GIS specialist (Forestry Commission Resource Management Support Centre, Kumasi, Ghana). A black star indicates the location of this research project, in the dry semi-deciduous inner and fire zones.

Figure 2.1 also shows the location and size of Ghana's main forest reserves and game parks. In 2012, the Ghana Wildlife and Forests Policy reported that the nation's 282 protected areas cover 22,754km². When other conservation areas are included, these make up just over 16% of Ghana's total land area. Forest reserves are predominantly managed for timber, although 20% have a conservation focus (Wildlife and Forests Policy 2012). Several studies have highlighted high rates of deforestation within both forest reserves and off-reserve areas, putting much of the blame on agricultural expansion and other livelihood activities (Vordzogbe *et al.*, 2005; Acheampong *et al.*, 2019).

2.4.2 Tree cover change in Ghana

As summarised in Chapter One, tree cover change in Ghana is often conceptualised through a framing of 'deforestation'. In their review of policy and development agencies' discourse, Kansanga *et al.* (2017) found that deforestation in Ghana is seen as a rapidly increasing and ongoing process, which is often illustrated with data that depict farming livelihoods contributing to perceived degradation.

There are multiple figures which substantiate these claims, each recording the extent of deforestation and forest loss slightly differently. In 2003, the Food and Agricultural Organisation (FAO) estimated that Ghana retained only 6 million hectares of forest, of which the majority was "degraded" and only 1.6 million hectares deemed "intact closed forest" (FAO, 2003:5). In 2014, the Ministry of Lands and Natural Resources (MLNR) estimated annual forest cover loss in closed forest areas to be akin to a 2% rate of deforestation, or 65,000 hectares per year (MLNR, 2014), whilst in 2008 the International Union for Conservation of Nature (IUCN) put the figure at 3% (IUCN, 2008). Most recently, Global Forest Watch (GFW) estimated that just under 1 million hectares of tree cover in Ghana was lost at an accelerating rate between 2001-2017, with over half occurring in the last five years⁴. Much of this tree cover loss occurred in the secondary forest of off-reserve areas that are dominated by different types of agriculture, mineral mining projects and human infrastructure.

⁴ Global Forest Watch. "Tree Cover Loss in Ghana". Accessed on 27th June 2019 from www.globalforestwatch.org.

Ghana's overall tree cover has been measured as covering 9.34 million hectares, and of this only 0.4 million hectares (4.6%) is categorised as primary forest.⁵ Figures from 2017 and 2018 showed an increase of 60% loss of primary forest in Ghana – the highest rate recorded amongst tropical countries that year (Weisse and Goldman, 2019). The same analysis showed that 70% of this primary forest loss occurred within legally protected areas – including government-owned forest reserves, demarcated wildlife zones and national parks.

These figures raise several questions – firstly, about how tree loss is calculated; secondly, whether the root causes of this perceived tree loss are being understood fully; and finally, whether the actions being taken, therefore, are appropriate for tackling these complexities. Regardless of the statistics, each endorses a narrative of degradation in their understanding of tree cover change. For example, FAO (2003) identifies the cause as a post-independence population increase and the methods of farming being employed.

There are also disagreements regarding the baselines that are used to make assertions of deforestation or degradation (Fairhead and Leach, 1998). Historically, there are different accounts about the state of forests in Ghana (previously called The Gold Coast by Europeans) before Europeans arrived. Fairhead and Leach's (1998) historical investigation into deforestation in Ghana showed that the forest zone may have been fluctuating for centuries prior to colonisation. In Akan⁶ areas, the fifteenth century saw a significant increase in people clearing large areas as they shifted from hunter-gatherer livelihoods to agriculture (Wilks 1977). Indeed, it is speculated that the arrival of the different waves of colonial arrivals (Dutch, Portuguese and British) catalysed widespread human depopulation and land abandonment across the present day Eastern and Central Regions as a result of extensive slave trading, warfare involving modern weaponry, spread of disease and famines (Fairhead and Leach 1998:74-76, Amanor 1994). This led to forest regrowth in these areas during the nineteenth century, and therefore greater tree cover than the historical norm by the beginning of the twentieth century (Fairhead and Leach 1998).

⁵ FAO, 2015. "Forest cover in Ghana." Accessed through Global Forest Watch on 27th June 2019. www.globalforestwatch.org

⁶ Akan people are discussed in Chapter Three. They remain the dominant ethnic group of the south of Ghana and in previous centuries their kingdoms expanded across much of what is today the south of Cote d'Ivoire and Ghana. The Ashanti kingdom was the most dominant.

British colonial rule from the mid-1870s onwards had several impacts on tree cover as it disrupted local governance systems, imported European ideas of forestry, and drastically altered landscapes for economic purposes. These have been documented extensively by both Ghanaian and European historians and scholars (Hill, 1963; McPhee 1971; Howard 1978; Wilks 1993; Amanor 1999). Soon after the abolition of the transatlantic slave trade in 1807, Europeans based in West Africa became more interested in timber and mineral commodities. Timber extraction and export from the Gold Coast began in earnest in 1891. At this point, African mahogany species (both *Khaya* and *Entandrophragma*) were the preference of mainly British and French timber companies (Oduro *et al.*, 2011). These new timber harvesting activities required regulation and from the 1890s through to when Ghana gained independence in 1957, numerous pieces of legislation were passed. The colonial administration, therefore, had a significant impact on the organisation of Ghana's land and forest reserves (Amanor 1999; Barton 2002), which were managed mainly for the purpose of timber extraction and export. To show the extent of European control over timber markets by the year of independence, in 1957 foreign (mostly European) companies held 96% of the country's timber concessions (Oduro *et al.*, 2011).

Even in post-colonial Ghana, many of the British policies relating to land and forests, and the narratives that justified them, continue to have legacies (Lund, 2002). As seen in other colonies, one example is the existence and management of forest reserves (Von Hellermann and Usuanlele, 2009). Since the Forest Bill of 1911 and the subsequent Forest Ordinance of 1927, forests across Ghana have been classified as either 'on-reserve' or 'off-reserve' (Amanor, 1999; Oduro *et al.*, 2011). Reserve boundaries were delineated by the state as forest resource managers and chiefs as landowners. The original forest reserve demarcation excluded people from areas of forest which had previously been used for farming. Some scholars have argued that this process undermined local belief systems and ways of life, which saw the forest as more than just a commercial opportunity and rather as a livelihood system which provided for rural people's needs, including medicinal plants, firewood, wild and cultivated crops, bushmeat and other non-timber forest products (NTFP) (Dei, 1992b).

Since farming takes place within forest areas, it is also pertinent to look at the impact of historical and post-colonial agricultural policies. Under the colonial government, the southern parts of the Gold Coast were dominated by the production of cash crops like rubber, coffee

and from the late 1800s cocoa. Agricultural policy, therefore, was primarily interested in export products rather than food crops (Amanor 1994, Kansanga *et al.*, 2019). This system relied upon an agreement between colonial rulers and 'Native Authorities' (Amanor 1999), who were the chiefs and custodial landowners. Immediately following independence (in 1957), agricultural policy shifted to scaffold the new government's ambitions of self-sufficiency and sovereignty. Alongside investment into industry and manufacturing, smallholders were supported to increase productivity through vast irrigation projects in the north of Ghana and more widely available farming inputs, machinery and other technologies (Seini and Nyanteng 2003). However, an economic crisis in the early 1980s led to Ghana, under the leadership of Jerry John Rawlings, entering the World Bank's Structural Adjustment Programs (SAP) in 1983 until 1992 in exchange for financial assistance (Berry, 1997).

The SAP was structured in three phases over the course of nine years: phase of stabilisation (1983-85), growth phase (1985-89), and liberalisation (1989-92) (Seini and Nyanteng, 2005). Overall, the SAP was aimed at boosting economic growth across different sectors in Ghana through reduced state intervention, the liberalisation of Ghana's domestic economy and financial austerity (Kansanga *et al.*, 2019). There was a strong emphasis on agriculture, where subsidies for farming inputs, including seeds and fertilisers, and support for small-scale food crop mechanisation were removed. This economic intervention gave good outcomes for intensified production based on export, contributing to Ghana's economic growth and giving the World Bank reason to cite the SAP as a success (Berry, 1997). However, it simultaneously created significant challenges for smallholders and rural communities. Increased input and labour costs forced farmers to take out bank loans and their access to previously available markets for food crops dwindled (Berry, 1997; Seini and Nyanteng, 2005). More broadly the national financial cuts to healthcare and education services hit the poorest hardest (Konadu-Agyemang, 2000). Due to the conditions of the SAP, the government of Ghana did not invest in agricultural mechanisation again until 2002. At this point, a scheme was created that supported community-level entities to have access to a tractor which could be used by smallholders within a catchment area (Kansanga *et al.*, 2019).

2.4.3 State management of trees

The Forestry Commission (FC) in Ghana falls within the Ministry of Lands and Natural Resources (MLNR). Headed by a government cabinet minister, the MLNR has overarching responsibility for the development and implementation of forestry-related policies. The current FC came into being under the sector institutional reforms of the 1996-2020 Forestry Development Master Plan (FDMP), through the Forestry Commission Act 1999 (Act 571). The Forestry Commission (FC) is the “corporate body responsible for the implementation of forest policies and the management of the utilization of forest resources in the country” (FDMP 1996:26). The FC regulates the “utilisation of forest and wildlife resources, the conservation, and management of those resources and the coordination of policies related to them” (FDMP 1996:99). Other previously separate forestry-related institutions were also made divisions of the FC under Act 571. These are the:

- Forest Services Division (FSD): implements forestry policy that protects, manages and develops forest resources and estates. This involves managing forest reserves, regulating timber harvests, conservation, education and development of plantations to increase tree and forest cover.
- Wildlife Division (WD): oversees the management and sustainable development of protected areas and wildlife resources through conservation, education, ecotourism, research and development of wildlife capacity.
- Timber Industry Development Division (TIDD): implements policy that promotes the “maximum utilization of timber and wood resources for the optimum benefits of all segments of society” which “guarantees future generations’ access to the resource” (FDMP 1996:100) through effective and sustainable regulation, enforcement, trade, and technical services.

FC operations are determined and governed by national legislation and laws. These are known to be fragmented, entailing numerous amendments. Some key pieces of legislation and amendments are the Constitution 1992, Concessions Act 1962, Forest Protection Act 1974 (including the Act 642 amendment in 2000), Timber Resources Management Act (1998), Forestry Commission Act 1999 (see Act 571, outlined previously), Forest and Plantation Development Fund Act 2000 (especially Act 583), (Kansanga *et al.*, 2019; Boon *et al.*, 2009). Pertinent information from these laws is summarised in Table 2.1.

Legislation	Summary of purpose and sections relating to forestry	Key amendments
The Constitution	This provides the legal framework foundation for the Republic of Ghana. It established the FC as the office responsible for management of forests, although forests are not distinguished from other natural resources (NR). General rules for the management of NR:	The final recommended amendment to the Constitution was that all lands and NR (including naturally occurring trees) are “owned by the people of Ghana and vested in the President in trust for and on behalf of the people of Ghana” (2013:7). However, during The National Constitution Review Conference (NCRC), the following were recognised:
1992	<ul style="list-style-type: none"> o Article 268: All NR concessions must be ratified by parliament o Article 267: all revenue and rent for NR should be shared as follows: 10% paid to the Office of the Administrator of Stool Lands (OASL), 25% to the stool, 20% to the traditional authority and 45% to the District Assembly o Article 36: the state recognises the ownership of land by stools and families are fiduciaries, obliging decisions and activities serve the interests of the people 	<ul style="list-style-type: none"> o Naturally occurring trees should be vested in communities and the benefits should go to the farmers who nurture them o As per the Concessions Act (124), public lands should continue to be vested in the President, but the ownership of forest resources should be vested in communities o The FC continues role as regulator and policy implementer
The Concessions Act	Act 124 stipulates that all of the following are “vested in the President in trust for and on behalf of the stools concerned”:	Act 124 is the only remaining section of relevance since the rest has been repealing and replaced by the Timber Resources Management Act 1998 (Act 247)
1962	<ul style="list-style-type: none"> o Forest reserve land, except areas that belong to private owners o All off-reserve stool lands (respecting previously granted timber concessions) o All timber on any land 	
	This enacted the ‘double trusteeship’ as state trusteeship is added to the already existing customary trusteeship (2013:9)	
The Forest Protection Act	This details the powers and duties of FSD and FC officers and outlines forest reserve offences and restrictions (replacing those previously identified in the Forests Act (1927)	Forest Protection (Amendment) Act 2002 updated FSD officer roles. Act 642 includes:
1974		<ul style="list-style-type: none"> o higher penalties for illegal logging, tree marking and other damage
Amended 2002		
The Timber Resources Management Act	This repealed the 1962 Concessions act. It outlines the process for granting timber harvesting rights and is intended to ensure the sustainable management of timber resources. Act 547:	The Timber Resources Management (Amendment) Act 2002 introduced:
1998	<ul style="list-style-type: none"> o All timber harvesting (except that done on private land with privately owned trees) must follow this legislation by acquiring a time and space limited Timber Utilization Contract (TUC) 	<ul style="list-style-type: none"> o A legal loophole which makes getting authorization for TUCs possible via the MLNR Minister rather than by parliament
Amended 2002	<ul style="list-style-type: none"> o TUCs include obligations for paying royalties and sharing benefits with landowners and farmers 	<ul style="list-style-type: none"> o New benefits and incentives for financiers of forestry and wildlife o Maximum duration and area boundaries for TUCs
The Timber Resources Management Regulations	This sets out the procedures for implementing the Timber Resources Management Acts (1998 and 2002), including:	The Timber Resources Management (Amendment) Regulations in 2003 inserted:
1998	<ul style="list-style-type: none"> o Payment of stumpage fees o Registration and use of chainsaws 	<ul style="list-style-type: none"> o A bidding system for timber concessions, awarding them to those who pay the highest fees o The requirement that a Social Responsibility Agreement (SRA) is in place before the permit is granted or logging can commence
Amended: 2003	<ul style="list-style-type: none"> o Procedure for timber concession, including landowners and farmers in field inspections o Inclusion of the need for “owners and others with holding interests” written consent for a TUC 	<ul style="list-style-type: none"> o Updated procedures for harvesting and monitoring o Stumpage fee is calculated in the presence of the District Forest Officer, landowner and timber contractor, according to the tree volume
The Forestry Commission Act	This established the FC as ‘body corporate’ and outlines its key functions. Act 571:	Act 617 of the Timber Resources Management (Amendment) Act (2002) inserted a provision that obliges any project which involves or impacts Forest or Wildlife to be assessed by the FC
1999	<ul style="list-style-type: none"> o Distributes responsibilities into five divisions 	
Forest Plantation Development Fund Act	Act 583 establishes the Forest Plantation Development Fund and its Management Board. The fund provides financial help for:	The Forest Plantation Development Fund (Amendment) Act (2002) now includes non-commercial and non-private plantations.
2000	<ul style="list-style-type: none"> o Forest plantation projects operating in areas suitable for timber 	
Amended: 2002	<ul style="list-style-type: none"> o Research and technical advice to support plantation practitioners 	
	It also promotes incentives to increase investment in plantation development	

The underlying discourse within these policies and legislation (Table 2.1) understands forests as protected areas and/or primarily economic timber landscapes, rather than as socio-cultural places of livelihood (Kansanga *et al.*, 2017). Together, these laws mean that tree tenure arrangements “remain unclear” (Forest and Wildlife Policy, 2012), because there are several different pieces of legislation that intersect. A summary of what these equate to for tree tenure in off-reserve areas is presented in Box 2.1. Tree tenure is discussed with empirical data in Chapter Seven.

Box 2.1: Key elements of tree tenure in off-reserve areas of Ghana

- I. For planted trees:
 - a. Any tree planted by an individual automatically belongs to them, however, ownership can only be proved if the tree is registered with the FSD through the tree registration scheme.
 - b. A tree owner needs to be able to demonstrate their ownership of the tree (through the tree registration system) in order to legally cut it for timber purposes and/or to protect it from being cut by either the landowner or the FC (due to II.a.).
- II. For naturally occurring trees:
 - a. Economic trees are assumed to be naturally occurring unless the planting and ownership of them can be proved by the tree registration system.
 - b. Customary law means that naturally occurring trees in off-reserve areas belong to the custodians of the land and the landowners (the chiefs and elders of the town/village) are mandated to manage these resources on behalf of the communities they serve. The custodians of the land, therefore, must give their permission for trees to be harvested for timber and can also seek permits from the FC (due to II.c.) to cut trees for the benefit of the town.
 - c. The timber value of all naturally occurring trees off-reserve is vested in the state and the FC is mandated to manage these resources on behalf of the President and the people of Ghana. Any economic tree being cut for timber or to make space for development needs a permit from the FC.

When timber trees are harvested, various payments are made to the traditional authorities and district assembly (discussed further in §7.3). The local community only receives payment through the Social Responsibility Agreement (SRA) – which is a legally binding document that states who will receive what payments and other benefits. The amount is equivalent to 5% of the stumpage fee. The SRA also stipulates what form this payment takes – usually it is in-kind, through the timber company paying for new community facilities. There are no direct monetary payments to the farmers except for compensation for crop damage. In state

sanctioned logging, farmers and other land occupiers do not get any payment for the timber value (Appiah 2001). This is discussed further in Chapter Seven.

Since the early 2000s, timber production has been in the top four contributors to Ghana's Gross Domestic Product (GDP), along with gold, cocoa and oil. The vast majority of Ghana's timber is produced for export on the global market. This means that whilst forestry policy is produced by the Government of Ghana (GoG), international agreements, trading actors, and financiers influence how forests are framed. For example, over the last fifteen years Ghana has been working towards securing a FLEGT (Forest Law Enforcement, Governance and Trade) licence for their timber exports to the European Union (EU) market and part of the long-term action plan has been the initiation of a Voluntary Partnership Agreement (VPA), ratified in 2009. Whilst the FLEGT licence requires legality across the supply chain for all timber headed to EU member states, the Ghana-EU VPA aims to improve forest governance and law enforcement overall, including the domestic market (Ochieng *et al.*, 2013). Although the VPA has been broadly hailed a success in reducing illegal operations and the presence of illegally harvested timber in global supply chains, it is not without critique. Some argue it has neglected social safeguards in areas where access to already restricted forest resources have become even more limited due to the increased law enforcement (Derkyi *et al.*, 2014). The VPA is also seen as having potentially adverse impacts on local timber governance systems, which currently provide arguably more equitable benefits and rights to farmers than the legal mechanisms, which may reduce the incentives to keep trees on farmland (Hirons *et al.*, 2018a). In a similar vein, others suggest that in failing to change the tree tenure legislation and benefit sharing arrangements, the VPA is limited in how far it can ensure sustainability, legality and social equity (Hansen, *et al.* 2018).

Many of the government owned forest reserves have been assigned as concessions to private companies in the form of public-private partnerships. The companies pay rent per hectare and keep the majority of the profit made from the timber. The trend across Ghana now has been a huge increase in exotic timber plantations within forest reserves – mainly teak, *Cedrela*, *Gmelina* and *Eucalyptus*⁷ – and native forest trees are only being planted in conservation or riverine areas. Given the change in forest reserve management and stock, it

⁷ Table 4.3 gives the scientific names of trees discussed in this thesis.

is unsurprising that the FC is making less money from stumpage fees. Indeed, at present, the FC makes more in stumpage fees from timber harvested in off-reserve forest-farmland areas than from reserves.

2.4.4 *Trees and local livelihoods*

This system of tree tenure has a significant impact on how people of differing livelihoods and social status manage trees. In this thesis, tree cutting that occurs outside of FC logging permits is referred to as the informal timber economy to avoid the pejorative use of ‘illegal’. Studies have shown that farmers have greater control over the process of logging, and therefore the amount of crop damage that is caused, and increased access to financial benefits through the informal sector than through logging which occurs with permits (Hirons *et al.*, 2018b).

In this regard, one of the most common forms of informal timber production is chainsaw milling – the cutting of timber into wooden planks by a chainsaw at the site where the tree was cut (Boakye, 2018). In 2008 it was estimated that chainsaw milling provides some form of employment across the production and supply chain to 97,000 people in Ghana (Marfo and Acheampong, 2011). On top of this, the informal sector creates multiple benefits to the communities it operates within, in the form of payments to landowners, traditional authorities, farmers or land-occupiers, as well as lumber services and infrastructure investments (Ros-Tonen, *et al.*, 2013). In 2014 it was estimated that chainsaw lumber accounts for 72% of the annual national production of timber products within the Ghanaian domestic market (Marfo *et al.*, 2017). The same study calculated that the value of this market – circa GhC 544.39 million (\$143.26 million) – at the time equated to four times as much as the revenue collected by the Forestry Commission in stumpage fees from legal logging concessions. These figures have been used to illustrate the financial loss that illegal logging presents to the formal timber sector and international timber exports, even as it contributes to Ghana’s national economy.

Several studies have been carried out to research what prevents or motivates farmers to keep trees on their farms in different parts of Ghana. In the wet evergreen forest zone in West Ghana, Oduro *et al.* (2018) found that the most common enabling external conditions for supporting them to plant on-farm trees were access to land, education about tree growing,

access to inputs or grants, and alternative income sources. Their most motivating factor was the anticipated future income from timber, followed by an awareness of environmental issues and investment for their children/grandchildren. The most significant barriers to planting trees were the high costs of and lack of knowledge about managing trees within their livelihoods (Oduro *et al.*, 2018). Very few farmers (less than 4%) showed concern about crop-tree matching or crop yield. Similar motivations and barriers were seen in farmers' decisions to keep remnant forest trees on their farms in the Brong-Ahafo region, situated in the transition zone (Danquah and Pappinen, 2013). This research also found that demographics played a significant role in determining a farmer's capacity to keep trees standing – with age, education, gender, and land tenure arrangement all proving important (Danquah and Pappinen, 2013). In northern Ghana, in drier savannah areas, communities make extensive use of woody vegetation within their livelihoods and allow selected trees to regenerate naturally in cultivated farmland areas, often protecting young saplings with thorns and clearing away other plants (Hansen, *et al.* 2012).

Farmers in Ghana consistently show an awareness of the environment, concern about climate change and forest loss, and desire to grow and/or preserve trees (Owusu and Ekpe, 2011; Hansen, *et al.* 2012; Danquah and Pappinen, 2013; Oduro *et al.*, 2018; Afriyie-Kraft, *et al.* 2018). Furthermore, farmers make conscious choices about the trees they select, how they are spaced or positioned within the farm, manage the amount of shade they cast, and the regeneration of farms through tree growth during fallow seasons (Awuah and Kyereh, 2020). To understand how farmers manage trees in forest-farm landscapes, it is vital to understand the farming economy, factors which impact on farmers decisions and the multiple practices of other actors involved in tree and land management.

2.5 Practices, perceptions and agencies

2.5.1 Beyond political ecology

This chapter has so far reviewed some of the vast political ecology literature on forests and farms in West Africa and introduced the forest-farm landscape of Ghana where this research

project took place. The various studies mentioned show that globally, forests are political, social and cultural spaces. In many places it is hard to decipher where the farms end and forests begin, or indeed, if these two categories are even useful for such enmeshed socio-ecologies. Forests have been constructed conceptually, strongly influenced by Eurocentric knowledge. How forests are defined, delineated, and 'protected' – including or excluding who and for what purpose – depends on many factors, not least the worldviews of those making the definitions (discussed in §2.2). There are accompanying narratives of degradation and what these mean for forest governance, access and farming were discussed in §2.3. Furthermore, on a local level there are a broad diversity of factors affecting tree cover which are liable to be overlooked without in-depth understandings of specific locations. The political ecology case studies show similarities in methodology, as they focus on micro scale activity within rural communities to challenge perceived and received knowledge.

Three dimensions transect these studies and provide a useful framework for this thesis: first, the practices of diverse actors; second, the multiple perceptions that are held about a landscape; and third, the different forms that agency takes. There are numerous ways of measuring and understanding tree cover change, which are informed by the narratives and perceptions of researchers and the tools used to make assessments. On the ground, different actors view and interact with forest-farm areas in different ways – for example, a conservationist, smallholder, timber contractor and real estate developer will see and do contrasting things. In this way, the practices that a person undertakes in a place are both informed by and reproduce their perceptions. In decision-making spaces, certain voices and worldviews are more present or powerful than others – meaning that the sense of agency any individual or collective experiences is bound to their own practices and perceptions and to those of other actors around them. To explore this complexity, I have been influenced by various theoretical ideas which are grounded in and extend beyond political ecology.

Rooted in social science, political ecology emerged as a direct response to the lack of political engagement within the conservation, ecological and biological sciences in their studies of the 'natural' world and environmental changes. One of the founding motivations behind political ecology was to bridge natural and social sciences, to prove that social scientists have pertinent contributions to make in the study of ecological issues (Blaikie and Brookfield, 1987). Over time it has transitioned into a 'community of practice' (Robbins, 2012:85) that intersects

academia and policy, with most political ecologists being situated in the global north. This means they are often working within or alongside the same institutions that the discipline is focused on challenging. This holds inherent contradictions – for example, securing research grants or forming partnerships with financial or political institutions that may have connections with the root ‘problems’ a given research project is investigating.

Due to its strategic position of multidimensional and interdisciplinary engagement, political ecology has been subject to critique by a broad range of researchers and practitioners. At worst, conservationists and natural scientists feel undermined or rebuked by political ecology’s persistent challenges to consider the social and political aspects of environmental changes. This discord across disciplines is not always conducive to effective collaboration or constructive dialogue. In many ways, this fractured relationship hinders progress as the different parties, speaking different languages, are not always able to hear or understand each other. In a similar way, political ecologists have been cautioned by colleagues in the policy-making world for focusing too much on thorough critiques and analyses of complex multidimensional human-environment problems and not enough on providing constructive solutions which can be implemented practically (Robbins 2012, Braun 2015). Furthermore, true to critical form, political ecologists themselves critique the discipline. Some have highlighted how it has tendencies towards anthropocentricity (Watts and Scales, 2015), by falling into the trap of separating humans from the environment and ironically succumbing to the nature-culture binary it disowns (Latour, 2004). Others have emphasised the contradiction between the postcolonial roots of political ecology as an approach, and its complex relationship to the power inherent in the production of knowledge, the histories of colonialism within many of the countries it works in, the positionality of the researchers who are disproportionately from the Global North, and the extractivist nature of research (Perreault, 2014).

Under the broad umbrella of political ecology, multidisciplinary thinkers have responded to these challenges through centring specific fields within the discipline that speak to elements of these contradictions. Braun (2015) proposes an increase in ‘experimental praxis’ within the political ecology community, highlighting the need for reflective practice and real-world application. This is echoed by Perreault (2014), who believes that the contradictions inherent

within political ecology's abstract theoretical contributions can only be made sense of and find relevance through a corresponding grounding in praxis.

2.5.2 *Ecologies of practice and perception*

In the 1960s social scientists began questioning the social responsibility of science and the influence of political, economic and cultural dynamics on knowledge production (Martin et al., 2012). Science and Technology Studies (STS) starts from an understanding of science as a social activity and views actors engaged in these varied processes as social creatures belonging to standardised communities of practice (Sismondo 2010). STS is an extension of the history and philosophy of science, as it questions how knowledge is generated and justified, and which social orders it upholds; whilst simultaneously acknowledging that other forms of intelligence and ways of knowing are side-lined or stigmatised, in part because they challenge the status quo (Shapin and Schaffer 1985).

Widely regarded as a foundational text of STS, *The Structure of Scientific Revolutions* (Kuhn, 1962) proposed that “scientific communities are importantly organized around ideas and practices, not around ideals of behaviour” (Sismondo, 2010:21). These ideas and practices set in motion the establishment of theories, which in turn create the worldviews, frameworks, and categories that underpin action. Kuhn (1962) argues therefore that “science does not track the truth, but creates different partial views that can be considered to contain truth only by people who hold those views” (Sismondo, 2010:16). This means that as scientists carry out their observations, often using data-collecting equipment and linear measurements, they see through the lens of theories and worldviews already constructed. As such, “perception is determined by the interaction of top-down theory information and bottom-up sensory information” (Brewer & Lambert, 2001:178). This definition can be used in reference to the viewpoints of scientists, practitioners and experts, as well as local people.

Recognising the agency of perception, STS acknowledges the incommensurability of knowledge when different worldviews and their agents are brought into dialogue – a process called co-production. Reflecting on her own experience as a researcher working in a multicultural multidisciplinary project, anthropologist Tsing (2015) concluded science is richer

when people from different backgrounds journey together, deconstructing and rethinking knowledge along the way. In this process, doing science becomes a form of translation (Tsing 2015), co-production (Machado, 2018) and re-creation, carried out by multiple actors engaging their own agency. This echoes the concept of a “sociology of translation” (Law, 1992:380), also known as Actor-Network Theory (ANT).

In direct contrast to the binaries and dualisms that characterise scientific ontologies, ANT is built on the assumption of ‘symmetry’ (Latour 2005), seeing landscapes and assemblages as “indivisibly composed of many actors, whether plant, human, animal, or geological” (Daly et al., 2016:6). Based firmly on a “relational materiality” (Law, 1999), ANT is “a body of theoretical and empirical writing which treats social relations, including power and organization, as network effects” (Law, 1992:379); seeing people, other beings, geological materials, human engineered technologies and tools, and even unseen structures and norms as actor-networks. Furthermore, each actor:

is a patterned network of heterogeneous relations, or an effect produced by such a network. The argument is that thinking, acting, writing, loving, earning – all the attributes that we normally ascribe to human beings – are generated in networks that pass through and ramify both within and beyond the body. Hence the term, actor-network – an actor is also, always, a network. (Law 1992:384).

As summarised by Law and Singleton, ANT is “best understood as... a lively craft that cherishes the slow processes of knowing rather than immediately seeking results or closure” (2013:485) and is “a sensibility that has political consequences” (2013:500).

To create space for this iterative process, ‘slow science’ (Lane, 2016) offers a direct challenge to the financialisation and politicisation of academic knowledge production (Stengers 2005). Slow science is “about re-establishing the kinds of situations that scientists can place themselves in relationally with respect to what they study, that can lead to the combination of curiosity, creativity, and innovation that makes science so exciting” (Lane 2016:10). Building on STS concepts, (Stengers, 2003:184) advocates an ‘ecology of practice’ that experiments with questions that practitioners of divergent disciplines can see as relevant rather than posing critical questions that give rise to hostility or defence. As seen, political ecology struggles to constructively influence the systems it critiques. Taking an ‘ecology of

practice' approach could create room for "staying with the trouble" (Haraway, 2010): spaces for discussion, dialogue and collaboration between local people, researchers, practitioners, policy makers and different kinds of scientists (Rocheleau and Edmunds, 1997).

Nyerges (1997:26) also uses the term 'ecology of practice' to understand the micro-level interaction between people, resources and the wider environment. He is concerned with putting the 'mundane activities' of everyday life into historical, cultural and ethnographic contexts. An 'ecology of practice' is "an approach and method for analysing the local, social dimensions of global environmental change" (Nyerges, 1997:40). Vayda (1983:266) called this 'progressive contextualization': "focusing on specific activities, such as timber cutting performed by specific people in specific places at specific times [and only then] trac[ing] the causes and effects of these activities onward". It combines the macro-political lens of political ecology with a micro-socioeconomic understanding of practices which can then be translated into appropriate impact. This echoes wider theories of practice (Ortner, 1984; Everts et al., 2011). In particular, Schatzki's concept of 'site ontology' reflects a similar framework for understanding the "site of the social [as] a mesh of practices and material arrangements. This implies that human coexistence inherently transpires as part of practice-arrangement bundles" (Schatzki, 2005:472).

2.5.3 Emergent socio-ecologies

Approaches which combine the consideration of social and ecological dimensions and their economic and political contexts are also important points of reference. One of the first to do this in a systematic way was Ostrom's framework for analysing socio-ecological systems (SES). During the 1990s and 2000s, policy was increasingly based on simplifications of environmental problems that supported blueprint solutions. Ostrom (2007:15181) developed a tool for the "serious study of the complex, multivariable, nonlinear, cross-scale, and changing SESs" that would contradict dominant assumptions and comprehensively illustrate the complexity of SES. The framework includes analysis of resource systems, resource units, governance systems and users and how they both affect and are affected by different interactions and outcomes that occur. These are then understood within the wider context of the socioeconomic, political and ecological settings, again in relation to both causes and

feedback (Ostrom, 2007, 2009). The approach has appealed to varied researchers and practitioners since it uses mixed methods to gather both qualitative and quantitative data, enabling people from different disciplines to collaborate and communicate effectively. It acknowledges multiple layers of expertise, from local ecological knowledge to policy makers, and combines these to gain a more complete understanding about socio-ecological systems.

Ostrom's framework has been critiqued for not giving enough attention to issues of power and political dimensions, since it focuses on providing models that explain the influence of social institutional factors over ecological outcomes (Cote and Nightingale, 2012). Ostrom's framework relies upon the imposition of categories that are predominantly rooted in scientific ways of seeing and understanding issues, onto landscapes and communities where these concepts do not necessarily provide the full picture. In contrast, political ecologists argue that studies of SES need to be situated so that the socio-cultural factors and multiple layers of influence within the decision-making processes of environmental governance can be revealed and analysed (Berry, 2009b; Cote and Nightingale, 2012). Machado (2018:54) takes this further by suggesting "[SES] cannot be reduced to either the ecological or social dynamics that "cause" them, but are themselves emergent realities of the interactions between these various dynamics."

In recent years, post-humanist thinking has sought to address political ecology's anthropocentrism, and its paradoxical reproduction of the nature-culture binary, by studying the complexity of relationships through which people relate to other beings and ecological processes. Some academics call these 'assemblages', a word which emphasises "emergence, multiplicity and indeterminacy" (Anderson and McFarlane, 2011). Technological and social systems are a core part of assemblages (Kirksey, 2015). Rocheleau (2008:209) uses the term 'emergent ecologies', to describe animated entanglements within which both humans and more-than-humans co-become (Haraway, 2010). This way of viewing human-ecological relationships demands a shift in ontological perspective – moving away from a nature-culture binary worldview that holds onto ideas of pristine and unspoilt nature, towards an always emerging and transforming 'socio-ecology' (Machado, 2018; Haraway, 2016). Taking this approach means tuning into the dynamics of "a lively world in which being is always becoming, [and] becoming is always becoming-with" (Doreen et al., 2016:2). This is enabling anthropology and political ecology alike to move 'beyond the human' (Kohn, 2013).

Rocheleau's (2008) research of community-based forestry in the forest-farm landscapes of Zambrana, Dominican Republic, was of specific influence in the design of this research project. Her concept of 'rooted networks and relational webs' views the ecosystem and people within it as assemblages of interconnecting interdependent relationships, involving complex power, ecological and cultural dynamics. The methodological approach respects the agency of individuals and groups. It questions assumptions and usual categories assigned with words such as 'community' and 'traditional ecological knowledge' (Horowitz, 2012) – paying particular attention to local practice, knowledge and agency without becoming tokenistic, disempowering or misrepresentative. Furthermore, 'rooted networks', unlike ANT, specifically recognise the politics of place, viewing the story of the landscape as embodied in situated knowledge (Massey 1994). This enables research to focus on the micro-scale through constructing polycentric ecologies of practice, in order to understand the culturally and environmentally embedded dynamics that effect the relationship between people and trees – and which ultimately, therefore, affect the number, age and types of trees in the landscape. This can be particularly useful when looking at the relationship between people and land, because a micropolitical study recognises "resource conflicts within and between communities, and between communities and the state, while analysing these tensions within their broader historical, social and politico-economic context" (Horowitz, 2008:261). To do this, it is important to develop understandings of ecological problems as interconnected to how humans relate to each other (Bookchin, 2005; Kaladie, 2019), and therefore conduct research that directly addresses intersectional issues stemming from social inequalities. As such, the 'rooted networks and relational webs' model endorses long-term contextualised ethnographic methodologies (Horowitz, 2012:26), enabling complex drivers of change to be tracked over time, and providing insights into possible future trajectories. The aim, therefore, is not to "get the one true story. It's about 'getting it' through the eyes of a diversity of actors in distinct positions, in complex actor networks, that are best described as rooted networks and relational webs (Rocheleau, 2008:215).

Post-humanist approaches have been criticised for building on wisdom found within the cultural or traditional knowledges and experiences of the people they have studied without giving due recognition, even as they identify and challenge the hierarchies that pitch western colonial knowledge as superior (Horowitz, 2008; Sundberg, 2014). Similarly other critics argue

that these frameworks romanticise indigenous groups as guardians of forests, for example. This simultaneously primitivises people through the 'noble savage' narrative, dehumanises them through their being a part of 'nature' rather than 'fully human' and portrays them as vulnerable groups that need protecting (Smith, 1999; DiNovelli-Lang, 2013). Tsing has deliberately avoided identifying groups she has worked with as indigenous for some of these reasons.

2.6 Approaching the forest-farm

The theoretical literature discussed in the preceding section (§2.5) and case studies presented throughout this chapter confirm the importance of understanding the complexities of practices and perceptions held within the 'rooted networks and relational webs' of one study site (Rocheleau, 2008). Whilst natural scientists might seek broad understanding through a large sample of comparative case studies, this research project is interested in developing an in-depth understanding of one small geographic area through a variety of perspectives. My approach draws attention to both the individual and collective agency that farming communities have within the forest-farm areas they cultivate and the limiting conditions of the broader political and economic contexts that they are adapting to. To do this I used a slow, ethnographic and participatory methodology (Tsing, 2005; Horowitz, 2012) that paid attention to social inequalities and their relationship to ecological dynamics (Bookchin, 2005). Chapter Four provides detail about the methodology employed.

This thesis explores the multi-layered story of one forest-farm landscape in Kwahu East, Ghana through the lens and practices of multiple local actors. These people have different types of access to decision-making spaces that impact more broadly on how forest trees are managed, land use is allocated and for what purposes. As the research unfolded, different perceptions of tree cover change became more apparent (Fairhead and Leach, 1996). These can be understood as narrative frames that combine socio-political information coming from the top-down with sensory information from the bottom-up (Brewer & Lambert, 2001). These not only influence the practices undertaken but also how people understand their own agency and the agency of other actors (Horowitz, 2008).

Recognising their important role in the forest-farm socio-ecology, the research began with observing the ecologies of practice (Nyerges, 1997) used by smallholder farmers in their farming economies and their management of trees (Netting, 1993; Mortimer, 2005). This immersion into local livelihoods also uncovered local perceptions of vulnerability and forest decline, which impact on the decisions that farmers make. Through 'progressive contextualisation' (Vayda, 1983) the research continued by considering the wider political and economic factors that affect tree cover and which farmers are adapting to (Blaikie and Brookfield, 1987; Rocheleau, 2008). This involved moving outwards to understand the same area through two broader lenses: that of foresters who manage the area for timber and of local authority decision makers who are most influential in trajectories of change around land use planning and development.

The limitations of political ecology were brought to the fore in this research as I designed an interdisciplinary project that sought to translate theory to practice in a way that conservation scientists could engage with. This project aims to be "a political ecology of human impact that takes seriously the complexity of degradation and recovery dynamics [which] can, therefore, point not only to the political drivers of degradation but also to the political possibilities of sustainable management" (Robbins 2012:119). To do this, I use some of the elements of a political ecology approach without going deeply into theoretical analysis. Whilst broader questions of power, neoliberalism and legacies of colonialism are interesting and critical, this research focuses on the farm-scale, showing how ecological, political and economic issues shape farmer actions. This naturally leads to exploring the ideologies that inform understandings of trees and forests, particularly through questioning ideas of modernity and 'development'. The process uncovers the complexity of local resource governance within and between the household, the economically diverse community and the state. These are important layers for conservationists to understand, enabling political ecology approaches to be practical and accessible to a wider range of researchers.

The fluidity of interactions between three dimensions – ecologies of practice, perceptions of change and sense of agency – contribute to the emergent realities of the forest-farm (Machado, 2018). Taking this approach to understanding the relationship between people and trees has influenced my understanding of "the problem" under investigation, how I collected and analysed the data, and the stories I communicate in the layered empirical

chapters which follow. In the spirit of STS's commitment to creating spaces of interdisciplinary dialogue and coproduction of knowledge (Stengers, 2003), this provides people working in bird conservation with an alternative way of conceptualising the forest-farm and factors which affect tree cover change.

3 The Forest-Farm Landscape of Kwahu

3.1 Introduction

This research project took place primarily in a small geographic area of Kwahu East, a district of the Eastern Region in Ghana, West Africa (see map in Figure 1.5). As outlined in Chapter One, this area has been of interest to NGOs concerned about the conservation of afro-paleartic migratory birds and the Royal Society for the Protection of Birds (RSPB) has a research field site here. This project focused on the same location – a small area of forest-farm in a valley between two villages called Pepease and Bokuruwa – carrying out household farming surveys, observations and interviews with farmers who cultivate food there. I then worked outwards into the wider district and policy landscape, speaking with government offices, traditional authorities and local NGOs as I investigated the complex relationship between people, trees and the land itself.

The three-hour drive from Accra to Kwahu, along the main N6 Accra-Kumasi road follows the base of the Kwahu plateau – a ridge of mountains that runs for 260km in a south-east or north-west trajectory, creating the edge of the River Volta (now Lake Volta) Basin. Arriving in Nkawkaw, a large trading town half-way to Kumasi which is dubbed the ‘gateway to Kwahu mountains’, the route turns off the highway and winds up the rocky escarpment to the top of the plateau. It is hard not to be in awe of the scenery approaching and then ascending the forested mountains (Figure 3.1). These impressive rock formations give Kwahu its name (see Box 3.1), its reputation as a cool climate, and inform the local economies and cultures.



Figure 3.1 A view across Kwahu Escarpment. This picture shows the iconic rocks of the escarpment and Nkawkaw town in the distance, known locally as the ‘gateway to Kwahu mountains’. Photo taken in May 2018.

This chapter situates the research geographically, socio-culturally, historically and politically. It starts by giving an overview of Kwahu East district (§3.2). In §3.3 geographic, ecological and climatic information is provided, along with a map showing Kwahu East in relation to geographic features. The Bokuruwa field site (Figure 3.2) is described in §3.4, to give the reader an understanding of the participating towns and villages. For historical context, §3.5 looks at how Kwahu from its settlement origins in the seventeenth century to the period immediately following Ghana gaining independence in 1957. This leads into §3.6 which describes Kwahu East in present times, focusing on the local economy, culture and land arrangements. As with other parts of Ghana, there are two main structures of governance in Kwahu – the traditional authorities and local government offices – which are summarised in §3.7 and §3.8 respectively. These sections also serve as introductions to some of the organisations who took part in the research and are referenced throughout the empirical chapters.

3.2 Overview of Kwahu East district

The traditional area of the Kwahu stool land (see §3.4) encompasses a large area of land which has been split into five decentralised political districts. Kwahu Afram Plains North and Kwahu Afram Plains South, more commonly referred to simply as the Afram Plains, is now separated by lake Volta. The area south of the lake includes Kwahu South, Kwahu East and Kwahu West. Many people living in these three districts still have ancestral land in the Afram Plains (see map in Figure 3.2).

Kwahu East is the newest of the Kwahu districts, as it was carved out from Kwahu South and inaugurated in 2008 (Government of Ghana census 2010, 2014). Abetifi, the capital of Kwahu East and one of the five towns/villages in this research field site, is the highest settlement in Ghana at 640m above sea level. The district covers 623km² of land (ibid 2014:1) and is home to a population of over 77,000 people (ibid, 2014:xi), which is made up of 70% Kwahu, 18% Ewe (an ethnic group originating on the East side of Lake Volta), and 5% Ga-Adangbe from southern Ghana. The remaining are a mix of people from across Ghana (ibid). Recently there has been an increase in the presence of Fulani people, some of whom are from northern Ghana, Mali, Niger and Nigeria (Derkyi *et al.*, 2014). Historically in-migration has been common due to the geographic position of Kwahu in relation to main transport routes for trade. In the most recent census, over 28,000 residents of Kwahu were born elsewhere. Half of these were born in another part of the Eastern region, and half from further afield (Government of Ghana census 2010, 2014). The population of males also drops significantly for those aged 20-24 (ibid), and this may be indicative of young men migrating away from Kwahu for economic reasons, often to larger towns or cities to study or work or to other rural areas where there are prolific mining opportunities (Hilson and Garforth, 2013). However, there is also seasonal in-migration, especially from northern Ghana, for farming labour during the early months of the year when farms are cleared (see outline of seasons in §3.3). Since the district is also home to the Presbyterian University College at Abetifi and several other vocational, technical and training colleges, there is also a relatively large number of students in the area. Whilst many of these are from Kwahu, others are migrants from across Ghana and even neighbouring West African countries.

Kwahu East is a relatively affluent area of Ghana. As is discussed throughout this chapter, Kwahu people are renowned for their skills in trading and business. Many Kwahu people have travelled for work or education and returned in later life to build large houses. There are also lucrative opportunities for varied employment and income creation in the district itself. Of the 32,000 people aged 15 and over recorded as 'employed' in the 2010 census, 55% were in agriculture, fishing and forestry; 15% in wholesale and retail, 81% of which were women; 5.5% worked in accommodation and food services, again dominated by women; 5%, mostly men, worked in the education sector at the district's many schools, training colleges and the university; and 7% in manufacturing (Government of Ghana census 2010, 2014). Across the district, 2000 people work in public government offices, which are mostly located in Abetifi and Mpraeso (the district capital of Kwahu South). Kwahu East is well connected with tarmac roads between urban small towns and some of the rural areas. Most larger settlements are connected to the national electricity grid, with exceptions of small hamlets and farming, herding or mining encampments. Furthermore, Kwahu East has a direct transport link to the Afram Plains via motorised dug-out boats at Kotoko and ferry at Adawso (Kwahu South district), two small towns on the west shore of Lake Volta (indicated on Figure 3.2). This location, along with the easy access to the nearby N6 highway makes the Kwahu traditional area a vital trade link for goods being transported to Ghana's two largest cities – Accra and Kumasi. The local economy is discussed more in §3.6.

In Ghana, 'urban' and 'rural' classifications of localities are based on population sizes. Across Kwahu East there is a range of settlements in many sizes – from hamlets to mining camps, market towns to district capitals. Any settlement of 5,000 people or more is classified as urban, and any settlement of less than 5,000 people is classified as rural (Government of Ghana census 2010, 2014:9). According to projected population figures provided by the District Assembly (DA) in February 2018⁸, of the twenty largest settlements in Kwahu East, only four have a population of over 5000. The highest is the district capital, Abetifi, at 12,257. Out of the district population of approx. 77,500, 35,029 (45%) people live in urban settlements and the remaining 55% are rural. The term 'small town' can be used to describe

⁸ Early in my fieldwork, I visited the District Assembly to ask for current population figures, since the census data was eight years old. They provided the projected populations for 2018, which I use throughout this chapter as the local population figures.

settlements that have a population of 5,000-50,000 (Owusu, 2004). In this thesis I use ‘small town’ in this manner and ‘village’ for settlements that are under 5,000.

Each small town and village in Kwahu is presided over by its royal family and traditional council, as discussed in §3.7. The district as a whole is governed by the Kwahu East District Assembly (DA), based in Abetifi. There is also a Kwahu East Ministry of Food and Agriculture office (MOFA) and a Forestry Services Division (FSD) in Mpraeso. More information is given about these institutions in §3.8.

3.3 Geographical features

Kwahu East crosses three different physiographic zones – the “Southern Voltaian Plateau, the Forest Dissected Plateau and the Savana Plains” (Government of Ghana census 2010, 2014:1). Perhaps the most defining features of the landscape are numerous escarpment ridges, the most important being Kwahu Scarp, and the accompanying forest-farm vegetation. As the land flattens out towards Lake Volta, the vegetation changes from semi-deciduous forest into sub-montane vegetation, with fewer trees and more grasslands (Watson, 2017).

In Hall and Swaine’s (1981) original differentiation of forest ecological niches (discussed in Chapter Two), Kwahu East is situated where the dry semi-deciduous forest and savannah-forest areas border. This is often referred to as part of the transition zone (Mallord *et al*, 2016, 2018) – a wide strip of land reaching across Ghana with similar vegetational characteristics. The dry semi-deciduous forest has an average rainfall of 1000-1250mm, an upper canopy of 35-45m with higher deciduousness than anywhere else in Ghana and dense undergrowth of forest herbaceous plants (Amanor, 1994). These, together with the annual leaf drop, provide fertile lands for agricultural use. The north-east strip of this forest ecological niche is labelled ‘dry semi-deciduous fire zone’ (Hall and Swaine, 1981) where natural fires thin young trees and result in greater quantities of fire-resistant species. According to Amanor (1994:38) “the area is prone to dessication, invasion by savanna grass species, and bush fires destroying tree growth and promoting ‘savannization’”. This research field site is located across the dry semi-deciduous inner and fire zones (Figure 3.2). Furthermore, Kwahu East is on the west fringe of the Dahomey Gap (Hall and Swaine, 1976), which encompasses the east of Ghana, Togo, and

Benin forming a break in the rainforest belt that reaches across West Africa. The Gap is known to have a lower density of tree cover, more extensive grasslands and drier climate.

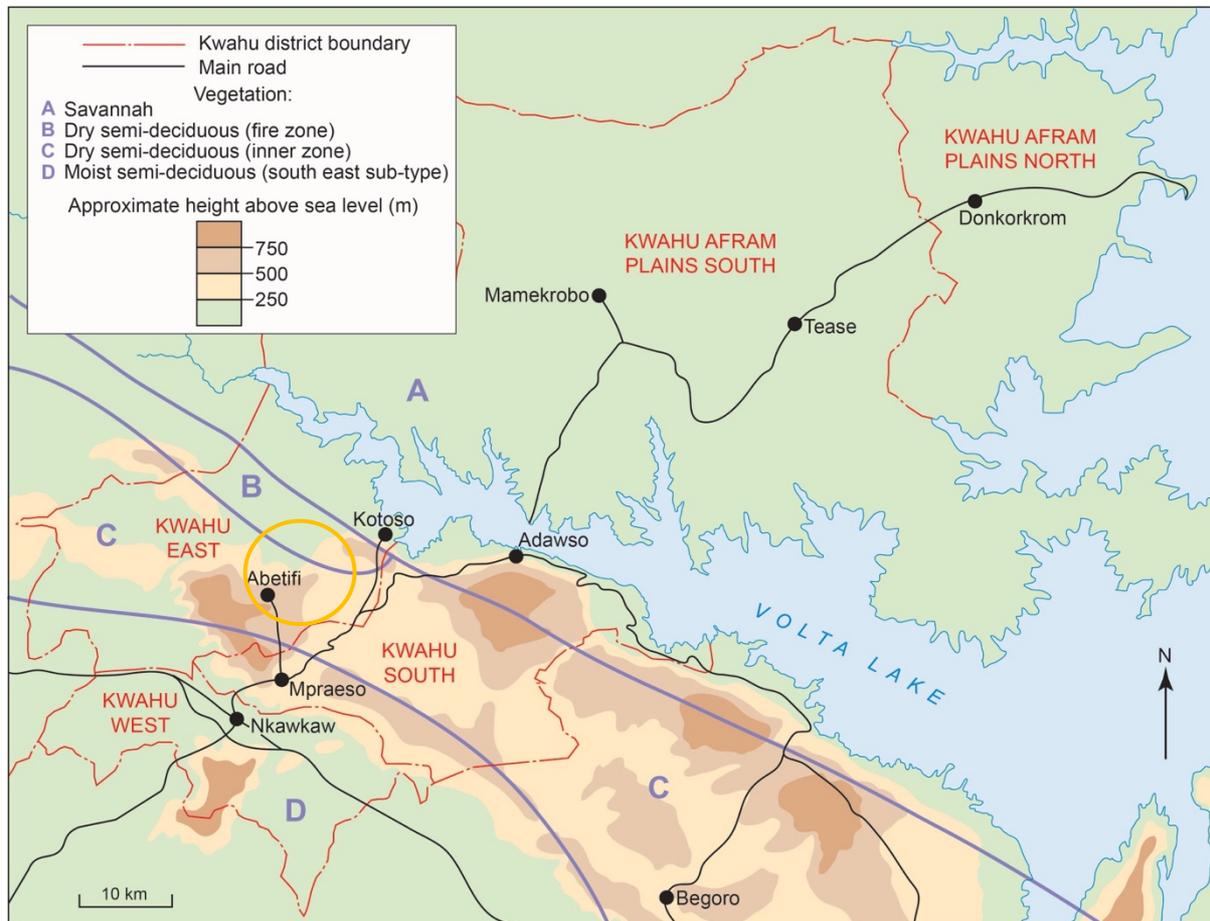


Figure 3.2 Map showing the five Kwahu districts. The key indicates district boundaries, main roads, topography and (approximate) vegetation zones (Hall and Swaine 1981). As shown by the position of Abetifi town, this research was located within dry semi-deciduous forest across both the inner and fire zones. Map produced by Philip Stickler, University of Cambridge, 2021. The approximate location and size of the study site is shown with an orange circle.

Given its geographic position, dry semi-deciduous forest covers around 75% of the district land area, and savannah grassland covers the rest. The latter dominates in the north and east areas where the land descends towards the Afram River and Lake Volta, important places of local drainage. The majority of Kwahu East also, therefore, lies within the Volta Basin as part

of the Guinean Savanna Zone (Mul *et al*, 2016), as the Kwahu escarpment forms the western boundary of the basin.

Anecdotally called “the Switzerland of West Africa” (Nkansa Kyeremateng, 2000) by the Basel missionaries who settled in Kwahu in the 1880s (see §3.4), Kwahu East is known for its relatively cool climate due to its altitude. Temperatures vary from 20 to 31 degrees across the year depending on the three main seasons – harmattan, the major rainy season and the minor rainy season. Figure 3.3 shows the maximum and minimum temperatures alongside the monthly rainfall for the years 2000 and 2017. Table summaries of both temperature and rainfall datasets are provided in Appendix 1. This data is from the meteorological station at Abetifi – which, given its position on the forested mountain peak, is not representative of the whole district, especially grassland areas.

December to February is the hottest, driest season, reaching average maximum temperatures of up to 31 degrees centigrade. Known as the ‘harmattan’, these months are characterised by increased dusty sand from the Sahara Desert hanging in the air, reducing visibility and lightly covering vegetation. This is the time of year when the deciduous trees drop their leaves and bush fires are most common. Since Kwahu East lies within the wet semi-equatorial zone it experiences two rainy seasons, shown in Figure 3.3. The first (major) is from March to June, although light rains can go into July. The heaviest rainfall occurs in June (almost 400mm recorded in 2014), and can make travelling difficult, especially on the non-tarmac roads which lead to farmland and more rural settlements in the hinterlands. Whilst the rains bring slightly lower temperatures than the dry season, there is also an increase in humidity. The second (minor) rainy season is from mid-September to mid-November. Farming during this time is riskier as there is more chance of rain failure. The amount of rain during the minor season varies depending on the year, as can be seen in the rainfall data (again, from Abetifi meteorological station) from 2000-2017, see appendix 1.

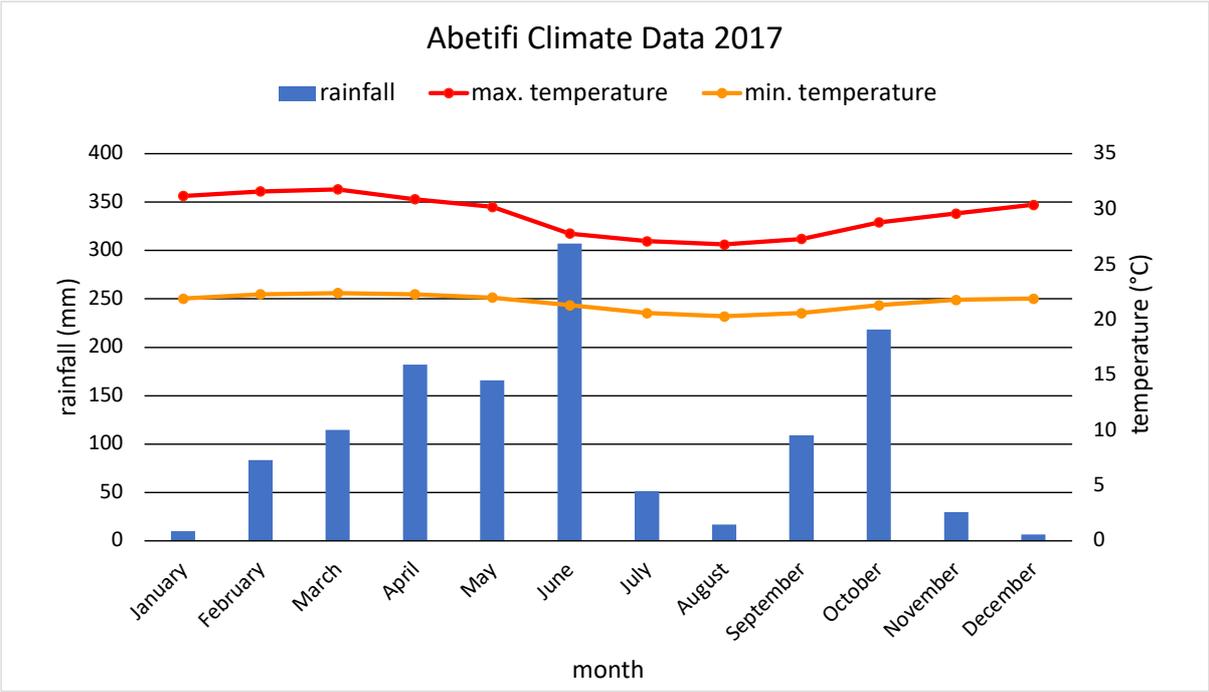
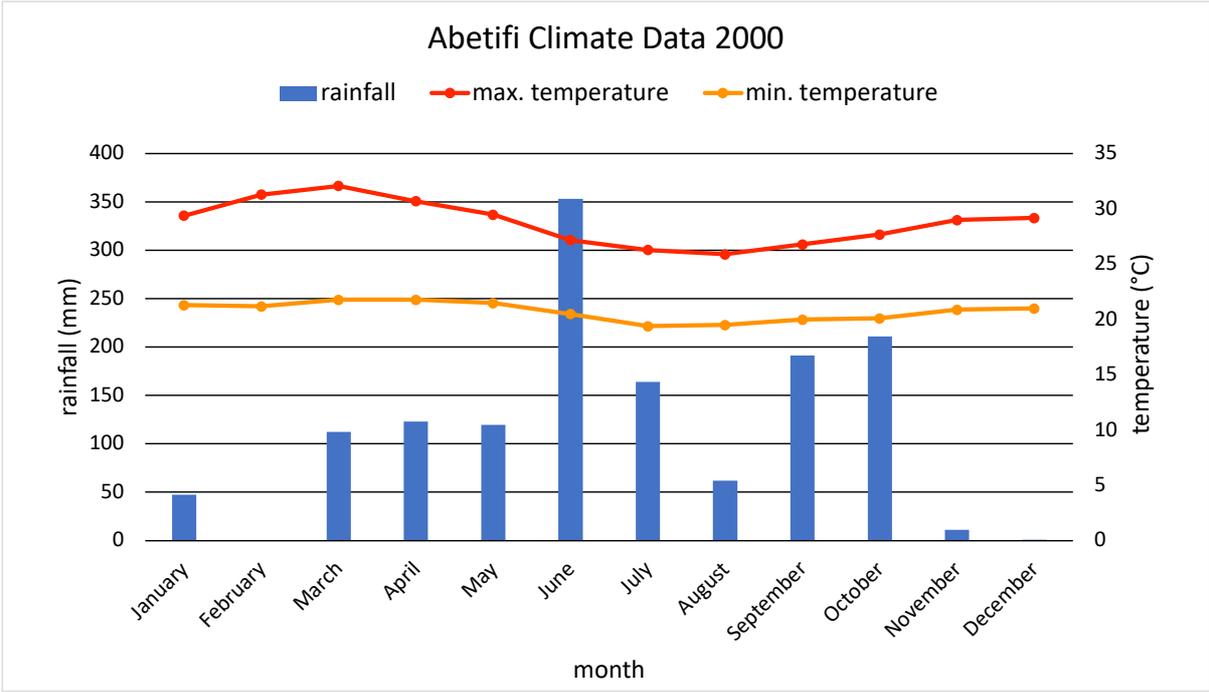


Figure 3.3 Graphs depicting the maximum and minimum temperatures and monthly rainfall for Abetifi in 2000 (top) and 2017 (bottom). Graphs created by Dr. J.J. Bissell.

3.4 The Bokuruwa field site

The field area for this research was created from the centre point outwards: I began in the forest-farm study site where the RSPB has been carrying out their ornithological surveys and ‘followed the farmers’ outwards. This led me to five settlements: Bokuruwa and Pepease, two rural villages; and three of the district’s few small towns – Kwahu Tafo, Nkwatia and Abetifi (district capital). I also included other governmental and independent actors who are involved in the management and development of the forest-farm area, including the District Assembly (DA) and Ministry of Food and Agriculture (MOFA), located in Abetifi; the Forestry Services Division (FSD) of the Forestry Commission (FC), based in Mpraeso (Kwahu South district capital); the MP’s charitable foundation, with an office in Nkwatia; and two small NGOs based in Kwahu Tafo. These places are all marked on the map in Figure 3.4.

To give a brief picture, from the N6 Accra-Kumasi highway you enter Kwahu land through a large town called Nkawkaw (shown on Figure 3.2) and head up the mountain on one of two steep winding tarmac roads that lead to Mpraeso. From here, you can take a main road to the north-east to Kwahu Tafo, three towns along; and pick a small rundown taxi from Tafo along the dirt road to Bokuruwa. Alternatively, you can take the other main road heading north-west out of Mpraeso to Nkwatia, Abetifi and finally Pepease. There is another dirt track that connects Pepease to Bokuruwa (and then Tafo), however taxis do not take this route as it is not well maintained or accessible for vehicles other than four-wheel drives.

Nkwatia and Kwahu Tafo are the two most similar small towns. They each have an established market (on different week days), numerous shops, small banks, guest houses, several printing shops, and places to get food. Tafo has a medical centre. Traders travel through Tafo to get to Lake Volta via the main tarmac road. Nkwatia, on the other hand, is situated between two district capitals – Abetifi (Kwahu East) and Mpraeso (Kwahu South) – and their bustling markets. There is a large well-funded school in Nkwatia called St Peters. Since 2017 there has been a significant construction project on the outskirts of Nkwatia where the Member of Parliament (MP) for Abetifi constituency is building the largest hotel in West Africa: Rock City Hotel. Abetifi is home to a university and Presbyterian missionary base. It has similar facilities as the other small towns, just in greater quantity and size. The district’s only ATM cash machine is located at the university. There is a vibrant night life with numerous ‘spots’ (a local

name for street bars) which play loud music. This small town hosts a bi-annual contemporary music festival called ‘Bliss on the hills’, funded and organised by the MP. I return to the activities of the MP in Chapter Eight. Abetifi is home to the DA and MOFA district offices and a large hospital is being built to the west of the town. Until this is completed, the Kwahu South hospital at Atobie (a small town south of Mpraeso) serves the population of both districts.



Figure 3.4 Map showing the roads and five settlements of the Bokuruwa field site. The settlements are Abetifi, Nkwatia, Kwahu Tafo, Pepease and Bokuruwa. Three further towns, not included in my field site due to being with Kwahu South district, are also shown (Mpraeso, Bepong and Asakraka). The map also indicates in red the location of places of interest that are discussed throughout the thesis. Map produced by Philip Stickler, University of Cambridge, 2021.

The two villages – Pepease and Bokuruwa – also share similarities with each other, and some key differences. Pepease, with a population of 4,478 (projected figure for 2018), is easier to reach as it is the next town along from Abetifi by tarmac road. The settlement begins relatively high on the escarpment, and various neighbourhoods have been established around the edges that begin the descent to the Afram river. The centre has only a few general shops, a printing shop, one bank, and a couple of spots. There are several stalls selling food produce, but no formal market like in the small towns. On the road entering Pepease from Abetifi, there is a large hotel called Modak Hotel which has a swimming pool, conference rooms and extensive accommodation. Bokuruwa (shown in Figure 3.5), the smallest settlement in the study area with a population of only 1,879 (projected figure for 2018), is the hardest to reach as there are no tarmac roads. It is noticeably smaller in size and less dense – houses are further apart and there is more land available next to compounds. There are two small shops and a few stalls, but no market. People generally sell their goods informally by word of mouth and some carry produce on their heads looking for customers or people to trade items with.



Figure 3.5 A street within Bokuruwa village. These breeze block and corrugated iron houses are typical smallholder dwellings in settlements across Kwahu East. Most housing arrangements contain an inner courtyard area which is used for outdoor cooking and processing farm produce, surrounded by separate rooms for different family members to sleep in.

Each settlement is surrounded by stool land (explained in §3.6) where people are allocated farmland to grow crops. Given the different classifications of the geographical area used to understand the district's varied landscape, climate and vegetation – i.e. the transition zone, fire zone, Guinean Savanna Zone and Dahomey Gap – there is also some variation within the field site of this study (see Figure 3.2). Nkwatia and Abetifi stool lands, due to their position on the Kwahu escarpment, are more forested. In contrast, the farmland of Pepease, Bokuruwa and Kwahu Tafo are closer to Lake Volta, bordering with the fire zone, and are more varied in vegetation – crudely, land to their south is wetter and more forested, whilst land to their north is drier with some sub-montane vegetation. This means that these three settlements, and in particular Pepease, are known for being slightly hotter, with fewer trees and more grassland within farming areas.

3.5 Kwahu historical context

3.5.1 Early history

Akan is the largest ethnic group in Ghana with a current population of fifteen million spread mostly across south Ghana.⁹ Kwahu people are an Akan subgroup with their own history, culture and traditions. The meaning of the word 'Kwahu' is given in Box 3.1. The origin story for how Kwahu was settled (Box 3.1) is recorded in the literature as two key moments of migration from Adanse in the Ashanti kingdom (Asiamah, 2000). The first was in around 1500, when under the leadership of Osei Twum, people left Adanse due to tribal wars, family conflicts and trading. It is believed that Osei Twum saw the rock formation near a stream which looked like a stone jar, and seeing this as a good omen, the surrounding land was settled and named *Obo-kuruwa*, now shortened to Bokuruwa, meaning 'stone jar'. This group eventually moved from Kwahu to Akim Oda further south, because they were displaced in battle by the second wave of migration in the 1600s. This second group, who settled in Abene, continues to rule Kwahu today (Wallis 1953). By the early 1700s many of the settlements seen

⁹ Calculated from the 2010 census data estimate that Akan makes up 47.5% of the total population. According to World Population Review, the estimated population of Ghana in August 2021 is 31,797,000, website accessed on 5th August 2021. <https://worldpopulationreview.com/countries/ghana-population>

today (including those in the field area of this research project) were established, as were the ‘essential political divisions’ of the Paramountcy (Asiamah, 2000:55), which explains why the paramount chief resides in Abene rather than Bokuruwa.¹⁰ To this day, in accordance with broader Akan culture, the Kwahu lands are organised under a head chief – the Kwahuhene – and lesser chiefs, each with their own council and stool land (see §3.7).

Box 3.1: The meaning of ‘Kwahu’

There are also at least two common stories of how Kwahu got its name. The first, told to me by the chiefs in Kwahu, stems the Twi words ‘go and die’ (*ko* and *wu* respectively), as throughout history, enemies that sought to invade the area were defeated due to the Kwahu people’s elevated advantage and protection provided by the escarpment. Another version, less victorious in imagery, suggests the name comes from an exclamation of “*akoa wuo ni*” (so this is [a] slave’s death), during the contrasting funerals of one of the founding men and his slave – as the former was hugely elaborate and the latter very simple. Over time, this phrase became *akoa wu* (where a slave died) and eventually Okwahu or Kwahu (Wallis 1953:10).

Historians believe that sometime between 1741-1764, Kwahu planned to invade the Ashanti kingdom, but that the failure of this scheme led to Kwahu becoming annexed and ultimately a vassal state of Ashanti for more than a century. This allegiance involved Kwahu in Ashanti conflicts – mainly with the British and their tribal allies in the south (namely, the Fante, Akyem and Ga). Another key conflict was with the Guan Empire, which Kwahu was nestled within as it reached from the Accra Plains north across present day Eastern and Volta regions. Victory in these operations throughout the 1800s led to Kwahu expanding their own territories, in particular colonising land on the east side of the Afram river (Asiamah, 2000) – an area which remains traditional stool land of the Kwahu people to this day, now called the Afram Plains (see map in Figure 3.2).

3.5.2 Colonial times

Kwahu people were only able to break away from Ashanti rule in 1874-75, during the British-Ashanti war, and their relative independence was only secured through signing a Treaty of

¹⁰ According to Akan tradition, this paramount chief – in this case, the Kwahuhene – should be situated at the oldest town. Many informants in this research, therefore, believe Bokuruwa to be the rightful seat of the paramount chief, even though the original settlers were displaced and succeeded by those in Abene.

Friendship and Protection with the British, thereby becoming an official British Protectorate in 1888 and subject to the colonial government (Asiamah, 2000). The treaty was signed by the Kwahuhene and ten lower chiefs, which immediately made manifest the colonial method of indirect rule via traditional elders (ibid). Kwahu was initially placed within the Birim administration (Simensen, 1975), with the District Commissioner based at Kyebi. Abetifi acted as a sub-administrative centre until Kwahu became administratively autonomous in 1914, at which point the Mpraeso became the district capital of what was then called Kwahu South district. This progression illustrates how governance was centralised across the Gold Coast under British colonial rule, and many of these structures continue to exist in Ghana today (Asiamah, 2000).

Another key moment in Kwahu history was the arrival of Christianity with the Swiss missionary, F. R. Ramseyer (Box 3.2). Interestingly, Ramseyer was originally stationed at a town in the Volta region, however, he and his family were captured during one of the Ashanti-led and Kwahu-supported military offensives into Ewe¹¹ land (east of the river Volta) in 1869. Ramseyer and his wife spent four years in exile as prisoners of the Ashanti kingdom (Wallis, 1953). A British invasion of Ashanti secured Ramseyer's release, who then went on to settle in Kwahu and founded the Basel missionary in Abetifi. Here, the missionaries established new education programmes for children and young adults, setting up numerous schools, training colleges and eventually a university within Abetifi.¹²

Box 3.2: Ramseyer and the British-Ashanti conflict

Records show Ramseyer was a strong supporter of the British colonial government and used his political connections to agitate for the overthrow of the Ashanti kingdom during the 1890s. This close relationship is depicted in a letter he sent to the Colonial Governor in October 1893, which ended:

“For humanity's sake, for the welfare of the country, for the real peace of all the tribes of the Gold Coast and for the benefit of the spreading of the word of Salvation which must be brought to all nations, we the missionaries of Abetifi take the liberty to ask the British Government to do the finishing stroke and bring Kumase [sic] and all that is remaining of Ashantee [sic] under the British Flag” (cited in Arhin, 1968).

¹¹ Ewe is the name of another large ethnic group in Ghana, whose land lies on the East of River Volta. The Ewe and Ashanti people (including Kwahu) had many conflicts about land during the 1800s.

¹² Both the missionary centre and university originating from these colonial activities became established local institutions and still thrive in modern day Abetifi.

Throughout the 1890s-1950s, European missionaries in Kwahu were profoundly entwined with the colonial administration, acting as spies, confidants, and influencers (Asiamah, 2000). Given this relationship, it is ironic that the increased literacy of people in Kwahu, associated with Christian schooling, also contributed to the ability of the *Asafo* ('commoners') to organise against the chiefs and colonial rulers.

Box 3.3: The meaning of *Asafo*

The full title *Kwa-Asafo* – where the Twi is broken down to *Kwa* ('slave' or 'commoner') and *Asafo* ('warriors') – means 'commoner warriors'. Now shortened to only *Asafo*, and used across Ghana, the word holds two primary uses: firstly, the social institution of the 'collective body of commoners' or those who have no formal or authority role in society; and secondly, as a military organisation of mainly young men that can be called upon to bear arms in instances of conflict or warfare (Simensen, 1975; Asiamah, 2000).

The uprising of the Kwahu *Asafo* (Box 3.3) during the first half of the twentieth century has been hailed as one of the most significant revolutionary actions in Ghana's history (Simensen, 1975; Asiamah, 2000). The *Asafo* movement came about primarily due to frustrations with the way chiefs were wielding power. By the early 1900s, Kwahu people had already gained a reputation, which continues to this day, as formidable traders and entrepreneurs. This was in part due to their geographic position and mobility, allowing them to become middlemen in trade arrangements between various territories, transport routes and colonial firms, the latter who were based predominantly in the south. Additionally, Kwahu people's high literacy levels also enabled them to take paid work opportunities. Earnings from trade and wage labour went straight to their own wallets – in contrast to other areas where wealth was accumulated in the hands of chiefs through land rental for farming and mining (Simensen, 1975). When Kwahu chiefs increasingly abused their power – and catalysed by the extortionate rates commoners were charged in various fees, penalties and taxes – the uniquely positioned Kwahu *Asafo* organised themselves and "emerged as an independent force able to check the power of the chiefs and elders in judicial administration" (Simensen, 1975:394). These events, spanning 1885-1935, have been documented in detail from archival sources (Simensen, 1975; Asiamah, 2000). Importantly, the colonial government, operating through indirect rule via their manipulation of the chiefs, realised in 1919 that increases to *Asafo* power was irreconcilable to their own colonial interests and control. Whilst they had initially held back from interfering due to latent British values of democracy (Simensen, 1975),

they stepped in when their own stability was threatened. The colonial administration, therefore, entertained a certain degree of political reform to satisfy the *Asafo* and then supported the chiefs to quash the uprisings. However, despite their revolutionary ambitions being stunted in their homeland, members of the Kwahu *Asafo* went on to become key supporters of the struggle for independence from British colonial control, eventually realised in 1957.

3.5.3 *A post-colonial event*

Almost immediately following independence (1957), Kwahu was rocked by a significant disruption to its traditional lands – the flooding of Lake Volta, the largest artificial lake in the world. In 1961, work began on constructing the Akosombo Dam on the River Volta in southern Ghana, which was complete by 1965. This Volta River Authority (VRA) development project was a flagship of President Nkrumah's economic programme immediately following independence (Miescher and Tsikata, 2009), designed to power the national grid with hydroelectricity. To illustrate the “formidable physical difficulties” of building the dam and resettling thousands of people, Chambers (1970:10) offers a geographical description of the basin that was flooded:

The dam was to be sited near the head of the narrow gorge where the Volta river cuts through the Togo and Akwapim ranges, impounding water from a catchment of 150,000 square miles. The lake to be formed would spread out over the shallow Volta basin to become in area the largest man-made reservoir in the world, covering 3,275 square miles... a thirtieth of the surface of Ghana... Much of the basin was also not easy to reach, with difficult terrain and vegetation and with communications that were very poor by national standards... Few roads penetrated the thick tropical rain forests which covered the hills of the south and east, and there were only a few motorable tracks in the savannah woodland of the north.

Extract from 'The Volta Resettlement Experience' (Chambers 1970:10)

The 'thick tropical forests which covered the hills of the south and east' that Chambers (1970) describes includes the Kwahu East field site where this research project takes place.

Over the five years that followed, the Volta river basin gradually flooded until it reached the size it is today. This brought with it the displacement of approximately 88,000 people, as people were moved from their submerged homes to resettlement sites. Many more were affected by the loss of farmland, access to forest and rupture to the region geographically. Of the displaced and economically affected, Kwahus were one of the largest ethnic groups represented. This was in part due to their stool lands becoming split – as shown in Figure 3.2, the areas now known by district names as Kwahu South, East and West lie to the south of the lake arm, whilst the Afram Plains lie to the north. These lands were previously only a walkable river ford-crossing away, but after the basin flooded they could only be accessed by boat. The area underwater between these districts was also Kwahu stool land resided and farmed on by Kwahu people, many of whom returned to ancestral towns on higher escarpment ground when the floods came. The social and economic upheaval caused by the loss of homes, land and access to the Afram Plains had a significant impact on Kwahu people. Despite these challenges, which were echoed in other Lake Volta fringe communities, the completion of the Akosombo Dam was hailed a success by President Nkrumah at the inauguration of the Volta River Project in January 1966 (Nkrumah, 1968).

3.6 Kwahu society and economy today

There have been two significant ethnographic studies of Kwahu society by male European anthropologists. Sjaak van der Geest (originally writing under the pseudonym ‘Wolf Bleek’) carried out longitudinal research in Kwahu Tafo (one of the small towns in my fieldsite) looking at family relationships, aging and identity (Bleek, 1976; Geest, 1976; Oppong and Bleek, 1982; van der Geest, 1997a, 1998b, 1998a, 2007). His work began in the early 1970s and continued in the late 1990s. Philip Bartle also carried out an ethnography in the 1970s in another Kwahu town called Obo (Bartle, 1973, 1978), in Kwahu South. Together, these accounts give a window into Kwahu life and social arrangements.

Geest’s (1998b:333) work in Tafo revealed the importance of the family home – “a house is the concretisation of social relations and the sentiments accompanying them”. The highest ambition of Kwahu people is to build their own home, with the size and grandeur

representative of their social status and achievement (Geest 1998). One of the striking aspects of the Kwahu area at the time of this research (2017-2019) is the disparity between affluence of households. The villages and towns are made up of large, often unoccupied, grand houses on the main roads (Figure 3.6 – usually built by members of the Kwahu diaspora who live fulltime in Ghana’s main cities or abroad – interspersed with basic structures made from concrete breeze blocks and tin roofs (see Figure 3.5), where the majority of local people reside. The mansion buildings are generally viewed positively and aspired to as both a symbol of status and to enable more comfortable living. This contributes to the common ambition across families to build large houses. This contrast in living conditions is indicative of the inequalities in access to wealth and resources, and is connected to hierarchical traditional structures, land tenure, and interactions between individual Kwahu people with the wider national and global economy.



Figure 3.6 A mansion house under construction in Abetifi. It includes an outbuilding with further accommodation. These homes are generally used by the owners and extended family a few times a year, during holiday seasons and for funerals. Photo taken in June 2018.

Kwahu is famous throughout Ghana for its Easter celebrations, attracting tens of thousands of Ghanaian and international tourists every year.¹³ For three days, the towns of Kwahu East and Kwahu South are transformed into street parties, with carnivals, numerous sound systems, food stalls and parades. Tourist experiences are scheduled to tour nearby attractions – including waterfalls, caves and a forest canopy walkway. These is also the opportunity to paraglide from the Kwahu Escarpment into the Nkawkaw valley. Kwahu Easter celebrations are a significant factor in real estate expansion, as families and distant members of the Kwahu diaspora return annually. It is also a driving force behind tourism and hospitality development, which is discussed in Chapter Eight.

Kwahu people are famous for their trading and business skills and are considered wealthy by other Ghanaians. Kwahu people are well-known in all regions for setting up stores, be they selling farmed produce or offering multiple services to customers, for example tailors, taxi drivers, seamstresses and sandal-makers (Geest, 1997). As described in section §3.5.1, this trading reputation has historical longevity since the colonial times. Kwahu is well placed for trade, as it is situated along the main Accra-Kumasi road, giving traders access both to commuting traffic and the two largest Ghanaian cities themselves. Over 60% of the adult population in Kwahu East were involved in agriculture in 2010 (Government of Ghana census 2010, 2014) but many have other employment or income in addition. Agriculture is generally on a small-scale for subsistence and cash crop production. Farmers use a rotational swidden technique within forest-farm areas (Figure 3.7) – clearing areas of overgrowth (usually from previous swidden cycles rather than established forest) to grow crops until the soil becomes less nutritious after a few years. Details of the farming economy based on new empirical data gathered during this research are presented in Chapter Five.

¹³ These celebrations are supported, financed and promoted by the Government of Ghana Ministry of Tourism, Arts and Culture. This is the most important festival in the year, as it marks the beginning of the main rainy season and coincides with the Christian calendar.



Figure 3.7 The forest-farm field site where smallholders cultivate crops. This road, connecting Pepease to Bokuruwa, is rarely used by cars other than four-wheel drives due to its poor condition. Most smallholders walk to their farms within this valley from the surrounding towns and villages. Photo taken in October 2018.

The land tenure system in Kwahu East is similar to that which is found across Akan societies (Amanor, 2001). There are several ways by which a farmer can secure access to land. Firstly, they might inherit land via their matrilineal bloodline (or *abusua*, outlined in §3.7). As life expectancy increases, however, young people are increasingly struggling because they are not able to inherit land until their relatives die or become too elderly or ill to farm (Amanor, 2001). Some opt for a sharecropping arrangement, and this is also used with farmers who do not have their own land, especially poorer matrilineages and migrants. Sometimes young family members use sharecropping but do not meet their relative's expectations in productivity, and so the landowner will stop the tenancy and sharecrop with someone else. This causes family conflict and frustration, leaving young men in particular with fewer economic opportunities and more incentive to migrate to other areas (Amanor and Moyo, 2008).

In Akan matrilineal culture, children belong to the mother's lineage, and land, possessions and status are passed down along the female bloodline (Boakye and Baffoe, 2006). This means, for example, that a man's property will be handed on to his sister's children rather than his own, because his children belong to their mother's bloodline rather than his (Berry, 2009a). Men can ensure inheritance for their own children only by producing an oral or written will which is agreed to by his matrilineal family (Lambrecht, 2016a). Perhaps in part due to this system, Kwahu women stay more closely attached to their families of origin than to their husbands (Geest, 1976). Similarly, marriage is considered a fragile institution, and is generally approached as a pragmatic arrangement to further childbearing and contribute to the potential economic production of a family (Oppong and Bleek, 1982). Despite the shared labour, across Ghana 83% of farmed land belongs to individual male farmers, and only 10% belongs to individual female farmers (Lambrecht and Asare, 2016), however these ratios alter in different regions. In the matrilineal south, women have greater, but far from equal, land access.

The inherent power dynamics in land allocation, use and tenure has a complex history, in part due to the colonisation of Ghana by the British and the legacies this left in governance and policy. For example, although traditionally stool land was intended to be communally owned and managed for the benefit of the chiefdom, over time some chiefs sold land to developers and the government, reducing the overall amount of custodial land. This has made the tenure of poorer farmers less secure, shorter term, and increased pressure on the productivity of existing farmland (Ubink, 2008). Land tenure continues to be a strong determinant of how farmers manage trees on their farms, as will be seen in the empirical chapters.

One of the recent issues in Kwahu East has been a growing tension between herders and farmers. In the fieldsite, these flared in 2015 when several violent clashes took place. In Bokuruwa, two people were killed when farmers deliberately poisoned some of the herders' cattle because they were grazing on farms. In other parts of Kwahu East it has been worse – there are now several abandoned villages and settlements in the drier areas to the north of Bokuruwa and Pepease. These displaced people moved to larger settlements, including Pepease and Bokuruwa, for fear of their safety.

The herders in question are thought to be of mainly Fulani ethnicity but, importantly, Ghanaian nationality. Fulani people are a broadly Muslim ethnic group of "mainly nomadic

and semi-sedentary pastoralists” (Bukari and Schareika, 2015:1) who have roots across West Africa and have been in what is now Ghana for over a century. Nowadays, many still make their livelihood by looking after cattle – their own and those which have been put in their care by absent, often socially elite, cattle owners (not usually of Fulani ethnicity) – regularly traveling to find fresh grazing sites. Conflicts occur when herders enter farmland areas with their cattle, causing crop and soil damage.

The Government of Ghana, in partnership with an international development agency and funded by the African Development Bank, have built several fodder ranches¹⁴ since the late 2000s on the north-east side of Lake Volta in the Kwahu Afram Plains South district. These are aimed at feeding cattle, and therefore, reducing the time they spend in farmland areas. Whilst this momentarily displaced the problem, it remains unresolved because the facilities are not being used frequently. Tensions between farmers and herders in Kwahu East have continued to increase since the fodder ranches were constructed and were a key complaint from smallholders during interviews and community meetings during this research.

3.7 Traditional authorities

A notable characteristic of Kwahu people, and Akan communities more broadly, is the importance of local traditional authorities and their role as custodians of the land (Kallinen, 2004). In Akan culture there are eight matrilineal clans in every settlement, which are the same across Akan land. These are: *Aduana*, *Agona*, *Asakyiri*, *Aseneɛ*, *Asona*, *Ayokoo*, *Tena-Bretuo* and *Ekoona* (Nkansa Kyeremateng, 2004). It is taboo for members of the same Akan clan to marry each other, even if they are from different areas. Each settlement is surrounded by the stool land, held under customary tenure by the chief and seven other *abusuapanin* [head of clan], who are mandated with looking after it for the common good. As such, stool land is divided into eight, one area for each clan. The *abusuapanin* for each clan manages access to this land and can allocate members of their clan *abusua* [family] land for farming.

¹⁴ Fodder ranches are sectioned off areas of grassland that have been dedicated for keeping cattle. Herders are encouraged to keep their cattle in these cordoned pastures, where they have access to different food sources (grassland and animal feed) and veterinary support. This provision is intended to reduce the movement of cattle through farmland, and therefore reduce the conflicts over land between farmers and herders.

Every town and village in Ghana has a ‘royal family’ which can usually trace their lineage back to the clan who founded the settlement. One female (often the oldest) from this family is enstooled (equivalent to ‘enthroned’) as the *ɔhemmaa*¹⁵ [queen mother], chosen by the *mpanyinfour* [elders]. In consultation with the *mpanyinfour* (who are also known as ‘king-makers’ during this process) she selects a male relative as *ɔhene* [chief]. The *ɔhene* is the main town authority, and rules with the support of a traditional council which is made up of *ahenefo* [sub-chiefs] and *mpanyinfour* [elders]. There is also an *abusuapanin* [head of clan] for each of the town’s eight clans, and these may or may not also sit on the traditional council. The traditional authorities are a mixture of hereditary roles that belong to clans and direct appointments by the chief to focus on specific issues. Together, these traditional authorities form the chieftaincy of the settlement. The village, or the chieftom, is made up of different matrilineal families who usually have a shared female ancestor (Nkansa Kyeremateng, 2010). Due to each village having their own chieftaincy, there is also a hierarchy between villages – so some chiefs are considered ‘higher’ than others. The highest (Paramount) chief is named uniquely according to the area they rule – so in Kwahu, he is called the *Kwahuhene*. All of the Kwahu traditional area is the *Kwahuhene*’s stool land, which is divided into town and village stool lands that are held by the relevant chief and used for the good of the community (Ramcilovic-Suominen and Hansen, 2012; Lambrecht and Asare, 2016).

The traditional councils hold the power to make decisions in the town and stool lands about development projects (including factories, hotels, socio-economic infrastructure and also large-scale industrialised agribusiness), household land allocation for different types of farming and houses, the removal of trees (both legally and informally), and other arising local issues. In this way, the traditional authorities work alongside the decentralised governmental offices and ministries – they are involved in all decisions and must provide their consent in development planning processes. They are esteemed figureheads that represent the towns at important political and cultural events, district meetings, official consultations – therefore also having some level of influence over discussions and decisions made in these spaces. In some parts of Ghana, research has shown that tension can arise between the traditional

¹⁵ In written form, Akan has two letters which are not a part of the English alphabet. These are *ɔ* (pronounced as a short ‘o’ sound, as in the word ‘*ɔn*’) and *ɛ* (pronounced as a short ‘eh’ sound, as in the word ‘*ɛgg*’).

authorities and local government (see §3.7), especially when there is disagreement about trajectories of change or distribution of financial benefits (Lund 2008).

The traditional council meet regularly to discuss issues in the town and to respond to requests from the outside for development, logging and other land uses. The usual process for an outsider seeking permission for their project involves being hosted by the chief, usually alongside the *ɔkyeame* [linguist]¹⁶ and wider traditional council, where they are asked to present their proposal and take questions. They are expected to bring with them an offering in the form of money, liquor and/or other valued products (for example, *kente* cloth). These gifts lubricate the discussion: a council will only grant access if they deem the respect paid has been appropriate and sincere.¹⁷ The outsider may also make promises to provide other benefits – this may include direct payments to the royal family and/or funding for community projects (which is still administered via the traditional council). During decision-making processes, the guidance of the ancestors may be sought through the *ɔbosomfo* [fetish priest]. The *ɔbosomfo* holds cultural and spiritual authority by performing ceremonies on significant days, attending to shrines in the forest-farm, and offering herbal medicine to people with ailments.

The system of elders and chief combine traditional values passed down through generations – for example, the mystery of their customary ceremonies and their regal performance at grandeur events – with modern development ambitions and perceptions of ‘progress’. One example of this performance that I witnessed during my fieldwork was when Kwahu East hosted the 2018 United Nations World Tourism Organisation (UNWTO) National World Tourism Day Celebration, which entailed a ‘durbah’ procession of the local royal families during the afternoon (see Figure 3.8). Many of the chiefs and subchiefs have had the economic privilege to study and/or work in Ghanaian cities or abroad, often making careers that bring financial security and assets that contrast with the localised life they now live. Some left Kwahu and returned to take up their stool positions in later life, even retirement. As such, chiefs will nominate sub-chiefs based at least in part on their social credentials, financial resources and perceived ability to bring prosperity and development to the town; similarly,

¹⁶ Communication between outsiders and the chief is mediated through the *ɔkyeame* (linguist), who acts as a translator and messenger, even when the visitor can speak the native language, because the chief must give permission for someone to communicate to him directly.

¹⁷ The value of the gift does not always correspond to the potential value-creation of the proposition.

these traits are equally desirable in candidates for chieftaincies. The multiple power dynamics at play also seem to impact on the enstoolment processes – at the time of this study, three of the five towns were struggling with internal rivalries over who should become the next chief.



Figure 3.8 A scene from a ‘durbah’ held for the UNWTO National World Tourism Day Celebration. Here the traditional authorities from royal families across Kwahu have gathered and are parading with traditional drums and ceremony. The *Kwahuhene* (Paramount Chief) is also present. Photo taken in September 2018.

3.8 Local government in Kwahu East

The Kwahu East district has several ministerial offices implementing national governmental policy on a local level, whose staff took part in this research. These are the Kwahu East District Assembly (DA), the Kwahu East Ministry of Food and Agriculture (MOFA) and the Mpraeso Forestry Services Division (FSD). These three offices act as the main state authorities in the district and their practices overlap strongly as they rely on each other’s processes at various stages of their policy implementation. The staff at these offices are employed as public servants, which means they can be transferred to other offices in any part of the country with little notice due to redeployment cycles. This can result in transience and the loss of institutional knowledge, as people are moved and replaced by others who do not know the area or local issues.¹⁸ It also affects the ability to coordinate across sectors.

¹⁸ During this research project, three senior roles changed hands – the MOFA director, FSD director and the FSD deputy – and a key informant and access gatekeeper for the DA was also transferred.

All three offices took an active part in the research, showing enthusiasm for the process, contributing ideas towards the participation-oriented methodology, and being interested in the outputs. Each office and their governance role is summarised below. For the locations of their district offices, see the map in Figure 3.4.

3.8.1 *The Kwahu East District Assembly (DA)*

The District Assembly (DA) in Abetifi is the decentralised arm of central government and encompasses the state system of governance for local matters. It is responsible for implementing national governmental policies and strategies, however, its local development plans, budgets and programmes are accountable to and inclusive of local citizens through electoral representation on the Assembly council. This is made up of forty-four assemblymen,¹⁹ with one elected from each town/village community, who meet to discuss and vote on plans. Their other role is to communicate between the DA and communities: Assemblymen feedback information about DA decisions to the towns they live in, and also take inputs from the communities and raise these points at the district level. This is the main way that information is passed down from district to communities, however there is also the Information Services Department²⁰ which educates people on what is happening through a variety of media, including town announcements, radio, bulletins and local information centres.

The DA is split into departments of employed civil servants that focus on different topics.²¹ These offices play a significant role in land use management across the district, especially through their oversight of urban and rural planning, infrastructure development (roads, electricity supply, schools, hospitals etc), water and sanitation, industry, and natural disaster response. All development proposals must be authorised by the DA having been through strict planning processes. As such, the values and priorities of the DA, and especially the leadership,

¹⁹ This is the term used for all elected members of the assembly, regardless of their gender – so female representatives are also called assemblymen – however, it also illustrates that this is a gendered space where men far outnumber women, which is discussed in Chapter Eight.

²⁰ This department is based within the Kwahu South DA but covers both districts.

²¹ Civil servants working within the town planning, environmental health services, budget, information services and disaster management offices were involved in this research.

are instrumental in determining how land use and allocation is evolving in the district (discussed further in Chapter Eight, §8.4 and §8.5).

The DA operates on a four-year strategic plan under the leadership of the District Chief Executive (DCE) who oversees the DA's direction, policies and practice. In Kwahu East, as per the process described in Box 3.4, the incumbent DCE was recommended for his post by the current Member for Parliament (MP) in early 2017. The district offices of MOFA and FSD sit within the DA structure as their own departments. Their directors report both to the DCE and to their respective senior authorities in Accra.

The MP for Abetifi constituency is also an honorary member of the DA however, he has no voting rights. This means he should attend assembly meetings to present feedback from parliament about new laws and policies and give advice on topics under discussion. The MP is a key gatekeeper to state funding as he oversees the distribution of a common fund and can lobby in parliament on behalf of the district, to secure finances for infrastructure projects. This means that even without voting power, he can influence the DA strategy through providing financial and political inputs within assembly discussions, and in conversation with assemblymen, the DCE and other department leads. MPs may also hold a role within the central government which can also impact on how they execute their local duties.

Box 3.4 The DCE appointment process

Every four years, the newly elected MP makes a recommendation to the President for the DCE position in their constituency DA. Generally, the President approves and directs central government to appoint the nominated individual. This is then ratified by a confirmation vote at the DA level by the elected assemblymen. The NPP plan to alter the appointment process in 2021 so it will instead be by local election. The purpose is to “increase grassroots local participation in local democratic processes” (interview with the Kwahu East DCE, D69). In the future, therefore, DAs may be led by DCEs who are politically independent or members of the opposition party.

In December 2016 an Accra-based international businessman, who was born and school educated in Nkwatia, was elected as the local MP. He is part of the ruling New Patriotic Party (NPP). He has a strong influence over district political and economic views, strategies and future trajectories due to his social status, wealth, networks, business projects and investments (discussed in §8.3).

As highlighted in studies from other parts of Ghana, there is an inherent power dynamic between the local state apparatus and the traditional authorities (Lund 2008). Similarly to legislation relating to timber, covered in Chapter Two, traditional authorities maintain their ownership rights over land and need to give their sign off to any building plans or changes to land use allocation.

3.8.2 Kwahu East Ministry of Food and Agriculture (MOFA)

The main office for Kwahu East Ministry of Food and Agriculture (MOFA) is also based in Abetifi. Considering that almost 70% of the 77,125 district population farms in some capacity (Government of Ghana census 2010, 2014),²² there is a small team of only nine Agricultural Extension (AE) Officers (made up of six agricultural and three technical officers) that cover the whole district, plus a director, a deputy director and several administrative staff. Each AE Officer supports approximately 6000 farmers, or 2000 farming households (interview with MOFA director, D66). Agricultural Extension (AE) Officers spend most of their time visiting farmers on their farms and in communities giving advice, however staff have to clock in and out of the Abetifi office.²³ The director oversees the implementation of the national agricultural policy on a local level, reporting directly to the District Chief Executive at the District Assembly. The deputy manages the nine-person extension team and all extension support programmes. MOFA's role is to operationalise the government of Ghana's agricultural policies on a local level, the overall aim being to increase production and yield. Two of the most important policies are 'Planting for Food and Jobs', which underpins all extension activities, and the new 'One District, One Factory' initiative which aims to establish a factory in every district of Ghana. Whilst the latter is not strictly only for agriculture, the likelihood is that the factory in Kwahu East will be for processing of farm produce – for example, cassava flour – and therefore impact on which crops are grown in large quantities.

²² The 2010 census found that 68.9% of households "engage in agriculture" – in rural areas, 8 in 10 households are agricultural, compared with only 5 in 10 for those in urban localities. 93.2% of these do crop farming.

²³ This is significant as it reduces the amount of time that extension officers have to spend with farmers in the field, partly due to the difficulty of travelling in areas lacking tarmac roads.

Given the high number of farmers in Kwahu East, MOFA has an extensive influence over the livelihood security of local people, as well as affecting their use and inclusion of trees within their farms. MOFA practices on the ground revolve mainly around agricultural extension work. This involves AE Officers visiting towns and villages to give farmers of all types of technical training in farming techniques, advise farmers on specific problems (for example, pest control or crop disease), and to provide extra support for those most vulnerable to adversity due to poverty or isolation in hard-to-access areas of the district. AE Officers also encourage communities to form Farmer-Based Organisations (FBOs) (see Box 3.5).

Box 3.5 Farmer-Based Organisations (FBOs)

FBOs are locally organised cooperatives of farmers who cooperate in labouring, processing, storing and selling farm produce. FBOs are usually made up of smallholders, some with semi-commercial operations, that grow their own crops. Crops can be sold separately at a price set by the FBO, thereby preventing traders from undercutting farmers. Alternatively, produce from different farms is combined to sell in bulk to traders, local maize processing mills, factories or the national food basket. These selling techniques reduce the power of traders over product value. Many FBOs have collective storage and processing facilities, which are important for maize, cassava, beans and groundnuts. Sometimes FBO members help each other with farm labour, especially during clearing and harvesting seasons, to save on paying labourers.

MOFA encourage farmers to organise into FBOs so that they can easily liaise, pass on information and provide agricultural inputs. This enables MOFA to reach more farmers more efficiently. Occasionally an FBO will be given an area of land by MOFA to communally grow crops specifically for the national food basket or as a demonstration farm, where MOFA can try out new crop varieties and techniques.

3.8.3 Mpraeso Forestry Services Division (FSD)

The main office for the local forestry services division (FSD) is situated in Mpraeso, the capital of Kwahu South district. Whilst this is outside of the geographic study area of the research project, they are responsible for the management of forest reserves and trees off-reserve across four districts, including Kwahu East. The team includes 32 forest guards, 57 protection officers, eight forest range supervisors, three forest range managers, two deputies, one director and several administrative staff.

The FSD is responsible for the implementation of forestry policy and operationalising timber extraction in Kwahu East, both within forest reserves, their immediate buffer zones, and in off-reserve forest-farmland. This also includes overseeing tree felling for development. The FSD's main activities in Kwahu East involve fire prevention, monitoring tree cutting activities on- and off-reserve, enforcing state regulations and legislation related to trees, keeping records of tree tenure and registration documents, organising timber concessions, monitoring forest farming arrangements, and ensuring timber stocks are replenished through reforestation schemes. These are all shaped by national forestry policy, see Table 2.1. Chapter Seven provides more detail about the FSD's work in Kwahu East.

3.9 Chapter Summary

This chapter has provided information that contextualises the research locally. As the empirical chapters provide new layers of detail, key aspects outlined here remain important. The Bokuruwa field site straddles the dry semi-deciduous inner and fire zones, within Ghana's transitional forest zone. This is where the moist deciduous forest meets savannah woodland. Kwahu's geological formations have an influence over the farming system, due to the rocky landscape and relatively high altitude. The area has a rich cultural history of local uprisings, political engagement and festival celebrations. Kwahu identity is connected to their reputation as business-savvy traders, and social status is expressed through the building of extensive family homes. There are two local governance systems which have significant influence over the course of development. As shall be seen in the empirical chapters, all of these elements connect to the complexities of tree cover change. Importantly, this local context also informed how the research methodology took shape.

4 The Research Process

4.1 Introduction

This chapter gives an account of the research process and how it evolved during the fieldwork in response to issues of positionality and methodological challenges. It begins (§4.2) with a reflection on my positionality as a researcher, looking at how my socio-political privilege, professional and personal experiences, and personality all informed the approach I took and how the research unfolded. This is followed in §4.3 with a discussion about the challenges of working with research assistants given their positions in the community, the limitations of working through a translator, and the dynamic we nurtured as co-investigators. From here, the chapter moves on to §4.4 where the case study research design is described, why this approach was taken and the timeline of fieldwork. §4.5 gives detail about the choice, execution and sampling strategy of each method used during data collection, reflecting on how effectively they elicited information and the difficulties encountered. I then explain how I gained free, prior informed (FPIC) consent from different participants in §4.6. Finally, §4.7 outlines the data storage and analysis process, justifying the qualitative approach and explaining how the coding system was created.

4.2 Researcher positionality

“The burning question now is what it means to start from a place of entanglement, as scholars situated in and often beneficiaries of the very politico-economic systems under consideration in our research” (Sundberg, 2015:117).

As a white British middle-class woman doing research in rural Ghana there were several layers to my positionality that were apparent from the beginning, others that came to the surface as I carried out my fieldwork, and still more that emerged as I reflected on my practice. These issues had a palpable influence over how I carried out my research, the relationships I forged,

the ways I interacted with the data, and therefore the trajectory the project took. Furthermore, my well-being and personal circumstances also intersected with my identity, positionality and approach to the research (Drozdowski and Dominey-Howes, 2015) (see Box 4.1).

There are three dimensions to positionality in the field. The first acknowledges how the researcher is seen by participants and the wider community which they are working in, understanding the differing perceptions, assumptions, associations and so forth that are based on both the participant's relative position and the researcher's gender, race, class, appearance and behaviour. The second dimension considers how these same political identities affect how the researcher sees the participants and activities they are taking part in, the interpretations made and the conclusions that are therefore drawn. This means that in order to situate the knowledge that is being produced, the researcher must become aware of their own identity, assumptions, privilege, emotions, experiences and personality, and make a discipline of thinking critically about the power dynamics of various interactions (Rose, 1997). A third element of positionality, and a direct consequence of the two mentioned, is the tangible presence and unequal distribution of power in any given scenario, and, in this case, the corresponding relative privilege of the researcher (Berry *et al.*, 2017). Furthermore, these can be made more complicated when working with translators or gatekeepers who facilitate access to and communication with different research participants.

During my fieldwork seasons, all these angles influenced my perceptions of those I was carrying out research among, their views of me, the relationship dynamics between us, discussions and conversations that we engaged in, and therefore the overall research direction and findings. The dynamics of my positionality changed over time as I established both friendships and professional networks. The boundaries, entrances and exits of 'the field' became blurred through developing personal communications and emotional investment in the community (Berry *et al.*, 2017). Furthermore, my understanding of my positionality and awareness of my privilege in various situations changed as I physically left Ghana and deconstructed my experiences with critical friends in the UK. My positionality, therefore, is not a stable, static thing that exists outside of space and time which can be brought to the surface, understood and then filed away (Sultana, 2007). It is instead multidimensional, spatiotemporal, in constant flux and, importantly, has a similarly fluctuating agency of its own

when it comes to research practice, reading, analysis, theorising and writing (Sundberg, 2015). As such, the pursuit of anti-racist and intersectional feminist knowledge production through political ecology research demands constant reflexivity. This, some argue, is an unachievable ideal (Rose, 1997) which has the potential to become self-indulgent navel-gazing unless it leads to emancipatory practice (Kobayashi, 2003). Indeed, reflexivity can lead to paralysis or withdrawal from particular locations, as researchers fear misrepresentation, inauthenticity and unwittingly perpetuating neo-colonial ideas (Sultana, 2007). This ‘impasse’ can be addressed by researchers grounding their work in political dialogue, finding ways to co-produce and communicate knowledge in accessible, appropriate language for different audiences (Nagar, 2002).

With this in mind, there are several overlapping elements to my socio-economic positionality which require acknowledgement and due attention. These include my race, gender, class, fluency in English, literacy, academic credentials and status, and institutional associations. It was impossible for me to conduct my fieldwork as an invisible, objective researcher (Berry *et al.*, 2017) and my presence will have had an impact on how participants interacted (Bell, 2005). Physically I stood out as a white female body, amongst black rural communities and often male-dominated hierarchical spaces. My race and gender had agency, simultaneously allowing me access to informants across the socio-political spectrum – from subsistence farmers to directors of ministries and the MP – and creating circumstances where I felt vulnerable, especially to the male gaze. This tension is described further in Box 4.1.

As time went on, I became increasingly aware of my presence being an involuntary gatekeeper for various structures of oppression that political ecology strives to deconstruct (Sundberg, 2015) – namely imperialism, white supremacy and patriarchy. This was brought to the fore by casual comments made by participants referring to me as “our colonial master”, seeing me as an expert coming to impart knowledge to ‘help’ people, and my reluctant pandering to the sexual objectification of elite male informants to ensure ongoing engagement. Whilst my racialised and gendered identity played the largest part in my positionality, I was also aware of other factors. As an educated English-speaking westerner, I was automatically seen as allied to the political elite, a status which was compounded by my institutional associations with GWS, RSPB, and the University of Cambridge, and my personal connection to the local MP. As a young white person, I was often mistaken either as someone

from the MP's charitable foundation or other local neo-colonial development organisations hosting international volunteers.

Box 4.1 Researcher well-being

It is unhelpful to separate the researcher's mental and emotional wellbeing from the research process because it has significant agency in relation to how relationships are formed, how data is interpreted and the motivations driving the researcher (Drozdowski and Dominey-Howes, 2015). The idea that research can be unemotional, unbiased and therefore objective is based on masculinist notions of how knowledge is produced and what types of knowledge are valid (England, 1994). Research is personal, and as such it is important to recognise personal circumstances which may be particularly influential, mitigate for these as far as possible, and acknowledge where the limitations lie.

This was particularly pertinent in my research because I experienced a close family bereavement during my fieldwork. Having arrived in Ghana in September 2017, I was called home after just two weeks to care for my terminally ill father in the last few months of his life. This disrupted my original fieldwork schedule and methodology (see 4.4.3), and had far-reaching impacts on my mental, emotional and physical wellbeing. When I returned to Kwahu in February 2018, I felt vulnerable and sensitive, which was challenging to navigate whilst living as an outsider, solo, white woman in a strongly patriarchal society. My emotional state contributed to the feelings of simultaneous power and powerlessness described in 4.2. My tolerance levels for sexual objectification and harassment, and my ability to professionally manage those dynamics, were lower because I was grieving. However, my grief also had an agency of its own: the loss of a parent altered my perspective on life completely and with this everything else reoriented too, including my attitude towards the research and how I went about doing it. I developed a fierce determination and heightened senses, which created unexpected pathways for engaging with informants and their lives in a more immersive, defiantly human way.

I mitigated for this emotional upheaval by making the most of supervisory structures, ensuring I was able to keep in touch with loved ones throughout my time away, taking breaks to spend time with friends, dividing my fieldwork season into two, and committing time each evening to processing and journal writing. The thesis remains unapologetically grief-infused.

I was unable to mitigate entirely for the multiple effects of these socio-economic identities. Instead, I made a conscious effort to be aware of my position and privilege, and where appropriate engaged informants, collaborators and friends in open dialogue about these dynamics. I made my whiteness a point of discussion, using it as a tool for exploring power and representation. My background in feminist, anti-racist community development work in the UK gave me transferable skills, professional praxis and a network of critical friends with whom to reflect on my practice, enabling me to operate according to participatory research principles. This approach affirms the knowledge in the room, positions the researcher as a

facilitator and/or learner rather than as an expert, prioritises deliberate daily reflection on practice (both personal and with collaborators), plans research methods in partnership with informants/participants, and works towards meaningful outputs for multiple stakeholders (Pain and Kindon, 2007; Kindon, *et al.*, 2010).

I used my privileged access to ministerial offices and the MP to both advocate on behalf of and create points of contact for those with less decision-making power (i.e. smallholders). This is demonstrated through the multi-stakeholder action group meeting and by inviting representatives from the Ministry of Food and Agriculture (MOFA) to farmer community meetings (see §4.5.5 and §4.5.6). I also spent considerable time meeting directors within the state offices, passing on information about the needs, priorities and ideas coming from people in the farming communities, with the farmers' permission. I spoke Twi as much as possible out of respect for the language and to build rapport with the people I worked with. This also served as a political statement and as a deliberate tool to differentiate me from other white people in Kwahu, who I was keen to distinguish myself from. English is the language of the colonisers and remains the national language of Ghana. It is still seen by many as more 'civilised', partly reinforced by the fact that fluency in English opens doors to many more education and employment opportunities, and children are reprimanded for speaking their native tongue in school. Choosing to speak my limited Twi, therefore, had a significant impact on how I was seen by people in the wider community and participants in the research. I employed local research assistants (see §4.3) and supported the Kwahu rural economy through my consumer purchases, both personal and for research activities.

It is important to acknowledge that regardless of the efforts made, the concern for authentic participation and sensitivity to how far knowledge is co-produced and communicated, my research remained largely extractive. This is one of the limitations of PhD level academic research, where the student needs certain information to write the thesis, the reality of being an outsider with privilege and a relatively short time in the field.

4.3 Working with research assistants

Another aspect of my positionality came with my employment of two local people as research assistants to broker access to informants, increase my capacity and provide translation.

Richmond,²⁴ a pastor and local community development worker in his forties, focused mainly on household survey collection. He mostly worked independently, which freed up my time for other tasks. My second assistant was Harriet, a young woman who grew up in Bokuruwa. At twenty years old, she had just finished school when I met her, was hoping to study geography at university and had excellent English-speaking skills. Since she knew the community well, it was a good fit and so I initially asked her to accompany me on a daily basis as I learnt about local lives and livelihoods through participant observation in Bokuruwa. We started carrying out household farming surveys together and it became clear that Harriet had a good understanding of the research, excellent people skills and was very reliable. I employed her on an almost full-time basis – where her time was split between carrying out surveys and working alongside me on other methods. Harriet became a key gatekeeper for interviews in the farming communities and collaborator in the design of data collection methods as the research evolved. When I returned to Ghana in September 2018, we spent some time reviewing the data and planning how to fill the gaps I had identified. Harriet used her contacts to find appropriate older people to carry out oral history interviews with, co-facilitated farmer community meetings, attended networking meetings with decision-makers, and co-led the multi-stakeholder action groups.

There were several issues that arose whilst working with local assistants. Each had their own positions and affiliations which occasionally caused a conflict of interest. For example, one day Richmond and I were interviewing a family head who attends Richmond's church. He told us how his farmland had been demarcated without his permission for an airport development scheme. Richmond responded by lecturing the man about how many economic benefits it would bring to the area. I intervened, careful not to undermine Richmond in public, and after the interview told him this was inappropriate. It led to an interesting conversation about power, representation and the role of a researcher; however, it also became clear at this point that Richmond was not the right person to be assisting me in interviews due to his understanding of development, his vested interest and relationships with developers, and his status as a religious leader in the community. As such, I asked him to focus solely on completing household surveys and unfortunately our relationship turned sour after Richmond became unreliable about turning up to work. He also lied to me about a significant sum of

²⁴ Both research assistant names have been changed for anonymity.

money I had left in his charge to buy a gift for a chief. We stopped working together and I asked Harriet to complete the surveys. In complete contrast, Harriet was eager to please me and at the beginning of our working relationship I was concerned she may be translating information to tell me what I wanted to hear. I overcame this by spending time discussing the research aims and approach with her in depth, reflecting together about how the interviews were going, what was being shared and what it meant. We looked at interview questions together in advance so she could translate them into Twi, and she demonstrated her grasp of the topic by the contributions she made during these planning and evaluation sessions.

Working through a translator for interviews, farming observations and community meetings was far from ideal. Nuance will have been lost, which impacts the data analysis. However, due to the participatory nature of the methodology, it made practical and relational sense to employ a local person to translate rather than a professional outsider. As the daughter of a struggling smallholder farmer, Harriet was able to provide insight and understanding of practices, perceptions and agencies that a trained, external translator would not have had. This adds another layer of potential bias and interpretation, but one which we were able to discuss at length and which triangulation of different methods helped to counterbalance. Furthermore, offering employment to local people contributed economically to those individuals and their families, and positively influenced my relationship with the farming communities.

4.4 Research design

With my positionality in mind, this research project took the shape of a classic political ecology case study of the relationship between people and trees, and the multidimensional factors influencing tree cover change in Kwahu East. It utilised participatory techniques to “move away from extractive relationships to ones of co-production in which research subjects are treated as partners and involved not just in generating data but also in deciding what counts as true and valid” (Demeritt, 2015:230). This section outlines the case study approach, field site area, and fieldwork timeline.

4.4.1 Case study approach and selection

The RSPB field site where my research also took place (Figure 1.5) provides an interesting and appropriate case study for several reasons. Firstly, whilst the site is of conservation concern, it is not a dedicated conservation area. This means the socio-ecological forest-farm system is similar to other settlements in the transition forest zone. By the same token, because there has been research carried out in this location before, there is an opportunity to make a unique contribution to current knowledge about the area by taking a different research approach.

Case studies have long been used by political ecologists to draw attention to the socio-political complexities of landscapes and are particularly useful for studying the micropolitics of a given community (Rocheleau, 2008, 2008; Jarosz, 2012). Case studies can be used to generate accounts of 'real life' through immersive, observational, participative research (Newing 2011, Robson 2002). Whilst this research project is not an ethnography, it makes use of slow ethnographic participant observation to understand the details of relationships, practices, values, perspectives and the multiple influencing narratives at both macro and micro levels (Bernard 2006, Puri 2011, Yin 1994). The flexibility of the case study approach and use of mixed methods to collate both qualitative and quantitative data also ensures "context ('ecological') validity" (Newing 2011:51).

There are limitations with this approach. Firstly, there is a risk that site-specific cases are used to make generalised recommendations across a wider region (Robson 2002), when local contexts may differ considerably. This is particularly relevant for this research, because the RSPB are interested in the West African transition zone more broadly. This dynamic means that sensitive dialogue and dissemination of findings are crucial. As discussed in section §4.2, there is also a strong potential for bias from the researcher because living in the area over a period of time and working with a participation-oriented methodology means becoming personally acquainted with participants.

4.4.2 Bokuruwa field site

I treated the RSPB study site, an area of forest-farm in a valley within the Kwahu escarpment (Figure 4.1), as the starting place and then figuratively 'followed the farmers' to create the parameters of my field site. This essentially meant that I started by including the three small

towns - Abetifi, Kwahu Tafo and Nkwatia – and two villages – Bokuruwa and Pepease – which use the RSPB site for farming and livelihood activities (see Figure 3.4). I also included the two conservation NGOs (RSPB and GWS) who interact with the site, and local organisations and ministries who are involved in decisions which impact on these communities and the forest-farm ecosystem. The latter included the local offices for the Ministry of Food and Agriculture (MOFA), the Forestry Commission, Kwahu East District Assembly, the MP’s charitable foundation, the Jesse M. Rohde Foundation²⁵ and other influential individuals (for example, businessmen from the Kwahu diaspora). People from another nearby town, called Asakraka (shown on map in Figure 3.4), also farm in the area the RSPB is monitoring, however, I decided not to include that town as it falls within the Kwahu South district boundaries. To gain further understanding about what is happening to trees in Ghana more broadly, I also interviewed some experts in forestry and farmer advocacy who work for rights-based NGOs in Accra and Kumasi. Whilst these individuals are not connected directly to this geographic location, they are working at a national level to influence government policy and have an in-depth understanding of how structural factors play out on the local level.



Figure 4.1 The landscape of Bokuruwa field site, viewed from Pepease. The RSPB study site lies within this valley. I started within this area of forest-farm and worked outwards to create the field site boundaries. Photo taken in October 2018.

²⁵ The Jesse M. Rohde Foundation is a small American-founded NGO based Oworobong (a small town to the south of Kwahu Tafo) which focuses on health and livelihoods. The Director became involved in the research as a key informant and gatekeeper for accessing older farmers for oral history interviews.

I obtained population information from the Kwahu East District Assembly and discovered that my field site included three of the largest towns in the district. Of the five towns and villages in my fieldsite, Bokuruwa village is the only place that is not accessible by tarmac roads. The RSPB forest-farm study site is accessible by dirt tracks – the main one being a road from Pepease to Kwahu Tafo that connects Bokuruwa, and other tracks into the forest-farm that have been left by logging. Most of the participant observation of local life took place within Bokuruwa village, the closest in proximity to the RSPB study site. This was partly out of ease – the chief was supportive and welcoming of my research, having been consulted by RSPB and GWS in previous years – and because I quickly built relationships within the village that enabled more immersive experiences. Contextual information and maps of the field site were provided in Chapter Three.

4.4.3 Fieldwork Timeline

As mentioned in Box 4.1, my fieldwork season was disrupted by a close family bereavement. This had an extensive impact on the research methodologically, as it altered the length of my stay in Ghana, where I chose to live and how I managed my time. My original plan was to be in the field for a calendar year to experience the full farming cycle; and to take a more ethnographic approach, living in Bokuruwa village and participating in daily livelihood production. Unfortunately, my in-country language training was interrupted and whilst I continued learning Twi through skype lessons from the UK, my progress was limited by lack of immersion. Upon returning to Ghana in January 2018, I decided not to carry out an in-depth ethnography of the farming system and tree management for two main reasons. Firstly, my limited grasp of the language made it an inappropriate methodology. Secondly, I was unable to live in Bokuruwa because the combination of poor phone reception for keeping in touch with family, intense living situation and relative isolation from nearby towns was unmanageable given my vulnerable mental health. This change in methodology also meant that it became less important to experience the whole farming cycle. For these reasons, I chose to do two shorter trips (January to June, September to December 2018) with a break in the middle rather than one long field trip. I also returned to Kwahu in July 2019 for a short visit, where I had some follow up conversations, final interviews and distributed a summary

of my research findings to collaborating stakeholders. Figure 4.2 gives a summary of how the research panned out and which methods were used when.

Figure 4.2 Fieldwork timeline	
Time period	Research Activities
10th - 30th January 2017	A ten day 'reccy' trip to Ghana, accompanied to Kwahu by a conservation scientist from the RSPB and field officer from GWS.
September 2017 - October 2017	<i>Two weeks of language learning and orientation:</i> 25th September: arrived in Ghana to start difficult language training. 9th October: Travelled to Kwahu -Visited Bokuruwa to re-establish contact with the Queen Mother and Chief -Accompanied RSPB and GWS staff on a walk in the RSPB study site for one day. 11th October: Flew back to the UK due to terminally ill father. Remained to care for him in his final months.
October 2017 - December 2017	Difficult language training via skype and desk work in the UK.
January 2018 - June 2018	<i>Five months of fieldwork:</i> 23rd January: Arrived in Accra 1st February: Moved to Kwahu, found a place to live in Atibie (Kwahu South) and took taxis to fieldsite villages to carry out research activities: -254 household farming surveys in four towns (10% of the population) -Participant observation in daily life and with NGO partners -Interviews (mixed structure) -Farming Observations -Attendance at events (local and national) relating to land use, forests and tourism In early May I became ill and found it difficult to recover my health. This disrupted data collection and resulted in me leaving Ghana ten days before scheduled. June 11th: Flew back to the UK.
July 2018 - September 2018	<i>Three months in the UK:</i> -Transcribing and data organising -Meeting with supervisors to reflect on where to go with the research -Identifying the gaps in my data -Planning the methodology for the next field season
September 2018 - December 2018	<i>Three months of fieldwork:</i> 18th September: Arrived back in Accra 25th September: Moved to Kwahu and lived in Pepease (one of the villages within my fieldsite) in a volunteer house for a local development NGO. Carried out: -Interviews with local decision makers and representatives from farming communities -Oral history interviews with older people in three towns -Six farmer community meetings, holding separate gatherings for men and women -One mixed gender farmer workshop -Two multi-stakeholder action groups -Attendance at local events related to land use, decision-making processes, tourism and farming. December 8th: Returned to the UK.
14th July - 7th August 2019	<i>A three week return visit:</i> 16th-21st July and 2nd-5th August: spent time in Kwahu -follow up conversations with participants from the ministries where I shared a short summary of research findings; -attended a Research Extension Linkage Committee meeting held by the district MOFA; -three final interviews. In this trip I also attended the July 2019 Forest Watch Ghana meeting where I met and interviewed forestry and advocacy experts.

4.5 Methods

I used a mixed methods approach, collecting both qualitative and quantitative data. My first fieldwork season was organised to give me practical experience of smallholder farming and a broad understanding of factors which affect tree cover. I began by spending a month orienting myself geographically, socially and politically in Kwahu by shadowing GWS and RSPB staff as they gathered ecological data and spending informal time with local people. This familiarised me with the RSPB study site from both the conservationist's and local perspectives. During this period, I also introduced myself and my research to officials working within government offices – the Ministry of Food and Agriculture (MOFA), the Forestry Services Division (FSD) and the District Assembly (DA). I used chance meetings, participant observation, community walkabouts with research assistants and unpublished socio-economic data²⁶ to rapidly appraise the farming system across the five towns I was including in my case study. I also visited the DA to obtain information about population distribution to inform my sampling strategy for each method.

This orientation process confirmed that the farming communities within the five towns (total population circa 35,500) use similar farming and tree management techniques, have comparable arrangements with land tenure, and engage in diverse livelihoods. I proceeded to design a mostly quantitative survey to gather broad data about the household structure, farming system, tree management, and livelihood challenges. These findings, along with participant observation on farms and in villages, informed my interview questions. My second fieldwork season focused on exploring perceptions of tree cover change and agency – in the form of access to decision making, representation and distribution of resources – through targeted interviews, farmer community meetings and multi-stakeholder workshops. Table 4.1 summarises the number of respondents for each method and the following corresponding chapter sections give more detail.

²⁶ This data was gathered by a consultant working in partnership with GWS.

Table 4.1 Research methods and number of respondents						
Corresponding chapter section	Method	Quantity of each method and types of respondents			Approximate number of respondents	More information about the method
		Farmers	Authorities/Elites	Total		
4.5.2	Farming Observations	15	N/A	15	10	These were semi-structured interviews held on the farmland, observing farming practice and taking part in livelihood production.
4.5.3	Household Farmer Surveys	252	N/A	252	500+	This number (252) equates to approximately 10% of households within four towns in the study area (Pepease, Bokuruwa, Tafo and Nkwatia). Abetifi was deliberately excluded due to it being a district anomaly (i.e. the district capital) and farmers being harder to locate. Most surveys involved two or more household members taking part.
4.5.4	Semi-structured Interviews	55	25	80	100+	25 of the interviews with farmers were carried out as part of the survey pilot – asking the survey questions and recording qualitative data at the same time.
	Informal Interviews	5	3	8	8	These vary from conversations had within events which were written up afterwards to specific interviews of an informal nature.
4.5.5	Oral History Interviews	12	N/A	12	16	These were with farmers aged 70+ in Pepease, Bokuruwa, Tafo and Oworobon. They differed from other interviews as they focused on historical information and change over time. Some historical elements were covered in other interviews too.
	Group Interviews	3	5	8	25	These were spontaneous group interviews, as opposed to individual interviews where other family members would occasionally speak. They were with staff from Forestry Commission, three different NGOs, one group of elders, and three groups of farmers.
4.5.5	Community Farmer Meetings	7	N/A	7	100+	There were 3 meetings for men, which averaged at 30 attendees each time, 3 for women that averaged at 55 attendees each time, and 1 mixed group which had 22 (7 men, 15 women) attendees. There was some overlap but new faces each week. MOFA staff were invited to participate at two of the meetings. Each meeting was 2 hours long.
4.5.6	Multi-stakeholder Workshops	1	2	2	26	There were two workshops in total (one was for both groups of participants). 12 attended the first, 22 the second and most of the decision makers came to both sessions. Each workshop was 2.5 hours long plus lunch.
4.5.1	Participant Observation	Participant observation over ten months underpinned the whole research project. It involved taking part in local life and learning by doing on a daily basis both within the farming communities and with partnering organisations (e.g. practical fieldwork and ecological data collection with GWS/RSPB, observation of dynamics between participants during workshops, learning farming techniques, and living in the community).				

4.5.1 Participant observation

Deliberate attentiveness and participant observation infuse all other methods whilst also being a method in and of itself. In practice, this means that I used participant observation in everyday life and livelihood creation; farm visits with different types of farmers; working alongside NGO staff carrying out conservation activities in the area; taking part in local cultural events; attending an international conference on tropical forests; and as a technique for gathering “complementary evidence” (Kearns, 2016:314) whilst carrying out other forms of data collection (e.g. observing power dynamics during workshops and meetings). My main participant observation of livelihoods took place in Bokuruwa, with the permission and support of the chief who encouraged me to join in farming so that I would understand local challenges. I spent six weeks shadowing conservationists specifically, as well as some time in the NGO headquarters in Accra, which informed the contextual framing of the research questions.

Participant observation provided the soft empirical data required for the research aims, whilst also facilitating the process of building trusting relationships with participants and increasing their engagement in other methods. As an approach that provides contextual understanding of a given place in time (Kearns, 2016), participant observation is especially important as it grants the researcher immersive lived experience, capturing details about emotion, relationships, contestation and conflict (Puri, 2011). I kept a daily fieldwork diary which both recorded information and enabled vital space for reflection and intentional introspection as the research unfolded (Evans, 1988).

Due to my interest in the relationship between people and trees, my approach was also inspired by multispecies ethnographic theory. In essence, this “centers [sic] on how a multitude of organisms’ livelihoods shape and are shaped by political, economic, and cultural forces” (Kirksey and Helmreich, 2010:545). Multispecies ethnography embodies “an anthropology that is not just confined to the human but is concerned with the effects of our entanglements with other kinds of living selves” (Kohn 2013:4). To do this, Dooren, *et al.*, (2016:17) advocate ‘attentiveness’, describing this as a two-fold process that seeks to get “to know another in their intimate particularity... [and] a practice of learning how one might better respond to another, might work to cultivate worlds of mutual flourishing”. Tsing (2011) calls this ‘passionate immersion’: paying careful attention to the multisensory entanglements

inherent in human-other relationships; acknowledging processes by which shared lives are created; being curious about types of interactions; and allowing this learning to change the way we construct knowledge about and cultivate care for multispecies assemblages (Doreen et al., 2016:6).

I carried out a total of ten months of participant observation in Kwahu East. Therefore, whilst the research was not an ethnography, the insights gained through slow everyday attentiveness and encounters had an ethnographic dynamic, which is reflected in the empirical chapters. The participant observation was intended to be illustrative rather than representative.

4.5.2 Farming and livelihood production observations

This method was a more structured form of participant observation. To learn about how farmers interact with trees on their farms, how livelihood decisions are made, and the challenges smallholders face, I ‘followed the farmers’ to their farms. This is the usual way that knowledge is passed on between generations, and people were welcoming of me joining them to learn. In total I carried out fifteen farm visits. Some farmers also showed me how crops were then processed – specifically cocoa, palm, maize, cassava, and groundnuts – at their households, market stalls and farming associations.

Taking part in these activities brought the challenges farmers face and decisions they make into reality – for example, learning how to weed and battling with tough grasses gave me a deeper understanding of the difficulties that farmers verbalised during interviews. It was an opportunity to see how farmers tend to young trees, which ones they keep and which they remove, and hear stories about their interactions with the Forestry Services Division (FSD) authorities who oversee logging. Furthermore, going to see farms was received very positively as a recognition of respect and genuine interest in farmer knowledge and experiences – and a gesture which other people in positions of influence do not initiate. This was invaluable for building positive relationships and rapport in the community. The farming observations mostly took place during April-June 2018 and gave me grounded experience that informed my understanding of discussions during the community meetings.

The sampling strategy for this method was a mixture of targeted and snowball non-probability sampling. The observations were recorded in note form during the session and written up afterwards. My research assistant Harriet attended farming with me to translate, and she also joined in. We invariably started with a tour of the farm, where I asked farmers about their crops, land use choices and presence/absence of trees. We would then weed for an hour or two, as long as the farmer was happy for us to (some preferred us not to). At the end of these sessions, farmers would often gift us crops to take home – usually cocoyams and fruit.

It proved difficult to organise these farming observations due to issues with local transport, miscommunications and my own ill-health. As such, I was unable to visit as many farms as I had originally hoped to. Furthermore, farmers work long hours and found it disruptive having us there, preferring to answer questions once the work was finished for the day. I settled on completing fifteen observations of differing farms – including two cocoa farms, two small-scale agribusinesses, one farm within forestry land, and a variety of smallholder farms, ranging from subsistence to semi-commercial.



Figure 4.3 A smallholder farming observation. This farmer has a problem with armyworm, an insect pest which causes extensive damage to maize. He showed me how he uses a pesticide spray (left of the picture) to kill them. Photo taken in April 2018.

4.5.3 Household farming survey

At the beginning of my time in Kwahu I decided it would be useful to do a household farming survey to gather a broad dataset which gave an overview of:

- i. Households – size, ages, gender, livelihood, labour distribution of tasks
- ii. Local farming system – crop choices, length of farm/fallow periods, land tenure
- iii. Farmer tree management – tree uses, retention and removal
- iv. Socio-political issues – rights, power, land dispossession, and livelihood challenges.

I drafted the survey (see Appendix 2) in consultation with key informants, creating an online form using Qualtrics which could be completed on a phone using an app. I piloted this across six different settlements with my research assistant Richmond. This ensured the questions gathered the right information in as short a time as possible, and it was also an opportunity to train Richmond in using the app. At the end of each day of piloting I made edits to the survey to improve it. We piloted six different iterations of the survey with twenty-five households.

After two afternoons piloting surveys in Abetifi I decided to drop this town from the survey because it was significantly harder to find farmers – as the district capital, it is much larger than all the other small towns in Kwahu East, so it is not representative of life for the majority of the district, and many people have jobs working in the town at the university or trading rather than being farmers primarily.

To determine how many surveys to complete, I asked the DA for the populations of the remaining two small towns (>5000 people) and two villages (<5000 people). From these figures and the pilot data I calculated the average size of household (9 people) to give me the approximate number of households in each settlement, and then aimed to complete surveys with 10% of these. Table 4.2 shows the breakdown of respondents.

Small town/ village	Settlement populations (study populations)	Number of Households (sample unit)	% of study population	Surveys completed	% of households (sample units) surveyed
Nkwatia	8729	970	37	84	9%
Tafo	8286	921	35	72	9%
Pepease	4478	498	19	48	10%
Bukuruwa	1879	209	8	48	23%
Total study population	23372	2598		252	10%

Once Richmond was confident, he collected survey data independently. I worked with Harriet to do surveys in Bokuruwa, and she took over independent data collection in all settlements from May onwards. I ensured parity between both of their working styles by attending with them, and the vast majority of the questions were multiple choice which limits the effect of the enumerator on the answers. However, over time it became clear that Harriet was recording more detail in the final qualitative question.

It was challenging to create a sampling frame as I had no list of households or maps of the area, so we used simple random sampling – by walking a route through the settlement, choosing a different neighbourhood each day, counting houses and visiting the 9th house. This strategy mitigated for the lack of GPS equipment, the absence of a pre-existing sampling frame and my research assistants' inexperience with using maps²⁷ or more formal techniques. We worked together to ensure they visited different 'neighbourhoods' – this relied upon my assistants' knowledge of the areas.

To aid the research assistants in generating conversations about trees, I made some tree flash cards which they gave to respondents to look through and talk about. This was useful for gathering data about which types of forest trees people keep and make use of on their farms, and which they always remove. This information forms the basis of Chapter Six. The list of trees I asked about were taken from the unpublished socio-economic study carried out by the RSPB and GWS in 2015 which identified the most common forest trees found on smallholder farms in the same field area. The trees are listed in Table 4.3. with their Twi, scientific and

²⁷ My first effort to create a sampling frame involved creating a map of each town using aerial images from google earth, since there were no other maps available.

common names. I use the local Twi names throughout this thesis, as these are the names used by most informants. I used the tree flash cards in a similar way during follow up interviews and community farmer meetings too. Table 4.3 also includes exotic trees, occasionally found on farms, used mostly by the Forestry Services Division (FSD) and other actors for reforestation.

Table 4.3 The scientific names of trees discussed in this thesis		
Common forest trees on farmland in Kwahu East according to research by the RSPB		
Twi Name	Scientific name	Common other name
<i>Emire</i>	<i>Terminalia ivorensis</i>	Black afara
<i>Ofram</i>	<i>Terminalia superba</i>	White afara
<i>Wawa</i>	<i>Triplochiton scleroxylon</i>	African whitewood
<i>Odum</i>	<i>Milicia exelsa</i>	Iroko
<i>Pepea</i>	<i>Margaritaria discoidea</i>	Pheasant-berry
<i>Okoro</i>	<i>Albizia zygia</i>	Pangban
<i>Ofoso</i>	<i>Sterculia tragacantha</i>	n/a
<i>Pampena</i>	<i>Albizia adianthifolia</i>	West African albizia
<i>Fotie/Otie</i>	<i>Hannoa klaineana</i>	Effeu
<i>Akuakuo-Ninsuo</i>	<i>Spathodea campanulata</i>	African tulip tree
<i>Akonkodie</i>	<i>Bombax buonopozense</i>	Red silk cotton tree
<i>Onyina</i>	<i>Ceiba pentandra</i>	White silk cotton tree
<i>Sese</i>	<i>Holarrhena floribunda</i>	False rubber tree
<i>Sesea</i>	<i>Trema orientalis</i>	Charcoal tree
<i>Sesemasa</i>	<i>Newboldia laevis</i>	Akoko tree
<i>Mahogany</i>	<i>Khaya senegalensis</i>	African mahogany
<i>Watapuo</i>	<i>Cola gigantea</i>	Giant cola
<i>Tweneboah</i>	<i>Cordia milenii</i>	Drum tree
<i>Tamatama/Edinam</i>	<i>Entandrophragma angolense</i>	Tiama mahogany
<i>Sapele</i>	<i>Entandrophragma cylindricum</i>	West African cedar
<i>Kyenkyen</i>	<i>Antiaris toxicaria</i>	False iroko
<i>Otoawa</i>	<i>Zanthoxylum gillettii</i>	African satinwood
<i>Odwen</i>	<i>Baphia nitida</i>	African sandalwood
<i>Nyamedua</i>	<i>Alstonia boonei</i>	Stool wood
<i>Gyama</i>	<i>Alchornea cordifolia</i>	Christmas bush
<i>Dinsinkro</i>	<i>Vitex gradifolia</i>	Black plum
<i>Prekese</i>	<i>Tetrapleura tetraptera</i>	Aidan fruit
<i>Bese</i>	<i>Cola nitida</i>	Cola nut
<i>Odwuma</i>	<i>Musanga cecropioides</i>	African corkwood
<i>Fruma</i>	<i>Voacanga africana</i>	n/a
<i>Onwama</i>	<i>Ricinodendron heudelotii</i>	African nut tree
Exotic species (occasionally found on farms, mostly used for reforestation programmes)		
Common name	Scientific name	
Cassia	<i>Senna siamea</i>	
Cedrela	<i>Cedrela odorata</i>	
Eucalyptus	<i>Eucalyptus camaldulensis</i>	
Gmelina	<i>Gmelina arborea</i>	
Teak	<i>Tectona grandis</i>	
Neem	<i>Azadirachta indica</i>	

There were a few issues with the household survey. Firstly, I wrote it early in the period of field work and the influence of the RSPB's current state of knowledge about the farming livelihoods and management of trees affected how I worded the answer options and the questions themselves. For example, in a question that asked about how farmers removed trees from their farms, I included coppicing, ring-barking and poisoning as optional answers, having been told by RSPB and GWS colleagues that these are popular methods. However, these three answers got only seven responses in total (<3%). In other parts of the survey, the responses indicated that the question itself may have been misunderstood or misinterpreted – either by the respondent or by the research assistant delivering the question. Working with two different assistants, who may have asked the questions or provided clarifications in slightly different ways, makes it difficult to know exactly how each question was communicated and understood. However, even with these limitations, there were interesting patterns that arose from the data which reflect my other observations and qualitative data from interviews. These are discussed in empirical chapters Five and Six.

The survey served several purposes. Firstly, it provided broad data from across the settlements about households, livelihoods, tree use and local vulnerabilities. Secondly, it was an easy way in to talk to people, build rapport and engage interest in other methods: it broadened my reach, exposing my research to many more people, and generating interest in focus groups and interviews. Finally, it also enabled me to work on different methods simultaneously as I delegated this work to my research assistants.

In contrast to my other research methods, the household survey was relatively extractive, which was picked up on by some respondents who expressed exasperation at being asked to participate in research which does not then lead to any 'help' for farmers. This was counter-balanced by using more participatory methods at other times, and conversations which started during survey collection were often followed up with other types of engagement.

4.5.4 Semi-structured interviews

I carried out a total of 108 interviews of varying structure and content. The findings from household survey data and relevant literature informed the questions. I prepared a question sheet grouped into topics for each interview type. The interview informants were split into

two main types: those who make their livelihood by farming and those who have positions of authority and/or have paid work within ministerial offices or NGOs. These are labelled 'farmers' and 'authorities/elites' respectively in Table 4.1, however, there is some overlap between these groups and they are not intended to be treated as entirely distinct. For example, some farmers have more access to people in decision-making spaces due to their wealth or land, and some people in positions of authority also farm.

Within farming communities, I used a mixture of targeted and snowball sampling to find interview informants. This meant I spoke to different types of farmers (subsistence, smallholders, semi-commercial, cocoa, and tree croppers), chairmen and members of Farmer-Based Organisations (FBO), chainsaw users, herbalists, fetish priests, traders, and others. In terms of traditional authorities, I was able to interview several chiefs, elders, clan heads and a queen mother, who are all custodians of the land. For ministerial offices and NGOs, I approached the directors in the first instance and asked them to make recommendations for which staff to interview. This meant that I interviewed a mixture of directors, middle managers and field officers at the Ministry of Food and Agriculture (MOFA), Forestry Services Division (FSD), Kwahu East District Assembly (DA), the MP's charitable foundation, Kwahu Tafo Progress Council and The Jesse M. Rohde Foundation based in Kwahu Tafo. I also met several wealthy members of the diaspora who bankroll and drive land use change. Some meetings took the shape of informal interviews, where I explained my research and asked if I could make notes on our conversations.

I carried out twelve interviews which focused on gathering oral history information. For these, I targeted individuals who had grown up in Kwahu East and were aged 70+. Harriet was able to find participants through her connections in different towns. I also spent a day in Oworobong (which is on a road south from Kwahu Tafo), a relatively new village built by Kwahu families in the 1960s and 1970s after the Volta Lake was created, about their perceptions of environmental change and how it had impacted on their livelihoods.

I carried out several spontaneous group interviews with two separate households, a trio of fetish priests, an informal group of smallholders, as well as development NGO staff and FSD officers. These were useful for gaining insight into hierarchies and collective opinion, particularly on frustrations about decision making and representation.

Finally, I spent some time in Accra at the end of my fieldwork, where I attended a Forest Watch Ghana meeting and spoke to several people who work for small advocacy-based NGOs that specialise in forests and forest people's rights. This was helpful for understanding how the issues I had come across in Kwahu relate to Ghana as a whole.

My overall approach to interviewing was flexible, opportunistic and dynamic. I ensured I was always ready to carry out interviews, open to different structures and locations, and followed up on leads through the individuals I met.

4.5.5 *Farmer community meetings*

During my second fieldwork season I organised weekly farmer community meetings in Bokuruwa (Figure 4.4). These created space to talk with farmers about livelihood challenges as well as explore the influencers and impacts of tree cover change. I organised the meetings by gender on separate days, as recommended by participants. After six split meetings I brought the groups together in a mixed gender discussion group (22 participants) specifically triangulating local knowledge about trees and their uses.



Figure 4.4 One of the Farmer Community Meetings with the women of Bokuruwa. This was the second of three and an Extension Officer from MOFA joined the meeting to answer questions. Photo taken in October 2018.

The meetings were open to all farmers in Bokuruwa and advertised through a town announcement on the loudspeaker the day before and in the morning. There was a large uptake – between 25-45 men and 50-60 women attended each week. The first session focused on livelihood challenges, the second on causes and impacts of tree cover change, and the third on collective farmer organising. On the request of farmers, I invited an extension officer from MOFA to attend for one meeting (a female officer came to the women’s group, a male to the men’s group). They took questions about farming techniques, listened to opinions and struggles, and gave advice about setting up a Farmer-Based Organisation (FBO). Each meeting was about two hours long, with participants taking the lead during the first hour (I asked a few questions to initiate discussion), and then the second hour being more structured for my research purposes. Harriet facilitated, providing basic translation so I could follow, and we transcribed the meetings in full using recordings afterwards.

I incorporated some Participatory Rural Appraisal (PRA) techniques to aid discussion. I created flashcards of livelihood challenges to aid discussion about which issues most affect farmers. One exercise which worked well was the use of a problem tree to explore the causes and effects of perceived tree cover change. I used this same exercise with the first multi-stakeholder meeting (see §4.5.6) so that the different groups’ answers could be compared (Figure 4.5). In the final farmer community meeting we used the tree flash cards to elicit local knowledge sharing about the use and management of forest trees on farmland.

I offered to type up notes for the men’s group at the end of the three meetings, and they agreed this would be helpful in case they chose to act on the discussions we had about establishing a Farmer-Based Organisation (FBO) in Bokuruwa. The notes recorded the decisions that had been made and the proposed next steps. I gave a printed copy to two English-literate smallholders (see Appendix 3).



Figure 4.5 A 'Problem Tree' PRA exercise. Top left was completed at the men's meeting; top right at the women's meeting; and bottom with the first group of local decision-makers. Photo taken in November 2018.

4.5.6 Multi-stakeholder workshops

The final method was to bring together different stakeholders around a common table to discuss tree cover change and what to do about it. I regularly visited each ministerial office, NGO and traditional town council to update them on the research process, discuss direction, and invited them to attend multi-stakeholder workshops, specifying that staff from different ranked positions were particularly welcome. The first meeting was with thirteen decision makers from five stakeholder groups – MOFA, FSD, traditional elders and two development NGOs. The second meeting was attended by representatives from the above plus different types of farmers and the DA. This totalled twenty-two participants. I provided lunch for all participants on both occasions.



Figure 4.6 The first multistakeholder meeting. This meeting was positively received and the group decided they wanted to meet again, inviting the DA and farmers to also participate. Photo taken in October 2018



Figure 4.7 The second multistakeholder meeting. This is half of the whole group (n=22). These participants, which included all of the five farmer representatives, held their discussion in Twi. Photo taken in November 2018.

These workshops were planned using Participatory Rural Appraisal (PRA) techniques (Newing 2011). PRA generates visual, interactive, participant-led quantitative and qualitative data (Newing 2011, Guijt, 2014). These workshops were particularly useful for comparing the perspectives, values and knowledge of different stakeholders. The facilitation was designed to be inclusive and engaging, enabling everyone to participate on an equal footing. There were some specific ethical considerations here – if it is not facilitated carefully, a workshop can become a microcosm of broader power struggles, leaving people feeling unheard, undervalued or misrepresented (Rocheleau, 1994). My background in professional community work has been formative in enabling me to develop effective facilitation skills, and I worked closely with Harriet and other research collaborators to ensure power dynamics were managed.

Harriet and I co-facilitated these groups. The first was small enough to all stay together, however, it was challenging to ensure every participant was able to contribute their ideas. The meeting was held in English, with some break out conversations in Twi, but it became clear from this first session that it would be better to hold the meetings in both Twi and English. For the second meeting, I split the group into two, encouraging participants to choose the language they felt most comfortable working in. Harriet worked in Twi, and I in English.

The farmers all chose Harriet's group, and the dynamic between farmers and decision-makers made a less structured and more dialogue-focused approach most appropriate. My group of decision-makers worked through the planned activities: first ranking the causes of tree cover change, land use change and complexity, and then doing a SWOT analysis for local organising. At the end of the meeting we came back together as a whole group to feedback key points. Attendees were very positive about the session – with farmers and decision-makers alike thanking me for organising it and feeling encouraged having met each other face to face.

4.6 Ethical Considerations

My ethical practice was a cause for continual reflection and adjustment. This research gained ethical approval of the university and followed the professional guidelines provided by the Department of Geography. I gained free prior informed consent (FPIC) from participants verbally. To ensure each participant had all the information, I asked my research assistant to translate a statement into Twi, and this was used at the start of each survey, interview and farming observation. Many participants were involved in more than one method, however, I always repeated the consent process. Most verbal consent is also recorded, although there are some exceptions, not least for interviews which were not recorded. I used the same approach in interviews with local decision makers and I gave them an information sheet to keep. The only method where I asked for written consent was in the multi-stakeholder action group meetings, because the participants were representing their organisations. Due to the informal and participatory nature of my methodology, I treated consent as an ongoing process rather than a once-ticked box – I continually updated participants on the research findings, direction and ideas arising. This nurtured a collaborative tone, where participants were intentionally treated as collaborators, as well as sources of knowledge and information. I approached traditional councils to gain overarching research permission – including Bokuruwa elders who agreed to my participant observation in their village, and the Abetifi elders who have higher responsibility as the district capital town.

I used informant's real names on the original data files, however, when archiving the data and during the writing up process, all names were changed to give anonymity to collaborators and research informants. This was more difficult for some individuals, especially those who work

for organisations in a particular role. This impacted on how I discussed and presented the data, especially since I will share the thesis publicly. To support the anonymity, I have used a key to indicate the empirical data source throughout the thesis. Where the informant's role or organisation is significant, I have included that information in the text. With the exception of the household survey (which is numbered 1-252), the numbers correlate with the transcript document number in the Atlas.ti project.²⁸ This is explained in Table 4.4.

Key	Informant	Key	Method	Associated informant keys
SH	Smallholder	FO	Farming observation	SH, SA
SA	Small-scale agribusiness farmer	IN	Interview (varied structure)	SH, SA, CU, TH, MOFA, DA, FSD, NGO1, NGO2, NGO3, BI, MP, TA
CU	Chainsaw user	OH	Oral history interview	SH, TA
TH	Traditional herbalist	FCM-Men	Farmer Community Meeting Men only	SH, MOFA
MOFA	Ministry of Food and Agriculture personnel	FCM-Women	Farmer Community Meeting Women only	SH, MOFA
DA	District Assembly personnel	FCM-Mixed	Farmer Community Meeting mixed	SH
FSD	Forestry Services Division personnel	MSM	Multistakeholder Meeting	SH, MOFA, DA, FSD, NGO1, NGO2, TA
NGO1	MP charitable foundation personnel	FHS	Farmer Household Survey	Bk, KT, Nk, Pe
NGO2	Rohde Foundation personnel	Key structure	Key is written as Method-Informant-Document number.	
NGO3	Tafo Progress Council personnel		*NB for group methods the informant is only specified in direct quotes.	
BI	Businessperson/investor	Examples	FO-SH-7 = farming observation with a smallholder, document 7	
MP	Member of Parliament		FCM-Women-88* = farmer community meeting women only, document 88	
TA	Traditional authorities		IN-DA-69 = interview with District Assembly personnel, document 69	
FWG	Forest Watch Ghana associate		OH-TA-72 = oral history interview with a traditional authority, document 72	
Ab	Abetifi		MSM-MOFA-90* = multistakeholder meeting, Ministry of Food and Agriculture representative, document 90	
Bk	Bokuruwa		FHS-Nk-4 = farmer household survey, Nkwatia respondent, survey 4	
KT	Kwahu Tafo			
Nk	Nkwatia			
Pe	Pepease			

I ensured the data was secure by storing information securely on my laptop. This was locked in my room at all times when unattended. The houses I stayed in had security guards who added another level of security. This was at greatest risk when travelling, so I ensured places I stayed at had lockers. During the day, handwritten notes were written in shorthand and with code names. This was kept on my person at all times. I also carried a USB back up in my wallet, in case of data loss. The laptop and files were password protected. Once back in the UK I used a similar filing system. Qualitative data was also uploaded into Atlas.ti on my personal laptop and desktop computers, which were only accessibly password.

My main concern with data protection was in terms of working with research assistants and the potential for sensitive information to be shared in interviews. I overcame this by talking through professional/personal boundaries with my research assistants and making it clear

²⁸ Atlas.ti is a qualitative data analysis software programme I used to analyse my data. I uploaded interview files and fieldnotes to apply analysis codes (outlined in §4.7).

that the content of interviews should be kept confidential. In practice, this was not an issue as people were very open and often encouraged me to use the information shared anonymously to advocate to the ministries who were also participating.

Being aware of the racialised dynamics implicit in being a white western researcher in a rural African context, and the local presence of other white people working in neo-colonial ways, I was cautious about taking photographs. I did not want to make a spectacle of people's lives and livelihoods. I always asked permission before taking a photograph with people in it, explaining that I may use it as part of my research and gaining their consent. I did not use any photographs with people's faces on my social media accounts. I asked for consent to take photographs at the beginning of each farmer community meeting and multi-stakeholder workshop.

4.7 Data analysis and archiving

The dataset that resulted from this mixed methods approach is rich and mainly qualitative. I transcribed all recordings myself, with Harriet's translation during the interviews and after the community meetings. Qualitative data from the surveys, interview transcripts, farming observations, meeting and workshop transcripts and the field diary were all coded using Atlas.ti. I used a combination of inductive and deductive coding – creating codes as they appeared in the data and applying predefined analytic codes from the themes the research is most interested in (Cope 2016) – to construct a conceptual framework that lets the empirical data speak (Newing 2011). These codes organised the complex data from different sources, enabling analysis and triangulation between methods. The data (with names anonymised), planning documents, interview sheets and survey are archived digitally for future reference or use.

Since my methodology was based on participatory principles, I met with research informants from different backgrounds regularly to check that my interpretations and analysis made sense to them. This meant having open conversations with farmers, chiefs, government personnel and NGO staff about my findings. To facilitate this further, I put together two short reports. The first, I created using the data collected between January-June 2018, which I began analysing during my break from the field. I distributed this on my return in September

2018, to give informants and collaborators a summary of the research findings so far and encourage them to continue engaging. The report also became a discussion point, where people could feedback their perspectives and any disagreement in my understanding. I wrote and distributed a second report in a similar manner in July 2019. Both reports are included in the appendices (Appendix 4 and 5).

4.8 Chapter summary

This chapter has described the methodology, challenges and limitations inherent in the research process. Reflexivity throughout has been vital in mitigating bias, positionality and ensuring validity of the analysis which follows. The research took shape through collaboration with research assistants and participants, making the most of opportunities that arose and ensuring several different ways of collecting data. The community meetings and multi-stakeholder workshops enabled space to explore perceptions and findings collectively with informants from different backgrounds.

5 The farming economy in a forest-farm landscape

5.1 Introduction

As I described in Chapter One, my first exposure to the forest-farm landscape of the field area was through bird survey and habitat assessment walks with conservationists. The more time I spent with farmers, the more I realised that the understanding a person gains of a landscape depends on who they are with. Since bird conservationists focus mostly on birds and their habitats, the presence and practices of people farming can be something of a mystery.

In this first empirical chapter, I therefore look at the forest-farm area through the eyes of people who make farming livelihoods there. The key questions this chapter explores are: how do farmers manage this landscape, what kinds of farming are taking place, and how does this affect the trees? To answer them, I take a closer look at how farmers farm the area, what influences the decisions they make, and how these impact on trees. As elsewhere in Ghana and West Africa more broadly, local farming practices vary depending on seasons of the year, altitude, ecological zone, farmer recourse to capital, the influence of government agricultural advice and policy, access to land, and labour availability. The number and age of trees on a farmer's land at a given point in time, therefore, depend in part on the season, the crops they are growing and the relative interval between farm and fallow cycles.²⁹ These aspects are outlined and discussed throughout this chapter.

Farmers are not the only actors who focus on crops in the forest-farm. The personnel of the Ministry of Food and Agriculture (MOFA) district office are also present. As the responsible department for implementing national MOFA policy on a local level, they support different kinds of farmers to maximise their yield through the provision of agricultural extension services, discounted farming inputs and educational opportunities. Their activities, therefore, influence the decisions that farmers make about their land.

²⁹ There are also other factors which affect what farmers do with trees – of particular note is the tree tenure legislation that requires a farmer to register trees to have legal ownership of them, which is a process not easily accessible to all farmers. These issues are discussed in Chapter Seven.

The chapter starts by describing the landscape, trees and farming cycle, painting a picture for the reader to understanding the forest-farm as a dynamic socio-ecology (§5.2). To contextualise the local farming economy, the chapter then gives information about households and their diversified livelihoods (§5.3) and land tenure arrangements (§5.4). The smallholder farming livelihood is described in §5.5, including various practices and crop choices. Since there is a broad diversity of farmers and farming styles, these differences are analysed in §5.6, showing how socio-economic factors affect the choice of crops, availability of resources, and utilisation of farming techniques. Given the research interest in trees, domestic tree crops are discussed separately in §5.7. A common theme amongst farmers of different socio-economic groups was their use of agro-chemicals, so this is described in §5.8. Throughout the chapter several livelihood challenges become apparent and these are synthesised with a discussion on their connection to tree cover change in §5.9.

5.2 The forest-farming cycle



Figure 5.1 An uncultivated rocky area of the forest-farm. This place has not been farmed since the RSPB and GWS began carrying out surveys here in 2011. The rocks make it a less appealing place to cultivate. Photo taken in February 2018.

The dry semi-deciduous forest-farm of Kwahu East Ghana is depicted in Figure 5.1. Such places are typical of smallholder farming with no local distinction between forest or farm made. Rather, farmers characterise thicker forest as a result of rocky land rendering it inaccessible for cultivation farming. According to one interviewee, the landscape is “all forest, it is all farm, but there is a difference. [I see] the geology and rocks, the areas of thicker forest, the different people’s farms, what land belonged to which families and custodians, and also

some of the trees” (FO-SH-4). As mentioned when introducing the field site in Chapter One, areas which bird conservationists think of as ‘forest’ due to the number and height of trees and extent of undergrowth (for example, Figure 5.1), are also still ‘farm’ since all off-reserve forest areas are utilised as an integral part of farming and may be cleared at any point. In this sense, it is all both farm and forest, hence the use of the term forest-farm throughout this thesis.

Such areas are interspersed with fresh clearings during the drier months, cultivated fields (Figure 5.2), overgrown farm, fallow areas and some places that are very old fallow where forest vegetation has re-grown over. The forest-farm landscape is dynamic and the annual farming cycle transforms small areas over short periods of time, having a significant impact on the number and age of trees that are found within the landscape in different seasons and at any particular point in time. As described in Chapter Three, there are two rainy seasons in Kwahu East (see Figure 3.3 for recent rainfall data) – the major rainy season, starting in March and ending in July; and the minor rainy season, starting in September and ending in November. Rainy seasons form the basis of growing seasons for three-month cycle crops (like beans, maize and groundnuts). Between December and February, during the dry harmattan season, smallholders manually clear fields for seasonal vegetables, ready to sow new seeds in time for them to germinate when the rains arrive in March. Clearing involves cutting undergrowth, old crops and young trees.



Figure 5.2 An example of a smallholder farm. In the foreground are tomato and peppers and behind is a section of cassava, cocoyam and plantain, with a reasonable number of forest trees remaining. Photo taken in April 2018.

Smallholders usually have two or more parcels on land – while one is cultivated for between 3-5 years, the other is left to grow fallow. Whilst clearing happens annually, if it is the year that the farmer switches fields some of the forest trees that are removed from the fallow area can be quite large. Smallholder farmers will occasionally hire chainsaw users³⁰ to remove forest trees, using them to make firewood or charcoal, and rarely timber boards. Some trees, however, are left standing if they have a particular purpose – for example the *pepea* (see Table 4.3 for scientific names) is popular with farmers to use as shade cover for resting from the sun, cooking and carrying out farm-based tasks (e.g. shelling groundnuts), and along with the *okoro*, is also grown for firewood and charcoal. Timber trees like *mahogany*, *ofram*, *emire* and *odum*, are usually left to grow because they can be cut in the future and used for construction.

When land is cleared of old crops, undergrowth, and trees, cut trees and branches which have been removed are piled on the edge of the farm to be used as firewood. The farm is then burned to add nutrients to the soil. For farmers making use of the minor rainy season there is also another clearing and soil preparation season in late July and early August. Many farmers reported that they are choosing not to plant fast-growing crops in this later season due to what they perceive as more unpredictable rains.

This annual cycle means that in late February significant sections of the forest-farm appear as cleared, burned areas, littered with recently cut tree stumps and piles of logs. However, when the rains arrive, the place is quickly transformed again as crop and tree seeds germinate in the nutrient rich soil.

5.3 Households and diversified livelihoods

To begin understanding the farming economy that influences the forest-farm landscape, it is useful to look at the size of households and diversity of their economic base. Tables 5.1 and

³⁰ I use the term ‘chainsaw user’ to indicate the cutting of trees by local people (often farmers) through informal arrangements because ‘chainsaw operator’ is undefined and often associated with more organised informal or illegal logging. Chapter Seven gives more detail about this distinction.

5.2 summarise key household and livelihood data from the household surveys in the four settlements surveyed: Bokuruwa, Nkwatia, Pepease and Tafo.³¹

Town/Village	Total number of survey respondents	Mean number of men per household	Mean number of women per household	Mean household size	Range of household sizes	Head of household man %	Head of household woman %
Bokuruwa	48	3.5	3.8	7.3	1-31	65%	35%
Nkwatia	88	4.8	5.2	10	2-24	68%	31%
Pepease	44	4.2	5.1	9.3	2-16	43%	57%
Tafo	72	4.3	4.8	9.1	1-18	75%	25%
All settlements together	252	4.2	4.7	8.9	1-31	65%	35%

Town/Village	Total surveys	Farming as main income (%)	Farming as second income (%)	Trading (%)	Paid job (%)	Driving a taxi (%)	Remittances (%)
Bokuruwa	48	73	17	43	6	4	13
Nkwatia	88	85	15	34	23	23	8
Pepease	44	84	18	34	16	20	0
Tafo	72	76	17	31	11	17	11
All settlements together	252	80%	16%	37%	15%	17%	8%

Rounded to the nearest whole number, the average household size across the four settlements is nine, of which five are female and four are male. The average age breakdown was three children aged 0-15, five adults aged 16-64, and one adult aged 65+. There were slightly more females in every age bracket. The range of household sizes depends on the town/village, and one anomalous respondent in Bokuruwa who was caring for many grandchildren whilst his own children are away working. Most households have a male head, although in Pepease 57% of household heads are women.

Households are usually based around a monogamous partnership and extended with mixed ages by including elderly relatives, siblings, and/or married children who may also have their own children. Farming labour is shared by men and women, although often in highly gendered ways (Amanor, 2001). Clearing land with cutlasses and burning scrub is usually carried out by

³¹ For information about sampling and how the survey was carried out see Chapter Four, §4.5.3.

men, so most trees cut in farm preparation are cut by men. Preparing the land for planting, weeding, hoeing and tending to crops are considered women's work (Lambrecht, 2016a). When farming as an economic household there are sometimes two separate farms (including two or more fields each), one used by the man and one by the woman. In these instances, the man's farm is usually larger and more focused on fast growing 'cash crops',³² whilst the woman's concentrates on subsistence. Both men and women take produce to market, however, at the farmers' meetings there were more women traders than men. The *Nana Hemmaa* (a more informal term for 'Queen Mother') in Bukuruwa believes women are too dependent on men's land tenure arrangements and sees the labour distribution as unfair because husbands reap the profits of the wife's work (IN-TA-80). Women in Bokuruwa agreed with this view to some degree, although their main concern was that men received more support from MOFA than women (FCM-Women-87).

Whilst smallholder farming was the main or second income for 96% of respondents, the survey shows household economics incorporate other forms of income and trading too. These diversified livelihoods are hard to quantify because different respondents may have different definitions of livelihood and most households do not keep records. For example, only 5% of respondents identified keeping livestock as part of their livelihood, even though most households kept some animals. Most households have adults with forms of employment or livelihood activities aside from farming – for example, charcoal making,³³ trading, driving taxis, preparing food at local 'spots' (street food bars), tailoring, working for small local businesses or organisations. People living in Pepease and Nkwatia were more likely to have paid employment or drive taxis. This is due to their proximity to the district capital, Abetifi, which has a higher number of jobs than smaller settlements due to its university, governmental offices and number of schools.

Livelihood diversification and remittances from absent family members are significant in relation to land clearing and the impacts on tree cover. Greater income increases farming capacity by allowing the payment for labourers to clear larger areas or for farming inputs to

³² This is the term informants used to describe the crops that grow on three-month cycles that can be sold in bulk. 'Cash crop' can also be used to describe the mass production of any crop, including tree crops like cocoa.

³³ Charcoal making as a form of income is discussed in Chapter Six.

increase yield. These differing capacities impact on decisions farmers make about their land, and also the trees within it. These socio-economic differences are discussed further in §5.6.

5.4 Farmland tenure arrangements

Land tenure arrangements affect the way forest-farm land is used in complex ways. Across Akan society, land can be held in three ways – *abusua* (family land), *abuna/abusa* (sharecropping) and renting (Amanor, 2001). Contextual information about land tenure and stool land were provided in Chapter Three (§3.6 and §3.7). This is expanded below with information collated from across interviews and household farming surveys. In Kwahu East, as in other parts of southern Ghana, there are three main ways that farmers get access to land. These are:

- I. *Abusua* (family) tenure: where farmers secure access to family land through their clan. They are often allocated two or more separate fields some distance apart which are farmed and left to fallow on rotation. *Abusua* land is the most secure option for farming, and farmers will generally be able to cultivate these fields for many years. The *abusuapanin* (head of the clan) is expected to ensure all clan members who need land have some.
- II. *Abunu* and *Abusa* tenure: this is a sharecropping arrangement where a farmer tills the land of a landowner but instead of paying rent in money, the payment is made in percentage of produce profit. *Abunu* means ‘to break into two’, so the farmer gets half and the landowner gets half; and *abusa* means ‘to break into three’, so depending on who covered the costs of inputs and labour, the produce is split into thirds with two thirds or one third going to each party. These arrangements are generally agreed when the farmer belongs to a different clan to the landowner so cannot claim *abusua* rights, or when the farmer is not financially secure enough to rent, for example, migrants from other parts of the region or country.
- III. Rental tenure: here the farmer pays an annual fee to the landowner or absent land occupier (i.e. someone who has *abusua* land that is not in use can rent it to another farmer) for use of the land. The amount depends on the location and quality of the land – areas within denser forest are more expensive as they are protected from some of the livelihood vulnerabilities which effect drier areas – and often the rental fee

increases year on year. The farmer needs to get permission from the landowner if they want to plant tree crops of any kind. This is the least secure arrangement for smallholder farmers as landowners usually renew the 'contract' annually, although with those aspiring to farm larger areas the arrangement may be slightly longer term.

The ultimate decision-making power for both allocation and usufruct rights lies with the landowners. These are generally the *abusuapanin* (head of clan) or the *ohene* (chief).³⁴ Land tenure is usually verbally agreed rather than written, adding to the farmer's insecurity of tenure if changes occur. For example, if a developer approaches the palace to request a site and it is approved, farmers on *abusua* (family) land can be displaced without lengthy notice. Equally, in *abunu/abusa* (sharecropping) and rental contracts, the landowner may decide to withdraw from the agreement because they want to use the land themselves or redistribute it to family members. In these two tenancy arrangements, there are also extra insecurities if crops fail or farms are damaged. In the sharecropping arrangement, whilst the yields are shared, the cost inputs are met solely by the farmer. If yields are low, therefore, they may struggle to meet the input costs. Similarly, a low yield for renters can leave them in debt on rent payments. Those with *abusua* tenure potentially have greater recourse to assistance from the traditional authority landowners due to family ties and social hierarchies.

In each of these arrangements, when a farmer takes over land, it is accepted that they will clear some trees to create space for cultivation. Despite forestry regulations stating that landowners and other interested people need to give consent to the removal of trees (The Timber Resources Management Act, 1998), in practice landowners will sometimes consent without consulting the tenant farmers (IN-SH-35). Furthermore, farmers must seek permission from the landowner to deliberately plant new trees, including timber, fruit and tree crops (FB-SH-7). This is rarely granted since the economic benefits of a tree are delayed and many land tenure arrangements are short term (IN-CU-53). For similar reasons, farmers may be reluctant to plant trees if they are unable to guarantee their use of the farm for the foreseeable future, especially since they reduce space for growing crops that return profit more quickly. The differential insecurity of land tenure makes it hard for most farmers to plan ahead, impacting on the decisions they make about the land and the trees naturally occurring

³⁴ Traditional authorities and their various roles were introduced in §3.7 of Chapter Three.

on it. For example, renters are more likely to choose sun-loving crops with shorter cycles so that they do not lose out if they are required to leave the land before perennial or tree crops yield. This choice may result in felling more trees during the clearing process.

Table 5.3 summarises information about land tenure arrangements in the research area. This indicates who has ultimate responsibility for the land which is being farmed meaning that land ownership remains in the hands of the traditional authorities – namely the chief and the heads of clans who hold control due to their customary rights, on behalf of the people. The land tenure arrangement gives an idea of the conditions under which the land occupier (farmer) manages it. These figures do not specify who farmers accessed their land through. For example, whilst *abusua* land is organised by the *abusuapanin*, adults can also hand their land to other relatives through the matrilineal lines of inheritance (Amanor, 1999) (see §3.6). This means that within each land tenure bracket captured in the household survey, there is still a diversity of arrangements.

Town/Village	Total surveys	Family land (%)	Renting (%)	Abusa or Abuna (%)	Other tenure arrangement	Has land by their house (%)	Has land elsewhere as well (%)	Has lost farmland (%)
Bokuruwa	48	77	15	0	8	40	35	19
Nkwatia	88	74	3	17	5	13	26	8
Pepease	44	32	65	0	7	11	16	68
Tafo	72	81	7	3	9	12	19	21
All settlements together	252	69%	17%	7%	7%	24%	19%	24%

Most farmers, 69%, use *abusua* (family) land, with the highest percentage in Tafo. Only 24% are tenant farmers – either renting or using *abuna/abusa* (sharecropping) arrangements.

The small number of respondents with these land tenures illustrates a weakness in my sampling strategy (see §4.5.3) in reaching more marginalised groups, given that this is most common amongst poorer people and recent migrants (Ghebru and Lambrecht, 2017). An average of 19% of farmers have access to land elsewhere. Almost a quarter of respondents reported that they had lost access to farmland – with the most common reasons being disputes with other farmers, the land being reallocated by the landowner or chief, and cattle herders grazing animals on their farms.

Pepease had the lowest number of respondents farming on family land (32%) and highest percentage of renting (65%). Furthermore, across the whole survey, only 43 households were

renting their farmland, and of these, 28 were in Pepease. This explains why Pepease also has the lowest average fallow length (Table 5.4) at only one year – in comparison to the other settlements with averages of three or more years fallow. Pepease respondents also reported unusually high (68%) incidence of loss of access to farmland in recent years (Table 5.3), with most of them blaming conflict with cattle herders (see §5.9 and §6.8.3). This illustrates the innate precarity of rented land, and the presence of herders in Pepease due to its location on the edge of the forested area and drier climate. Studies elsewhere in Ghana have shown that land tenure precarity increases when a field is left to fallow (Ghebru and Lambrecht, 2017), and that this risk is heightened by social inequalities, with those of lowest social or political status being most affected (Goldstein and Udry, 2008). This can lead farmers to reduce the amount of time they let land rest. Since the fallowing technique is the main way soil is rejuvenated, this can cause loss of productivity over time (Goldstein and Udry, 2008).

Town/Village	Farm one field for how many years			Fallow one field for how many years		
	Mean	Median	Range	Mean	Median	Range
Bokuruwa	2.2	2	1-6	3.7	5	1-10
Nkwatia	2.5	2	1-4	3	3	1-7
Pepease	3.1	3	1-8	1.7	1	1-5
Tafo	2.1	2	1-4	3.4	3.5	1-6

In contrast, farms in Bokuruwa have the longest fallow interval and the greatest range, as well as an unusually high number of respondents (40%) with land by their home (Table 5.3). This is partly due to it being the smallest and most rural, meaning that land is more plentiful. Interviews with farmers from both Tafo and Nkwatia (FO-SH-9, IN-SH-12 and IN-SH-33) show that land inside and at the edges of the towns that was formerly used for farming has been reallocated for building housing and other development projects, often involving disputes between chiefs and land users.³⁵ Bokuruwa also has the highest number of people with land elsewhere (35%) which is almost twice the average across the dataset, and they were the only respondents to mention hiring labour on land elsewhere as well (17%).³⁶ This is due to their

³⁵ This is explored further in Chapter Seven.

³⁶ The survey question was “do you hire any labour on your land?” and one of the answers was “yes, on my land elsewhere”

ancestral land in the Afram Plains (see Chapter Three). Since they also have the highest number for hiring labour on their land in Bokuruwa (68%), this indicates greater wealth or farming capacity than farmers in other settlements.

5.5 Smallholder farming

The household surveys described in the last section allow a broad description of smallholder farming in the study area. There is a broad range of diversity within smallholder farming, as discussed in the next section. Smallholders are both men and women. Most have secondary school education and many have other skills/experience that provide alternative forms of livelihood in addition to farming, as shown in Table 5.3.

Farms range in size from half a hectare to ten hectares, including land that is currently in use and that which is in fallow. The land tenure arrangement is mostly through the *abusua* (clan land), with some rental. The land is farmed on cropping rotation that usually involves growing short cycle crops one year, then cocoyam and plantain for two years, then left to fallow for three to five years while another field is cultivated. This cycle is said to help maintain soil fertility (Goldstein and Udry, 2008).

Many farmers on *abusua* land do not have the resources to farm their whole allocation, due to the cost of transportation to areas further from home, difficulties in monitoring farm activities between visits and lack of capital to pay for labour. Smallholders use small, controlled fires during the hottest months to prevent a build-up of material on the farm that could result in more serious wildfires and clear firebreaks at farm edges. Despite this, the spread of unintended fires on unprepared land is not uncommon, damaging trees and perennial crops. This makes the clearing process more difficult because it leaves coarse, half-burnt vegetation which machetes do not cut through as easily.

Most smallholders grow a mixture of crops for both subsistence and in intentionally greater quantities to sell in larger amounts. For example, a ripe field of cassava can be sold to one trader who visits the farm, pays a wholesale price and harvests it himself; or the farmer harvests the field and sells it by the bag to a cassava processing unit. There are three main types of crops: perennial staple carbohydrates, including cassava, yam, cocoyam, and plantain; seasonal, sun-loving crops grown on three-month cycles, including maize,

groundnuts, black-eyed beans, and vegetables like green pepper, cabbage, tomatoes, okra and chilli; and tree crops, including various fruits, cocoa, palm, and occasionally rubber. All of these crops can be traded as 'cash crops'. Cocoa is always grown to sell. The most popular cash crops are cassava, plantain, those which can be dried/processed and stored – e.g. groundnuts, maize, beans – plus some vegetables. These are grown in fields up to 1 hectare in size and usually under mixed cropping conditions. Produce is typically sold locally to chop bars (places of local cuisine) or mills, produce stalls at Kwahu East town markets, and the main market by Lake Volta at Kotoso, 10 miles away (see map in Figure 3.2).

Farming in a way which produces high yield harvests rather than necessarily diverse harvest times throughout the year is incentivised by MOFA. They give advice and farming inputs – like fertiliser, insecticide, herbicide and new seed variants – to help farmers increase their yields. This does not always equate to being able to sell the produce or get a good price. The main method by which support is offered is through Farmer-Based Organisations (FBOs), described in Box 3.5. These give farmers access to sell produce straight into the country's bread-basket stores or to independent traders at a set price that prevents local undercutting. Non-FBO members more often do on-farm trading with market people who travel from nearby towns by car and haggle the price on the farm. This can lead to farmers accepting prices that they believe are lower than is fair. Farmers also pass traders to each other if they cannot fulfil the trader's requirements.

Almost all trade crops are grown firstly for consumption, with trade secondary in importance. Crop choice influences how many trees farmers keep standing, as trees are cleared to reduce shade, especially for the sun-loving cash crops that grow in three-month cycles (for example beans, vegetables and maize). Farmers are choosing to grow more of these quick growing crops. One interviewee noted that this is because they fetch a better price at market or, with maize and groundnuts, can be stored until the price is good; and they are less vulnerable to bushfire damage, which affects perennials like cassava and plantain that grow throughout the dry season (FCM-Men-82). The gamble with this crop selection is that if the rain fails, smallholders risk losing a significant income.

5.6 Farmer diversity

5.6.1 Smallholder diversity

Farmers in Kwahu East are not homogenous and differences in socio-economic status and resources impact on farming techniques and choices. Wealth plays a key role in a smallholder's ability to clear land, hire labour, transport goods to market, purchase farming inputs and agro-chemicals, and store produce securely. The key characteristics of smallholders (ranging from subsistence to semi-commercial) and small-scale agribusiness farmers are summarised and compared in Table 5.5. This illustrates how different aspects like financial resources, gender and education interact with farmer capacities, choices and techniques.

The least affluent smallholders (predominantly those aged 65+, and mostly women) rely largely on subsistence farming. These farmers learnt their livelihood by "following [their] parents to farm".³⁷ Some live on their own, and some are within households with other family members who pursue alternative livelihoods or send remittances home. Subsistence-focused farms are smaller than others, ranging in size from less than 0.5 hectares to 2 hectares,³⁸ usually organised into two parcels of farmland so that one field can rest whilst one is cultivated. Most have acquired their land through their *abusua* (clan family) and several described farming the same place for decades. Farms are usually within an hour's walk from where they live. Subsistence-focused farmers clear the land themselves or with help from family members. Depending on the availability of male labour, this can influence how many trees are left standing in fields since older women can only cut small trees with a machete. Clearing becomes increasingly difficult as farmers age. Most grow a mixture of crops to provide dietary variety. Whilst subsistence is the priority, when there is surplus or the farmer needs money, crops can be traded.

Subsistence farmers are rarely involved in local FBOs because their small yields do not warrant bulk sale. Their exclusion reflects wider perceptions (observed in the male farmer community meetings) of women and older people as subsistence-focused, weak, and too small-scale to contribute economically to farmer unions which ultimately prioritise productivity within

³⁷ This was a phrase used repeatedly in interviews when I asked how farmers learnt to farm.

³⁸ Size of plot is estimated based on information given during interviews (it is unclear how accurate these figures are) and observations on the land – therefore these are approximate.

capitalist agricultural frameworks rather than collective autonomy. This marginalisation also prevents access to other forms of support from MOFA, who prioritise visiting larger more productive farms.

	Spectrum of smallholders		
	Subsistence smallholder	Semi-commercial smallholder	Small-scale agribusiness farmer
Dominant age bracket	65+ years	30-65 years	40-65 years
Dominant gender	Women	Men	Men
Education level	Primary school	Senior school, some further training	Degree and/or agricultural employment/training
Land tenure	Mainly <i>abusua</i> , some rented and sharecropping	Mainly <i>abusua</i> , some rented	Many <i>abusua</i> , some rented through the chief - access is granted specifically for more intensive farming
Farm size range	0.5-2 hectares	1-10 hectares	1-5 hectares
Grows crops for household consumption	Yes - main purpose	Yes, but sometimes these are in a different place to their semi-commercial fields	Sometimes, but always in a separate place to their main agribusiness farm
Grows crops to trade	Only surplus	Yes	Yes - main purpose
Farm field and fallow arrangement	Usually two fields with one farmed and one in fallow; mostly mixed cropping	Between two-fifteen fields in total, some in farm and some in fallow; small areas of mixed cropping, larger monocrop fields which are farmed on rotation	Between one and five larger fields, mostly these are farmed constantly in monocrop
Hires labour	Rarely, but depends on household finances	Mostly yes, only seasonally during clearing and harvesting times	Yes, often all year round
Additional livelihood income within the household	Occasionally, however, subsistence farming provides all food for the household	Yes, however, semi-commercial farming provides main income	Yes, however, agribusiness provides the main income (except for those who have only just established their farms)
Incorporation of trees within farms	Some - useful forest trees are left to grow; presence of fruit trees; ability to clear forest trees usually depends on having money to pay a labourer	Some - timber and other useful forest trees are left to grow; some timber trees planted within cocoa plantations; some farmers grow tree crops (palm, rubber, mango)	Generally no forest or domestic trees are kept within farmed field areas but may be left to grow at farm edges
Farm clearance method	Mainly with machete and burning, by themselves. If they have money, they may pay a local chainsaw user to cut forest trees and use them mainly for firewood, otherwise trees are left	Mainly with machete and burning, often hiring labourers to assist. They also pay a local chainsaw user or charcoal maker to cut and process forest trees into timber boards or charcoal. Some have occasional access to a tractor.	Regular access to a tractor, fields are ploughed annually. Trees are removed when the field is first made (to enable use of tractor) but can be left to grow at farm edges.
Likely to be a member of a FBO?	No	Yes	No - independent access to sufficient markets

These farming choices, limitations and techniques have multiple impacts on how trees are managed within the farm. Firstly, since the farming areas are relatively small, the number of

trees under an individual farmer's care is also very low. When land is cleared, economic timber trees are generally kept standing. Those that are useful for firewood are cleared when they are of a certain height so that they do not obstruct the crops. These are cut up and taken home to use. Once the land is cleared, new trees germinate and subsistence-focused farmers will nurture these if there is a purpose for them. Other trees are likely to be uprooted young, since the farmers will struggle to remove them once they have grown large as this requires paid labour or access to a chainsaw. Due to their socio-economic status, poorer farmers are less able to protect the trees on or around their farms, and are less savvy in negotiating benefits from tree extraction sanctioned by the Forestry Services Division (FSD).

At the other end of the smallholder economic spectrum, the most financially affluent farmers can be described as semi-commercial. These farmers grow cash crops on a large scale due to their economic capacity for hired labour, greater access to land, and farming inputs like agro-chemicals. Financial resources often stem from having previous employment. These farmers generally do not have formal training or professional agricultural background and do not use intensive methods.³⁹ Semi-commercial smallholders sometimes incorporate elements of modern mechanised farming practices, for example through occasional access to a tractor. Some showed a dislike of using agro-chemicals, believing them to be harmful to the environment. Whilst their focus is on trade, these farmers usually also grow enough for household consumption.

Semi-commercial smallholder farms vary in size between five and ten hectares, but the key is that substantial fields are set aside for cash crops,⁴⁰ sometimes grown monoculturally and sometimes as mixed crops. Only a few of the smallholder farmers in any given settlement have this affluence and most are involved in FBOs. One farmer in Pepease (OH-SH-48) has five hectares, of which he uses two to grow maize per year. He owns a tractor, ploughs his maize field annually, and ploughs other farmers fields for a payment of 200cedis per hectare. He also uses the tractor to collect and transport water to his fields, meaning he can water his crops even when the rains fail. He previously worked as an engineer before taking up farming in his retirement (he is now 75 years old and has been farming for fifteen years), so he was

³⁹ This distinguishes semi-commercial smallholder farmers from the small-scale agribusiness farmers described in §5.6.2

⁴⁰ This can also include more wealthy cocoa farmers as described in §5.7.1.

able to invest savings into his farm. Another farmer, from Kwahu Tafo, has farmland that covers a total of ten hectares. He uses only manual labour to produce cash crops in high quantities.⁴¹

Semi-commercial operations are encouraged by MOFA, who would like to see more farmers growing large yields. This approach is amplified within annual Farmers Day celebrations, where commercially successful farmers are rewarded prizes – with the top prize being a motorbike-trailer (see Figure 5.6) – and heralded as examples of success. This incentivises smallholders to increase production and for some, this translates into clearing more trees.

Some semi-commercial smallholders maintain and nurture trees within their farms but only if they have a particular livelihood purpose or are economic forest trees. The occasional use of tractors prevents trees regrowing within farm fields and de-incentivises farmers to deliberately leave trees to grow. Because of their additional finances, these farmers can afford to pay for trees to be cut during clearing season for timber, charcoal production or fuelwood. Larger farmland potentially gives farmers more flexibility to leave trees to grow. The socio-economic status and consistent presence of semi-commercial farmers also enables them to protect the trees on or around their farms from chainsaw operators or timber contractors.⁴² They are also more savvy at negotiating shared benefits when trees are felled. This is discussed in Chapter Seven.

5.6.2 *Small-scale agribusiness farmers*

Alongside the diversity of smallholder farmers, there are some farmers who have successfully established small-scale agribusinesses (see Table 5.5 for comparison). These farms are not necessarily bigger than smallholders – as those farms vary greatly in size – but rather the techniques used and approach to land management differs. Small-scale agribusiness farmers tended to have a higher level of education (some up to degree level) and/or have a professional agriculture background from having worked for MOFA, the Cocoa Board, private agriculture companies or other small to medium-scale agribusinesses. The skills learnt in

⁴¹ This farmer's farm was described in the narrative in §1.1. The narrative shows how the farmer has deliberately kept trees on his farm and even protected some from being cut down.

⁴² As illustrated in the narrative in §1.1.

these jobs assist individuals in starting their own enterprises using capital also gained from such employment. For most, the agribusiness is their main income. These agribusiness farmers employ a greater degree of mechanisation (in most cases through having regular access to a tractor) and employ between one and ten workers for clearing, ongoing weeding and harvesting throughout the year. Two interviewees were setting up an agribusiness in addition to their salaried roles at the District Assembly (DA), with the ambition to make it profitable enough to leave their paid jobs. People in this group were critical of traditional farming techniques, associating these approaches with under-development. They believe progress entails more intensive, mechanised farming.

Access rules relating to land tenure affect small-scale agribusiness farmers differently to smallholder farmers. Land is usually acquired for lengthier periods, directly through the chief or family heads and allocated for the specific purpose of more intensive farming. The same plot is farmed continuously, rather than two or more plots on rotation. Plots range in size from one to five hectares. Farmers in this category may still grow some staple foods near their house for the family to eat, but the farms are dedicated to cash crops sold in bulk to buyers from larger towns and cities (Koforidua, Accra, Kumasi). Traditional authorities support small-scale agribusinesses by making whatever space or resource is needed (for example, barn buildings) available in a manner that is generally not applied to smallholder farmers. Agribusiness farmers are regularly invited to decision-making spaces and consultation events – including meetings which discussed what kind of factory should be built in Kwahu East under the ‘One District, One Factory’ government scheme. This means that these farmers have a layer of influence and access to decision-makers that smallholder farmers do not (IN-SA-24, IN-SA-36).

5.7 Domestic tree crops

There are smallholder farmers who do not fit the mixed farming categories in Table 5.5, because they concentrate on tree crops, either cocoa (§5.7.1) or other tree crops (§5.7.2). There are also two local projects reforesting Kwahu East with domestic trees (§5.7.3).

5.7.1 Cocoa

In 2018 MOFA announced that cocoa would be the focus crop for Kwahu East, despite it only growing in the forested areas which is approximately 75% of the terrain. For cocoa farmers, cocoa is the main income for the household. It is sold through the Cocoa Board according to fixed prices and guaranteed sales as long as bags pass the quality assurance tests. Labourers are usually hired to assist with harvesting and processing the cocoa ready for sale since the yields are usually extensive. The main harvest is in May-June, and there is sometimes a second harvest in November at the end of the minor rains, depending on farm size and productivity of the trees.



Figure 5.3 A smallholder cocoa farm. This farmer is using two hectares on the edge of Nkwatia which may be reallocated for real estate. The cocoa trees are eight years old. This picture also shows a simple structure he has built to dry the cocoa beans in the sun and another shaded shelter where he cooks and rests. Photo taken in May 2018.

Cocoa farms range greatly in size (Figure 5.3) – some are as small as one hectare, others can be up to ten hectares – and the size of the farm gives an indication of the wealth of the

farmer.⁴³ Farmers require capital to establish a farm as cocoa does not produce fruit for the first three years, and yet still requires significant labour spraying pesticides and weeding. The investment capital is often made by working in paid jobs, sometimes in other parts of the country, and bringing savings back to Kwahu to establish farms. Smaller crops are grown amongst the cocoa initially (maize, cocoyam, cassava etc) to bring some income and to feed the household. Most cocoa farmers continue to grow food for the household at the edges of their cocoa farms or on other pieces of land nearer the house. Young cocoa requires shade protection from the sun, so cocoa farmers plant plantain, fruit trees and timber trees as the plantation is being established. When the cocoa grows and its canopy closes, the plantain dies away, whilst the fruit trees continue to produce harvests and timber trees can be left to accrue value. The most popular forest trees for growing with cocoa are *ofram* and *emire* (see Table 4.3 for scientific names) as they are fast growing and tall without a wide canopy. *Odum*, *mahogany* and *wawa* will also usually be left to grow if they are found on the cocoa farm. Cocoa trees produce for 40-60 years, after which they are cleared and replaced. Timber trees are often harvested at the same time, causing minimal farm damage. The Cocoa Board provide forest tree saplings for cocoa farmers to grow within their cocoa plantations – advising that six forest trees should be planted for every acre, approximately one every 40ft. One farmer reported that the *akonkodie* tree is particularly good at storing water, so he deliberately grows these close to the cocoa. Forest trees also protect his cocoa from the wind.

5.7.2 Other tree crops

Many smallholder farmers incorporate domestic tree crops into their farms. These are mainly fruit and nut trees including palm, cashew, almond, mango, avocado, coconut and citrus, and a small number of rubber trees.

The inclusion of tree crops within smallholder livelihoods varies greatly, depending on a farmers' economic resources. For smallholders, and especially subsistence farmers, domestic trees form part of broader, diverse livelihood. Tree nuts, fruit and seeds are usually traded in

⁴³ One cocoa farmer I spoke with, who is also a traditional authority and retired police officer, has over 30 hectares of cocoa farms. I have not included his farm in the range of cocoa farm sizes since this was the only cocoa farmer I met who had such vast lands.

local markets rather than sold in industrial amounts to factories. Subsistence-focused farmers tend to dot fruit trees within their ordinary fields alongside perennial crops or at the farm edges, using them as an additional income to food crops and trading (FO-SH-6, IN-SH-37). More wealthy smallholders may have sections of farm dedicated to small numbers, less than twenty, of specific tree crops (FO-SH-4, FO-SH-5). Smallholders with a semi-commercial dimension to their income grow larger monocrop acreages of tree crops, for example one participant reported growing four hectares of African oil palm (*Elaeis guineensis*) and three hectares of orange trees (IN-SH-20). Tree crops are grown predominantly by men rather than women and usually those under 60 years old due to the heavy-lifting labour required and length of time between harvests (IN-SA-24).

Farmers showed strong interest in growing tree crops, however, there are various factors which make this livelihood option less feasible. Firstly, farmers have limited land and therefore usually decide to grow more quickly profitable crops and food for sustenance instead. The insecurity of land tenure also causes a barrier – those who rent need the landowner’s permission to plant tree crops (including fruit trees), which is usually not granted; and those who farm on family land cannot rely on access being granted for the long-term, since decisions about land use do not involve them:

If you don’t have land, you can’t grow trees. If the government came and said here is some land to grow trees, I would be very happy. If the only land you have is one acre of family land, you can’t use that to grow trees as you and your family will go hungry. (IN-SH&CU-53)

As farmers become more wealthy or secure more land, their choices over domestic tree crops change as they can grow small plantations of fruit trees or cocoa. This affects the number and type of trees found in the landscape. However, this is compromised by several livelihood threats that farmers face – for example, the risk of crop loss to uncontrolled fires and damage caused by logging – which are particularly problematic for tree crops since the potential loss is greater the longer a crop has been growing for. These issues are discussed in section §5.9.

One smallholder, Kwame (IN-SH-13) explained how he has a diversified smallholder livelihood based mainly on tree crops, growing a mixture of cocoa, palm, and rubber trees. He also grows subsistence foods for his household. He decided to take this approach in 2010 because the

government was encouraging young men to grow cocoa to supply Ghana's export, providing incentives like free fertilisers and cocoa saplings. In 2016 the government started investigating whether the cultivation of other tree crops would benefit from similar schemes. The MOFA inspected Kwame's land and decided the farm would be a good place to try growing rubber trees, so they provided Kwame with some free seed which he is growing as a trial. It only takes a few years for the trees to grow and begin yielding. Extension officers will examine the land and the tree growth to see if it is successful – if it is, they may encourage other farmers in Kwahu East to grow rubber too. Rubber is used to make car and bicycle tyres and, as a cash crop, there is a high demand for it from the government. Semi-commercial smallholders anticipate that rubber may become a key agricultural crop in the near future in Kwahu East. This is why Kwame planted it: "it is very important, [MOFA] asked for it more than cocoa" (IN-SH-13). At the moment, the rubber seed is very expensive and it is not known whether the trees like the Kwahu soil, so farmers do not grow rubber out of choice yet. Kwame has nurtured many forest trees within his farm, including *nyamedua*, *ofram*, *akonkodie*, *okoro*, *emire*, *odum* and *wawa*. He believes that in the rainy season they will absorb and redistribute water to his tree crops.

Palm trees are grown to harvest palm nuts, used locally in small-scale palm oil production – a livelihood dominated by women (Figure 5.4). After ten to twenty years of yielding fruits, palms are cut and tapped for palm wine – this process is mainly done by men. The tapping technique harvests palm water from the trunks to distil into palm wine and palm gin. Up to 50L of palm wine can be collected from one fully grown palm tree. This is usually sold for one cedi per litre in local towns and villages. Some tappers turn the wine into palm gin using a forest-based distillery method (Figure 5.5) – heating the palm wine slowly and condensing the alcohol vapours. This creates very strong liquor which can be drunk neat or diluted with palm wine.



Figure 5.4 A woman making palm oil in Bokuruwa village. Palm oil is a vital ingredient in many Ghanaian dishes and important cultural cuisine. She produces small amounts using repurposed plastic water bottles to sell it in the village. Photo taken April 2018. The photograph has been cropped to protect the identities of the individuals.

Some palm wine tappers grow their own palm trees – occasionally in small plantations, usually as scattered trees across their fields – whilst others tap the palm trees belonging to other farmers, as a skilled service and form of paid labour. Palm wine tappers use fire in the process of extraction – setting a small slow-burning fire under the felled palm tree to enable the juice to be drained. Local informants suggested that if this fire is not cared for, there is a chance it can increase and spread, causing bush fires:

Palm wine tappers apply fire to the part of the palm tree that they tap, to kill insects, worms and other things that may cause poisoning to the drink. If after the operation they don't ensure that the fire is extinguished, then it may spread and then that is also another cause of bush fires. (IN-NGO3-74)

The prevalence of criticism may be in part due to social prejudice and exclusion – both palm wine tappers and palm gin distillers are notorious for drinking, which can be associated with carelessness when intoxicated by alcohol.



Figure 5.5 An on-farm palm gin distillery. This structure has been made using bamboo from the forest and dried palm branches. The palm gin is transported to and sold in Bokuruwa. Photo taken February 2018. The photograph has been cropped to protect the identities of the individuals.

5.7.3 *Tree crop reforestation*

Two people I interviewed have embarked on projects that aim to reforest areas of Kwahu East with fruit and nut tree crops. The first is a mango planting initiative started by a small-scale agribusiness chicken farmer in Pepease (IN-SA-24). He is concerned that tree cover in the area is decreasing and thinks that supporting smallholders to grow more fruit trees will mitigate

for some of the negative impacts this has for farms.⁴⁴ From visiting other areas in Ghana and talking to MOFA he had the idea to nurture mango saplings and distribute them to mainly older, subsistence-focused farmers who will benefit from the added income that a good mango harvest provides. There are two types of mango fruit grown in the area – one is small and very sweet, the other larger and more expensive. A mature tree can produce up to two hundred mangos, which sell for 100ghs (\$25) or 500ghs (\$125) respectively. Knowing this information, some smallholders plant multiple trees. These can be in small orchards or singularly around the farm. Since the agribusiness farmer provides the saplings for free, when they are ready to harvest he also gets a share of the profit or the fruit as payment.

The second is an almond tree plantation project (IN-NGO3-74). He has ambitions to reforest the Kwahu area with almond trees that can be used to make oil, milk and eventually timber boards from older trees. He is focusing on planting small plantations in Kwahu East and South. He provides seedlings to a range of growers, from semi-commercial smallholders to chiefs with ample land, as part of an out-growers scheme. When mature, he buys the nuts and processes them at a small unit he has built in Kwahu Tafo. For the first three years, the trees are small enough that farmers can grow crops alongside them. This almond entrepreneur has contacts and support within several governmental ministerial offices at different levels, as well as other institutions: he has consulted with the Ministry of Trade in Accra, the local and national offices of FSD and MOFA, the Crop Research Institute, the University of Ghana and other experts in nutrition and environmental issues. This has enabled him to make a product viable for international markets – almond oil and, eventually, almond timber – and affiliation with them improves his reputation, making him more appealing to other gatekeepers and influential actors. For example, Kwahu chiefs have made land available for him to build a factory to collect and process the nuts into different products, however, he does not yet have the capital to embark on this project.

These initiatives are of particular interest to this research project due to their potentially positive impact on tree cover in Kwahu East, albeit with trees that are not favourable to wood warblers, and the way they work with farmers to plant tree crops as out-growers. Both entrepreneurial individuals are included in local conversations about development, including

⁴⁴ Local perceptions of tree cover change and its impacts are discussed further in Chapter Six.

spaces which are discussing what kind of district factory to establish, the outcome of which will impact on what smallholders are encouraged to grow. Crucially, these projects also highlight how access to decision-making spaces, land and other resources has been critical to their success: both have support and interest from the local governmental offices, chiefs and other institutions. These layers of influence are discussed further in Chapter Eight.

5.8 Agro-chemicals, markets and MOFA

Smallholders use agro-chemicals within their farms for different purposes throughout the year. Herbicides are applied to help clear the farm (December-January and July-August), whilst fertilisers are added to the soil after clearing before planting (early March and late August). Pesticides are used if there are problems with insects during crop growth (March-July and September-November), and cocoa farmers periodically use various fungicide and pesticide sprays throughout the year.

The use of agro-chemicals has been steadily increasing in Ghana since the 1960s, however, the last decade has seen a rapid increase in the prevalence and availability of many types of chemicals. For example, one study found that the number of registered pesticides in Ghana increased six-fold between 2003 and 2011 (Onwona *et al.*, 2018). This liberalisation of chemical supply and commercial distribution has been accompanied by advertising – not least by MOFA extension officers who promote the use of chemicals and periodically provide discounted products as they seek to encourage greater yields from smallholder’s limited land (Onwona *et al.*, 2018) (also see Figure 5.6).

One respondent of the household survey commented that MOFA’s focus on chemicals undermined other forms of advice and guidance which would be more useful to farmers: “the Agric officers came to sell to us chemicals for farming instead of educating and helping us” (FHS-Pe-23). Others reported that rather than aiding smallholders, chemicals can make livelihoods more vulnerable by creating extra work:

Some people said we should use chemicals on our farms. After spraying it, the weeds die, but when it rains, even more weeds come, and they are even more difficult to clear. The chemicals are from abroad and they seem to be making the work more difficult. (FCM-Women-87)



Figure 5.6 Kwahu East National Farmers Day celebration 2018. Prizes are awarded to farmers based on productivity, overcoming misfortune, and quality of crops. This photo depicts some of the most common prizes: a container for spraying agro-chemicals (which costs approx. 25ghs or \$5.5 to buy) and the top prize of a motorbike-trailer (see \$5.6). Photo taken December 2018.

MOFA, on the other hand, views itself as a partner or collaborator with farmers and considers the exchange of knowledge to be two-way:

It is a very good indigenous knowledge these farmers have, just that they may not know the biological [reason] behind what they are doing. It is our mandate to explain further the rationale behind what they are doing. We have to let them know why it works. Any time there is indigenous knowledge, it is also helpful to us. We are the so-called technocrats [and we don't always know] the indigenous knowledge. Ours may be knowledge from research [which] we are disseminating to the farmers. But [farmers'] indigenous knowledge is also helpful to us, so we learn from them and they learn from us. (IN-MOFA-77)

However, this neglects the power imbalance between MOFA personnel and farmers, where many farmers rely on advice, agricultural inputs and access to markets supplied by the Ministry. Farmers complained that the cost of chemical inputs become a burden and believe that the chemicals may be harming the soil and vegetation, making traditional farming methods more difficult. The notion that MOFA and smallholders learn from each other is contradicted by comments from farmers which state the lack of support available for growing trees on their farms, despite farmers showing interest. Furthermore, there are consistent narratives amongst MOFA (as with other state actors) that undermine farmer knowledge and agency in stewarding their own forest-farm sustainably. There is an interaction between livelihood challenges and tree cover change, which is discussed in the next section.

Another problem that smallholders identified is the instability of market opportunities, which are strongly influenced by market dynamics.⁴⁵ These impact choices about which crops farmers choose to grow and therefore decisions about forest trees on their farmland. Prices vary unpredictably depending on demand, availability and crop loss, as this woman explained (FCM-Women-87):

Woman: Last year when we planted maize, the armyworm destroyed it, so this year we planted groundnuts.

Clare: Did that affect the price of groundnuts?

Woman: Yes, it got to a certain point that the buyers won't accept the price we are trying to sell it for. So the farmers' price is rejected and the traders bring their price. The groundnuts went down in price.

Despite these uncertainties, MOFA policy and extension officers continue to offer advice to farmers around how to increase their yields, without always providing ways through which these large yields can be sold. Interviewees reported a lack of transportation and marketplace infrastructure for transportation (for farmers to take products to market or for traders to reach farms directly) and places where produce can be processed into preservable food items (IN-NGO2-65). Issues around capacity in local production also impact on prices – if farmers were able to convert fresh produce into non-perishable items (e.g. through processing

⁴⁵ This is discussed in Chapter Eight.

cassava into *gari* at a small local factory),⁴⁶ there would be alternative options for farmers, giving them more power in the face of traders offering unsatisfactory deals. Instead, smallholders reported settling for lower prices with traders, as they would rather do this than see their crops rot on their farms: “whenever the farm produce are ready you won’t get proper buyers to come and buy them, so it will just be there, some will rot, and once in a while you get a buyer” (IN-SH-28).

The lack of consistent profits mean that banks are increasingly refusing to give FBOs loans for farming inputs and capital investments. This affects a range of semi-commercial smallholders as FBOs are made up of diverse members, many of whom are producing in relatively small yields (e.g. half a hectare of one crop) but join together for strength in numbers. Similarly, the most entrepreneurial farmers report that it is becoming harder for them to secure insurance for damage to their crops due to the increasing risks and limitations to risk management from the complexity of livelihood threats.

5.9 Farming livelihood challenges and tree cover change

During farming observation and interviews, smallholders talked at length about the multiple, complex livelihood vulnerabilities they face. One informant, Afrifa (anonymised), has been farming for forty years (FB-SH-5, IN-SH-29). In this time his farm has been damaged repeatedly by uncontrolled fire, cattle grazing, and logging. He reported that in recent years, unpredictable rains and an increase in insect pests have resulted in crop failure or significant reduction in yield. He has suffered illness and injury in the past and is worried about how aging and financial constraints will limit his capacity in the future. This is particularly concerning as he believes the vegetation on his farm is changing and becoming more dominated by tough grasses that are difficult to clear. This increases his input labour and agro-chemical costs. He has also experienced difficulties in selling his produce for a good price due to a lack of transportation and living in a village with no market, which also then affects his

⁴⁶ There is an unused community building in Bokuruwa village which despite having machines to process cassava into *gari* (a staple food consisting of ground dried cassava), has never been used. Farmers complained that many years their cassava harvests go rotten on their fields or are sold for extremely cheap prices because they cannot transport it to a market town. If it was possible to process it in their own town, this would increase their livelihood resilience and prevent crop waste.

cash flow and capabilities. Furthermore, he is worried about the security of his land due to various developments in the area and this makes it harder to plan for the long-term.

Afrifa's situation highlights the complex and difficult nature of vulnerabilities that farming livelihoods are subject to in Kwahu East. These reinforce each other and overlap with factors which affect tree cover in numerous ways. The eight most common challenges that interviewees spoke about were: bush fires, tough vegetation, farm damage from grazing livestock (especially cattle), farm damage from logging, crop failure from lack of water, lack of market opportunities for farm produce, damage to crops from pests and displacement from farmland.

Smallholders like Afrifa have various ways of responding to these challenges, by adapting their livelihoods according to conditions. Importantly, the ability of a farmer to respond to these challenges and the degree of impact these risks pose is determined in a large part by their socio-political resources, status and land tenure arrangement. Table 5.6 synthesises the key threats smallholder farmers identified and shows how socio-economic and geographic variables can affect a smallholder's ability to adapt and the level of risk they experience.

Table 5.6 Livelihood threats and factors which determine the risks these pose to different smallholders

		Factors that heighten or lessen the risk for smallholders			
		Land tenure arrangement		Socio-economic position	
		<i>Abusua or accessed directly through a chief or elder</i>	<i>Other rental arrangements & sharecropping</i>	<i>Relative wealth/status/ age (semi-commercial or diversified livelihood)</i>	<i>Relative poverty/status/ age (subsistence or limited diversification)</i>
		Location of the farm			
<p>Livelihood threats and hazards</p> <p>Bush fires: these can be set by multiple actors including hunters, farmers, palm tappers, and cattle herders. Uncontrolled fires cause damage to crops and vegetation.</p> <p>Tough vegetation: smallholders report that vegetation is becoming more difficult to clear, making farming harder and increasing the need for paid labourers and herbicides</p>	More access to support from landowner; more likely to have space for an effective firebreak	Less access to support from landowner; less likely to have space for an effective firebreak	Resources to pay labourers to clear farms of fire hazards (dry debris) and create firebreak	Less resources to pay labourers to clear farms of fire hazards (dry debris) and create firebreak and hunters	<p>Forested areas (Nkawtia, Abetifi & south of Pepease, Bokuruwa, & Tafo)</p> <p>Drier areas more at risk of fire and damage to vegetation; greater presence of cattle herders</p>
	<p>Farm damage from grazing livestock (especially cattle): livestock cause damage to farms through grazing on crops and trampling soil. The larger and more numerous the animals, the greater the damage. Sheep and goats from nearby towns and settlements roam free and cause small amounts of disruption.</p>	N/A	N/A	Resources to pay labourers to clear farms and buy herbicides	Less resources to pay labourers to clear farms or buy herbicides; makes clearing farms manually harder for older people
<p>Farm damage from logging: land occupiers (farmers) should be asked for permission before logging takes place and be given compensation for farm damage. Smallholders complained that this rarely happens and many have had their crops damaged by falling trees, logging tracks and abandoned extraction debris.</p>	Land tenure security does not rest on productivity or profit; more access to support from landowner if damage is caused	Crop loss can lead to debt or displacement; if rent is not paid; sharecrop arrangements can be jeopardised by repeated crop loss; less access to support from landowners if damage is caused	Higher social status makes someone more able to negotiate with cattle herders; bigger farms are less likely to lose whole yield; more affluent smallholders are more likely to be farming in forested areas where cattle do not graze	Lower social status makes someone less able to negotiate with herders; loss of produce has greater impact for farmers with less money or other sources; least affluent smallholders are more likely to be farming in drier areas where cattle graze	<p>Cattle livestock do not graze as frequently within forested areas as they are less accessible and cattle prefer grass and green vegetables, which are found in higher quantities in more open areas</p> <p>Most at risk as these areas are more easily accessible to large animals in herds and have higher quantities of grass and green vegetables</p>
	More likely to be consulted by the landowner and contractor/operator before logging occurs and more access to support from landowner if damage is caused	Less likely to be consulted by the landowner and contractor/operator before logging occurs and less access to support from landowners if damage is caused	Higher social status makes someone more able to negotiate with loggers; more resources to pay for their own tree removal makes them less vulnerable to having trees removed by others	Lower social status makes someone less able to negotiate with loggers; less resources to pay for their own tree removal makes them more vulnerable to having trees removed by others	Most at risk because of the number of forest trees in and around the farm; cocoa farmers are most at risk of high loss due to the longevity of their crops

Table 5.6 cont. Livelihood threats and factors which determine the risks these pose to different smallholders		Factors that heighten or lessen the risk for smallholders				
Livelihood threats and hazards	Land tenure arrangement		Socio-economic position		Location of the farm	
	Abusua or accessed directly through a chief or elder	Other rental arrangements & sharecropping	Relative wealth/status/ age (semi-commercial or diversified livelihood)	Relative poverty/status/ age (subsistence or limited diversification)	Forested areas (Nkawtia, Abetifi & south of Pepease, Bokuruwa, & Tafo)	Drier, less forested areas (North of Pepease, Bokuruwa & Tafo)
Crop failure from lack of water: smallholders believe that the rains are becoming more unpredictable - arriving later in the year, being shorter in length and showers being less intense. This puts their crops at risk of drying out.	Land tenure security does not rest on productivity or profit	Crop failure can lead to debt or displacement if rent is not paid; sharecrop arrangements can be jeopardised by repeated crop loss	The most affluent farmers reported using tractors or other vehicles to transport water; others have created simple irrigation systems or dug wells nearby to secure water	Most do not have money for transportation or well/irrigation construction; some collect water by hand from nearby streams or communal wells/springs; harder for older people	Forested areas maintain moisture in the soil and partial shade protects crops from drying out; these farms are usually closer to a natural source of water (small springs and streams)	Less tree cover means soil moisture evaporates and crops become dried out; these farms are usually further from a natural source of water (small springs and streams)
Lack of market opportunities for farm produce: smallholders sometimes struggle to sell their produce because they are unable to transport their goods to market, or the prices drop. Traders sometimes travel to the farm to make deals, but these can undercut farmers.	Land tenure security does not rest on productivity or profit	Inability to sell crops can lead to debt or displacement if rent is not paid; sharecroppers might not be able to cover input costs	Diversified income means farmer is more resilient overall; greater ability to store produce; more money to pay for produce transportation; more likely to be in a FBO which provides a minimum price	Less diversified income means more vulnerable to lack of market; less able to store produce; less money to pay for produce transportation; less likely to be in a FBO so does not have a minimum price	Rather than being affected by whether the farm is in a forested or less forested areas, the main consideration is how close the farm is to well maintained roads, its proximity to market towns, and the farmer's ability to transport the produce (privately or paid). There are large markets in Abetifi, Nkawtia and Tafo.	
Damage to crops from pests: food crop smallholders find armyworm most difficult to deal with, as it can decimate whole fields of maize (and less so, groundnut) and requires extensive agro-chemical inputs to manage. Other pests include small mammals, especially grasscutter, who eat tubers and other crops.	Land tenure security does not rest on productivity or profit	Crop failure can lead to debt or displacement if rent is not paid; sharecrop arrangements can be jeopardised by repeated crop loss	Diversified income means farmer is more resilient to crop damage; more money to travel and purchase agro-chemicals; more likely to be in a FBO; monocrop fields of maize are most vulnerable to armyworm	Less diversified income means more vulnerable to impact of crop damage; less money to travel and purchase agro-chemicals; less likely to be in a FBO; mixed cropping more resilient to pests	Higher biodiversity gives some protection through natural pest control; more at risk of damage from grasscutters, duiker and squirrels	Lower biodiversity reduces protection through natural pest control; less at risk of damage from grasscutters, duiker and squirrels
Displacement from farmland: due to insecure land tenure, smallholders are susceptible to being displaced if the land is reallocated for a different purpose (for example, town expansion, infrastructural development, or an industrial farming project)	Land tenure is more secure and if a farmer is displaced they will usually be offered other land to farm	Land tenure is less secure and farmers can be displaced at short notice, often without being offered other land to farm	Higher social status makes farmers more able to protect their land, or negotiate with landowner to secure compensation and/or somewhere else to farm	Lower social status makes farmers less able to negotiate with landowner nor secure compensation or somewhere else to farm	The most vulnerable farms are those within or at the edges of towns where urban expansion and development projects are being proposed. Overall, forested areas are less vulnerable to land reallocation than more open areas due to the number of trees and the limitations this presents to development and intensive agriculture.	

The land tenure arrangement and location of the farm in relation to tree cover density alters the level of risk and affects a farmers' capacity to adapt. To give some examples, subsistence smallholders that focus more on perennial staple food crops like cassava, plantain and cocoyam which are harvested repeatedly from the same plant, are potentially more vulnerable to damage from forest-farm fires and logging (FCM-Men-82). These hazards become an incentive to grow short-cycle crops, which may also mean keeping less forest trees as farmers making these crop choices deliberately minimise shade. Smallholders on rented farmland adapt their crop choices to mitigate for the inherent precarity of their tenure, growing short-cycle crops that yield within three months, reducing the risk of loss through displacement. However, these crops are also more vulnerable to lack of rain. Most of the renting smallholders are in Pepease, which is also where farmers report the most unpredictable rains, and the high risk of crop failure if rains do not arrive when hoped. Farmers with more money irrigate their farms or dig wells to mitigate lack of rain.

Access to market opportunities are significant to tree cover because wealth or poverty create relative security or precarity and therefore determine to some degree the adaption techniques a smallholder employs to overcome a livelihood challenge. Having money makes the difference between whether a smallholder can hire labour to clear farms and cut trees or not. Labourers are also used to make firebreaks that protect farms and stop uncontrolled fires spreading. A farmer with less money has less capacity to maintain firebreaks. Fires also affect farmers in different ways. In drier areas, smallholders reported that uncontrolled fires were making weeds more difficult to clear and increasing the extent of grassy vegetation. This requires more labour costs in land preparation and therefore affects older and poorer people most profoundly.

Wealth also intersects with other socio-economic dimensions like age and social status. People of higher social status and access to custodial landowners are more able to negotiate when there are issues of conflict or contention – be that over farm boundaries, loss of fallow land, timber logging or presence of herders with cattle.

One of the most mentioned livelihood challenges which arose was the local conflict between farmers and herders (see §3.6). Informants from across the groups interviewed– including rural farming communities, traditional authorities, governmental personnel and NGO staff – reported that since 2012, the herders in this part of Kwahu have been using farmland to graze

their cattle setting fires to stimulate grass growth, causing extensive damage to crops, trampling soil and provoking fear in the local communities. This is mainly affecting farmers in drier areas, to the north-east of Pepease, Bokuruwa and Kwahu Tafo, where the vegetation is classified as dry semi-deciduous forest (fire zone) (Hall and Swaine, 1981).

The cattle being herded often belong to local and national elites, including people who work in the government, wealthy individuals and traditional authorities (Bukari and Schareika 2015). They are purchased as an investment and given to herders to look after, who are paid in money and/or the supply of other valued resources, including weapons, motorbike fuel and food. In part due to the unknown extent of conflicting interests and due to other corruption, traditional authorities, local governmental offices and the police do not support individual farmers when conflicts with herders over land occur.

The combination of fear and distrust in the possibility of obtaining a fair resolution discourages smallholders in Pepease, Bokuruwa and Tafo from going to their farms. Smallholders reported that after being burned by herders, the land struggles to regenerate trees, resulting in an increase of grassland and difficult weeds. This makes weeding much harder, forcing farmers to spend money on weedicides. Many farmers complained of losing crops and land due to herder activities – saying that when the herders come the farms are ruined (crops eaten, soil trampled and areas burnt). Some feel unable to cultivate these fields again and abandon the farm in case the cattle return. This forces farmers to look elsewhere for other land, usually having to rent new plots, which costs more money, decreases land security and shortens fallow periods.

Importantly, all these factors affect the decisions farmers make about which crops to grow and, therefore, how to manage the forest trees on their land. These matters are discussed in the following chapter.

5.10 Chapter summary

This chapter has given an overview of the farming economy in Kwahu East. It has shown that there is a broad diversity of farmers operating within the forest-farm area, ranging from people farming for subsistence to those establishing small-scale agribusinesses. Smallholder farming livelihoods, practices, crop cultivation and farming techniques have been described and discussed in relation to forest tree cover. The findings demonstrate that smallholders have agency and make active choices about their land in relation to the broader household and local farming economy. There are various elements of these livelihoods that impact on the number of trees in the landscape, not least the annual farming cycle and economic pressures to increase crop productivity as incentivised by MOFA. There are also multiple challenges and hazards which smallholders have to adapt to. In spite of the smallholder agency seen earlier in the chapter, the vicious cycles created by these threats fuel individual and collective feelings of powerlessness among rural communities, affecting how farmers manage trees on their farms. I explore this complexity further in Chapter Six.

6 Farming livelihoods and tree management

6.1 Introduction

As well as tree crops (see §5.7.2), farmers often have forest trees on their farms which they manage as part of their livelihood. Some farming practices (described in Chapter Five) have direct effects on forest trees and other wild plants. For example, farmers and other people living near forest-farm areas have always collected non-timber forest products (NTFPs) from surrounding fallow and forest areas. These include fuelwood, herbal medicines, animal fodder, bushmeat, as well as other wild food like snails, mushrooms and plants gathered from fallow or forest areas that are not necessarily nurtured by the farmer. Whilst many of these practices do not involve cutting or killing trees, there are other uses which do – like felling for timber building materials or making charcoal and wooden products. Forest trees also play important roles within the ecology of fields by providing different kinds of shade, soil nutrients and protecting moisture from evaporation. Some farming techniques, like clearing land and setting fires to create fertile fields, involve damage to or removal of trees. The economic decisions and actions of farmers therefore have profound implications for forest tree cover. These influences alter throughout the annual farming cycle.

This chapter focuses on how farmers utilize and manage the forest trees on their farms (not domestic tree crops which were covered in §5.7.2). It details which forest trees are most common on smallholder farms in Kwahu East and how farmers manage them. Since there are restrictions to the benefits available to smallholders from the standing value of timber trees, the decisions farmers make about trees are shaped and constrained by the limitations of land and tree tenure arrangements.⁴⁷ Farmers find ways to balance the economic, cultural and ecological value of trees with their need for space to cultivate crops.

The chapter opens by summarising the key uses and values of forest trees (§6.2). I then present the data collected from the household survey about tree management techniques and uses in §6.3. The following three sections discuss these data with qualitative findings from interviews, farming observations, and farmer community meetings. Information is collated

⁴⁷ As I shall show in Chapter Seven, rights to timber trees is an important factor in shaping tree survival in the farmed landscape

about different tree uses: the use of mature trees on farms (§6.4); firewood and charcoal (§6.5); and medicine and other NTFPs (§6.6). Throughout this chapter we see that farmers are interested in keeping more forest trees on their farms but are subject to political and economic constraints, which are outlined in §6.7. This uncovers a local perception that forest trees are decreasing, and that this is also making farming more difficult. Perceptions of tree cover change are explored in §6.8 through three emerging narratives – of environmental change, powerlessness and blame.

6.2 The value and uses of trees

Data gathered across the different methods (see §4.5) gave me an understanding of smallholders'⁴⁸ use and management of forest trees on their farms. As outlined in Chapter Four, I asked smallholders about the most common forest tree species that are found on farmland in the area by using a list of trees provided by the RSPB (see Table 4.3). Early participant observation indicated that smallholders also frequently used and nurtured two trees which were not on the original list – *fruma* (*Voacanga africana*) (Figure 6.1) and *onwama* (*Ricinodendron heudelotii*) – so I also included these. The household survey collected data about which of these common trees (n=31) smallholders use most and for what purposes. It also asked about tree management and removal techniques. Extensive qualitative data collection provided information about the local economic, socio-cultural and ecological values of different trees. A focused discussion during the final farming meeting (FCM-Mixed-88) confirmed and triangulated the information I had collected.

These data are collated in Table 6.1, identifying the role of each species in the local economy and information about how they are managed. The table is organised alphabetically by Twi names for ease of reference. I have used colour coded shading of rows to indicate local tree preferences, as follows:

⁴⁸ As discussed in Chapter Five, smallholders have diverse economic situations and livelihood capabilities ranging from subsistence-focused to semi-commercial. These data do not include small-scale agribusiness farmers.

- Dark green = smallholders keep this tree on their farms, either by nurturing them as saplings or leaving them standing when they are clearing the field, and reported that they deliberately plant these trees
- Light green = smallholders keep this tree on their farms, either by nurturing them as saplings or leaving them standing when they are clearing the field
- Light orange = smallholders sometimes keep this tree standing and sometimes cut it down when making their farms
- Light red = smallholders always remove this tree from their farms either by cutting it down during the clearing process or by not leaving saplings to grow



Figure 6.1 The *fruma* tree in blossom within Bokuruwa cemetery. The *fruma* is not only important as a medicinal tree but is also planted in cemeteries. The flowers create a sweet scent and pretty 'confetti' on the ground. Photo taken in June 2018.

Table 6.1: Important forest trees found on smallholder farms in Kwahu East, their economic role and local uses					
Twi Name	Scientific name	Other names	Role of tree in the forest and/or economy	Local description and uses by smallholders in Kwahu East	Smallholders leave this tree to stand/grow
Akonkodie	<i>Bombax buonopozense</i>	Gold coast bombax, red-flowered silk cotton tree	Dug-out boats, light timber construction	timber boards; dried seeds can be made into a medicinal soup; fresh leaves can be made into a soup; bark is medicinal; good for planting with cocoa as it protects them from wind and keeps water in the soil; flowers bright red in November/December, similar tree to onyina	Yes, always keep if found growing
Akuakuo-Ninsuo	<i>Spathodea campanulata</i>	African tulip tree	Plywood, charcoal	this tells farmers when Christmas is coming, and has lots of medicinal uses, including heart disease, makes good charcoal	Yes, always keep if found growing
Bese	<i>Cola nitida</i>	Cola nut	Timber for construction, edible seeds	the cola seeds are chewed as they contain caffeine; too soft to make timber; it can also be used to make cloth; farmers plant this tree deliberately	Yes, always keep if found growing and deliberately planted
Dinsinkro	<i>Vitex gradifolia</i>	Black plum, evino	Light construction	a shrub that doesn't grow high and is always kept on farms if met there as it has many medicinal uses	Yes, always keep if found growing
Emire	<i>Terminalia ivorensis</i>	Black afara, idigbo	Fast growing timber tree, used to shade cocoa farms	timber boards; medicinally used to treat hernia and toothache; also used for firewood and charcoal; similar tree to Ofram, but harder wood; COCOABOD advises farmers plant this with cocoa farms; once cut, new trees self-germinate to grow again	Yes, always keep if found growing and deliberately planted
Fotie/ Otie	<i>Hannoa klaineana</i>	Effeu, effen	Timber	important medicinal uses including to make blood tonic and the sap treats children's sores; the bark is used in palm nut soup; good timber boards	Yes, always keep if found growing
Fruma	<i>Voacanga africana</i>	Small-fruit wild frangipani	Seeds are used in the pharmaceutical industry	powerful medicinal painkiller similar to paracetamol found in its seeds; seeds can be sold at market, providing income; seeds can be made into something similar to shea butter; trees are planted in cemeteries due to the sweet fragrance of their white flowers; farmers plant this tree deliberately	Yes, always keep if found growing and deliberately planted
Gyama	<i>Alchornea cordifolia</i>	Christmas bush, dovewood	Pioneer forest tree, timber for light construction	Grows wide and makes a lot of shade so farmers always cut it down; used for firewood; leaves are used medicinally to treat fever and make blood tonic; seeds are used by children in catapults to shoot at birds	No, always cut due to too much shade
Kyenkyen	<i>Antiaris toxicaria</i>	Upas tree, false mvule, false iroko, bark cloth tree	Timber for veneer production and light construction	tall straight fast growing medium-hard wood; good for timber but not strong enough for roofing; used to make firewood and charcoal; some farmers plant this tree deliberately; used as farm boundary marker; soil nutrients; forefathers used the bark to make cloth (by soaking and beating it repeatedly); bark and leaves medicinal, used to make blood tonic	Yes, always keep if found growing and deliberately planted
Mahogany	<i>Khaya senegalensis</i>	African mahogany	Timber, medicinal purposes	Strong timber used for roofing and furniture; medicinally used to make blood tonic, treat malaria, rheumatism, coughs, back ache, head aches boils, broken bones etc;	Yes, always keep if found growing and deliberately planted
Nyamedua	<i>Alstonia boonei</i>	Stool wood, cheesewood, pattern wood	Pioneer forest tree, timber for construction, light carpentry and sculptures	timber boards; medicinal leaves are used to treat measles; tree is sometimes left to grow for timber and other times is cut, depending on the crop plan; can be used as a replacement for wawa tree uses as it is a similar soft wood	Sometimes kept, sometimes cut down
Odum	<i>Milicia exelsa</i>	African teak, mvule, iroko	Hardwood timber tree	strongest wood of all the trees; high value timber; makes good charcoal; can be used medicinally to treat rashes; planted with cocoa for shade; it holds spiritual importance; acts as a wind break for farms and towns	Yes, always keep if found growing and deliberately planted
Odwen	<i>Baphia nitida</i>	Camwood, African sandalwood, barwood	Timber for cabinet making	this tree germinates and spreads easily so it is always removed; used for firewood and also chewing sticks; it has strong medicinal value and can be made into blood tonic, rash treatment and the flower is used to treat heart problems	No, always cut because it grows too quickly
Odwuma	<i>Musanga cecropioides</i>	African corkwood, umbrella tree	Pioneer forest tree, very light timber used for roofing and small wooden products	used for firewood; medicinal value, used for many treatments; snails and mushrooms are known to grow under it; branches store water which can be drunk from the tree	No, always cut
Ofram	<i>Terminalia superba</i>	White afara, korina	Fast growing timber tree, used to shade cocoa farms, paper production	fast growing native timber tree; also used to make wooden products like drums; good for charcoal and firewood; medicinal value; COCOABOD advises cocoa farmers to plant ofram with cocoa; similar tree to Emire, but softer timber.	Yes, always keep if found growing and deliberately planted
Ofoso	<i>Sterculia tragacantha</i>	n/a	Timber; resin used in confectionary production	used to make soft timber boards; leaves used to wrap kenkey; bark used to tie firewood together; branches can be eaten; some farmers keep this tree standing, especially if it is large; others cut it to reduce shade	Sometimes kept, sometimes cut down - depends on shade

Table 6.1 continued: Important forest trees found on smallholder farms in Kwahu East, their economic role and local uses					
Twi Name	Scientific name	Other names	Role of tree in the forest and/or economy	Local description and uses by smallholders in Kwahu East	Smallholders leave this tree to stand/grow
Okoro	<i>Albizia zygia</i>	Pangban	Pioneer forest tree, timber tree, fuelwood; resin used in cosmetic, food and pharmaceutical industries	Can be used to make timber boards when large, otherwise used for firewood and charcoal; the bark and leaves are medicinal; can be used to grow yam up; some farmers base-burn to kill the tree, especially when it is very large; many farmers let this tree grow deliberately to use for firewood	Sometimes kept, sometimes cut down - depends on shade and need for firewood
Onwama	<i>Ricinodendron heudelotii</i>	African nut tree, Cork wood,	Pioneer forest tree helps regeneration, seeds used to in food production, very light wood for carving	medicinally used to make blood tonic, timber boards, snails live under it and lay their eggs	Yes, always keep if found growing
Onyina	<i>Ceiba pentandra</i>	White silk cotton tree, true kapok	Light timber construction, paper production; seed oil used in pharmaceutical industry	Softwood timber; cotton for stuffing bedding; medicine from leaves and bark; fresh leaves can be made into a soup; seen as good for rainfall due to its height; soil warmth and nutrients; often used as farm boundary marker; similar tree to akonkodie	Yes, always keep if found growing
Otoawa	<i>Zanthoxylum gillettii</i>	African satinwood	Pioneer forest tree, timber, charcoal	medicine to treat toothache, fever and digestive parasites; fodder for sheep and goats; fruit can be picked and eaten, especially by children; fruit is boiled with beans to help soften them; gives reliable shade to people and crops without breaking	Yes, always keep if found growing
Pampena	<i>Albizia adianthifolia</i>	West African albizia, goane	Pioneer forest tree, timber used for carving	This is soft and breaks easily causing damage/injury, and it has a wide canopy – “when you meet this tree you cut it straight away”; once cut it is used for firewood and less often charcoal (not good quality)	No, always cut because it is weak and dangerous
Pepea	<i>Margaritaria discoidea</i>	Pheasant-berry	Charcoal production and fuelwood, fire breaks	Shade to sit under and shade for crops; medicinal uses to treat jaundice and rheumatism; used to make firewood and charcoal; soil nutrients and moisture; used to grow yam up;	Yes, always keep if found growing and deliberately planted
Prekese	<i>Tetrapleura tetraptera</i>	Aidan fruit, aridan tree	Timber for lightweight wooden products, edible and medicinal fruit	Important medicinal seeds, bark and leaves for treating many illnesses including asthma, fever, blood pressure, heart disease and ensure healthy circulation; prevents strokes; some farmers plant this tree deliberately; strong interest in growing more	Yes, always keep if found growing and deliberately planted
Sapele	<i>Entandrophragma cylindricum</i>	West African cedar, sapelli mahogany	Timber	good timber boards, used for furniture; part of the same family as mahogany but grows taller	Yes, always keep if found growing
Sese	<i>Holarrhena floribunda</i>	False rubber tree	White timber used for lightweight wooden products	This tree is not strong, it dies in bush burning and it breaks when there are high winds so farmers remove it before farming; timber is used to make roofing boards and wooden products like the banku spatula and the pepper grinder	No, always cut because it is weak and dangerous
Sesea	<i>Trema orientalis</i>	Charcoal tree, pigeonwood tree	Timber, charcoal, paper production	Used for medicine and birds eat the seeds; tree also good for carving wooden products and making stools	No, always cut
Sesemasa	<i>Newboldia laevis</i>	Akoko tree	Fuelwood, ornamental	generally kept to make farm boundaries as it is a tall straight tree that doesn't cast much shade and “doesn't die easily”, but farmers might remove it from other parts of the farm; it is used as chewing sticks and the bark/leaves treat coughs, medicinal use for women after childbirth; seen as a spiritual tree because of its healing properties	Sometimes kept, sometimes cut down, depends on location (kept at farm borders)
Tamatama/Edinam	<i>Entandrophragma angolense</i>	Tiama mahogany, tiama	Red timber	timber boards; same family as mahogany and can be mistaken once cut into boards	Yes, always keep if found growing
Tweneboah	<i>Cordia milenii</i>	Kyeneboa, drum tree	Timber, craving drums and instruments	timber for doors and roofs; wood also used to make drums	Yes, always keep if found growing
Wawa	<i>Triplochiton scleroxylon</i>	African whitewood, samba, obeche	Soft timber tree, shade on farms	high value timber; used to make dug out boats; shade for cocoa; farmers leave this tree to grow even though their crops do not yield if they are under it	Yes, always keep if found growing and deliberately planted
Watapuo	<i>Cola gigantea</i>	Giant cola	Timber, shade on farms	used to make timber boards; plantain, cocoyam, and groundnuts can grow well under this tree; large leaves give nutrients to the soil	Yes, always keep if found growing

The qualitative data collated in this table are discussed throughout the chapter. Before going on, the quantitative household survey data is presented for reference purposes.

6.3 Survey data

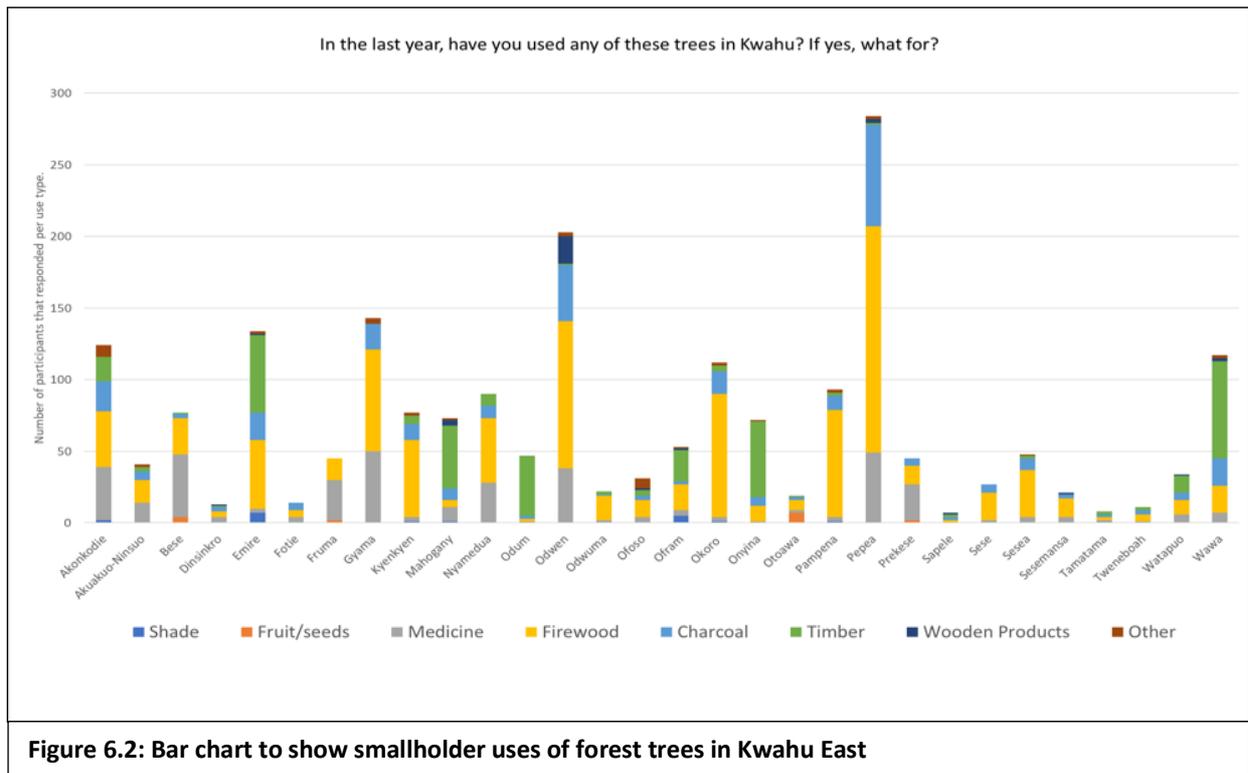
The household survey asked respondents what forest trees in the local area they had used in the last year and provided multiple choice answers of: shade, fruit/seeds, medicine, firewood, charcoal, timber, wooden products and other. The results indicate that the most used trees overall are *akonkodie*, *emire*, *gyama*, *odwen*, *okoro*, *pepea*, and *wawa*. Except *wawa*, these are all frequently harvested for firewood, which is by far the most widespread use of trees in this survey, as discussed in §6.5. Table 6.2 and Figure 6.2 below present this data.

Tree species	Shade	Fruit/ seeds	Medicine	Firewood	Charcoal	Timber	Wooden Products	Other
Akonkodie	2	0	37	39	21	17	0	8
Akuakuo-Ninsu	0	0	14	16	6	3	0	2
Bese	0	4	44	25	3	1	0	0
Dinsinkro	0	0	4	4	3	1	1	0
Emire	7	0	3	48	19	54	1	2
Fotie	0	0	4	5	5	0	0	0
Fruma	0	2	28	15	0	0	0	0
Gyama	0	0	50	71	18	0	0	4
Kyenkyen	1	0	3	54	11	6	0	2
Mahogany	1	0	10	5	8	44	4	1
Nyamedua	0	0	28	45	9	8	0	0
Odum	0	0	1	2	2	42	0	0
Odwen	0	0	38	103	39	1	19	3
Odwuma	0	0	2	17	1	2	0	0
Ofofo	0	0	4	12	3	4	1	7
Ofram	5	0	4	18	2	22	1	1
Okoro	1	0	3	86	16	4	0	2
Onyina	0	0	1	11	6	53	0	1
Otoawa	0	7	2	7	2	1	0	0
Pampena	1	0	3	75	10	2	0	2
Pepea	0	0	49	158	71	1	3	2
Prekese	0	2	25	13	5	0	0	0
Sapele	0	0	0	2	2	2	1	0
Sese	0	0	2	19	6	0	0	0
Sesea	0	0	4	33	8	2	0	1
Sesemansa	0	0	4	13	3	0	1	0
Tamatama	0	0	2	2	2	2	0	0
Tweneboah	0	0	1	5	3	2	0	0
Watapuo	0	0	6	10	5	12	1	0
Wawa	0	0	7	19	19	68	2	2

Overall, for each use, the most popular tree(s) were:

- Shade – *emire*
- Fruit/seeds – *otoawa*
- Medicine – *gyama*, *pepea*, *bese*, *akonkodie*, and *odwen*

- Firewood – *pepea*, *odwen*, and *okoro*
- Charcoal – *pepea* and *odwen*
- Timber – *wawa*, *onyina*, *emire*, *mahogany*, and *odum*
- Wooden products – *odwen*



Few respondents mention collecting seeds and fruit from forest trees. There is a general trend that the use of trees for firewood and charcoal corresponds to the most common, pioneer, fast growing forest tree species. The timber preferences are all high value economic trees.

Smallholders use forest trees on their farms for specific purposes (Table 6.3). There is some correlation between these on-farm uses and the more general ways trees are used, summarised in Table 6.2. Firewood was the most important use of on-farm trees, followed by shade for people (not crops) and collecting fruit. ‘Other’ included to make yam poles (n=4) and to keep the soil moist (n=1). Some uses frequently discussed in interviews and farmer community meetings were rarely mentioned in the survey, for example, protecting crops from wind, making charcoal, maintaining soil health and use as timber.

For firewood	212
Shade for people	154
To collect fruit	148
To use in medicine	84
To make charcoal	47
Shade for crops	24
To mark farm boundaries	20
To protect crops from the wind	19
Other	7
For timber	6
For other tree products	2
For tree cash crops	0
For future investment (timber or charcoal)	0

Interestingly, when asked if they had deliberately grown (either planted or nurtured) a forest tree on their farm, only 46 out of 252 (<20%) smallholder respondents confirmed they had. However, qualitative data (discussed later in this chapter) showed that farmers were keen to have more trees on their farms, actively weed around saplings they see as valuable and protect trees from loggers. This means that many trees on farms are self-seeded, which was also found in Fairhead and Leach’s (1996) research.

The survey results indicate that the most common uses for deliberately grown and saved trees were timber (42%) and shade or windbreak (15%). Of these, *mahogany* was the most popular. This is the most mentioned tree, valued for both timber and medicine. Second were *emire* and *ofram*, which are given to cocoa farmers by the Cocoa Board to shade cocoa plantations. Several other participants mention being given the trees from the Forestry Commission (FC), MOFA and one reforestation initiative. This shows that when trees are provided for free, people are happy to grow them, particularly if they can accrue benefits when trees are felled (like cocoa farmers planting timber trees).⁴⁹ Smallholders also indicated that deliberately grown trees are used for firewood and charcoal. On a par with these common purposes was the recognition that trees enrich the forest, land or soil. This further indicates that farmers are interested in more than just the benefits they can directly reap from trees – they also care about the health of the ecosystem as a whole.

⁴⁹ This is highly dependent on tree tenure rights, which are discussed in Chapter Seven.

The survey also asked respondents what tree clearing methods they had used in the last year, (see Table 6.4). In my farming observations I mainly saw smallholders using machetes to fell saplings, mirroring the data here which finds over 91% of participants clear trees with machetes. Previous research by the RSPB identified ring-barking (a method that involves stripping a ring of bark from the tree to kill it) as prevalent in the area, however little evidence was found of this practice. In my observation and conversations, it was clear that women used base burning (setting fire to the base of the tree) more often to prevent large trees casting shade on crops (shade is discussed further in §6.4). They use the gradually dropping dead branches for firewood supplies. In the survey, half of the respondents used base-burning, indicative of this gender split. I did not see anyone use an axe, even though over a quarter of respondents said they used them. Finally, it is interesting to note the relatively high use of chainsaws (also around 25%) given that there are regulations requiring people to have licenses to operate a chainsaw. This figure may also include hiring licensed chainsaw operators to cut trees (see Chapter Seven).

Felling with machete	Felling with axe	Felling with chainsaw	Coppicing	Ring-barking	Base-burning	Poisoning
92%	27%	24%	1%	2%	50%	0%

6.4 Mature forest trees on farms

Farmers identified various roles that forest trees play on their farms, including moisture preservation, soil fertilisers, wind and firebreaks, different kinds of shade and distinguishing farm boundaries. Table 6.5 summarises these uses and tree preferences.

On-farm use	Smallholder tree preferences	Position on the farm
Keeping soil fertile	<i>Watapuo, anyina, odum</i>	A few within the farmed field, often with cocoyam and plantain planted close by; and at farm edges
Preserving moisture	<i>Onyina, odum, akonkodie, ofram, wawa</i>	A few within the farmed field, often with cocoyam and plantain planted close by; and at farm edges
Preventing wind damage	<i>Odum, anyina, akonkodie, mahogany, kyenkyen</i>	At farm edges
Supporting fire breaks	<i>Pepea, akuakua-ninso</i>	At farm edges
Creating shaded areas for people	<i>Pepea, fruma</i>	A few within the farmed field and at farm edges; kept clear underneath to give space for people to rest, cook and work
Providing moderate shade to crops	<i>Emire, ofram, kyenkyen, watapuo, anyina, odum</i>	A few within the farmed field/cocoa plantation and at farm edges
Indicating farm boundaries	Any distinctively shaped or strong large tree, especially: <i>sesemansa, otaawa, anyina, odum, akonkodie, mahogany, akuakua-ninso, okoro, kyenkyen</i>	At farm edges
Acting as yam poles	Any pole-like young tree, especially: <i>okoro, pepea</i>	A few within the farm, sometimes the tree growth is stunted

Smallholder often described trees as ‘keeping the farm warm’ – meaning relatively cooler than the hot climate – showing a specific appreciation of the moisture trees capture and protect:

When we are able to plant more trees, it will provide more rain and give warmth to the farmland. (FHS-Bk-21)

Cutting down of trees has affected farmland because when there are a lot of trees on the farms it provides warmth and [whilst] the trees do take water, some of the trees keep water; so even if it doesn’t rain and there are a lot of trees, if you are growing something it will probably grow healthily and produce better. (IN-SH-61)

You have to leave some trees on your farm to give the land some warmth. Some trees are meant to be cut down, some too are not to be cut down. (FCM-Men-83)

Smallholders suggest that trees not only ensure crops have moisture, but also keep the ground soft for weeding and planting, making the smallholder’s work easier. Several farmers showed me how trees provide nutrition as natural fertilisers, usually through the drop and decomposition of their leaves annually. Some trees, for example, *watapuo*, are kept deliberately for this purpose because their leaves are large. Tall, thick trunks, especially *odum*, *onyina*, *akonkodie*, *mahogany*, and *kyenkyen*, provide shelter and protection from wind, which can damage crops during rainy season. Short, thin trunks and young trees of many varieties are kept by farmers to act as yam poles, whereby yam grow beneath the tree with their vines climbing the trunk. Two favourites for this are *okoro* and *pepea*, both of which also

have high firewood and charcoal use. Some farmers prune, burn or poison these trees at the base to stunt their growth for continual use as yam poles, others let the trees continue growing.

Shade is both a major benefit of trees and a potential problem. It is an important requirement for farms for two reasons. Firstly, it shields the crops and soil from the harsh sun, which also helps to preserve ground moisture. Secondly, people use shaded areas to sit under for rest, refreshment, and to carry out on-farm processing jobs like shelling groundnuts or preparing cassava stalks to be replanted (Figure 6.3). In the household survey, shade for people was the second most common use of trees on farms (n=154). When choosing trees to shade people, farmers prefer shorter, wider trees – with the *pepea* being the most common, as it is also a good tree for firewood and charcoal making. In contrast, to provide a good amount of shade for crops, farmers tend to leave or nurture the fast-growing timber trees that are taller and have narrow canopies or small leaves, to ensure the shade is not so much that the crops' growth is inhibited – with the most frequently chosen being *emire*, *ofram*, *kyenkyen* and *watapuo* (despite their large leaves). *Emire* and *ofram* are particularly popular, as they are promoted and freely provided by the Cocoa Board (see §6.3).



Figure 6.3 A *pepea* tree casts shade in the centre of a smallholder's farm. He cooks, eats and rests here. There is a washstand and a place to hang his clothes. There are also stones set in the ground that he uses to sharpen his machete, which he believes have been used by several generations of farmers, and other rocks to sit on. Corrugated iron sheets are leant against the trunk to store his farm tools under. The farmer (left of the picture) is sweeping away *pepea* seeds using a palm leaf broom because he likes to keep the area tidy. Photo taken in June 2018.

Despite the many apparent benefits of trees within farm boundaries, over half of the survey respondents cleared trees to create space for crops and 35% regard trees and crops as in competition for soil nutrients, water and sunshine. Furthermore, given the diversity of farmers and crop choices, the extent to which shade is a hindrance or a help depends on many factors. Forest trees may be left to grow in one area, and removed from another, depending on the crop planting plan, the position of the tree, and the smallholder's perception of wider livelihood risk and adaptation. A young tree is easier to control, and remove, than a large tree. The poorest subsistence smallholders are more likely to leave large trees standing because they do not have the financial resources to pay for their removal; equally their poverty could become a reason to cut them down, if they can be processed into timber boards. Smallholders who grow larger quantities for trading (including semi-commercial farmers) remove more trees in their land preparation if they are planting three-month cycle, sun-loving crops (such as maize). Equally, more financially and land tenure secure farmers showed willingness to leave trees standing because they have space within their farmland and believe the ecological benefits outweigh the costs. The most affluent small-scale agribusiness farmers remove all standing trees from their field areas, especially if they use tractors, but generally showed enthusiasm about keeping trees at the farm edges.

Interviews confirmed that regardless of the farm, trees that bring too much shade – i.e. those with wide canopies (*gyama, odwen, pampena, okoro*) and/or which spread too quickly (*odwen*) – are usually pruned or cut down. Both the cleared trees and pruned branches are used for firewood, building materials for small storage containers, and occasionally they are processed into charcoal or timber. Some fire-resistant trees are grown deliberately at the edges to contribute to firebreaks – and this use correlates with the properties that make good charcoal, found in trees like *pepea* and *akuakua-ninso*.

Similarly, whilst many of the farm boundaries happen to coincide with trees, to say that trees are *used* to mark farm boundaries is a potential extrapolation of the spatial arrangement of trees by ecologists trying to make sense of the forest-farm area. Large forest trees (*odum, onyina, wawa, akonkodie, okoro* and others), which also act as wind breaks, do 'mark' the edge of farms in so far as the field ends by the tree – but the tree was often there first and the field size is accommodating for it. The exceptions to this are the use of fast growing *otoawa* or *sesemansa* trees which, due to their unique shapes, might be planted when there

are no other features to depict a boundary. When planted close together, *sesemansa* creates a fence-like border, used to demarcate a farm or compound's parameters.

6.5 Firewood and charcoal

As discussed above (§6.3), firewood was the most commonly reported use of trees in the household survey by far (see Table 6.2). As described in Chapter Five, when farms are cleared the trees that have been cut are invariably used as a by-product to make firewood or charcoal. When asked why a tree was cleared, over 90% of survey respondents chose 'for firewood' as part of their answer. This shows that smallholders are cutting trees specifically for firewood – even if they are simultaneously clearing space for crops. The correlation between unwanted and/or shady trees and those used for firewood also supports this inference. For example, *pampena* is always removed during clearing because it is prone to breaking in storms causing damage to farms, and it is a popular firewood too. Some trees are pruned, so that their branches are used for fuelwood but they remain standing and growing.

The survey showed that most jobs involving cutting trees are done by male members of the household, however, collecting fuelwood and bringing it to the home is the responsibility of women and children. Women will often take a whole day to gather firewood and female farmers with more deadwood on their farms will share with other women (FO-SH-1). Some farmers grow trees specifically on their farms to use as firewood in the future. The most popular are *okoro*, *pepea* and *odwuma*.

The process of cutting or pruning trees is done by smallholders themselves (especially men) if they have access to a chainsaw or through hiring chainsaw operators or labourers to cut trees for them and/or make the charcoal. One female smallholder described in an interview (IN-SH-39) that a day's labour for a chainsaw user to cut trees into firewood from one hectare of fallow cost her 500ghs (\$100) and she paid a further 150ghs (\$30) to transport the wood by motorised tricycle from her farm to the house in Kwahu Tafo. This is an expense few women can afford.

Whilst firewood is usually only collected for the household, charcoal production in the research area takes two forms: localised family production and commercial charcoal making.

The first involves small-scale production by smallholders themselves with help from other family members or labours (Figure 6.4). The sale of charcoal is incorporated into their livelihoods as occasional/seasonal extra income. The second involves individuals and small groups of specialised charcoal makers who move between settlements and within the forest-farm areas making charcoal for farmers either as hired labour or through shared profit/produce. Whilst there is a difference in the distribution of labour and profit, the process of charcoal making is the same.



Figure 6.4 Charcoal-makers labour on a smallholders farm. Charcoal is made during the clearing season. The photo shows how several trees have been left standing throughout this field of palm. Photo taken in February 2018.

Charcoal is made mostly during the dry clearing season – January-mid March – when farmers prepare a section of previously fallow land into a field. Some small to medium trees are felled to make space for crops, although trees considered important or useful are left standing.⁵⁰ A chainsaw operator might be hired to cut all the trees on one farm: some trees are turned into timber boards or posts, some chopped into firewood and other trees, plus the debris after making timber, are burned into charcoal. The most popular native species for charcoal production include *okoro*, *pampena*, *odwen*, *emire*⁵¹ and also mango (*Mangifera indica*). Two exotic species are regularly used too: neem and acacia. Farmers will sometimes prune large branches rather than cutting the whole tree – often the case with mango. Whole trees, debris and branches are chopped into smaller pieces and piled in a shallow square hole. They are set

⁵⁰ Across the various data collection methods, farmers repeatedly reported leaving trees they know the uses of or those known to have economic value.

⁵¹ *Emire*, *okoro* and *odwen* are also cut for timber so often the debris from this process is turned into charcoal.

alight, and as they smoulder are covered over with soil, creating a mound (Figure 6.5). A few holes are made for ventilation. They are left to combust slowly for 12-24 hours (depending on the amount). When uncovered, the charcoal is brittle, breaking easily. Charcoal makers use rakes to separate charcoal from the soil. Usually this is done communally or as a small group – with a couple of people clearing the soil, and others sorting and bagging the charcoal. Each large bag of charcoal (see Figures 1.2 and 6.4) is sold for 25ghs (approximately \$5.50). One medium sized *okoro* tree can make as many as twenty-five bags – fetching over 600ghs (\$120). This is a significant amount given that earning 200ghs (\$40) a month is a good wage for anyone outside of professional paid work. Farmers hiring in this labour split the profits or the bags with the charcoal makers.



Figure 6.5 A burning charcoal mound. Wood is burning slowly beneath the soil. The mound has been fortified with branches. A ventilation hole can be seen on the shaded right-hand side. Photo taken in May 2018.

Farmers need adequate space on their farms to carry out charcoal production, which is another reason why it is usually done when fallow land is cleared. Some farmers also do charcoal making at other times of the year (as in Figure 6.5). This process is said to enrich the soil, which is sometimes redistributed directly to crops, or the area is used as an on-farm nursery for starting vegetable crops, before transplanting into the main field (FC-SH-7).

6.6 Medicine and other NTFPs

Beyond charcoal and firewood, most smallholders and village informants described using other forms of non-timber forest products (NTFPs) as part of their livelihood, as identified in §6.3. Other NTFPs include wild food, bushmeat, animal fodder, mushrooms, snails, and medicinal plants. Table 6.6 collates data from interviews showing only the trees from Table 6.1 which smallholders identified as being important for NTFPs.

Table 6.6: The NTFP uses of forest trees on farms in Kwahu East	
Tree name	Most common NTFP uses
<i>Akonkodie</i>	Medicinal seeds, leaves and bark. Leaves can be cooked into a soup
<i>Akuakuo-Ninsuo</i>	Medicine, especially for treating heart disease; makes good charcoal
<i>Bese</i>	Seeds are chewed for caffeine and dental care; bark can be used to make cloth
<i>Dinsinkro</i>	Medicine
<i>Emire</i>	Medicine to treat hernia and toothache; offcuts are used for firewood and charcoal
<i>Fotie/Otie</i>	Medicinal sap; the bark is used to make palm nut soup
<i>Fruma</i>	Medicine, powerful painkiller in the seeds works like paracetamol; seeds can be made into a skin-moisturising butter
<i>Gyama</i>	Medicinal use of leaves for treating fever and making blood tonic; seeds used by children to shoot at birds
<i>Kyenkyen</i>	Medicinal use of bark and leaves in blood tonic
<i>Mahogany</i>	Medicinally bark is used to make blood tonic and to treat many ailments
<i>Nyamedua</i>	Medicinally leaves are used to treat measles
<i>Odum</i>	Medicinal use to treat rashes; makes good charcoal
<i>Odwen</i>	Medicinal use in blood tonic and for heart problems; good for firewood; chewing sticks for dental health
<i>Odwuma</i>	Medicinal uses; branches store water which can be drunk; good firewood
<i>Ofram</i>	Used to make wooden products, e.g. drums; good for charcoal and firewood
<i>Ofoso</i>	Leaves are used to wrap <i>kenkey</i> ; bark is turned into tying strips for carrying firewood; branches can be eaten
<i>Okoro</i>	Medicinal use of bark and leaves; good for growing yam up; good firewood and charcoal,
<i>Onwama</i>	Medicinally used to make blood tonic; snails lay their eggs here
<i>Onyina</i>	Medicinal use of leaves and bark; cotton from seeds is used for stuffing bedding
<i>Otoaawa</i>	Medicinally used to treat toothache, fever and digestive parasites; fodder for sheep and goats; edible fruit
<i>Pampena</i>	Good for firewood
<i>Pepea</i>	Medicinally used to treat jaundice and rheumatism; good firewood and charcoal; growing yams up
<i>Prekese</i>	Medicinal seeds, bark and leaves for many illnesses including asthma, fever, and heart disease
<i>Sese</i>	Used to make wooden products like the <i>banku</i> spatula and pepper grinder
<i>Sesea</i>	Medicinal uses; wood can be made into carved products and stools
<i>Sesemasa</i>	Medicinal use of bark and leaves to treat coughs and for women during childbirth; chewing sticks
<i>Tweneboah</i>	Wood is used to make drums

Many forms of wild food, including crops which have not been deliberately cultivated, growing in fallow forest-farms. Sometimes people gather cocoyam leaves, cassava seeds and other additional crops from these areas. These places often contain abandoned fruit trees and perennial crops, as well as mushrooms and snails, which are also free to collect and used by those in need of extra food (FCM-Women-87). The core ingredients of *kotomrie* stew – a staple dish made using fresh, young cocoyam leaves – are often gathered from uncultivated or fallow forest-farm since these plants are older, larger and have more young leaves to spare than those growing on cultivated farms.

Some farmers set traps to catch bushmeat and pests (Figure 6.6). These include duikers, squirrels and, most importantly, cane rats (*Thryonomys swinderianus*), known locally as ‘grasscutters’. Such animals both cause damage to crops, especially grasscutters, and fetch a good price for local cuisine. Teenage boys and young men organize with guns as hunting groups to look for bushmeat. They set fires to chase grasscutters out of thick bush. Hunters and loggers use each other’s trails, each making it easier for the other to reach new areas of forest. People also use the forested areas to gather wild mushrooms and snails to eat, and fodder for farm animals back at home. One oral history interviewee pointed out that the hunting of bushmeat is disrupting the dispersal of tree seeds through animal manure, and also affecting the regeneration of the forest (OH-SH-48).



Figure 6.6 Two varieties of small mammal traps. These are set by both hunters and farmers, as the mammal pests that cause crop damage can also be eaten and sold as bushmeat. Photos taken in February 2018.

There are also other useful products that can be sourced from the forest or fallow areas. For example, in wetter places, bamboo grows which can be used for construction and making tools; the seeds of the *bese* tree, which is a type of cola, are chewed as a stimulant; and specific trees like *odwen* and *sesemansa* are used to make chewing sticks to care for teeth.

Forest plants are sourced for medicine and herbal remedies (Figure 6.7) such as a tonic made from mahogany bark that treats malaria. Popular medicinal trees include *mahogany*, *prekese*, *fruma* and *akuakua-ninso*. The relatively few mentions of *prekese* and *akuakua-ninso* may be indicative of their scarcity in the forest because unlike the *fruma* tree, these are not often planted deliberately by farmers or within villages. Instead, *pepea* and *gyama* appear as the most used medicinal tree, however, this may be because as fast-growing trees they are more numerous.



Figure 6.7 Examples of medicinal NTFPs. On the left, a herbalist showed me *mahogany* bark, used to make many tonics; on the right, a farmer showed me the *fruma* seeds which are said to be a powerful painkiller. Photos taken in April 2018 and November 2018.

Herbalists who specialise in healing people hold extensive knowledge about where to source and how to prepare plant-based remedies for a large variety of ailments. The three traditional herbalists (TH) I spoke to in this research are all in their seventies and learnt their knowledge from their parents:

My mother was a priest, so when the gods contacted me, they taught me everything about how to use plants and trees to heal people. I didn't go to school, instead I went with my parents [to farm] and they taught me all about what plants can be used for. They told me to pay close attention. Every tree has a purpose and the type of sickness it can cure. (IN-TH-15)

Herbalists say they are not always able to pass their knowledge onto the next generation because young people are not interested to learn and there is an increased scepticism around herbal remedies with the availability of professional medicine. Even so, in the communities they serve, there are increased demand on herbalists due to social problems – one reported high alcoholism amongst men, which she puts down to inequality and farming livelihood struggles; another pointed to poverty preventing some people accessing other forms of medical care.

Finally, another tree-based product is the natural pesticide made from the non-native neem tree (*Azadirachta indica*). Neem are found both on farms and within towns and villages. Some farmers plant them deliberately (FO-SH-10). To make a pesticide, the leaves and seeds are cut, mashed and soaked in water for four days (IN-SA-36). This liquid can be used on its own or mixed with pepper, and then sprayed on crops as a non-poisonous (to humans), organic defence against insect pests – who ingest it and die (IN-MOFA-77). This natural pesticide works for the armyworm, which had caused extensive crop damage to maize in the two years preceding fieldwork. However, there are not enough neem trees to supply all smallholders with this pesticide (IN-SA-36).

6.7 Limitations to farmer management of forest trees

As shown by the diverse uses of forest trees, smallholders value their presence on farmland and often expressed a willingness to let them grow:

I have *odum, ofram, onyina, akonkodie, sesemansa, sese, emire...* I keep these trees as they protect the land. If you don't leave the trees, the farm will turn to grassland. (OH-SH-52)

When trees have a purpose, I keep them. (FO-SH-4)

Having no trees on your land means you have to buy firewood, which costs money.

This wasn't a problem in the past but is now. (IN-SH-32)

Overall, smallholders deliberately let grow 68% of the forest tree species we discussed and showed an interest in planting almost half of them (see Table 6.1). Generally, smallholders will not plant forest trees if they do not believe there is a good chance of seeing the financial or livelihood benefits that come with them reaching maturity. They will, however, let naturally occurring forest trees grow when there is a specific use for them (e.g as firewood, animal fodder, medicine, timber). Older smallholders believe that younger or less experienced farmers may not be as knowledgeable about the uses of different trees and their benefits, nor as able to identify young saplings and that may be contributing to them removing trees from their farms (FCM-Mixed-85). When respondents were asked if they would be interested in learning more about the uses of different forest trees, 80% said they would. Similarly, 50% said they would share their knowledge of trees with other people.

Smallholders who are dependent on producing food for household consumption and trade are not able to make forest trees a priority since the income will be delayed. Both domestic tree crops and forest trees do not provide direct livelihood benefits or income until they are mature, which takes several years. Incentives to keep trees, like advance payments or insurance schemes to cover damage, would make this livelihood option more viable (IN-FWG-92). Overall, however, there is a lack of incentives, technical advice or inputs from the government to support the growing of forest trees on farms or tree crops (IN-MOFA-66).⁵²

Aside from considerations about shade and space for crops, two important barriers prevent smallholders from nurturing forest trees on their farms. The first is the tree tenure system and accessibility of the tree registration process for proving ownership of economic forest trees. Smallholders repeatedly reported that trees on their farms are felled and extracted without their consent:

⁵² In September 2020, during the writing up of this research, a new national initiative was launched to support farmers to grow tree crops – the Tree Crop Development Authority – starting with rubber, palm oil, mango, cashew, shea, cocoa and coffee.

The *wawa* tree for example, you meet it on the farm, when you are weeding you weed around it and let it grow. One day you go there and it has gone by a chainsaw operator. Who are you going to ask? No one. (FCM-Women-87)

This means that growing more forest trees is only attractive and possible under certain conditions. Crucially, smallholders need larger areas of land for longer periods of time and secure tree tenure.⁵³ The second disincentive is the perceived risk of bush fires or set fires damaging trees, as outlined in §5.9. Both issues are heightened by the impossibility of securing insurance. When forest trees are burned or logged, the space that they had taken up whilst growing, the damage caused through felling and the lack of benefits reaped means an overall loss for the farmer. This is particularly painful when farmers leave trees to grow as a form of investment in their family's future.

The land tenure arrangement further complicates matters: as discussed in §5.3, smallholders have limited influence over decisions concerning the trees which grow on land they farm due to the tenure. Renting farmers are actively discouraged from planting tree crops because there is too long a delay in economic benefits. Those on family land know that any nurtured forest trees will be under the guardianship of the landowner, unless a land occupier is able to register their ownership of the tree.⁵⁴ In response to this uncertainty and lack of equitable financial remuneration or compensation for the lost value of standing trees or the crop damage caused by felling, it is not surprising that a farmer might decide to arrange for forest trees to be cut on their own terms. These issues are discussed at length in Chapter Seven.

Interviewees consistently depicted a local perception that the number of trees in Kwahu is decreasing and that this is having various impacts on different livelihoods. Smallholders described how the loss or absence of trees from their farms reduces soil fertility, makes the soil dry, exposes farms to harsh sunlight and strong winds, and alters the vegetation so that weeds and grasses grow that are more difficult to clear. Lack of trees also means they have nowhere to rest on their farm and reduces access to firewood, NTFP, timber and wooden materials. These consequences impact on farmer livelihoods overall – in particular, increasing

⁵³ Tree tenure is discussed in Chapter Seven, §7.2.

⁵⁴ The exception to this is cocoa farmers, who are encouraged to plant native economic trees alongside their cocoa. As outlined in Chapter Five, the Cocoa Board advise cocoa farmers to plant economic forest trees alongside their cocoa to provide shade and shelter from wind.

the total amount (and therefore cost, if hired) of labour required, and the amount of money spent on agro-chemicals. Herbalists described certain forest trees as becoming rarer and medicinal plants harder to find. They have to travel further to gather the products they seek. These impacts of tree cover change on livelihoods affect less affluent people more severely, especially subsistence farmers, women and older people, because they have less resources at hand to adapt to the harder conditions (Rocheleau and Edmunds, 1997).

One key impact of tree cover change which disproportionately affects women's livelihoods and well-being is the reduction in access to non-timber forest products (NTFPs). These items are economically important, but women report that they have become scarcer due to changes in vegetation cover. Informants described how gathering snails and mushrooms for sale used to provide extra income without input costs, however, they are increasingly hard to find. Similarly, using medicinal plants provided some degree of self-sufficiency in meeting family health needs, but as herbal plants become rarer, households spend more money on government-provided or western pharmaceutical healthcare. These time, emotional and financial burdens fall more heavily on women due to gendered household structures, roles and responsibilities.

Women and children are also largely responsible for collecting firewood and water for their households. With fewer trees in the forest-farm landscape, they need to travel further to gather wood from fallow areas, adding labour time and insecurity to their work. Respondents also reported that unpredictable rains affect local water supplies and reduce the amount of rainwater that can be harvested at the home from roof guttering. This requires women and children to walk further to collect water by hand from communal taps or natural springs. These activities not only take hours out of the day, but also require body strength and fitness. Older women, pregnant women or those with health conditions are less able to adapt. Furthermore, universally experienced livelihood challenges have knock-on effects on women due to their role within households. For example, several female participants commented on the increase in alcoholism amongst men, especially when crops fail or when they lose access to farmland through disputes or displacement, and how this impacts on the household economy, labour distribution and family relationships.

Several farmers reported that their adaptation strategies for livelihood challenges (see §5.9) also impact on the number of trees. For example, many smallholders, herbalists and

traditional authorities believe that the use of chemical herbicides is affecting the regrowth of forest undergrowth, including ground flora and herbal plants, by poisoning saplings and preventing the germination of dormant tree seeds:

Yes the forest has depleted. Its due to chemicals people use on their farms. They kill the [plants] that are useful. They are very harmful. The chemicals spread and cause all sorts of plants to deplete. (IN-TH-15).

When [a forest tree] is felled the seeds are likely to sprout and grow but looking at our farming system these days we apply chemicals, weedicide, so what happens to the new seed that is germinating? Weedicide is applied on it only to kill it. (OH-SH-50).

Several interviewees reported that the chemicals are making collected animal food scarcer: “the weedicides that we use to clear the grass [kill] the eggs of the snails and the worms and so forth, so nowadays we don’t have snails in abundance” (IN-TH&TA-67).

Smallholders believe that the complex livelihood threats they are adapting to, (see Table 5.6), are also impacting on the forest-farm. For example, if farmland is reallocated for development, farm plots become squeezed and there is less room to create effective firebreaks that protect the farm and forest-farm trees from wildfires (discussed in §5.9 and §7.5). Some smallholders reported that there is an increasing demand for farmland within denser forest areas because its moisture and less cattle-friendly vegetation (see §5.9 and §6.8.3) makes it safer to cultivate crops. These smallholder observations of the connection between the hazards to their own livelihoods, their adaptations and the impact of both on the farm-forest more broadly are summarised in Table 6.7. They point towards various narratives of tree cover change which are discussed in §6.8.

Table 6.7 The impact of hazards and farmer adaptations on the forest-farm and tree cover		
Hazard	Limitations of smallholder adaptations	Impact of adaptations and hazard on the forest-farm and tree cover
Bushfire	Farmers are not always able to create firebelts or clear farm of debris (which stop fires spreading) due to cost of labour	Fires spread damaging standing trees and in some areas is reportedly making the vegetation more difficult to clear
Tough vegetation	Weeds and grass growth stimulated by fire can increase the use of herbicides in farm clearing	Farmers believe that the use of herbicides could be affecting young tree growth, undergrowth (particularly of medicinal plants), killing snail eggs and wild mushrooms
Unpredictable rain	Some farmers choose to cultivate short-cycle crops which require more sunshine	This involves clearing more trees to reduce shade
Farm damage from grazing livestock (especially cattle)	Farmers are displaced from or abandon farms and desire to cultivate areas that are less at risk from cattle	Farmers look for land in more densely forested areas where cattle do not graze and clear farm fields from old fallow, cutting trees
Farm damage from logging	Smallholders with lower social status are less able to negotiate with loggers to stop extraction or secure benefits/compensation. Soil is compacted by logging trucks and debris left behind which reduces cultivation space. Farmers lose the standing tree value and crops (especially perennial) are damaged.	This context can push farmers towards removing trees themselves so that they are in control of the extraction, or growing short-cycle crops (that need less shade) which are less at risk of damage due to their fast growth. Removing trees affects the soil moisture and fertility, as well as the biodiversity of undergrowth (including medicinal plants) and bushmeat.
Damage to crops from pests	Farmers report that armyworm is increasing their use of pesticides, costing them more money.	Farmers believe that the use of pesticides could be affecting young tree growth, undergrowth (particularly of medicinal plants), killing snail eggs and wild mushrooms
Displacement from farmland	When farmers remain on their land, some trees are cut to create space for farming, some trees are deliberately kept within the field or edges, and many trees grow during fallow periods.	When farmers are displaced from their farmland for infrastructural development, town expansion or intensive agriculture, the trees are usually removed permanently as the land use changes.

6.8 Local narratives of tree cover change

Smallholders often recalled certain historical moments as markers of change outside of their control and which they struggled to adapt to through livelihood diversity strategies. The three most common reference points were the creation of Lake Volta in the 1960s, the droughts of the early 1980s and the recent removal of iconic *onyina* trees from the landscape by timber contractors in 2014. These are spoken about as moments of abrupt environmental change that were starting points for other ripple effect impacts. Regardless of whether this is evidenced by scientific fact, the stories told about these happenings are social facts that create local narratives of forest decline. These inform how local people understand what is

happening to trees and shape their sense of agency regarding issues that affect their livelihoods and trajectories of change. Three narratives emerged from the data: environmental change, powerlessness and blame.

6.8.1 *Narrative of environmental change*

The flooding of Lake Volta (Figure 6.8) in 1965 (described in §3.5.3) was an important local event for Kwahu people. During interviews and oral histories, it was repeatedly mentioned as the moment at which tree cover began to change in Kwahu East:

In those days [before the lake], the forest was so green and thick, and we cultivated crops easily. Now the place has changed – there are less trees, the land is hard and dry. I put this down to the building of Akosombo Dam. Officials informed us that the dam would have an impact – that there would be environmental changes which would last for about 15 years, some of the trees would die and the rain pattern might alter. (OH-SH-44)



Figure 6.8 Lake Volta near Kotoso on Kwahu East shore. Since the forest was not cleared before the river basin flooded there are thousands of dead submerged trees still standing in the lake. Photo taken in May 2018.

There were immediate environmental and social impacts of the dam. A large area of forest-farmland, predominantly subsistence crops and cocoa farms, was submerged under the lake itself (OH-SH-48), displacing 88,000 people. One participant hailing from Bokuruwa stool

lands described how, upon his family's cocoa farm being lost to the lake, they were relocated to a new town, Amate Quarters. Here, due to the absence of farmland in their reallocation compensation, the family subsisted on food parcels provided by the government (IN-SH-25). In the years that followed, respondents reported that trees within the vicinity of the new lake began to die and what used to be a moist forested flood plain became gradually drier. Some of these trees were cut down as the arrival of the chainsaw in the 1970s, combined with the precarity of displaced livelihoods and economic opportunities of supplying new settlements, resulted in an increase in the production of charcoal (IN-TA-67). On the Kwahu East bank of the new lake, the land had previously been rich in forested coffee and cocoa farms since the late 1800s (Agbodeka 1992). By the 1980s, in perceived correlation to the arrival of the lake, the only forest remaining was that on the escarpment hillsides.

Traditional authorities and some state personnel view the flooding of the lake as being a turning point in the local environment, blaming it for a perceived change in the micro-climate as it is seen causing dramatic tree loss which disrupted the rainy season. For example,

The cocoa and coffee farms between Bokuruwa and the lake were destroyed by the dam – the rising water rotted the roots of the tall trees, causing them to die. This changed the local rainfall pattern. Now the drought [dry season] is longer and harder – too long to grow cocoa and coffee. (IN-TA-82)

Informants in this research project also believed that the lake brought with it damage to the climate, which some claim to remember being warned about at the time by government and VRA officials:

The weather has changed, and [it's because of] the Akosombo dam completed in 1965. The VRA officials visited local farmers and warned us that for some years after the dam was built the area [around the flood plain] would become grassland. (OH-SH-53).

Over the next twenty years people associated all other changes in the Kwahu East area as having a starting point with the creation of the lake. The local narrative goes that in the years

following the creation of Lake Volta, the rainy seasons were altered and the area got drier.⁵⁶ People believe that they began to experience annual wildfires from the late 1970s onwards, which destroyed the cocoa and coffee farming (IN-TA-82, IN-TA-67, IN-SH-49). This culminated in a historical moment that forms a part of the national memory (Dei, 1988) – the drought and wildfires of 1983. Whilst this was a common experience across West Africa and studies have shown these droughts were not related to the creation of the lake (Gyau-Boakye, 2001), the connection between the two in Kwahu people’s minds creates a narrative of cause and effect:

In 1983 there were wild unattended bush fires that came and burnt all the forests in Kwahu. That bush burning changed the land because all the forest and easy-to-weed plants were burnt off. And when it started raining the land changed into grass. 1983 was when the grass started growing in Kwahu. There was also bush fire in 1973. These two incidents cumulatively made the grass land worse. (IN-SH-13)

The few cocoa farms that remained in what is now Kwahu East were destroyed in the 1983 fires, along with the large storehouses full of harvested cocoa (IN-TA-67). After these significant losses, and due to the ongoing risk of fires, cocoa farmers did not return to their former livelihoods.

This story presents a cyclical, degradation dynamic in the landscape: as more trees are removed or destroyed in fires, the ground loses moisture and nutrition, the microclimate becomes warmer and drier, and these conditions make it harder for new trees to grow. Informants believed that with less large forest trees and canopies than years gone past, there is now less rain. According to smallholders and elders, some years the rain only comes during the major season, and the minor is dry; whilst other years the seasons roll into one, concentrating the usual eight months of regular rain into four months of heavy downpours. Some of these patterns can be seen in the rainfall data recorded at Abetifi (Appendix 1), however, since Abetifi is more wet than Pepease, Bokuruwa and Tafo these figures do not indicate rainfall for the whole field site area. Farmers in areas with fewer trees (Pepease and

⁵⁶ The question of climatic variation and change (Kasei, *et al.*, 2010) in Kwahu specifically and Ghana more generally goes beyond the scope of this thesis. Whatever the scientific story, the power of local narratives of climatic change associated with the creation of Lake Volta in the 1960s is clear and significant.

Kwahu Tafo in particular), reported the rain patterns altering to unreliable, shorter, later and less intensive wet seasons:

In the past it used to rain heavily – the seasonal pattern was the same, in terms of when the rains would come, but now there is less rain than there used to be. It used to rain a lot when the forest was there and sometimes it was so torrential that we couldn't go to farm. Now there is a vast difference, and we don't get the heavy downpours they used to. (OH-SH-38)

Across the many interviewees, the perceived change in weather and increase in fires are seen as one of the main causes of both livelihood vulnerability and vegetation (Figure 6.9) and tree cover change.



Figure 6.9 Grassland in the Volta basin. These pictures of the same location near Kotoso (see map in Figure 3.2) from different angles illustrate the grassland vegetation in contrast to the dry semi-deciduous forest on the hillside. The top photo was taken at the end of the dry harmattan season whilst the photo to the left was taken in early rainy season. Photos taken in February (top) and April (bottom) 2018.

6.8.2 Narrative of powerlessness

Another more recent reference point that both smallholders and traditional leaders pointed to when explaining their understanding of forest decline was the 2014 timber harvest of *onyina* trees. This story evokes a narrative of powerlessness

Onyina trees (*Ceiba pentandra*) are some of the largest, most iconic trees in the landscape. They grow taller than most other trees, up to 50m+, towering above the other forest trees to provide a high canopy. Their base can be over 15m in girth due to their broad, thick buttresses. *Onyina* is a relatively soft wood and is therefore not as desirable as others for use in construction. When used as roofing it is known to attract insects and need replacing after a few years (IN-TA-76). Until the last decade there was an abundance of hardwood forest trees (*odum*, *mahogany*, *ofram* and *emire*) to harvest, and so the *onyina* trees were left standing. As forests become more depleted, however, soft woods were sought after as well. Timber contractors came to the area in 2014 to harvest *onyina* trees and some informants believed they were working with the permission of the Forestry Services Division (FSD) (IN-SH-16, IN-SH-40, FHS-Bk-3, FHS-Bk-48). Others thought they mainly gained access from local chiefs (IN-SH-12). It is not clear which timber company the contractors worked for, or for what use the trees were being cut. The process for securing timber concessions is complex (see Box 7.1) and discussed at length in Chapter Seven.

A sub-chief of Bokuruwa recalled:

The contractor came to Asakraka⁵⁷ [next to Kwahu Tafo] and arranged with the chief to harvest the *onyina* there. Before we realised, they had entered into Bokuruwa land. Myself and the Queen wrote a petition to the forestry officer at FSD Mpraeso, saying that somebody has entered our land harvesting our wood without our knowledge. [The FSD] wrote to the contractor to come down and discuss it with us. That is how he came here and arranged to have the woods here harvested. So we sat down and asked him to pay some compensation and do the harvesting. (IN-TA-76)

Whilst the contractors may have been given correct permission by the FSD initially in Asakraka stool land they gained physical access to other parts of the forest by unofficially entering neighbouring Bokuruwa stool land. From here, seemingly with the support of the FSD, they

⁵⁷ Asakraka town, within Kwahu South district, is indicated on the map in Figure 3.4

then negotiated a deal – and therefore, supposedly legal access to the timber – with the chief once the trees had already been cut. Since this course of events involved the sending and receiving of letters, it is possible that many trees were harvested before permission was granted. The explanation by the sub-chief pointed to his own feelings of powerlessness in the face of a timber company with the backing of the state, a perspective echoed by other traditional authority figures (IN-TA-63, IN-TA-67, IN-TA-80). In this case, since it is likely that many trees had already been cut and the FSD had not enforced their own regulations on legal logging, he started the negotiation with the timber company from a weak position.

Meanwhile, during a farming observation, a farmer recounted an incident that occurred on his rented farmland at around the same time (FO-SH-7). The timber contractors came trying to cut down an *onyina* on his farm edge. He pointed it out to me, showing how despite its height it is still very young with a relatively thin trunk (given how large *onyina* can grow), and would not make many timber boards. It angered him that the contractors had been given permission to cut such a young tree, so he argued with them to leave it. He refused to give them his own permission to cut it, partly because it would have caused a lot of damage to his farm and because he thought the tree was too young to cut regardless. For now, the tree has been left standing.

This is interesting for several reasons. Firstly, the farmer assumes that permission had been granted, which we can infer means he believed the contractors had a permit from the FSD and clearance through the chief. As seen through the chief's perspective, this is not necessarily the case and the contractors may have been working illegally. This assumption of permission indicates the farmer's sense of powerlessness – that things which do not seem fair or sustainable, both for him and the forest, are the state-sanctioned norm. This echoes the narrative that perceives environmental change as being caused by the creation of Lake Volta. However, in contrast to this narrative of powerlessness, the farmer's altercation with the contractors stopped the tree from being cut, demonstrating his agency. Furthermore, the comparative power of the farmer and the chief in this scenario are reversed: the landed and traditional authority figure has been backed into a corner to give consent after the fact, whilst a tenant farmer on rented land has managed to successfully stall the logging of an *onyina* tree on his farm.

Returning to the moment in 2014 when “they cut all of them – there are no *onyina* left” (IN-SH-43), we can understand this as a narrative repeated by farmer participants to understand tree loss and forest decline. This frame goes some way to illustrating the differential agency of multiple actors (farmers, chiefs, timber contractors, FSD personnel) and their correlating feelings of agency or powerlessness about trajectories of change. Whilst each actor has layers of power, interviews across the different informants indicated frustration at their limitations due to the complexity of factors and actors impacting on tree cover. This is illustrated further in the following chapters.

It also demonstrates the blurred lines between legal and illegal logging, showing how a process that starts as legal and potentially has state support throughout, can become illegal due to the way that consent is coerced or side-stepped. In doing so, it demonstrates how elements within the legal logging process contribute to both unsustainable logging practices and other causes of tree cover change. These issues are discussed at length in Chapter Seven. Importantly for the smallholders who refer to this story of *onyina* trees being taken, this moment is viewed as the epitome of unsustainable logging practice and an indicator of the state of the forest: since *onyina* are the least preferred of economic forest trees, cutting *onyina* means that there are no other better timber trees available to harvest. Furthermore, linking back to the narrative of environmental change, many farmer participants saw the felling of *onyina* and other large forest trees as having had an impact on the rains (for example IN-SH-40, IN-SH-16, OH-SH-48, FHS-Bk-4, FHS-KT-33):

There is an old saying that when there are many trees on the farmland, the trees help the rain to fall frequently. In the past, the FSD and timber constructors didn’t seem to like [harvesting] the *onyina* tree, and so there were many *onyina* on the farmland. Now, however, they have all been cut down. This is why the rain has changed... and this is making farming much harder” (IN-SH-40)

Several farmers showed me the remains of the *onyina* trees that were left on their farm (Figure 6.10) – having caused damage to crops when initially felled, large chunks of debris still lie across cultivated areas taking up valuable space. Some farmers have tried to burn this away or turn it into charcoal, whilst on other farms the stumps are used as flat surfaces to put farm produce or personal belongings on.



Figure 6.10 Remains of a large *onyina* on a smallholder's plot. Despite being felled four years prior to the photo, there were still large pieces of debris scattered on the farm. The farmer has tried to burn the stump away. Photo taken in February 2018.

6.8.3 Narrative of blame

The final narrative emerging from the data is one of blame. Different informants had various opinions about who and what was to blame for the perceived change to tree cover. There was general agreement amongst smallholders attending farmer community meetings that a combination of uncontrolled fire, and overuse of agro-chemicals were killing bush plants, young trees, snail eggs, mushrooms, bushmeat and also bringing about an increase in grassland vegetation which is harder for farmers to clear. Smallholders also believe that the reduction in trees means there are less damp conditions needed for both snails and mushrooms to thrive. Significant blame was pointed at those seen to be altering the number

of trees, including charcoal makers and chainsaw users for cutting down forest trees, as well as timber contractors working on behalf of the FC and timber companies

These perspectives were interesting because at the same time as identifying possible causes, smallholders also talked about their own uses of fire, pesticides and removal of trees from their farms – seeing their own practices as careful while viewing that of others as careless. This indicates internalised negative narratives about local livelihoods – where people with slightly different livelihood practices are blaming each other for perceived environmental changes. This was most acutely seen in the way smallholders blamed nomadic herders for their use of fire, and its consequences in perceived expansion of grassland areas, and chainsaw operators for their cutting of trees, even though smallholders themselves also use fire and cut trees:

The Fulani menace [sic] have been causing the bush burning, they want fresh grass for their cattle so they burn the dry ones, and due to them burning it, it sets wild fire everywhere. (IN-SH-12)

There are less trees in Kwahu now compared to ten years ago. The charcoal makers and the chainsaw operators have cut down all the necessary trees to make charcoal and timber to sell for money. (FHS-Nk-75)

Participants from government ministries, both MOFA and the FC, named the use of trees in traditional medicines as a causal factor of tree loss alongside various other factors. They perceive some of the practices, in particular stripping the bark of medicinal trees like mahogany, as damaging the trees and eventually caused them to die. The fact that this was raised as a cause of tree loss alongside other far more significant factors points to narratives that blame local people for forest degradation: this labelling of traditional livelihood practices as unsustainable, fails to recognise the inherent protection and nurture that traditional values and practices embody. I return to this recurring theme throughout the following chapters.

The most prominent blame narrative that emerged from all types of informants was the scapegoating of herders for farmer livelihood insecurity, loss of land, increase in grasslands, increase in fires (see §3.6 and §5.9), and ultimately, reduced tree cover:

I will say for the few years that I have been around, almost every year there has been the ritual of these Fulani menace [sic] with bush burning and that has contributed so much to the decline of forest trees that we are not seeing today. (MSM-MOFA-89)

This perception is inseparable from the problem of ongoing conflict for land between smallholder farmers (predominantly Akan) and herders (predominantly Fulani), which has been an issue in other parts of Ghana and West Africa too (Turner *et al.*, 2011; Bukari and Schareika, 2015; Kuusaana and Bukari, 2015). In Kwahu East, the conflict is exacerbated by the powerplay of some actors and is worth exploring as an example of how the stories that are told about a problem lead to actions that compound it. I was not able to interview herders about these issues, so the data I gathered was one sided and, as such, deeply prejudiced on ethnic grounds. However, the findings show a clear narrative of blame amongst smallholders, traditional authorities and government personnel which scapegoats herders with causing what is perceived as increased grassland and decrease of trees through their use of fire.

Farmer-herder conflict is affecting farmers in Pepease, Bokuruwa and Kwahu Tafo most profoundly as there are more herders in these areas. Numerous smallholders complained of losing land and crops due to herder activities, saying that when the herders come the farms are ruined (crops eaten, soil trampled and areas burnt), and they feel unable to cultivate them again because of the ecological impact and in case the cattle return. This forces people to look elsewhere for other land, usually having to rent new plots, costing them more money, decreasing land security and shortening fallow periods.

In 2018 local people complained to the local MP and governmental offices – especially the Ministry of Food and Agriculture (MOFA) and the District Assembly (DA) – because the traditional councils were seen to be doing nothing to protect farmers. The MP, who was also the Minister of State at the Ministry of National Security, launched another ‘operation cowleg’ (see §3.6) in collaboration with the DA: essentially bringing in armed military forces to drive the cattle and herders away from Kwahu East into neighbouring areas. These intermittent episodes of state violence resulted in many cattle being killed and carcasses being abandoned, from which local people collected meat (FCM-Men-D83). This intervention displaced the problem to another location, only for it to return. During the period of fieldwork for this thesis (2017-2019) there was no-one working on a long-term, holistic solution, and no system for

participative decision making that takes into account different stakeholders needs and perspectives, including the herders themselves.⁵⁸

The cattle being herded often belong to local and national elites, including people who work in the government, wealthy individuals and traditional authorities (Bukari and Schareika 2015). They are purchased as an investment and given to herdsmen to look after, who are paid in money and/or the supply of other valued resources, including weapons, motorbike fuel and food. In part due to the unknown extent of conflicting interests and due to other corruption, traditional authorities, local governmental offices and the police do not support individual farmers when land conflicts with herders occur.

The armed response by the government, fronted by the MP, is politically motivated: it affirms the local MP's popularity and reputation as a man who solves problems. It also detracts the attention of both those with vulnerable livelihoods and those with relative power away from addressing corruption, dishonesty, inequality and precarious land arrangements which would ensure a long-term solution. I return to discuss other actions of the MP in Chapter Eight.

6.9 Chapter summary

Chapter Six has shown that many trees remain in the landscape *because* the smallholders are there too. Smallholders work within their means to steward forest trees for specific purposes because they are a valuable part of the forest-farm ecosystem and smallholder economy. Farms depend on trees to provide nutrients, moisture and shade. At the same time, farmers remove some forest trees to create space for crops, to use as fuelwood, and to mitigate the risk of valuable timber loss through logging.

Smallholders are limited in their management of forest trees by a complex entanglement of different factors, including tree tenure, livelihood hazards and land issues. They perceive a

⁵⁸ This was suggested by one of the key informers in this research, who is also a member of staff at the DA. In his own time he put together a proposal for a holistic and fair resolution to the farmer-herder conflict based around restorative justice and community coordination. The District Chief Executive, who is himself writing a thesis on the Fulani issue, dismissed this suggestion, perhaps in part due to his connections to the MP who has been the main force behind current state interventions.

decrease in tree cover in the area and spoke of how this is making their livelihoods more difficult overall. Some of the adaptations farmers make to offset the challenges they face can become factors that impact on the number and age of trees in the landscape. Any tree cover changes that relate to farmer practices, therefore, cannot be separated from the broader economic and political contexts which farmers are operating within and limited by.

Finally, local narratives emerge that inform smallholder perceptions about what is happening to forest trees and how much agency they have in trajectories of change. These stories demonstrate that the land and tree management practices of farmers rest on broader political and economic conditions. The logging of *onyina* trees highlights the intersections of governance, tree tenure and specifically the role and limitations of the legal logging process in smallholder decision-making about forest trees. It is therefore necessary to better understand how forestry practices, regulation and enforcement are related to tree cover change, which is where the thesis now turns.

7 Trees and forest management

7.1 Introduction

Chapters Five and Six have shown that, whilst farmers manage forest trees on their farms for multiple livelihood purposes, they often do not have tree ownership rights. As a result, farmers are far from the only influence on the presence of trees in the landscape. In this chapter I turn my attention to other tree-users by examining the motivations of foresters and other people engaged in timber-related enterprises. These include chainsaw users, timber contractors, Forestry Commission personnel, commercial tree crop projects and sawmill owners. This chapter asks the question, what do these tree workers do with trees and how does this affect the type and extent of tree cover?

As the local branch of the national government Forestry Commission, the Forestry Services Division (FSD)⁵⁹ office in Mpraeso, Kwahu South has overarching management of the Kwahu East forest-farm landscape. As described in Chapter Two, forests in Ghana are organised into two overarching types: on-reserve and off-reserve. Figure 7.1 shows the Mpraeso Forest District and the location of the forest reserves. All other areas are off-reserve. The fieldsite for this research (see map in Figure 3.4) is located between Mpraeso town and the Northern Scarp West forest reserve.

The FSD do not regulate forests alone – their activities are supported or hindered by the actions of other key actors. Some of the most significant are traditional authorities represented by chiefs and landowners. Due to the custodial land system they are legally required to sign off timber extraction agreements and thus have some influence over what trees are cut and when. Reforestation programmes are often supported by different actors again – and this research found a multitude of people and priorities shaping reforestation activities including chiefs, a sawmill owner, chainsaw users and farmers.

⁵⁹ See §3.7 in Chapter Three for an overview of the FSD.

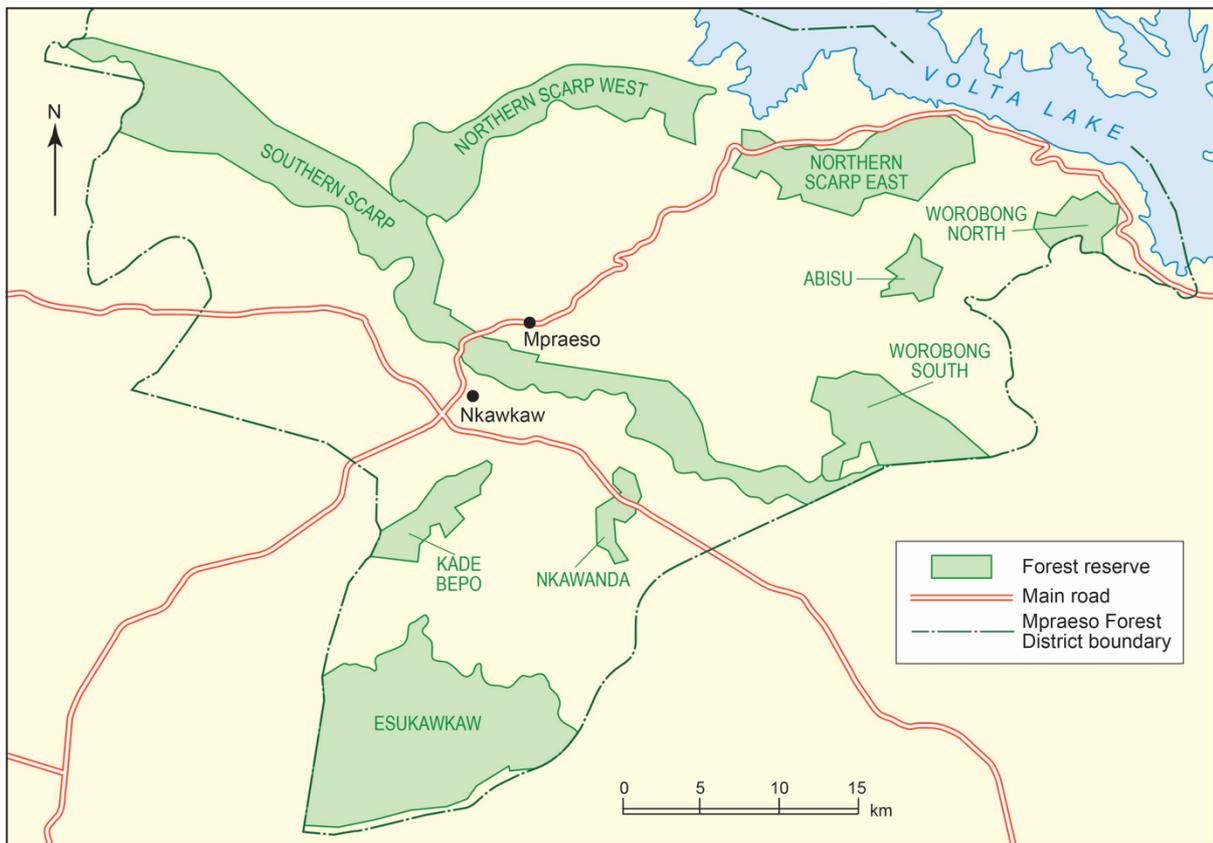


Figure 7.1 A map showing Mpraeso Forest District. It includes the district boundaries and location of forest reserves. This map was drawn by Philip Stickler at the University of Cambridge, 2021.

This chapter explores how each of these actors and their forest management and regulation practices influence the number, age and type of trees that exist in the landscape. The chapter begins with an analysis of tree tenure and registration (§7.2), since this determines who has rights over the trees in the landscape and therefore how they are managed and who by. I then look at timber harvesting (§7.3) by timber contractors and chainsaw users, examining the impacts of commercial logging. This leads into a discussion about illegality and the role of monitoring and enforcement for both logging and farming livelihoods (§7.4). Finally §7.5 reviews forest stewardship activities, including fire prevention efforts and reforestation programmes. Throughout the chapter, the failings of forestry regulation to protect forest trees becomes more apparent. In particular, the chapter highlights farmer perspectives on these issues and shows how their ability to nurture and manage trees sustainably is limited and compromised.

7.2 Between tree tenure and registration

Before discussing the tree tenure system, it is important to have an overview of the timber concession process because permission to fell timber trees is a source of confusion and conflict in the field area (as illustrated in §6.8.2). This is outlined in Box 7.1. The number of different actors involved in timber concession applications leaves room for manipulation, vested interests and corruption, as this chapter uncovers.

Box 7.1: The timber concession process

There are two processes by which timber concessions take shape. In the first type, a timber concession is initiated at the central Forestry Commission (FC) level. The FC commissions a timber contractor to log an area it has identified as ready for extraction or is approached by a contractor requesting a non-specific concession. The central FC makes an application and sends this to the regional and then district FSD offices for ratification. In the second type, a sawmill or timber company initiates the process by scouting an area looking for mature trees and approaching the stool to ask permission to apply for a concession. In this case, a document is drawn up between the stool and the interested contractor, specifying the area of forest to be harvested, and sent to the local FSD. In both processes, once the concession request is in the hands of the local FSD, an assessment of the area is carried out by field officers. They identify trees ready to fell, measure them, and advise on the extraction process. The FSD then writes a concession document specifying which trees (species, location, size) can be cut, before traditional authorities sign it in agreement. This is stamped by the FSD, then sent to the regional office for approval and returned to the central office in Accra for the final signature. Upon completion of the paperwork, the timber company has to negotiate two further types of permission before a permit is issued: permission from the landowners whose land the trees are growing on and a negotiated agreement with the land occupiers which should include compensation for damage to crops and loss of standing tree value. This is recorded as a Social Responsibility Agreement (SRA) which often include community development projects – for example, the timber company may pay for a new toilet block or school building.

7.2.1 *Tree tenure*

Tree tenure legislation, described in Chapter Two (see Box 2.1), is complex and has extensive influence over what happens to trees in off-reserve areas. Firstly, it means that farmers who are nurturing trees on their farms have no rights to them unless they specifically planted the tree themselves and registered ownership with the FC (outlined in §7.2.2). This requirement becomes a barrier to farmers planting trees because of the limited access to official

documentation, especially for rural communities. It can also contribute to the logging of trees through the informal (and illegal) economy (IN-FWG-118), which is discussed in §7.3.

As outlined in Box 2.1 and §6.7, naturally occurring trees and young saplings which farmers deliberately allow to grow on their farms in off-reserve areas do not belong to them. In theory the FC recognises the role that farmers play in nurturing trees: “we acknowledge they nurture the trees because the tree was on their farm: ‘they could have killed it but they didn’t’” (IN-FSD-64). Timber contractors are obliged to compensate farmers for the economic loss of the value of a standing tree and for any damage caused to the farm during extraction through the Social Responsibility Agreement (SRA). In reality, as described in Chapter Six, farmers report that they are not consulted consistently, that they rarely receive financial benefits from the timber nor compensation for damage caused to the farm, and that landowners, contractors and the FC do as they please without thought for the farmers:

The timber contractors cut down a tree that was near my cocoa farm, they didn't check the direction it would fall, so when it fell it destroyed my cocoa plants. I went to see the leader of the timber contractors and he made up excuses and I didn't get any compensation. (FCM-Men-SH&CU-83)

In off-reserve areas, forestry management is shaped by the farming system because agriculture is the most important land use (Akapme 2016:10).⁶⁰ Informally this means that farmers can remove trees from their land to grow crops, but they are not legally allowed to process them into timber boards without permits. The land tenure system (§5.3) means that smallholder farmers are not usually the ‘landowner’ when it comes to timber concessions. Furthermore, a landowner also needs a permit to cut native trees for timber on their land because even though the standing trees belong to them, the timber value belongs to the state. Akapme (2016:10) suggests that this legislation “seems to superimpose State trusteeship over stool trusteeship”.⁶¹ This system creates uncertainty and room for elite capture of benefits from timber concessions (Lund, 2008).

⁶⁰ This is according to the legislative ‘Manuals of Procedure’ (Section F, Instruction Sheet F1.1, paragraph 1.5), referenced in footnote 23 of Akapme (2016). Akapme (2016) is an independent review of relevant legislation that made recommendations for the reform of Ghana’s tree tenure and benefit sharing scheme.

⁶¹ These various levels of responsibility are also reflected in who is consulted and compensated when timber concessions are granted and implemented, which is discussed in §7.3.

When research participants were asked their opinions on the current tree tenure legislation and whether it should be changed to give farmers more rights to make it easier for them to keep more trees on their farms, there were a variety of responses. Nearly all smallholder farmers agreed they would keep more trees if they had legal rights over them and viewed the legislation as unfair. Small-scale agribusiness farmers (see §5.6.2) disagreed, arguing smallholder farmers would cut down more trees if they had rights to the timber. People working for both MOFA and FSD ministerial offices and for one of the local NGOs also took this line of argument, seeing farmers as a risk who need to be regulated rather than trustworthy custodians of trees on forest-farm areas:

[Smallholders] have rights but the rights are limited so that the whole thing can be controlled. (IN-FSD-64)

If farmers are given the opportunity to just cut tree[s], I don't think there'll be a single tree [left] standing. (MSM-MOFA-89)

Should farmers or the local people own the trees, it means they are at liberty to harvest them at any given time without necessarily going through any permission. Once they own the trees, any hardship that comes their way, they can easily decide on clearing these trees for their economic gains. And based on that reason, they shouldn't own the trees. (MSM-MOFA-89)

[If trees] belong in the hands of the individual, they will misuse it and you won't get anything at all, [but if] it's under government you can regulate it (MSM-NGO1-D89)

These interviewee quotations demonstrate a narrative within the government offices and local NGOs that places disproportionate blame for tree cutting and perceived tree cover decline on smallholder farmers.

7.2.2 Tree registration

The FSD is responsible for the registration of private tree ownership. The current system was initiated in 2014, before being reviewed and relaunched with a new trial in 2018. To prove ownership of trees, smallholders and private individuals are required to complete a registration form that records the species, number and location of the trees they wish to

legally own. This can include individual trees, large plantations, smaller woodlots and even naturally occurring tree saplings which farmers have nurtured. The latter is controversial to people working in ministerial offices given that tree tenure policy vests these automatically in the state. The form also records the boundaries of the farm, distance between the trees, information about the stool lands, and year of establishment. Approximately 20% of form submissions should be verified by FSD personnel carrying out farm or plantation visits to check the information is correct. Once processed, farmers receive a certificate of ownership stating which trees are theirs.

There are several issues with this registration scheme. Firstly, the process relies on people knowing their rights and having access to the forms. The tree tenure registration scheme is still relatively new and many farmers do not know about it (IN-FWG-114). The forms needing to be completed rely on people having literacy skills and access either on paper or electronically on a mobile phone app that has been created. Since the FSD lacks human resources and staff, they rely on local NGOs and Farmer-Based Organisations (FBOs) (Box 3.5) to aid farmers with completing the forms, however, no financial support has been made available to enable this. In Kwahu East, no one was encouraging or helping farmers to register trees. The FSD staff told farmers to travel to the FSD office (in Mpraeso, a 15-45 minute drive away) to register their trees but this was difficult because of travel costs and application fees. This was further problematised by a lack of tree location coordinates. Informants who did know about the tree registration process commented that “the process to get trees registered is very hard. So someone might have the knowledge of tree growing but not know how to get the registration document. Then if the FC catch you cutting your tree you get in trouble” (IN-SH&CU-53).

The registration form includes a statement at the end which says asks the land occupier (usually farmer) to affirm that “before planting the trees, I had sought approval of the landowner”.⁶² The FSD advises that NGOs and FBOs draw farmers’ attention to this statement when they are filling in the form to prevent landowners from taking back land under the premise that tree planting was not permitted. However, by the time the form is being completed, the trees have usually been planted and it might be too late to seek the

⁶² Extract from the tree registration form, viewed at Forest Watch Ghana Annual General Meeting, July 2019.

landowner's approval at that point. This clause therefore puts power in the hands of the landowners who can decide to not permit farmers to plant or register nurtured trees in their own name. Furthermore, there is a large backlog of forms which are waiting to be processed due to a lack of resources within the FSD to carry out verification visits and finalise paperwork. These issues with the current tree registration process often leaves farmers with insecure tree tenure and vulnerable to their loss.

The registration system relies upon the people working for NGOs and ministries to enable farmers to complete forms. However, these are the same actors with whom I observed a prevailing narrative which views farmers as 'villains' (Leach, 1994; Madge and Cline-Cole, 1996) rather than as responsible custodians. The inaccessibility of the tree registration system and its gatekeepers, therefore, become a barrier to farmers securing tree rights.

National experts in forests and rights are campaigning for a change to the legislation itself – so that farmers automatically have rights over trees rather than needing to apply for tenure. In 2016, members of Forest Watch Ghana (FWG) recommended to the Ministry of Lands and Natural Resources (MLNR) that policy be changed so that local communities be given a 60% share in the timber value of off-reserve trees. This was initially agreed by the MLNR only to be rejected by the FC because they make more income from timber in off-reserve areas than from forest reserves (IN-FWG-118). This is in part due to reserve degradation and the privatisation of reserve concessions through public-private partnerships. The tree tenure legislation is unlikely to change anytime soon due to the revenue off-reserve trees generate and other political motivations – if the law changes, timber companies will lose out on revenue as more will go to farmers and communities, and “timber companies support certain political parties” (IN-FWG-118). Furthermore, whilst there has been some recognition of farmers nurturing trees on farms (Ghana National REDD+ Strategy), the narrative that blames local people for loss of trees is still strong amongst those in policy-making positions (IN-FWG-103). Regardless of legal ownership, however, farmers do have some rights over the trees on their farms which should be respected by timber contractors for logging to be considered legal.

There is a further disincentive for farmers to register economic forest trees, which was raised during a farmer community meeting:

Even if the trees you planted are yours, you still have to go for a permit. They will still come and measure it. You still have to have their permission and they will even take money from you before they will let you cut it down... Once you have registered [the trees], it means the government has a hand in it. (FCM-Mixed-85)

Therefore, smallholders are reluctant to officially register trees since this means that the FC will take a cut of the price when they are harvested. This incentivises an informal timber economy. These issues are discussed in §7.3.

7.3 Timber harvesting

Trees in off-reserve areas are felled for timber by two main routes. One is state-sanctioned extraction through timber concessions on stool land (where smallholders farm), carried out by timber contractors working for timber companies, commissioned by the FSD and given permission by the chiefs. The second is through the informal economy dominated by small-scale chainsaw operators, some of whom work in organised logging groups and others who operate on a local level often in coordination with farmers and landowners. Despite these distinctions, many smallholders use the terms ‘timber contractor’ and ‘chainsaw operator’ simultaneously or interchangeably:

There are not enough jobs here so everyone turns to farm. Here lies the problem: the trees in Kwahu that will actually keep the land fertile are cut down by chainsaw operators and timber contractors because of the money they will get but [they] don't think about the lands they are destroying. It has really made farming difficult. (FHS-KT-69)

There is a range of logging practices within both practices which vary in sustainability and legality. These implicate multiple informants from across the socio-economic groups represented in this research.

7.3.1 *Formal timber and timber contractors*

The timber concession process was outlined in Box 7.1. When I interviewed informants from the FSD and traditional authorities, none of them referenced the Social Responsibility Agreement (SRA) by name nor did they report that farmers need to give their consent before timber extraction can take place. I found out this information at the Forest Watch Ghana (FWG) meeting in July 2019 and through follow up interviews with national advocacy NGOs. This omission on a local level indicates a lack of knowledge about and neglect of farmer rights. Farmers themselves do not always know their rights, and people at various levels of the permit process (FSD, chiefs, landowners and timber companies) may also be unaware of or wilfully overlooking the requirement that farmers give informed consent. This is an issue that the national advocacy NGOs have been trying to overcome by educating farmers on the SRA process and their legal rights. When SRAs are in place, if there is non-compliance or abuse, the timber company can be called to account through legal means via the FSD reporting process or one of the Civil Society Organisation (CSO) watchdog platforms (IN-FWG-101). However, one informant sees the SRA as a form of coercion and legitimisation of unfair resource exploitation which essentially “buy[s] the community’s compliance” (IN-FWG-96).

With the absence of this knowledge, it is no wonder that farmers repeatedly spoke of their powerlessness in dealing with timber contractors, with many claiming trees had been harvested without their permission and that no or inadequate compensation had been offered.

There is also no stipulation within legal logging permits and agreements for companies to plant new trees to replace those harvested. Whilst forest stocks are supposed to be replenished by the FSD, this is often undermined by capacity and FSD reported focusing on forest reserves, not off-reserve areas.⁶³

Whether through the market demand for timber or the land trees are growing on, financial factors also come into play. Development investment and agents of various sorts impinge on the process of granting and maintaining timber concessions.⁶⁴ The multiple vested interests this introduces affects which trees are harvested and where (IN-DA-70, IN-TA-76).

⁶³ Reforestation activities are discussed in §7.5.2.

⁶⁴ The next chapter covers impacts of development and developers in more detail.

Furthermore, timber concessions make up a significant proportion of income for both the District Assembly common fund and traditional councils (IN-FWG-118, IN-TA-62, IN-TA-76), giving those institutions incentives to support permits (see Figure 7.2). Landowners, i.e. the stool and the Traditional Authorities (TA), receive a combined 20.25% of both the stumpage fee and the contract area rent; the Office of the Administrator of Stool Lands (OASL) receives 5%; and the District Assembly (DA) receives 24.75%.

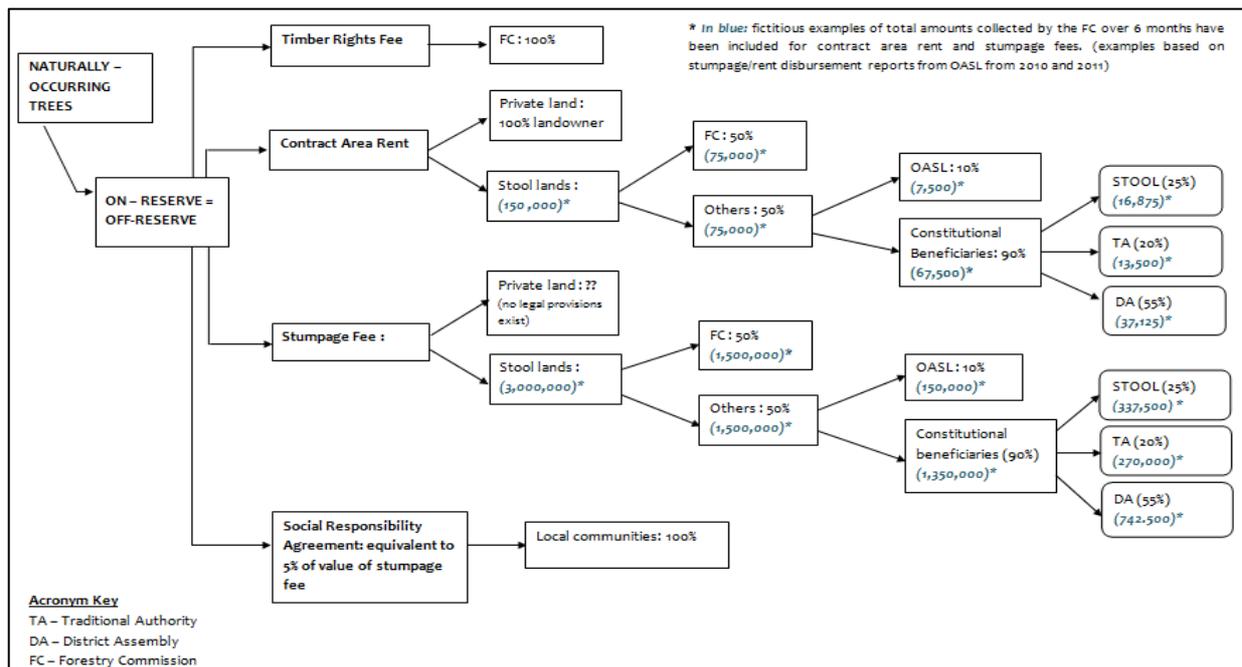


Figure 7.2 The distribution of benefits for naturally occurring trees. These are according to the Ministry of Lands and Natural Resources (MLNR) as currently practiced in Ghana (diagram copyright of Government of Ghana MLNR 2016:35)

There is limited transparency in the District Assembly Common Fund (DACF) system because the fund is transferred to the DA after being consolidated alongside payments from other concessions (e.g. mining) and other state funding through several bureaucratic offices within the OASL, FC and central government. According to a DA informant, when the DACF payment is received at the DA, there is no breakdown of where the money has originated, and therefore how much came from timber concessions (IN-DA-60). This means, therefore, that whilst the DA are mandated to use the timber concession funds for the common good (therefore providing local people with indirect benefits from logging), there is no accountability or record of how much of the DACF is from timber or where this money is

spent. The DA argues that since all of the DACF is used for the benefit of the people that this lack of transparency is inconsequential (IN-DA-60). Similarly, the traditional authorities should use timber concession payments for the community, but farmer informants believe chiefs often keep the money for themselves.

On farms, in the broader forest-farm landscape, and even within forest reserves, the confused inefficiencies of the tree tenure and felling rights system has a strong effect on which trees end up where. The community distrust about how timber concession money is used and the perceived lack of benefits for local people (especially the farmer land occupiers where logging takes place), contributes towards the removal of trees via the informal economy.

7.3.2 *Informal timber and chainsaw users*

I use the term ‘informal timber economy’ to describe the cutting of trees for local purposes that occur outside of official permits granted through the FSD. This includes more organised illegal logging groups, commonly referred to as ‘chainsaw operators’ by interviewees.

As described in Chapter Six, smallholders expressed anger at the loss of the standing tree value and farm damage caused by chainsaw operators: “they are disturbing our farming activities. They are always found in bushes and forest cutting down trees and destroying people’s farm which is very bad” (HFS-KT-57). Interviewees spoke of chainsaw operators as people from outside of Kwahu East, strangers who come to forest-farmland to take trees under the quiet of darkness or on days when farmers were known to be resting at home: “some of them were operating in the night. We may have a huge *odum* tree on our farm, tomorrow you go there, it has been felled and sawn and everything is taken away” (IN-NGO3-D74).

As illustrated by these quotations, chainsaw operators are often characterised as organised groups of villainous nomadic outlaws. However, farmers also spoke of chainsaw operators as a type of labourer who can be hired by landowners, farmers or chiefs to fell trees and prepare wood for its other uses (whether as timber boards or manageable pieces for firewood, charcoal making, and various types of wooden products), paid either in cash or percentage of product.

According to the FSD, anyone who operates a chainsaw is a 'chainsaw operator' – in this sense they are not only people from outside Kwahu East who can be othered and blamed, but can also be known members of the communities – indeed, many are smallholders as well. According to national law, chainsaws must be registered and users licensed (Timber Resource Management Regulations 1998, number 28 and 29). Those which are not can be confiscated by FC personnel. This means that chainsaw operators are often known to the FSD and sometimes employed as timber contractors by the FSD, timber companies or developers. Since the term 'chainsaw operator' was used without definition or qualification by my interviewees, and due to my lack of data about the more organised groups of operators, I focus on the practices of chainsaw users that work with farmers and landowners. I use the term 'chainsaw users' to indicate small-scale, on-farm practices.

This research is interested in the cutting of trees on farms by people with chainsaws and use of the resulting timber by the farmer or other community members in the immediate area. This informally logged timber does sometimes enter the formal economy supply chain, which remains a mixture of legal and illegal timber despite efforts to reduce illegality in domestic trade (discussed further in §7.4) (Hansen and Treue, 2008). The extent to which this occurs in Kwahu East is beyond the remit of this research.

A land occupier (usually a smallholder) or landowner (usually chief or family head) can arrange to cut trees on their land through a chainsaw user. In off-reserve areas, this is only illegal if the chainsaw is not registered or if the cut tree is turned into timber boards (as this requires a permit, see Box 7.1). A chainsaw user agrees to cut trees in return for a third of the revenue or product. One third goes to the landowner and the final third to the land occupier/farmer. For example, if the tree is cut into timber boards or turned into charcoal, the chainsaw user is given either a third of the boards/charcoal or money to that equivalence. Since these trees are cut without FSD permission, timber boards cannot be transported to enter the national supply chain as that risks confiscation by the authorities, so they usually end up in local markets or are used by the individuals involved in their own construction projects. Chainsaw users are hired to cut trees for multiple purposes. Chapter Six demonstrated that most trees are cut to clear the farm for planting and to make firewood.

Through the community meetings I was introduced to Kwashi (IN-SH&CU-53), a chainsaw user, who explained that cutting trees well and preparing wood for its uses (particularly

timber boards) takes skill and diligence. He described how he looks closely at the bark and trunk when deciding where to make the cut, and harvests with care so as not to cause unnecessary damage to the timber tree, surrounding trees or the farmland. He believes that many of the complaints about chainsaw operators are referring to those who have not honed their skills and therefore cut trees irresponsibly, leaving excessive debris and causing avoidable damage: “if you are not experienced you just go about cutting random trees and it creates a lot of tree loss for the town” (IN-SH&CU-53). Another informant, a sawmill owner, made a similar comment:

In Ghana before you can operate a sawmill, you have to register the company properly and go through a long process to make sure you are doing it well. But the chainsaw operators, they just take a chainsaw, hide himself somewhere, cut a tree and go on his way, and because of one mature tree he will spoil 100 trees because he doesn't use good practices (IN-BI-81)

Previous studies have shown that some young people are taking up chainsaw operating because they are unable to secure other jobs or land for farming (Boakye, 2018). This demonstrates how this cause of tree cover change is connected to the wider local and national economy. This ties in with the unfair distribution of farmland that is available and the general lack of jobs in rural areas. Farming livelihoods are associated with poverty rather than seen as an attractive livelihood option, and some smallholder informants believe this stigma puts young people off becoming farmers. Several smallholder and government informants associated informal logging with the farmer or chainsaw user needing to meet high unpredictable expenses (e.g. funerals or family illness) and other forms of poverty:

The man is doing illegal chainsaw operating, and that is taking care of his wife and children, so if you advise him not to do that, how does his children and wife survive? So sometimes, it is due to the economic situation people find themselves in. If you are living under \$1 a day, it's very difficult for you to do other things. (MSM-MOFA-89)

In contrast, a chainsaw user and smallholder at a farmer meeting disagreed, saying: “it's because we need things that are made of trees - that's why we cut the trees. It's not because of unemployment. We don't cut down trees for money. Trees are used for so many things - building, making furniture. It's not solely because of money” (FCM-Men-SH&CU-83).

Another smallholder agreed with him, highlighting the hypocrisy of the government putting blame on smallholders and herbalists who cut mahogany bark to use medicinally (leaving the tree standing) when the government exports these trees as timber to other countries for large profits. Both these men believe trees are cut by chainsaw users and operators because they are being used for specific purposes.

There are multiple layers of potential collusion and corruption: the FSD complains of insufficient human resources to perform its protection and enforcement duty; smallholders and chainsaw users believe the FSD to be complicit in unsustainable logging through their acceptance of monetary bribes in place of confiscating chainsaws or timber (MSM-90); chiefs are implicated as local people believe they commission or condone chainsaw operators cutting trees for money towards the palace (IN-SH-12). These dynamics are discussed further in §7.4.

7.4 Monitoring and enforcement

As noted in the first three sections of this chapter, one of the main roles of the FSD is to monitor and enforce forestry regulation both on and off-reserve. These FSD practices are summarised in Box 7.2. Many of the forest reserves are classified as degraded, and for this the FSD blames smallholders farming illegally or unsustainably within the reserve boundaries, damage caused by out-of-control fires, unsustainable logging practices, and a lack of resources within the FSD to look after the reserves effectively (IN-FSD-64).

‘Illegal logging’ as a cause of tree cover change was highlighted repeatedly by those working for government and local NGOs. Without clear definition, it has become an umbrella term used most often to indicate trees cut under a range of informal arrangements outside of state permits, however, government informants also acknowledged that not all of the logging permitted by the FC was being done in a legal manner:

When people agree a permit [through] the FC, they are permitted a concession and trees are marked for them to harvest. But when they are there and there is nobody to supervise them, they take advantage to harvest what they want to and what they are

not supposed to harvest. So some people go through the [legal process] alright but then in the field they do things [illegally]. (MSM-MOFA-89)

In this section, therefore, I use the term ‘illegal logging’ to encompass both illegalities within timber concessions and the informal timber economy. Many of the issues around enforcement and monitoring of logging apply to both timber contractors and chainsaw users so they are discussed simultaneously.

Box 7.2 FSD monitoring and enforcement activities

FSD monitoring and enforcement involves a variety of practices that include community engagement, raising awareness of legislation and rights, pursuing legal action, ensuring permit procedures are followed and supervising timber contractors during their harvesting (IN-FSD-64). The FSD carry out regular patrols at the edge of forest reserves, along accessible routes into reserves, and in forested off-reserve areas as well. These patrols are usually a mixture of law enforcement and engagement – where staff will seek out offenders (typically chainsaw operators or users, timber contractors and smallholders) and issue fines, confiscations of chainsaws, final warnings, instructions to report to the FSD office and occasionally make arrests (IN-FSD-68). Similarly, patrols and stationed FSD staff along forest reserve boundaries police access to the forest by ‘encroaching’ farmers or those looking for non-timber forest products (NTFPs) and also oversee the legal farming arrangements that take place on reserve land. The FSD highlighted organised illegal logging – carried out by organised groups of chainsaw operators who might have travelled into Kwahu from elsewhere – as a significant problem. When dealing with these groups during enforcement activities, the FSD can call upon military support from Koforidua (the regional capital) if they feel at risk of harm and up to three military personnel will attend to assist FSD officers (IN-FSD-64). The extent to which these groups operate in and around Kwahu East is not clear from the data I collected and so my analysis focuses on illegalities within timber contracts and the informal timber economy, as described in §7.3.

The multi-stage process of ratification required for permits to be granted makes the timber concession system vulnerable to several layers of corruption, coercion and vested interests, leading to illegalities:

It's the government that gives the concession in the first place because they want revenue... The chiefs also make their demands – fine, [they] could have asked for something that will benefit the entire community, but more often than not the chiefs also want something that will basically go to only their pockets. (MSM-MOFA-89)

Some of these corrupt practices have direct significance to tree cover:

The timber contractors too, though they have the permit with the rules... they can cut more than they've been allocated on the permit, and if you talk about it to the FSD, they don't do anything about it - they don't hold the contractors responsible. There are some yards of trees that the FSD mark from a riverside to a length away and you are not allowed to cut these trees down. But the contractors don't care, they will cut down whatever trees they can. If it's economic trees, they don't mind where it is, whether it's the near the river, they will still cut it. (FCM-Men-SH-83)

FSD personnel are legally required to oversee the process of timber extraction (Timber Resource Management Regulations 1998, number 20) and they are usually accompanied by a representative from the relevant traditional council. In practice, due to FSD staff capacity and lack of vehicles, this does not always happen. One smallholder complained that “you will see something, like someone cutting down a tree, and you call the FSD and they tell you they don't have a vehicle” (MSM-SH-90). This allows room for illegality. For example, sometimes timber contractors harvest more trees than have been allocated or remove trees from areas outside the boundaries of the permit: “they might also go to get a permit for one tree, and return to cut down five trees. Some don't have permission at all” (IN-SH-55).

As outlined in Chapter Five, many smallholders deliberately let forest trees grow as a form of investment for the future and therefore, despite the tree tenancy regulations stipulating that all naturally occurring trees belong to the state unless registered, FSD permitted timber extraction is seen as a loss to their livelihood and assets (FO-SH-1, FO-SH-3, FO-SH-4, IN-SH-13, IN-SH-41, IN-SH-43). In interviews and the multistakeholder groups, the FSD did not acknowledge their limitations or ineffective monitoring of timber contractors, even when challenged directly by colleagues from other departments and farmers. They did accept, however, how their limited resources prevent them from attending every report of logging happening illegally (MSM-FSD-90). A participant from MOFA pointed out the impact of illegalities on local and central government revenue, as the taxes raised from legal logging are calculated through the permits (MSM-MOFA-89).

A key theme that emerged from diverse interviewees was allegations of corruption and collusion within the FSD monitoring processes. The chairman of a FBO (IN-SH-55) claimed “the chiefs and elders have informed the FSD [about suspected illegal logging] and asked them to increase their enforcement operations” but they do not see action being taken on the ground.

The chiefs are seen as staying silent on the issue because of money passing hands: “instead of our elders and chief doing something about [trees being cut illegally], they kept mute for those people to deplete the rich forest here” (FHS-KT-53). Several smallholders and chief informants complained that the FSD collude with those logging illegally, which compromises their enforcement:

The FC should go into bushes to do enforcement activities, guard the forest and catch people who are doing illegal logging. But all I can see is them calculating money they can get from cutting down trees on farmland, and accepting bribes. Corruption is increasing - there is higher bribery everywhere. (MSM-SH-90)

Interestingly, one chainsaw user and smallholder framed the bribery in a positive light, as it enables tree cutters to avoid arrest or confiscation:

[The FSD] educate us on how to cut trees properly. So sometimes someone is a chainsaw operator but doesn't know the rules and they can be arrested. But the FC will sometimes not arrest and instead teach them the rules and tell them not to do it wrong again - if you plead with them they will take some money and leave you to it. They know that if they [arrest] you, you will suffer. (IN-SH&CU-53)

Someone from the Forestry Research Institute of Ghana (FORIG) in Kumasi, which works in close partnership with the FC, also believes the FSD enable illegal activities by accepting bribes and even showing chainsaw operators which routes to use to avoid police/FC checks. This informant had also been told by smallholders that chainsaw operators pay the police – meaning that if a farmer reports the illegal activities, the police fine or arrest the farmers, accusing them instead.

Many informants were frustrated that the FSD's mandatory law enforcement role is not being done effectively and believe the absence of enforcement drives more people to cut trees illegally (MSM-89, MSM-90). On some occasions the corruption has left local people feeling powerless to protect the forest because their reporting of illegal activities to the FSD has backfired:

The people cutting trees have given the FSD something [money], and even if you go and inform the FSD, they would rather tell the tree cutters that “someone from the

town called us, he said his name is this, he said you are doing this and that" and at the end you will be in trouble, you will be at loggerheads with that person because they now know who you are and that you informed the authorities. (MSM-SH-90)

Participants of all groups also believe chiefs and landowners enable illegal logging of various types. In return for a cut of the timber profit, they grant cutters permission to enter their territory to harvest trees without legal permits; they protect them from legal action if FSD personnel attend the scene, which the FSD claims leaves them powerless despite their state powers; and even when illegal loggers come without the stool permission, they are often let off if they make an appropriate monetary gift to the palace.⁶⁵ Smallholders and government personnel alike believed "the elders of the town should do something about this issue concerning felling of trees" (FHS-KT-57).

Outside of the recognisable forms of illegal logging already discussed, the FSD also includes some livelihood practices under the label of 'illegal logging'. This deflects attention away from their own complicity in illegal timber supply chains and places blame on local people. There was a strong emphasis by all FSD participants on the impact of smallholders and other forest-based livelihood practices (IN-FSD-64) on tree cover both on and off reserve. They called traditional farming methods "slash and burn" (IN-FSD-72), and perceive smallholders as the main culprits in clearing forest areas to create new farms, and through their need for firewood and charcoal. FSD informants also do not trust smallholders and other forest users, believing that local people withhold information about who is cutting trees, making it harder to prosecute. This also links to another aspect of enforcement, which relates to the FSD policing who has access to reserves for livelihood purposes (collecting NTFP, for example), monitoring the presence of farmers within forest reserves, overseeing the *taungya*⁶⁶ farming arrangements and taking legal action (such as eviction) when deemed appropriate: "Now we are thinking of a more drastic way of driving illegal farmers out of the forest. So for those ones we use the court system, you have to get a court order, and evict them" (IN-FSD-64). Many of these FSD activities are framed within the rhetoric of education and 'sensitisation' – by which

⁶⁵ I return to the role of chiefs when discussing the distribution of decision-making power in Chapter Eight

⁶⁶ This is a system whereby farmers are given permission to grow food short term alongside young trees in deforested areas of government land that are being reforested. This thesis does not discuss *taungya* arrangements in more detail because it is focused on off-reserve areas.

they mean making local people aware of forestry legislation and regulation through community events, engagement and patrols: “then the farmers too, we educate them. We have talks with them, especially when we go down to the village for the fire season” (IN-FSD-64).

As outlined in §7.2, the cutting of trees to make space for farming is legal outside forest reserves because farming is prioritised in off-reserve areas, however, the use of these trees for timber is illegal because the timber value is vested in the state. This fuels a narrative which was seen across research respondents from government departments and NGOs: that smallholders and chainsaw users are cutting trees both illegally and in an unsustainable amount. This simplification not only paints smallholders as villains that cause tree loss in forest-farm landscapes but also does not consider the circumstances that farmers are adapting to which might lead to them pre-emptively cutting some trees. As Chapter Six has shown, farmers do cut trees, but they are simultaneously key stewards of trees. Ultimately, smallholders do not trust the FSD’s resource management, monitoring or enforcement of tree cutters who come to farms and take trees without their consent; and the informal timber economy gives smallholders a fairer price and control over the timing of extraction, limiting the harm caused to crops.

Smallholders’ descriptions of chainsaw operators, timber operators and FSD officers all illustrate a sense of injustice and lack of power. In the eyes of smallholders, there is a not much difference between someone coming with or without a permit, legally or illegally, if the outcome for them is still the same – an absence of decision-making power or consideration, damaged farms, loss of standing tree value and what they perceive to be an environmental impact of tree felling on their livelihoods (Ribot and Peluso, 2009). This recalls the previous discussion on governance and access (§2.3). Some scholars argue that small-scale (currently mostly illegal) logging by local people is a fairer way to distribute the financial benefits of the trees and a potentially more sustainable way to manage forest resources (Hirons *et al.*, 2018a). Since the revenue arising from the felled tree is split three ways (IN-SH&CU-53), the smallholder who has grown the trees gets a third of the money, as opposed to none within the formal process.

This discussion raises questions about not only how far the laws are being enforced and levels of collusion, but also whether the laws themselves are fit for purpose if the aim is to sustainably manage forest resources and halt tree cover loss.

7.5 Sustaining the forest

The final area of forest management and regulation practices relates directly to efforts to make forestry management 'sustainable'. The overarching aims of these activities are to protect the forest from fire (§7.5.1) and replenish it by planting new trees (§7.5.2). The main actors involved are the FSD, fire volunteers, farmers and different types of trees planters and nurturers.

7.5.1 Fire Prevention

Uncontrolled fires occur regularly across the district (see §6.8.1). Many are started deliberately as part of people's livelihoods practices – including farming, hunting, palm wine tapping, cattle grazing and cooking – and these can intensify and spread if not controlled, especially during the dry harmattan season between December and February. As outlined in Chapter Six, smallholder informants believe that the rain patterns and vegetation are changing, and that fires are getting worst – for example, those living in Pepease complained of longer dry seasons and the spread of grassland.⁶⁷ In the farming household survey, 24% of respondents said their farms had been damaged by uncontrolled fire in the last two years and a further eight named fire as a cause for concern when asked if they would like to share anything else at the end of the survey.⁶⁸

I have been farming in Kwahu for ten years now and it's very interesting but the problem I have is bush burning. My farm was destroyed by fire for the past three years which I felt bad about but I didn't see the person who did that. (FHS-KT-26)

⁶⁷ Local perceptions and narratives of environmental change were discussed in Chapter Six and I return to them in Chapter Nine.

⁶⁸ This was in response to the last question on the survey, which asked "Is there anything else you want to tell us about farming, trees or local life in Kwahu?"

As indicated by this respondent, farmers complaining of fire often do not know who or what caused it, however there are certain groups of people in society who get blamed more often:

Interviewer: Do you have any trees on your land?

Farmer 1: I have no trees on my land because of the wildfire. It has burnt all the trees, so my farm looks like a desert.

Farmer 2: The same applies to me.

Interviewer: Do you know what started the fire?

Farmer 1: When I don't go to the farm, hunters go in search of bushmeat – they will just set fire to catch bushmeat. That is the root of it. And then everywhere unattended fire will just attack your farm and everything will burn.

Farmer 2: Especially the cows, the Fulani. They do the same thing. So that they can get the fresh leaves for their animals. They cause the trouble very very well. They put the fire in a wrong place and then the wind blows and the fire covers all our farms. They set the fire.

Extract from a group interview with farmers (IN-SH-14)

During this research, both cattle herders and hunters were blamed by smallholders, ministries and NGOs for starting wildfires (see §6.8.3). The latter two groups also blamed smallholders. The order of blame and who blames who is indicative of social inequalities – herders are the most marginalised group, however, smallholder's use of traditional farming techniques like controlled burning are still considered backward by officials within ministries and local NGOs. Regardless of who is to blame, nearly all research informants agreed that the number and extent of fires in Kwahu East is a problem that affects both the livelihoods of people and impacts on the number, age and type of trees. Furthermore, aside from the direct damage that fire causes to crops, farmers believe it is gradually changing the vegetation type and making farming more difficult. This means that fires may or may not result from, but certainly add to, perceived farming vulnerabilities.

Fire prevention practices featured as a priority for the FSD, various tree planters, MOFA and many farmers. One of the most important aspects of the FSD reserve management is the fire

prevention labour that aims to reduce the potential for damage and loss of standing timber value from fires. In the months ahead of harmattan, forestry officers spend time creating firebreaks between the reserve and the surrounding areas. This involves clearing a minimum of three metres of undergrowth and setting controlled small fires that remove dry forest matter from the boundary. Fire-resistant trees like teak and *Cassia* are planted on the forest-side of the firebreak, to give another layer of protection. Throughout the year the firebreaks around reserves are maintained by regular clearing and replanting of fire-resistant trees.

As well as protecting reserve areas, there are some efforts to prevent fires in off-reserve forest farm areas through education, however, this takes less of a priority when FSD time and resources are limited (IN-FSD-64). In interviews and farming observations I learnt that diverse farmers take fire prevention precautions as part of their practices – as outlined in Chapters Five and Six – by using controlled fires throughout the dry season to reduce the amount of combustible matter on their farms, creating cleared firebreaks around their fields when they have space, and planting or nurturing specific fire-resistant trees at farm edges. Since farming takes priority in off-reserve areas, there is some disjointedness in terms of which department (Agriculture or Forestry) communicates information to or engages with farmers and when. For example, I witnessed a MOFA Extension Officer (EO) briefly tell farmers to create firebreaks at one of the farmer meetings (FCM-Women-86) but fire prevention was not mentioned as a priority in interviews with MOFA staff.

Meanwhile, the FSD coordinate education sessions with the Ghana National Fire Service (GNFS) and the District Assembly (DA), to increase awareness of fire risks, causes of fires, and to encourage farmers to incorporate firebreaks. In some Kwahu towns and villages there are established groups of fire volunteers who extinguish small bushfires before they can spread too far. These volunteers also run community events and education – for example, I observed a demonstration at the National Farming Day celebrations. There is some evidence to show these interventions are more effective due to them being run by community members rather than the FSD, as also argued by Appiah et al (2010). In Kwahu East, voluntary fire response and prevention efforts also have the support of a local sawmill owner who trains and resources fire volunteers to protect the young trees he plants as part of his afforestation programme (see §7.5.2). A few informants commented that the fire volunteer initiatives are not effective because there are too few for the size of the district: the number of fires far

outnumbers the capacity of volunteer groups, and there is not sufficient support from the GNFS with appropriate fire-fighting equipment and vehicles (IN-NGO3-74).

FSD informants shared that their department does not always have enough resources – in particular staff time and vehicle availability – to carry out these fire prevention duties in full. In discussion at the multistakeholder meeting (MSM-90), smallholder participants complained that the FSD are not doing enough to prevent fires and expecting local people to do too much. One semi-commercial smallholder suggested the FSD hire people to create firebreaks around forests – indicating either that he did not know the FSD do this already for reserves, or that the FSD's firebreaks are insufficiently maintained. In reply, two FSD participants deflected the criticism by reverting to the common blame narratives familiar to farmers – turning the attention away from FSD failures and towards to the role of hunters, and then qualifying that responding to them is in the remit of the Wildlife Division (WD) not the FSD:

The forests are very large, so if for example we are at the roadside on one side of the forest, someone could still be in the forest hunting for bush animals and mistakenly sets fire. We won't see the person. Some hunters are very stubborn - they know not to go into the forest but they go anyway and we don't see them. So the hunters should make sure they put the fires out after hunting. (MSM-FSD-90)

We look after the trees, but it is meant to be the WD that deals with hunters. (MSM-FSD-90)

This points to a recurring theme amongst interviews with people from different ministerial departments: that coordination is often lacking, and responsibility shifted, between different offices on key issues which effect trees and local livelihoods. In this example, the communication gap lies between the FSD and the WD – which are both part of the central Forestry Commission (FC). In addition, across the data there was no mention from FSD or MOFA personnel about their two departments working together (or with the WD) on fire prevention, even though both view smallholder use of fire to clear the land as a key cause of uncontrolled bush fires. Whilst this is one example of departments failing to coordinate, in Chapter Five (§5.7) we also saw this problem in relation to support for farmers to grow domestic tree crops. This is discussed further in Chapter Eight.

7.5.2 Reforestation Programmes

Many respondents highlighted the importance of replenishing the forest as part of sustainable forestry management: smallholders made suggestions that for every logging concession, new trees should be planted; chiefs are making land available for tree planting; NGOs, MOFA and the DA staff at the multi-stakeholder meetings voiced concerns that the FSD was not doing enough to replace trees that are cut down. The FSD informants' views varied: some see the planting efforts as sufficient and sustainable, others recognised their limitations.

One of the most significant interventions is a government afforestation programme that the FSD coordinates, which involves tree planting both on and off reserve areas. Launched in 2018, the aim is to replenish national timber stocks. Targets for planting of new trees are being met in part through co-delivery in partnership with the Youth Employment Agency (a central government public service organisation) 'Youth in Afforestation Programme' (YIP). This is coordinated on a local level by the FSD, who plan and oversee all the planting, although the DA interviews and appoints the young people as employees. Teams of young people and FSD supervisors gather in designated towns and villages to carry out planting activities. These focus on replenishing forest reserves and also some on public land in agreement with community organisations, schools and traditional authorities. Sometimes land is cleared before planting – and occasionally planting schedules are disrupted when the clearing has not been sufficient (IN-FSD-64). In Kwahu East, thousands of trees with particular qualities are being planted the purposes of use for timber, charcoal production, fuelwood and paper pulp. The selected trees are a mixture of native (*ofram* and *emire*) and exotic species⁶⁹ (teak, *Gmelina*, *Cedrela* and *Cassia*) which are all fast-growing trees that can be harvested within five to fifteen years. The quickest to mature is *Cassia*, which can be cut after between three and five years to make charcoal. Since there is a strong risk of fire in some parts of the district, teak (fire resistant) and *Cassia* (evergreen and moist) are particularly popular. These species are often incorporated into firebreaks around forest reserves, afforested areas and farms alike (as described in §7.5.1)

⁶⁹ See Table 4.3 for scientific names

There were mixed opinions of the YIP amongst research informants. FSD staff reported some practical challenges as the coordinators of the programme. At the time of research, there was a lack of resources to run the programme effectively, because whilst the targets are set by the central government, no extra money was being made available to the FSD to deliver on them. This meant that aside from the extra labour provided by the young people, all other aspects of the programme are falling within the capacity of existing staff and budget, which is already stretched. These tasks include training in tree planting techniques, supervising working groups, silviculture practices (weeding regeneration areas, pruning and coppicing as trees mature, etc), creating and maintaining effective firebreaks, and nurturing young trees in nurseries. These workloads were often subject to the familiar logistical challenges experienced in wider reserve management and regulation – with remote areas being difficult to get to, or the lack of capacity to transport all the youth labourers due to there only being one pick-up vehicle. On top of these direct practices and difficulties, FSD staff also saw an increase in the monthly paperwork for all the employees, monitoring and reporting. One FSD informant shared that the FSD team look forward to this programme ceasing when a new government is elected as it is causing too much work.

Amongst other research informants, opinions differed about how far the YIP is genuinely about increasing tree planting and therefore addressing a recognised need for reforestation, or if it is politically motivated by election promises to create job opportunities for young people. Some believe the programme to be ineffective since the trees do not always survive:

YIP is a political move and not a wise action, and is a completely useless programme – what are they planting and why? If you go and see it a year later you will see. It's just about saying that they are planting trees and creating employment. There's lots of space [5m] between trees to plant crops but that is not happening. It's a waste of resources and doesn't bring value to communities. (IN-FWG-114)

Some forestry experts (IN-FWG-103 and IN-FWG-114) see YIP as a tool the government used to gain voter support – as tree planting and reducing unemployment are two prevalent political issues. It is argued that it has been implemented without effective planning and is therefore not delivering on either aim. Young people are only employed for short, seasonal contracts, which rarely lead onto further long-term employment, and the shortage of resources and capacity at the FSD means that young saplings are often neglected. Some

informants (as illustrated in the quote above) believe many of the planted trees do not survive and see the absence of mixed food cropping alongside them (as described by IN-FWG-114) as a missed opportunity for great community benefits. Without ongoing silviculture management and attention by the planters or FSD supervisors, the young trees are prone to damage from fires, grazing cattle or dry out when the rains fail.

In contrast, adjacent communities seem to be broadly in favour of the initiative. Whilst it is unclear how far they get a say in what land is used, or what state the land and its trees were in before being cleared for planting, local people welcome the planting because when trees mature their timber is allocated for community purposes. When these trees are cut, the stool still needs to apply for a permit, however, the FSD does not take a payment or percentage of the timber – all of it can be used by the community (IN-FSD-64). In the meantime, the trees provide welcome shade in and around settlements and farmland.⁷⁰ The FSD reports communities welcoming the tree planters and volunteering to help look after the saplings. I also observed this when spending time in Bokuruwa – on more than one occasion I was unable to interview someone because they were out volunteering to plant trees – and the afforestation programme received praise at the farmer community meetings. The only conflict mentioned in interviews was when the programme plants trees within forest reserves on the farms of farmers cultivating crops there. In these situations there have been instances of sabotage – for example, according to the FSD one woman uprooted 300 saplings, cut their roots and then replanted them (IN-FSD-64). She was arrested and prosecuted.

Some private initiatives also plant trees in the landscape as part of reforestation efforts. Two examples of tree planting using tree crops were described in §5.7.3. Another, focused on timber trees, is a private enterprise. It is being led by a local sawmill owner, and employee of Kwahu South DA, Mr Boateng (anonymised) (IN-BI-81), in partnership with a friend who also works as a Field Officer for the Mpraeso FSD. They are supported by the Boateng family who own a timber company based in the USA. Mr Boateng has established an operation he calls “Afforestation Volunteers” with which he is doing timber tree planting across Kwahu East and South. He mostly plants native species – *emire*, *ofram*, *mahogany*, *kyenkyen* and others – along with some exotic teak. He is doing this for two reasons: firstly his sawmill business relies

⁷⁰ See §6.4 for a discussion on the benefits and costs of shade.

on local timber stocks being replenished; and secondly, because he is genuinely interested in ensuring Kwahu maintains its forests. He works with the Environmental Protection Agency (EPA), FSD, and local schools to do tree planting both in forest reserves and on school grounds. He grows these seedlings in his nursery (Figure 7.2) and supplies them for free, not expecting any return from them, however, he is in the process of drawing up a contract with the EPA and local schools to continue those projects. Similarly, he distributes trees to farmers – “the farmers, we give to them, they plant it but they don’t register them” (IN-BI-81) – again with the intention of encouraging farmers to keep trees rather than for his own benefit. He has larger plantation initiatives for his business which have the support of several chiefs – he has secured 500 hectares of stool land to grow timber trees under the arrangement that when the trees are grown, the chiefs will get a 20-30% cut of the revenue. “Almost every chief within Kwahu has given us land where we are to start doing the planting” (IN-BI-81). In Mr Boateng’s experience, chiefs are keen for tree planting activities because it is financially lucrative and they do nothing except provide the land. The Kwahu paramount chief is especially supportive of his programme, which may be why he has the interest of other chiefs.



Figure 7.3 Afforestation Volunteers tree nursery in Kwahu South. Here, Mr Boateng nurtures saplings which he then plants across Kwahu South and East districts.

7.6 Chapter summary

This chapter has explored the practices and priorities of actors who manage the forest-farm area for timber. It has demonstrated the tree cutting for timber happens through different means and is a factor that affects the number, age and species of trees found in the landscape. To regulate this logging there are layers of legislation, monitoring and enforcement, however, these are applied haphazardly and policies are not joined up. There are examples that show the FSD is underfunded, under-resourced, inefficient and in places corrupt. There are various forms of illegality by different actors, both within the formal timber concessions and informal economy, and these impact on tree cover in different ways. Informants across the research, aside from those working within the FSD, agree that both formal and informal logging is unsustainable. There is also evidence of forest stewardship within timber management processes. The FSD and DA are invested in fire prevention, however these efforts are also stifled by under-resourcing and departments working in silos. The reforestation efforts have made progress in planting new trees across the district, but the government funded programme focuses on exotic species that do not perform the same ecological function as native forest trees, altering the floristic composition of the forest-farm – a factor which is of interest to bird conservationists.

So far, this thesis has demonstrated that there are multiple actors with complex practices who both steward and cut forest trees for different purposes. However, since trees grow on land, these actions rest upon a broader political and economic context which is altering the way that land is used, allocated and contested. Chapter Eight explores these dimensions.

8 Development trajectories and tree cover

8.1 Introduction

Chapters Five to Seven have shown how trees are managed by farming communities and foresters for livelihoods and timber. Each of these priorities involve different practices and a multitude of actors which impact on the number, age and species of trees that make up the landscape's tree cover. These chapters also demonstrated how the decisions of actors are embedded within the wider socio-economic context, particularly regarding access to land and how land is used. Whilst practical tree management – farming, logging, charcoal production, reforestation etc. – impact directly on trees, they are contingent on wider factors. We can gain a deeper understanding of what is affecting tree cover by understanding what is happening to the land that the trees grow on, who is involved in decision-making about land use that drives tree cover change at a distance from the forest-farm, and what values and interests are influencing these processes. The key question this chapter asks, therefore, is: aside from farmers and foresters, what and who else is impacting tree cover in Kwahu East?

This chapter argues that the number, age and types of trees within the landscape are shaped by the wider economy and society. It draws our attention away from the direct management of trees and towards the complex political, economic and cultural factors which underpin how decisions are made – by whom and for what purpose – about the land on which forest trees grow. By discussing the socio-political relations in which events beyond the local scale impact tree cover and decisions about land use, a 'chain of explanation' (Brookfield and Blaikie, 1987) emerges. For example, Chapter Seven highlighted how issues with logging cannot be separated from government forestry policy, the power of landowners and traditional authorities, and the market value of timber. This final chapter uncovers a similar pattern with land use, showing that decisions about infrastructural development are being driven by social inequalities within the district, vested economic interests of different actors and the influence of political values underpinning legislative processes.

The chapter starts (§8.2) by providing more information about the decision-making structures, the key actors involved and how these intersect within the socio-political context to influence outcomes for land and tree cover. The chapter then identifies the local vision for development and who is driving it (§8.3). This is explored further by discussing two main land issues: town planning and infrastructural development (§8.4) and tourism development (§8.5). These examples illustrate that the actions of decision-makers and influencers away from the forest-farm affect trajectories of tree cover change. Finally, §8.6 draws together the social, political and economic factors which influence how access to land is granted by discussing social differences, national government policy and market forces.

8.2 Local authorities

Whilst Chapters Five and Six demonstrated the agency of farmers and the diversity of techniques in managing trees on their farms, it became clear in Chapter Seven that the use and removal of trees as part of livelihood practices are constrained by the broader socio-economic context (Dei, 1990; Miller, *et al.*, 2017). This has been demonstrated in other political ecology studies (see Chapter Two). Far from livelihood practices driving tree cover change in a simple way, findings of this research show that a complexity of factors affect both livelihoods and tree cover that smallholders are adapting to and may also inadvertently reinforce. The interviews and community meetings repeatedly pointed to both farmer agency and factors outside of the farmers' control which impact on the decisions they make (Otutei, 2014) – especially the interconnecting influence of personnel and elites in positions of relative power, and the law, policy and enforcement that accompanies them. Therefore, whilst this research started by 'following the farmers'⁷¹ to learn about the forest-farm landscape, it ultimately led me to the offices of those with local authority, decision-making and implementation power. This included those working in ministerial offices, NGOs, development actors, traditional authorities and wealthy members of the diaspora with business interests. The two most important structures for decision-making are the District Assembly (DA) and the traditional authorities.

⁷¹ See methodology, Chapter Four

8.2.1 *The District Assembly (DA)*

Previously introduced in §3.8.1, the DA plays a significant role in land use management and planning across the district, and therefore, for the field area. All development proposals must be authorised by the DA having been through strict planning processes, discussed in §8.4. For example, if someone wants to build a house, they need to pass all plans through the DA, whose Technical Committee will then authorise the building to go ahead in return for an appropriate fee (IN-DA-79). Furthermore, the DA planning department Technical Committee is responsible for creating and updating local settlement plans, in consultation with the stools. The settlement plans categorise the land for different types of development and use, including: commercial, central business district, residential, industrial, farmlands, places of worship, and others. Before larger projects can go ahead, they may also need the approval of the Environmental Protection Agency (EPA).⁷² This role in authorisation gives the DA significant influence over tree cover change, since nearly all development requires trees to be cut in the process. Money also plays a part: in most cases, a private development project will pay the DA fees (IN-DA-79); similarly, when timber concessions are granted, a percentage of the stumpage fee is redistributed back into the DA (IN-FWG-118) (see §7.3.1). These types of payments both go into the same pot – the District Assembly Common Fund – which finances the DA’s development work, social interventions and policy implementation across the district (IN-DA-60).

The DA’s role, however, not only involves paperwork authorisation, but also sets the direction that development takes: the values and priorities of the DA are instrumental in determining how land use and access is evolving in the district, and therefore what happens to the trees in different areas. The MP is an influential investor and opinion-leader in the local area. More information about his role and the way he works alongside the District Chief Executive (DCE) of the DA is given in §8.3. These two individuals strongly influence the values which underpin the DA’s priorities and strategy. At present, the common perspective across informants from the DA is that capitalist and industry-focused projects equate to progress, even when they fail to address social inequalities. This was seen in Chapter Five with MOFA’s emphasis on

⁷² Since Kwahu East is a relatively new district and was originally part of Kwahu South, it still uses the Kwahu South EPA

increasing the yield of crops and encouraging modern farming techniques, the use of agro-chemicals and mechanisation. The land issues discussed in §8.4 and §8.5 also illustrate this.

Another local authority role at the town level is that of the elected assemblymen (see §3.8.1). They are responsible for communicating government policy and DA decisions to their town or village. These positions are predominantly filled by men, partly because women are less likely to have the time or educational credentials that enable them to take part. At a district level, the assemblymen take part in deliberative democratic decision-making processes, however, these are framed and influenced by key state actors – specifically the local MP, the DCE, other salaried government personnel and on occasion agri-business or development actors. More vulnerable groups in society, including women, migrants, young people, and rural smallholder farmers (of all genders), are underrepresented within these processes. Assemblymen do not always fulfil their communication function (IN-MOFA-66), leaving ordinary people unaware of important district decisions, and there are no accountability structures for ensuring they represent the interests of the town in how they vote or deliberate.

8.2.2 Traditional authorities

Traditional authorities were introduced in §3.7. They exist in parallel to the DA and are involved in all decision-making processes relating to development planning. They therefore also have some level of influence over discussions and decisions made in these spaces. At the village or town level, outside of unusual exceptions, the only female representative within the traditional council is the Queen Mother (see §3.7). Predominantly male chiefs and sub-chiefs are chosen in part based on their social status, wealth and perceived influence in fields related to business, government or development. Elders and family heads on the traditional council have disproportionate land rights and ownership. In principle they are custodians on behalf of their communities, however, decisions about land allocation and use can be influenced by their own interests.

Since the traditional authorities act as gatekeepers for all matters involving the stool lands (see §3.7), they are perceived by other actors as being the final permission by which factors that affect trees are enabled: infrastructure projects, land clearance, cattle herding and even farming cannot go ahead without either their direct approval or wilful blind-eye. Specifically,

traditional authorities are accused by other informants (smallholders, government staff and NGOs) of allowing unsustainable tree-felling because they grant permission and oversee various types of tree management, including colluding with activities that are illegal and/or unsustainable. As actors with resources, hierarchical status and gatekeeper privilege, the traditional authorities also have a significant impact on the livelihood choices and practices of the other groups.

The level of responsibility accepted by traditional authorities varied greatly: they consistently affirmed their importance as caretakers of the stool lands and therefore gatekeepers as well, whilst simultaneously providing information that pointed to the limits of their influence given the socio-economic context and the expectations from people with greater political or economic influence. Whilst in theory chiefs must sign off all building projects or timber concessions that take place on stool lands, therefore having veto power in the planning stages, there are layers of responsibility and communication between multiple actors (especially the state offices and investors etc.) that leave space for collusion, misinformation and manipulation – both by and of traditional councils.

The final layer of power lies with the *Okwawuhene* (paramount chief) who is enstooled as the overarching chief of Kwahu land and Kwahu people.⁷³ Any significant decision about land use change which has the potential to alter the Kwahu economy is also passed by him within the Kwahu Traditional Council (made up of chiefs and Queen Mothers from across the Kwahu area), giving him veto power. The current Okwawuhene is a business and finance man who went to school in Nkwatia, studied in America and has been living and working with European companies for the last decade.⁷⁴ He has a passion for sustainability and, recognising the ecological and economic role that trees play, made 1000 acres of land available to a private-run reforestation project described in §7.5.2 (IN-BI-81). He has also provided vast lands for the cattle fodder ranches in the Afram Plains intended to ease the conflict between farmers and herdsmen (IN-MOFA-66).

⁷³ In accordance with Akan chieftan hierarchies, the Okwawuhene has authority over all other chiefs in Kwahu settlements, is accountable to chiefs of his equivalence in neighbouring areas, and is positioned under the ultimate leadership of the Asantehene (the king of all Asante people, who is based at Kumasi Manhyia Palace).

⁷⁴ Ghana web news site, accessed 27th July 2020:

<https://www.ghanaweb.com/GhanaHomePage/NewsArchive/Kwahuhene-outdoored-and-calls-on-his-subjects-to-unite-to-develop-Kwahu-564752>

8.3 Development visions and forest loss

The incumbent Member of Parliament (MP) for Abetifi constituency, within which the field area lies, has various layers of influence from his constitutional position (see §3.8.1). However, his main social status and political power comes from being a multi-millionaire businessman and entrepreneur. Upon finishing his schooling in Nkwatia, he went to study business in the United States of America (USA), which gives another layer of respect and social status (discussed in §8.6.1). He has established various highly lucrative businesses, as the owner of several large hotels in Accra, housing compounds in Ghana and the USA, and an IT company specialising in security technology with extensive contracts in Ghana and Europe.

The MP has a vision for development in Kwahu East which revolves around boosting tourism, the hospitality industry and higher education institutions.⁷⁵ He sees these three areas as having the potential to change the local economy, bringing in more wealth and improving the lives of local people. His vision assumes that money will trickle down to the poorest people through the creation of jobs and by increasing the market for farm-grown goods. The MP's ambitions drive much of the development in Kwahu. He uses his position of influence to inform decision-making by organising business events, providing financial and material incentives for supporters, and using his own assets to initiate projects. He is heavily invested financially in several infrastructural development schemes and has established an organisation called 'Kwahu Republic' (Box 8.1) to help push his tourism agenda. Inspired by his time at university in the USA, the MP is also actively creating a "college town" feel to Kwahu East by building a new university and five vocational training centres. These will be in addition to the already existing Presbyterian University College in Abetifi and together will increase the market for student accommodation, boosting the opportunities for real estate development.

⁷⁵ I gleaned this information from participant observation at events and through informal conversations with the MP.

Box 8.1 Kwahu Republic

Kwahu Republic is a business venture seeking to increase and improve the tourism in Kwahu. It was set up by the MP and is based in Accra. Kwahu Republic organises several events every year – including collaborating with other tourism organisations for the Kwahu Easter celebrations and an annual music concert called ‘Bliss on the Hills’ in Abetifi. Kwahu Republic is bidding for the contract to develop a tourist site at *Oku* water shrine near Bokuruwa and is involved in the proposed airport on Bokuruwa stool land. These tourism developments are discussed in §8.5.

A part of this vision relies on the transformation of the agricultural system. The MP is critical of traditional farming methods, seeing them as unambitious and responsible for ecological degradation – for example, he placed the blame for loss of forests on smallholder farmers and the use of NTFPs like charcoal and firewood. Instead, he wants to see local farmers providing the produce for catering at the educational institutions and large hotels that he is establishing and believes the best way to do this is through increasing mechanised, intensive agriculture. He also wants to extend current irrigation systems to enable year-round farming and reduce the reliance on subsistence agriculture (IN-DA-69, IN-DA-70). The District Chief Executive (DCE) is also on board with these plans. Furthermore, this strategy complements the government ‘One District One Factory’ policy which aims to mainstream local food production to supply raw material to local factories. It has not yet been determined which type of factory Kwahu East will build, however, the MP and DCE organise regular engagement events at local hotels for key stakeholders (including traditional authorities, entrepreneurs, members of the elite diaspora, and medium to large scale agribusinesses) to discuss business opportunities. At one such event held in June 2018, a DA report was presented that advocated intensification of specific crops, most noticeably ginger, cassava, tomatoes which all require little shade and so result in forest trees being cleared for their cultivation. It also welcomed proposals to increase tourist attractions and hospitality, and encouraged prospective mining exploration to investigate bauxite resources in Kwahu’s mountains. Reports like this ultimately inform Assembly agendas too, influencing decisions about land allocation and development priorities.

The MP’s personal financial investments and infrastructure projects, along with his access to central state funds, gives the MP significant sway in determining how much money there is in Kwahu East and how it is spent. He has strong support, not least due to high profile music festivals he puts on under Kwahu Republic and his philanthropic work through his charitable

foundation (see Box 8.2). These activities double as publicity for the MP through the charity's fleet of vehicles which circulate the district daily, large expenses-paid celebratory events and generous financial investments branded with his name in many communities (e.g. water tanks, boreholes, and electricity generators). This may act as an incentive for local people to vote for him in the future, and to also trust his influence and actions in other areas – for example, his extravagant development projects – even when they do little to tackle social inequality and, in some areas, negatively impact on local livelihoods due to land re-allocation.

Box 8.2 The MP's charitable foundation and international volunteers

This sustainable development charity was set up by the MP for Abetifi in June 2017. It is funded primarily through the MP's salary, which he donates in full to the charity, and other capital from his various businesses. They also apply to international aid organisations to fund specific projects. The aim of the foundation is to lead the development agenda in Kwahu through programmes focused on health, education and livelihoods. These include initiatives that improve access to water and sanitation, build and staff clinics, provide scholarships and equipment to school students, refurbish schools, run economic empowerment courses and work with farmers to increase their yield and diversify their livelihoods. The foundation also partners with a small international volunteering organisation based in Kwahu which was set up with the help of the MP by a British man who spent time in Ghana on a gap year. Together the two organisations host international (mostly European) volunteers to work on foundation projects, usually as unqualified teachers, sports coaches and manual labour in refurbishment, and occasionally skilled professions like trainee veterinarians. The MP encourages volunteers to feedback how to improve education and tourism and welcomes their opinions on other local issues. He incorporates these into his own development planning.

The development the MP drives is inspired by capitalist notions of 'progress', which are further embedded by the presence and promotion of its predominantly white volunteers throughout the NGO's programmes. This is also seen in the relationships between those working for the foundation and those in receipt of its benefits, which reproduce the social hierarchies commonly found in charity aid work, resulting in dependency and saviourism rather than transformative redistribution of wealth and power.

8.4 Town planning and infrastructure development

To understand what is happening to trees over time, it is vital to also understand what is happening to the land they grow on, particularly in relation to development planning and

changes to land use in off-reserve areas. A wide range of interviewees spoke about the impact of development, town expansion and infrastructure on tree cover change. Informants provided numerous examples of vegetation being cleared to make way for different kinds of development initiatives: the electrification of settlements brings with it the cutting of all trees within reach of the electricity line (MSM-89); the building of roads (MSM-89); commercial development plans, for example creating an airstrip or building large hotels (IN-DA-70, IN-TA-76); making space for new houses to be built (IN-DA-79), especially large mansions on the hillsides for wealthy members of the Kwahu diaspora (IN-NGO1-73); and the development of tourist sites (IN-DA-69). In the words of one MOFA informant:

If you want a road you need to take away trees. Urbanisation - if you want more buildings, you need to take away trees. For the purpose of farming, you have to take away trees. If you want to build schools, trees have to go down. You want to build hospitals... Even if you have a tourist site, and you are going to construct a road... There is no development where you don't take away some trees. Touching trees is inevitable. (MSM-MOFA-89)

In Kwahu East, the towns and villages have expanded significantly since 2010. Alongside developers and investors, the key actors in town expansion are the Planning Department at the DA and the traditional authorities. Within the town boundaries, land is allocated depending on the town plan, put together by the Planning Department in consultation with the Lands Commission, and the approval of the traditional council, who give permission to proposals which meet the conditions set out in the plan and are of benefit to the town or its residents (IN-DA-79).

However, these actors are not completely objective, and are themselves influenced by vested interests, narratives of development and powerful figures defining local development priorities. For example, in Kwahu Tafo participants complained that the previous chief repossessed land from people who are not using it to build on it. This has led many households to erect simple structures or basic foundations on their land to ensure it remained in their possession whilst they secure finances to build a complete home (see Figure 8.1). Without this rule, they could have continued to use the land for farming until they were financially secure to complete the building project, but instead the town is now littered with unfinished buildings. Similarly, a farmer in Nkwatia confided that he worries his two-hectare farm located

within the town will be overtaken for a proposed church building project (FO-SH-D9). Another farmer, on the edge of town farming opposite the enormous new hotel being built by the MP, told me he was not consulted before that project began and whilst he feels sure of his land rights in theory, there is nothing to guarantee he will not be affected by future hotel expansion (FO-SH-3, IN-SH-18). These examples point to the relative power of those in positions of town planning and the powerlessness of farmers and small homeowners in the face of land development proposals.



Figure 8.1 A typical unfinished house. The structure on the left is incomplete because the person building the house did not have the finances to finish it. Sites like this are common throughout Kwahu East. Many projects end up being abandoned entirely. Photo taken in May 2018.

One of the problems with the current system of town planning at the DA is that there is no cumulative record of trees felled for development and whilst building permits stipulate that trees cut should be replaced, this is not enforced or monitored. Since many of these developments are taking place on the edge of urban areas or within the forest-farm, the removal of trees and erection of buildings or infrastructure equates to permanent land use change. The lack of cumulative records means the loss of trees' ecological and livelihood value are not measured or considered in the permit-granting process of subsequent projects.

Kwahu culture has an emphasis on building grand houses as a way to invest savings in property and gain social status (van der Geest, 1998c; Otutei, 2014) In correlation with Ghana's economic growth and expanding tourism industry over the last ten years, there has

been an increase in the number of ‘mansions’ being designed and built in Kwahu East by elite, wealthy Kwahu people. Many of these are members of the diaspora who live elsewhere – some have moved to Ghanaian cities and build these houses as holiday homes or for their eventual retirement, whilst others work away from Ghana and build houses in their homeland to return to at some point in the future. These mansions stand in stark contrast to the small urban dwellings built by farmers as they are invariably large double storey properties with extensive concrete drives and walled gardens. The presence of these vast real estate compounds in the landscape is unusual for Ghana and other areas of West Africa. An informant from Ghana Wildlife Society (GWS) described a road of mansions outside Mpraeso as ‘millionaires’ row’. An example is given in Figure 8.2.



Figure 8.2: A typical mansion compound in Kwahu. It has a large concrete forecourt, boundary walls and double storey main house with side buildings. These types of rural estate developments are found across the five settlements in this field site and each takes up significant land compared with smallholder dwellings. Photo taken in February 2018.

The tarmacked compounds require disproportionate areas of land to be cleared, especially given that most lie empty as holiday or weekend homes rather than being a main residence. Many of these properties are built in scenic locations along the edges of hillsides, causing concern amongst some participants that the removal of trees could result in landslides (INGO1-73). These glamorous-looking mansions have helped to give Kwahu a reputation as the ‘Hampstead of Ghana’ – an anecdotal expression used locally to describe the

disproportionately large houses on the hillsides – with the real estate, business opportunities and cool mountain climate attracting investors. For example, there are numerous construction projects building new accommodation blocks for university students, healthcare workers and civil servants, which are being financed through a mixture of state and private funding – including the MP. Furthermore, some developers ‘offset’ their private projects by building large churches. Bokuruwa village, with its population of 1,800 people, now has seven church buildings, with several built in the last decade by real estate developers. This multitude of construction projects not only take up swathes of land themselves but also often involve the extension of tarmac roads and electricity supplies, all of which also involve vegetation and tree cover clearance.

Aerial images give an indication of how the Kwahu East settlements in this study area have expanded over the last twenty years. The two Google Earth satellite images below (Figure 8.3) show the villages/towns of Pepease, Bokuruwa (unlabelled village near the centre of the image), Kwahu Tafo, Nkwatia and Abetifi. The image at the top was taken in 2000, and the image below in 2020. These cannot be used to distinguish changing vegetation patterns by visual inspection because the image from 2000 is of lower quality and taken at a different time of year. However, the distinction between vegetated and developed land is visible in both images and is unaffected by seasonality. The image from 2020 depicts the presence of buildings and land clearances along the roads between settlements. These are areas typically used to build large mansions.

The key in Figure 8.3 locates sites of significant development construction expected over the next few years (also shown on Figure 3.4), some of which are discussed in §8.5.

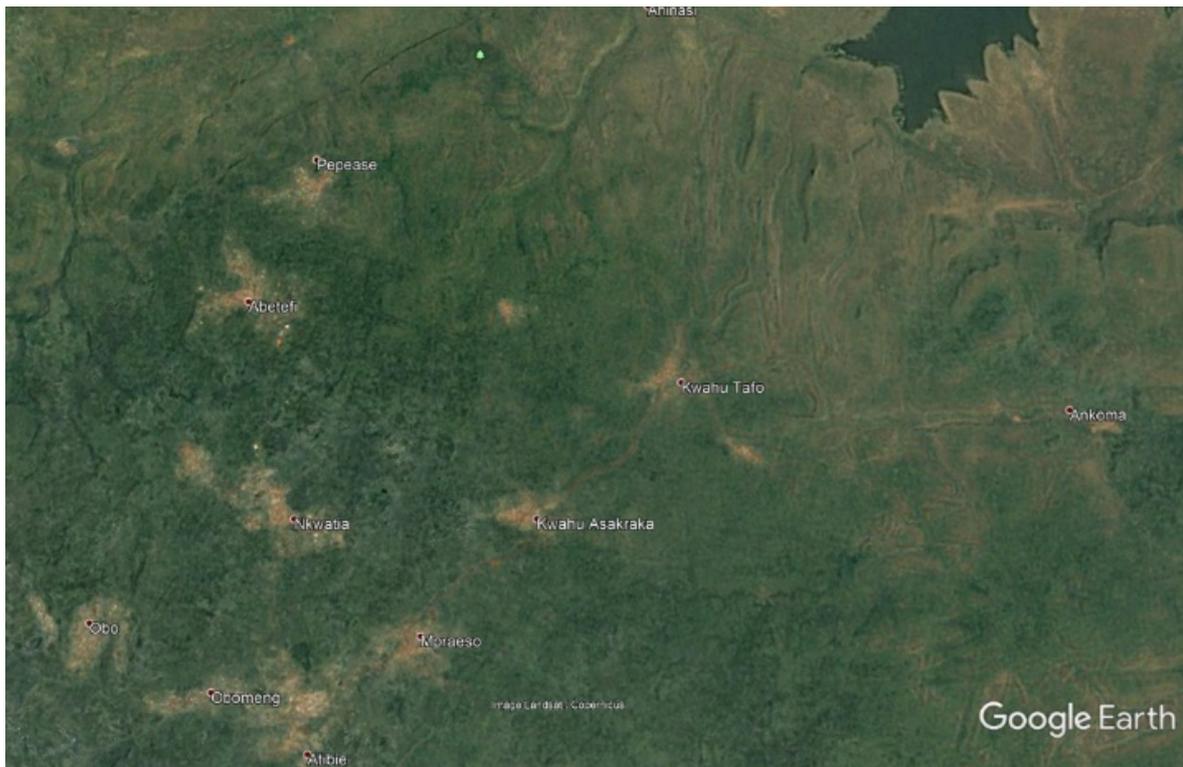


Figure 8.3 Google Earth aerial images of the settlements in the Bokuruwa fieldsite. These depict settlement growth and the increase in buildings along the roads that connect them. The bottom aerial photo indicates the location of four infrastructure and tourism sites. The roads between Pepease, Bokuruwa and Kwahu Tafo are expected to be tarmacked as part of these developments. Top photo taken on 31/12/2010; bottom photo taken on 05/04/2020. Copyright, Google Earth.



Figure 8.4 Global Forest Watch (GFW) maps depicting tree cover change in Kwahu East between 2010-2018. The top image represents tree cover change in the year 2010. The bottom image from 2018 shows tree cover change that occurred between 2010-2018. Green areas indicate 'tree cover with 30% canopy density'; pink areas indicate 'tree loss with 30% canopy density'; and blue areas indicate 'tree gain with 30% canopy density'.

Note: the white areas that indicate towns/villages in the GFW images remain the same size between 2010 and 2018. This may be disguising tree cover change linked to town expansion – as tree loss has also occurred in the white areas, especially along main roads, between these two maps.

When the aerial town images in Figure 8.3 are viewed alongside the maps in Figure 8.4 depicting tree cover change from Global Forest Watch (GFW) (Hansen *et al.* 2013), there are various points of correlation between town expansion, development and tree cover change. As towns and villages simultaneously become more dense and expand at their edges with large mansion houses, and as infrastructure and commercial development displaces farmland in other areas, farmers are moved further out of settlements. This increases pressure on forest-farm areas and contributes to livelihood challenges due to loss of previous farmland, the cost of establishing new farms and increased conflicts between herders and farmers (detailed in §5.9 and §6.8.3). These factors combined may explain why the majority of tree cover loss recorded by GFW in this location is in close vicinity to the settlements themselves.

GFW state that their data on tree cover loss does not always equate to ‘deforestation’:

“Tree cover” is defined as all vegetation greater than 5 meters in height, and may take the form of natural forests or plantations across a range of canopy densities. “Loss” indicates the removal or mortality of tree cover and can be due to a variety of factors, including mechanical harvesting, fire, disease, or storm damage.⁷⁶

The tree cover change perceived by the RSPB therefore, is connected to the town planning processes and decisions about land use that farmers have little say over. The disproportionate focus on the actions of farmers, given the context of accelerating infrastructural development, is potentially a distraction from more pertinent and long-lasting causes of tree cover change. Smallholders rarely have an opportunity to voice their concerns or preferences about land development for real estate, even when the land they farm on is reallocated and they are moved to new farmland. Interviews with farmers and farmer meetings highlighted the lack of local trust in decision-making process, who has influence, and whose needs and rights are taken into consideration. Some complained of chiefs ‘taking land’ for their own monetary gain through agreeing to real estate projects without following the traditional council processes like consulting with other elders and especially the family head whose land

⁷⁶ Taken from the ‘layer info’ tab on the Global Forest Watch website, accessed 2nd June 2020: www.globalforestwatch.org

it is. One example was the former chief of Pepease, a stool which has been vacant for a few years now because the elders cannot agree on who the new chief should be:

When someone came and wanted the land, instead of negotiating with the *abusuapanin* [family head], because he is the chief he thinks he doesn't have to inform anyone and he just takes the money and gives them permission to use the land. This was not fair. The chief was very autocratic, he was an autocratic leader and what he said was final. He never thought about the wellbeing of the town. Whenever he takes a decision no one has a say. (OH-SH-45)

There was a general acknowledgement from informants at the FSD, MOFA, DA, and NGOs that development plays a part in the loss of tree cover, but this is seen as necessary and unavoidable rather than something which could or should be addressed (IN-DA-69; MSM-89). They also mentioned some structural issues which overlap with land use change – including corruption within state and traditional authority processes and the power of real estate investors. The DA environmental health officer highlighted “the need to, as an Assembly, formulate policies and programmes that are geared towards streamlining the encroachment on our environment” (IN-DA-75), pointing to the assembly’s role in authorisation. In interviews, FSD personnel also commented on the impact of town expansion on forests – but instead of raising issues within planning processes or the political and economic forces behind commercial projects, the FSD blamed increasing local populations – the logic being, as populations increase, so does the number of houses and necessary infrastructure. This echoes neo-Malthusian narratives of overpopulation found in policy discourse (Kansanga et al, 2017). During the farmer meetings, both the men and women pointed more to the underlying causes rather than development itself – seeing the problem as being with how decisions are made, the institutions making decisions, corruption, lack of enforcement and regulation, and hypocritical leaders. I return to this in Chapter Nine.

8.5 Tourism development

Tourism, mostly from within Ghana and international visitors attached to volunteering organisations, is an expanding economic activity in Kwahu East. The district is home to several tourist sites (including ancient caves, waterfalls and Lake Volta), a large annual Easter

celebration event (with music, parades and paragliding off the Kwahu escarpment down to Nkawkaw) and a growing number of hotels. Many of the most recent large development projects in Kwahu East have been part of this growing tourism industry.

As described in §8.4, two of the main actors pushing for an increase in tourism-related initiatives are the MP and the DA District Chief Executive (DCE). The MP is involved in the central governmental committee on Trade, Industry and Tourism and has extensive business investments in the Kwahu tourism sector. He is the owner of a small hotel – Jay’s Lodge – located on the mountain between Obo in Kwahu South and Nkwatia in Kwahu East, which has a canopy walk-way and zip-wire through the forest. In recent years he acquired the land on the other side of the mountain (in Nkwatia) to build the largest hotel in West Africa – Rock City (Figure 8.5) – which will have 2700 rooms when it is complete in 2025. The MP has visions of hosting the African Union at the hotel, along with other high profile political and social events.

There are two significant land use alterations associated with this vast hotel, aside from the land already being used for construction of the hotel itself. Firstly, the MP has bought the forested mountain that stands between Rock City and Jay’s Lodge “to protect the forest from local people” (IN-MP-71). In his mind, this will ensure a rainforest tourist experience as he knows Kwahu’s spectacular rocks and trees are an attraction in themselves. This area of forest-farm has now been enclosed, with local people no longer having access to their pre-existing farms nor the resources that forests provide for livelihoods, like medicinal plants, bushmeat, firewood, and other NTFPs. The elite capture of forest for the purpose of tourists is concerning on its own, however there are other development ambitions which raise alarms for tree cover: it is proposed that Rock City will include within its grounds an 18-hole golf course, theme park, aquapark, night clubs, shooting range, motorsports course and other tourist attractions.⁷⁷ Far from protecting the forest for tourists, it seems large swathes of forest may be cleared to make way for these attractions.

⁷⁷ What’s Up News website, accessed 4th August 2021: <https://whatsupnewsghana.com/2019/11/12/bryan-acheampongs-golden-castle-in-a-ghost-town-kwahu-residents-sceptical/>



Figure 8.5 Rock City Hotel, Nkwatia. The top photo shows the site under construction viewed from the Mpraeso-Nkwatia road. The bottom photo is taken from inside a bar area and shows one of the completed swimming pools with accommodation buildings in the background. Photos taken in June 2018 (top) and July 2019 (bottom).

Secondly, to service the mega-hotel and specifically for the high-class clients he hopes to attract, the MP is building an airport (see Figure 8.6), on 185.5 hectares of farmland on the outskirts of Kwahu Tafo on Bokuruwa stool land:

[The airport] is mainly the MP's idea. It is part of his conference centre initiative, whereby he wants to host conferences here in Kwahu that formerly would have taken place in Accra. The flight from Kotoko (Accra) to Kwahu would only be about twenty minutes, so even people at a conference in Accra could easily be transferred here to

Kwahu to enjoy tourist sites. There is a huge ambition here, particularly from the MP and also from the DA, to make Kwahu a top destination for tourists and recreation so that anyone who comes to Ghana will want to come to Kwahu. (DA Planning Officer, IN-DA-79)

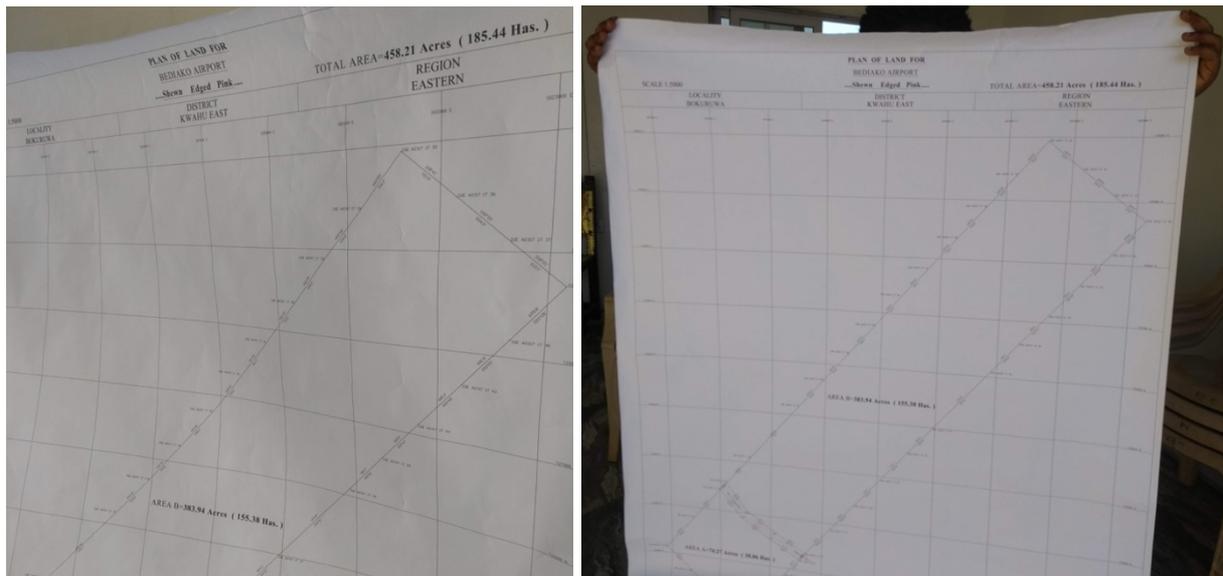


Figure 8.6 Plans for the proposed airport on Bokuruwa stool lands. This development will also involve the tarmacking of the roads between Kwahu Tafo, Bokuruwa and Pepease, connecting the airport to local settlements and a key tourism site also currently in planning, Oku water shrine. The chief of Bokuruwa is holding the plans up to show me. June 2018.

At the time of this interview (May 2018), the airport area had been allocated by the traditional council of Bokuruwa, demarcated by developers, and the farmers had been given notice that they would be reallocated new farmland to cultivate. Farmers complained that there was no consultation about this development – indeed, one reported that he only found out when he found signs on his farm that meant the land would be built on. This airport project has the permission of the Bokuruwa stool (IN-TA-76) who provided the land because he believes it will help to bring tourism to the area and that this will in turn create economic opportunities for local people. Kwahu Republic, the tourism company set up by the MP (see Box 8.2), is

involved in the airport development and have publicly claimed that it will include the longest runway in West Africa, at 4km.⁷⁸

With tourism gathered pace due to these grand multi-million projects, there are rumours of other forest areas becoming developed tourist sites. One particularly striking example is a traditional water shrine, named *Oku* (see Figure 8.7), on the outskirts of Bokuruwa behind a small farming settlement. This shrine is of local cultural importance as it is said that the water never runs dry, always providing clean and safe water throughout the year, even during the harshest dry harmattan months. It is considered sacred and protected by a spirit who must be honoured when collecting water. People take offerings of liquor to the deity believed to reside there and only visit with bare feet so as not to make the place unclean.

With the recent increased focus on tourism as a form of development, this sacred space is now at risk of being developed as a tourist site. Early planning documents produced by Kwahu Republic suggest this process will involve significant tree loss as it may include a high rope walkway through the forest, a sports area and a large concrete car park. Should these plans come to fruition, the people living at the settlement will likely be displaced and access to the shrine for drinking water – used by people in Pepease and Bokuruwa alike when the taps in the villages are dry – may become restricted or prohibited. It is not yet clear how the development will affect access to the shrine by the *ɔbosomfo* (fetish priest) (see §3.7) or other people wishing to pay respects to the deity believed to reside there.

⁷⁸ This was reported within a video on Kwahu Republic's social media page, accessed July 27th 2021: <https://www.facebook.com/watch/?v=1139125706607481>



Figure 8.7 Oku water shrine. This is a sacred place. Water always flows, even during the dry season, so it is an important source of water for people in Bokuruwa and Pepease when settlement taps run dry. October 2018.

Several research participants expressed scepticism about the rapid increase in tourism ventures, despite the political rhetoric about the economic wealth it promises to bring to the area. Smallholders suspect that gains will be captured within the hands of those with hotels, tourist sites and the chiefs that provide the land, rather than being distributed meaningfully through the local economy. One informant, Mr Sarko (anonymised), commented on the risk that these tourism developments pose to the forest themselves – even as tourism depends on forests as a spectacle, many trees are being cut down in the process. He has embarked on a tourism initiative of his own that takes a very different approach.

A few years ago, Mr Sarko inherited his family land in Abetifi. It includes Bosompra cave which was used by people from as far back as 12,000 years ago in the Stone Age era. Over the past

five years he has commissioned the building of an eco-friendly tourist centre, where he plans to house a museum and restaurant, and landscaped the grounds to create 'Abetifi Stone Age Park' as a tourist attraction (see Figure 8.8). This is the first noticeable difference between Mr Sarko's tourist initiative and the MP's – everything has been done with the local ecology in mind. The buildings are powered by solar, waste water is recycled into the toilet cisterns and watering the garden, and he has deliberately chosen not to build a tarmac car park or prestigious driveway, as is the norm in Kwahu housing and hotel developments. The cave is at the bottom of this garden, down a track along the edge of the ridge. Here he displays seventeen statues which depict life scenes from the stone age, as imagined by Mr Sarko, making fire and carving animals.



Figure 8.8 Bosomptra Cave and tourism site. The top left photo shows Bosomptra cave. The top right shows the view from the cave of surrounding forest. The bottom depicts a panoramic of the Stone Age Park grounds. December 2018.

As part of his project, Mr Sarko secured the surrounding twenty hectares of forest from the Abetifi chief, to ensure that views from the cave give an impression of what it was like in the past. However, instead of restricting access by enclosing this area he has ensured local people are still able to collect forest products and individuals are employed to maintain the firebreak that protects the area from bushfire. He aims to establish a reserve for the whole valley to protect the forest for the long-term, which includes the forest-farm area most farmers in this thesis farm. His opinion is that farming, hunting and grazing all contribute to tree loss, and therefore these activities would not be allowed in the reserve. He was keen, however, to think about alternative employment – as forest guides for example. Mr Sarko’s approach to eco-tourism and decision to open a museum was in part inspired by spending twenty-five years living in Germany as an art teacher, where he visited free galleries and museums. Mr Sarko believes that excessive development will bring more harm than good to Kwahu, as it will concentrate wealth in the hands of the few rather than being a form of redistribution, and cause environmental damage, particularly to forests. His initiative is intended to show other investors that it is possible to do tourism more sustainably.

Whilst the tourism initiatives led by Mr Sarko and the MP are strikingly different in design, they share two things in common. Firstly, both men believe tourism will bring economic benefits to the area, although there are key differences in how they perceive this happening in practice. Secondly, both initiatives involve forest privatisation to preserve the area for the touristic experience, an intervention which rests on ingrained assumptions that view local people and their livelihoods as a risk to forests, rather than as part of the forests. Throughout participant observation at events and interviews with civil servants, smallholder farming was consistently seen as stuck in the past while tourism was associated with progress and development. The traditional authorities, DA, FSD, MOFA and local NGOs are broadly bought into the ambition of increasing tourism and the economic benefits that it promises. Without exception, the local NGOs incorporate tourism into their development strategies, whilst the traditional authorities speak of it bringing money to Kwahu. However, whilst tourism speaks of protecting forest, the industry is inherently structurally violent in its environmental degradation (Büscher and Fletcher, 2017), seen in Kwahu East as the construction of facilities and infrastructure permanently removes forest areas. It also displaces farmers, who then

move elsewhere and create new cultivation fields, inevitably clearing some trees in the process (Das and Chatterjee, 2015).

8.6 Socio-economic influences on land use and tree cover

This chapter has outlined how land use for development is altering the trajectory of tree cover change into the future. Given the rate of investment in tourism, real estate and infrastructure, the landscape of Kwahu East is on course to look very different in twenty years time – an expectation that was repeatedly communicated within the multistakeholder meetings and interviews. An informant from the DA planning office predicted that in the years to come, farming will decrease as land is allocated to tourism, large residential properties, hotels, a large hospital, the airport and the expansion of education institutions (IN-DA-79). Someone from MOFA discussed the impact of the promised factory, anticipated to be built on farmland to the north-west of Abetifi, and how this will alter crop cultivation amongst farmers as they are incentivised to supply it (IN-MOFA-66). He also disclosed that the Ministry of Mines and Energy have been exploring Kwahu escarpment as a potential location for bauxite mining.

Decision-making which takes place away from the forest-farm site is driving land use change in Kwahu East and shaping the future configuration of tree cover. These decisions can be contextualised by identifying key sociocultural, political and economic factors of influence. These are best understood as social differentiation, national government policy, and contingent market forces.

8.6.1 Social differences

Land is a social relationship, therefore, social differences influence both actions and the underlying conditions which shape tree cover. There are multiple social differences within Kwahu society which influence the social position, privilege and agency of an individual or group and that have significance for land management. The three intersecting forms of social difference which came up most frequently during interviews and which I witnessed in participant observation were gender, wealth, and socio-cultural status (e.g. people with roles within traditional councils versus migrant labourers). Each of these interact in different ways with decision-making spaces about land use, tree cover and resource management.

There is a plethora of literature exploring inequalities related to gender in land use access, ownership, agricultural choices and social status in Ghana (including Lambrecht, 2016b; Lambrecht and Asare, 2016; Asaaga and Hirons, 2019). Whilst my own research project did not set out to explore gender specifically, it became apparent from interviews and observations that gender inequalities and roles do relate directly to factors that affect tree cover. These findings can be understood as two overlapping concerns: firstly, that women's livelihoods are disproportionately affected by environmental change (Rocheleau and Edmunds, 1997; Elias *et al.*, 2017), and secondly that within patriarchal societies women are excluded from or underrepresented within all levels of decision-making that adapt or contribute to environmental change (Agarwal, 2001; Ihalainen, *et al.*, 2020). In the case of tree cover change in Kwahu East, as women's livelihoods become more vulnerable (as described in §6.7), they have less time and resources to participate in decision-making about factors that impact on tree cover. Since women's perspectives and needs are overlooked when decisions are made, their specific vulnerabilities are exacerbated.

Other intersecting social differences that became apparent through the findings were socio-economic and socio-cultural roles, resources and status (Asaaga and Hirons, 2019). Class structures in Ghana are complex and revolve around multiple entangled factors. The research questions and methodology do not provide adequate detail to analyse at length how these play out in Kwahu East, however, it is important to note some recurring themes. Firstly, amongst local authority interviewees there was a strong association between smallholder farming and ideas of local people being uneducated and unable to manage resources sustainably (interviews with multiple participants including elders, NGO staff and civil servants, e.g. IN-SH-55, IN-FSD-64, IN-MOFA-66, IN-FSD-68, IN-BI-70, IN-DA-71, IN-MOFA-77). These reinforce development and conservation narratives circulating locally and across Ghana which see farming livelihoods as a key contributor to deforestation (Kansanga, *et al.*, 2017) rather than as responsible, sustainable forest-farm management. This negative narrative has also been internalised by smallholder farmers themselves to some degree (Murray Li, 2007; Cullen, 2020) – as was discussed in Chapter Six, farmer respondents often highlighted other smallholders' (and herders') practices as contributing to perceived tree loss.

Furthermore, the cultural status of chiefs, sub-chiefs and Heads of Clans give them access to places of decision making and vested interests in particular outcomes (IN-TA-76, MSM-89,

MSM-90). The ability to speak fluent English brings social status that means a person is taken more seriously and has greater access to professional and democratic spaces where deliberative decisions are made (MSM-89, and participant observations). People who have had university education or employment in the global North have wealth, resources and, consequently, influence over developmental priorities at a district level (interviews with local elites: IN-DA-69, IN-BI-70, IN-DA-71, IN-FWG-118). These patterns are replicated within traditional authorities as enstoolment decisions also reward these traits and privileges (IN-FWG-119 and IN-TA-76). Participant observation of daily interactions between people from different socio-cultural and economic groups indicated that these attributes inform perceptions of validity, legitimacy and authority when it comes to making decisions about the local area, including decisions which impact on tree cover change.

At all levels of decision making, men with socio-economic privilege and socio-cultural status dominate. Whilst women and people of lower social ranks may be involved in choosing some of these people (e.g. through voting for assembly representatives and the local MP), elections too are subject to hierarchical patterns as only those with higher social standing have the resources or reputation to stand and be considered legitimate given the way social power is structured, reproduced and validated. These multiple inequalities not only leave women, poorer people and those of lower social status disproportionately exposed to livelihood vulnerabilities and the specific impacts of tree cover change (explored in Chapters Five and Six); they also simultaneously limit their agency within already gendered and exclusionary decision-making processes (see §8.2) by reinforcing the barriers to their participation.

8.6.2 National government policy

Another crosscutting factor shaping forest outcomes is government policy and, more broadly, the role of the state. Whilst Chapter Two gave a country overview, Chapters Five to Seven drew attention to the multi-faceted influence of several aspects of government policy. It is multi-layered, including both centralised policy and decentralised policy implementation. At a central level, there are various influencing factors, most relating to national economic priorities. On a local level, the practices of the Ministry of Food and Agriculture (MOFA), Forestry Services Division (FSD) and District Assembly (DA), each have various approaches to regulation, community engagement and monitoring (as discussed in Chapters Five to Seven).

Their powers are based on complex bundles of national legislation, which warrant different modes of enforcement. Finally, on an individual personnel level, there are limitations created by policy blind-spots, inconsistencies and corruption. In all these ways, government policy shapes the actions of those who implement it; whilst other actors and factors affecting trees are embedded within and responsive to it.

Farmers and state forestry staff say that the policy instruments of the state play a significant role in deciding the direction of social, environmental and economic change. For example, numerous informants talked of the far-reaching effects of the 1960s flagship development initiatives of the first post-colonial government, like the Akosombo dam and flooding of Lake Volta (discussed in §3.5.3 and §6.8.1). More recently, state influence over rural change, and indirectly tree cover, is seen through the climate change mitigation strategies, tree tenure and forestry legislation, logging permissions, monitoring and the financial flows of timber concessions, and agriculture policies prioritising mechanisation and intensification in forest-farm landscapes. Later in this chapter we will see how government bodies, subject to state influence, are entwined with the mismanagement and manipulation of localised land conflicts, and the decision-making processes involved in land use allocation and large development schemes. Each of these have consequences for either the land where trees grow or the trees themselves.

Under Ghana's two-party democracy, government policies enact the political values of the ruling party. Since Ghana adopted a new constitution in 1992, the two main parties – the centre-right liberal conservative New Patriotic Party (NPP) and the centre-left social democratic National Democratic Congress (NDC) – have rotated position as ruling party and opposition every eight years.⁷⁹ With the current president being NPP, their flagship programmes include 'One District, One Factory' for the trade and industry sector; Planting for Food and Jobs in the agricultural sector; and a Nation Builders Corps programme for social development. In correlation with the NPP's political position, these all have job creation and neoliberal economic values at their base. Numerous participants in this research expressed frustration at the political system, especially for the inefficiencies of newly elected governments deliberately undoing the work of their predecessors. Informants believe

⁷⁹ 1992-2000 Jerry John Rawlings (NDC); 2000-2008 John Agyekum Kufuor (NPP); 2008-2016 John Atta Mills (died during office) and John Dramani Mahama (NDC); 2016-present day Nana Akufo-Addo (NPP).

politicians use questionable tactics to sway voters and ensure allegiance, and perceive flagship policies as being more interested in public appeal than genuine social justice. Furthermore, the social differences described in §8.6.1 determine to some degree who stands for election as candidates with more disposable resources and business or politics-related networks tend to be elected. This informs whose interests are represented in parliament and subsequent policy making processes.

There are also patterns emerging from the data collected from civil servants about how policy implementation overlaps with the organisational structure of state departments. Informants highlighted the limitations of decentralised power structures, as local offices struggle under the strain of low budgets, insufficient staff capacity, lack of financial and material resources and overarching bureaucratic inefficiencies. Some also criticised the central department headquarters in Accra for creating policies with a top-down approach that do not always make sense on the ground. On both a local and national level, the forestry and agriculture offices struggle to work together, which creates disjointed implementation of strategically overlapping policies. This fuels feelings of distrust and frustration with government personnel amongst local smallholder communities. These challenges within the state bodies open up space for other power dynamics, especially corruption and vested interests at various levels. Smallholders complained that the FSD collude with timber contractors and illegal loggers (Chapter Seven), and that MOFA seem to show favour to farmers that use mechanised farming techniques (Chapter Five). Furthermore, the DA – to which both the local MOFA and FSD offices report, as outlined in Chapter Three – serves particular development values and infrastructural projects based on neoliberal economic logic (see §8.6.3).

8.6.3 Market forces

The third dimension that underlies factors affecting tree cover is the economic energy of market forces. This revolves around the agency created by supply and demand dynamics. It is impossible to separate market forces from the state policies and power discussed in §8.2.2, as they both stem from neoliberal economic ideology and values. These are connected to influences from outside Ghana within the global political economy. Examples include the pervasive deforestation within forest risk commodity supply chains (Acheampong *et al.*, 2019) and the drive to reduce emissions through forest-based carbon capture, including REDD+

(Asiyanbi, *et al.*, 2017; Saeed, *et al.*, 2018; Kansanga and Luginaah, 2019). In Kwahu East, economics infuse all factors affecting tree cover change, however, there are three overlapping areas where market forces are particularly noticeable – the market value of trees, especially when processed into timber and charcoal; the government’s focus on intensifying and ‘modernising’ agriculture, including the increase in cash crop production and cocoa; and finally, demand for land itself for industrial agriculture, tourism and large infrastructure projects.

As described in Chapter Seven, formal and informal logging in Ghana are crucial economic activities for both domestic and international timber markets. This dynamic is felt no less in Kwahu East. The main drive behind chainsaw user livelihoods is the demand for timber products (IN-SH&CU-53). Logging concessions granted by the FSD in forest-farm off-reserve areas are also driven by the market as these areas create more revenue in stumpage fees for the FC than their management of forest reserves. This is an important reason why the state has been reluctant to reform tree tenure – to give land occupiers (crucially, smallholders) more rights over naturally occurring trees – as it would reduce their income significantly.⁸⁰

The market value of timber and agricultural products drives change within local agrarian economies and impacts what decisions different farmers make about their land. A smallholder can choose to leave trees standing as a form of investment but this risks them being extracted with no compensation or benefits. Similarly, they make decisions about which crops to grow to cover input costs and turn a profit, and therefore which clearance, rotation and agroforestry techniques are utilised on the farm. These decisions are influenced by both market dynamics and government policy because agriculture contributes to 54% of Ghana’s GDP, 40% of exports revenue and supplies 90% of domestic food.⁸¹

To illustrate the overlap between government policy and market economics in relation to what happens within the forest-farm landscape, we can discuss the most recent policy (2018) to come from MOFA which allocates a ‘key crop’ to each district. In Kwahu East the designated crop is cocoa, despite there being a 25% portion of the district where cocoa does not grow

⁸⁰ This information arose from participant observation at the Forest Watch Ghana annual meeting in July 2019 in Accra, specifically the presentations on July 25th titled ‘Tree Tenure and Benefit Sharing – what has happened so far?’ and ‘Tree Registration Update’.

⁸¹ FAO website, accessed on 16th June 2020: <http://www.fao.org/ghana/fao-in-ghana/ghana-at-a-glance/en/>
Within GDP assessments agriculture also includes forestry.

well. As such, farmers are receiving input incentives to establish cocoa farms. This is fuelling feelings of inequality and underappreciation amongst farmers who grow staple crops, who perceive the government as doing more to help cocoa farmers than smallholder crop farmers due to the economic value of cocoa in Ghana's exports.⁸² Furthermore, cocoa is typically a crop choice that requires capital and secure land tenure that many smallholders do not have access to. It involves high risk due to the regularity of forest fires in the area and difficulty in getting farm insurance. The impact of this policy in Kwahu East will not be known for a few years, however, as cocoa farms increase it might also bring a further decrease in tree cover as current forested and fallow areas – where a diversity of native tree species are found in greatest numbers – are cleared and converted to cocoa plantations with sparse economic timber trees giving shade, as determined by the advice of the Cocoa Board.

One area where market forces are tangible is the demand for land. §8.4 gives examples of how various types of development in Kwahu East are having a significant impact on tree cover through the clearance of land for building projects (especially large private mansion properties on forested hillsides), major infrastructure upgrades, roads, electrification and the drive to increase tourism in the area. These also invariably require timber for construction. Land is a commodity in itself, valuable for real estate, and Kwahu is a popular place for second homes. These changes in land use impact on space for agriculture and therefore forests – as land becomes scarcer and livelihoods are intensified, this influences the choices available to farmers and therefore what they do with the trees on their land. In addition, several tourism schemes (detailed in §8.5) involve the elite capture of previously common forest-farm land and reduced access to forest resources for local people. This uneven development is contributing to the widening gap between rich and poor, where the most vulnerable have least input into decisions (Agarwal, 2001) as these land use change processes are concentrated in the hands of the MP through his influence over the DA and the chiefs (Asaaga and Hirons, 2019). These are also impacting on tree cover, as this chapter illustrates.

⁸² One recurrent complaint from smallholder crop farmers was that cocoa farmers have a guaranteed and stable market for their goods – so long as they pass quality assurance, all the cocoa they produce is bought at a fixed price. Crop farmers, on the other hand, suffer from unstable markets, fluctuating prices and infrastructural issues that prevent them from getting their crops to markets. This makes crop farming more vulnerable.

8.7 Chapter summary

This chapter places the research site in a wider political economy, signifying broad forces – both structural and cultural – beyond the site of the individual farms that influence tree cover. This is important because attention to such networks and chains of relations provide a more profound understanding of the drivers behind tree cover change. Furthermore, it demonstrates that despite a hegemonic view of farmers as villains of forest loss, in Kwahu East the extensive development of infrastructure, tourism, real estate and urban growth are having the most substantial impacts on tree cover. These initiatives result from overarching decisions about how land is allocated and what it will be used for, which officially lie in the hands of traditional authorities and the DA. These actors have their own priorities, worldviews and interests, which inform the decisions they make and the projects they give license to. However, individuals within these structures and the decision-making processes themselves are informed by the MP's vision for Kwahu East's future. Due to his political associations and economic assets, the MP has a significant influence over development trajectories and the future configuration of the forest-farm landscape.

One key consequence of this economic context and the decision-making processes is that people who feel the effects of tree cover change most profoundly in their livelihoods have least opportunities to shape the direction of development. Social differences go a long way to define experiences and perceptions of agency. The distribution of decision-making power amongst people with layers of socio-economic and cultural privilege ultimately impacts on what decisions are arrived at. Tree cover change is inherently connected, therefore, to the governance structures of both forests and land.

9 Conclusion

9.1 Introduction

This thesis has explored the complexity of tree cover change in the dry semi-deciduous forest-farm landscape of Kwahu East, Ghana from the perspective of a number of different actors. These include bird conservationists, smallholder farmers, traditional authorities, the district assembly, forestry officers, agriculture specialists, entrepreneurs, and people who work for local development NGOs. It opened with one perception – that of the UK conservation organisation the RSPB (the Royal Society for the Protection of Birds), whose research in the area originally raised concerns about the impact of tree cover decline on migratory birds. This thesis has sought to provide an in-depth understanding of what is happening to trees in the area through a study of how farmers manage trees in their care and the sets of factors shaping their actions and the extent of tree cover. The four empirical chapters each unveiled a new layer of understanding: from the agency of farmers over crops and trees (Chapters Five and Six), to the management of forests for timber (Chapter Seven) and impact of development (Chapter Eight). Indeed, throughout the thesis, it became clear that the forest-farm landscape of Kwahu East contains a multitude of stories, actors and interweaving factors which inform how decisions are made, by whom, and with what effect on both the forest-farm composition and the farmers who cultivate it. Like other political ecology case studies, this research illustrates the power of narratives about tree cover change (Fairhead and Leach, 1996) and how these inform the complex web of social and political relationships within which decisions are made that affect trees (Rocheleau, 2008).

This final chapter brings the thesis to conclusion by summarising what the research findings mean for trajectories of change and the future of the farm-forest area (§9.2). These are then discussed in relation to two emerging constraints: trust and uncertainty (§9.3). Subsequently, I offer some implications for conservation practice (§9.4). Through reflection on the limitations of this study, I outline some areas which would benefit from further research (§9.5) and finally close the thesis (§9.6).

9.2 Research findings

The RSPB has been involved in this research from the beginning. As outlined in Chapter One, the enquiry was designed to fill a gap in their knowledge about the factors that affect tree cover of Kwahu East. It has, therefore, been written to inform the understanding of bird conservation scientists on issues of tree management and forest decline. Annual studies of habitat, tree cover and migrant bird populations from 2011-2016 had led to them concluding that tree cover was decreasing in the study site at Kwahu East (Mallord *et al.* 2016). The RSPB wanted to know more about how local farming livelihoods might be impacting on trees, and in particular, how trees are managed on farmland. However, as Adams *et al.* (2014) assert, since the birds in question winter in landscapes that contain multiple land users and rural livelihoods, this requires consideration of the wider economic context which might be affecting tree cover and livelihood adaptations.

Having identified the problem that my research aimed to address, my methodological and theoretical approach was influenced by political ecology. This field has a strong history of challenging preconceptions about landscapes in West Africa (Madge and Cline-Cole, 1996; Fairhead and Leach, 1996; Ribot, 1999) and using case studies to understand places in multidimensional ways that take into consideration the different social, economic and political factors behind environmental problems (see Chapter Two). To contextualise and inform my empirical work, I researched background geographical, historical and cultural information about Kwahu – the place and the people (Chapter Three). Conservation literature rarely considers these aspects since it generally focuses on ecological data of a given place (Mallord, 2016). Taking this approach uncovered a scarcely documented history of localised political struggle and alternative structure of governance in the form of the *Asafo* (commoners) (Simensen 1975; Asiamah, 2000). Understanding such local histories can be powerful tools for thinking about identity, agency and how to alter future trajectories through participatory governance (Bookchin, 2005).

With this philosophy in mind, I designed a methodology that started from the farm level and worked outwards, to understand how local people manage trees and crops on their land, who else is involved in forest tree management and what is happening with land use in the area

that contributes to trajectories of change. As discussed in Chapter Four, my overall approach has been slow, participatory and ethnographic in both design and delivery. I identified three overarching research questions and a set of secondary questions to enable me to explore this problem (Table 1.1). These correlated with three general routes of enquiry:

1. Practices: What are different people doing with forest trees in Kwahu East, and why?
2. Perceptions: How do different people perceive what is happening to tree cover in Kwahu East and the causes of change?
3. Agencies: What micro and macro forces are informing practices, perceptions, and tree cover change in Kwahu East?

When carrying out the field research, immersive methods which began at the farm and village level gave me an insight into rural life and culture. This exposure contextualised the data I gathered about farming, tree management and the extent of agency smallholders have. It became clear that whilst local people have their own agency and logic for decision making within their livelihoods, these are constrained by wider social, economic and political factors. This led me to explore how forest management for timber, infrastructural development and the decision-making processes involved in these are also impacting on both tree cover itself and influencing local farmers' management of forest-farm areas. Four empirical chapters present the findings as different lenses on to the same landscape.

Chapter Five outlines the local farming economy, illustrating that there are a diversity of farmers managing the forest-farm for subsistence, semi-commercial and small-scale agribusiness crop production. It details farmer agency by documenting their practices, livelihood decisions and adaptations to complex livelihood challenges. This micro-political ecology shows how farmers, and particularly those with least wealth and resources, are constrained in their agency by both land and tree tenure, and broader economic and political factors.

Building on Chapter Five, Chapter Six seeks to understand how farmers' roles and practices as tree managers in situ impact on the number, age and type of trees in the landscape. It finds that trees are present because farmers are there too. There are no less than 31 species of tree which occur commonly on farms, demonstrating the compatibility between farming and trees. All have multiple local uses for NTFPs, fuel for cooking, and timber, as well as useful

functions within the farm, such as providing adequate shade, wind breaks, soil nutrients and protecting moisture. Of these 31 species, farmers report that only six are *always* cut down and this is because they spread too quickly, give too much shade or are brittle and hazardous if left standing. Local narratives of forest decline show that smallholders also perceive a decline in tree cover which is making their livelihoods more difficult. Farmers consistently expressed a desire to grow more trees, showing interest in planting over 50% of the tree species identified, and enthusiasm for sharing local knowledge of tree uses and management. However, the multiple livelihood challenges uncovered in Chapter Five make this difficult as smallholders do not currently have space, secure tenure, protection or enabling conditions to nurture more trees on their farms.

Since the lack of tree tenure is a key barrier to farmers nurturing trees, Chapter Seven provides information about how the forest-farm is managed by the state and custodial landowners primarily for timber production, with the involvement of chainsaw users. It demonstrates that forestry legislation is complex; the local Forestry Service Division (FSD) is limited in their capacity and competence in monitoring, enforcing and regulating logging practice; and that corruption can be an issue. It finds that farmers need to be able to prove ownership of trees if they want to cut them for timber, but the registration system is not easily accessible. Legal logging should gain the consent of farmers and provide compensation directly or through Social Responsibility Agreements (SRAs), but this does not always happen. As such, informal logging is a better way for farmers to get benefits from trees on their land because profits are split three ways between the chainsaw user, landowner and farmer. It also shows how fire prevention lacks coordination and resources, and reforestation efforts rely on access to land and decision-making spaces.

The final empirical chapter (Chapter Eight) explores how the number, age and type of trees in the landscape are affected by land use issues and decisions. It shows that the people and institutions with influence in decision-making processes have vested interests, and that the cumulative impact of land use change on trees is not being monitored. The two most important land use issues affecting tree cover are development of infrastructure (including real estate) and tourism. These put on-farm decision making by farmers into perspective, showing the limitations of farmers' agencies when there are significant economic decisions being made elsewhere. The trajectory of change in tree cover will be decided by these factors

rather than what farmers do with trees. Furthermore, since farmland is being turned over to use for development projects, the future ability of farmers to keep trees on their farms will be constrained by access to sufficient land.

9.3 Emerging constraints of distrust and uncertainty

Throughout the empirical chapters, factors influencing tree cover change have been shown to be complex. Furthermore, there are multiple narratives that different actors use to frame their own understanding of what is happening to the forest. This first comes from 'above' and is seen in the perceptions of both bird conservationists and local authorities (those working in local government, NGOs and within traditional councils). This set of narratives see tree cover change as strongly influenced by the actions of smallholders. Elite interviews and multistakeholder meetings were infused with opinions about the perceived unsustainable practices of farmers and chainsaw users, and the belief that people with these livelihoods are ignorant or in need of education. Livelihood activities were viewed by people within local government and NGOs as harmful to the forest, undesirable as part of the development vision and requiring either modernisation or diversion to other forms of income. This narrative contributes to an overarching viewpoint amongst authority figures that forests should be protected through privatisation or state management because under local control they would be depleted, misused or degraded. There was also a strong assumption amongst people within local government that the root cause of perceived environmental degradation in Kwahu East is population growth. Furthermore, these perceptions of local livelihoods are reinforced by ideology around progress and development which justify market-based interventions like tourism and hospitality.

In contrast to these prevailing views, this thesis shows that smallholders cut some trees and keep other trees as part of their farming practices, and that these decisions are bound by the wider political and economic context. Here, from 'below', there are another set of narratives, as described in §6.8. Smallholders also perceive forest decline, but their stories depict a complexity of causes. These include historical environmental change; unsustainable logging; corruption amongst people who make decisions about land use and timber felling; lack of protection from damage and access to benefits for farmers in their care of trees; and an

ongoing conflict between herders and smallholders that has far-reaching impacts. These narratives inform a farmer's sense of agency and therefore the way that they manage trees on their land.

Two common themes emerging from both sets of narratives are social distrust and uncertainty. Currents of distrust between individual and groups of informants, both socially and institutionally, are evidenced by broad issues of conflict, malice and collusion. In interviews, community meetings and the multistakeholder workshops, a lack of social trust was palpable. On a community level, there was tangible guardedness or dishonesty about livelihood success for fear of being ill-judged or deliberately ill-treated. Several participants reported that curses were regularly used to cause harm to individuals by people who felt wronged, or to victimise people who had good fortune, either because it was deemed unfair, or the curser was jealous. There appeared to be little cultural confidentiality, so both news and rumours spread quickly. The farming communities I interviewed lack faith in the authorities, and consistently complained of corruption, backhanded payments, inaction in the face of illegality, collusion, and insufficient enforcement. This criticism was directed most strongly by smallholders towards FSD personnel, the police and some chiefs. Layers of suspicion and distrust interact directly with factors affecting tree cover on the specific issue of forest law enforcement. Given the ground-level distrust within communities and towards the FSD, a system which relies on local reporting does not work because people do not have faith that the FSD will respond with appropriate enforcement measures and informants are fearful of personal repercussions when reporting illegal behaviour to authorities (see §7.4).

Similarly, the perceptions of people in positions of authority (described above) indicate their lack of trust and confidence in local people, particularly in their knowledge and abilities to make sustainable decisions. Additionally, even within and between the different governance structures, trust was rare. There were mixed opinions of traditional authorities by state personnel, local NGO actors and community members, depending mainly on the chief in question. Elements of distrust arose between state actors from different departments, with suspicion about vested interests and corruption being most commonly directed towards the FSD and high-ranking DA staff. Currents of scepticism circulated about the overarching motivations of authority figures, especially of those in leadership positions.

Secondly, there are several uncertainties which make planning for the long-term difficult. This was seen at the scale of farmer decision making about crops and trees, and within governance structures. Thinking about and planning for the future are complicated by livelihood challenges, institutional inefficiencies, and a lack of strategic cooperation between actors. The notion that it is difficult to plan both arises from and reinforces the issue of distrust. For farmers, their livelihoods are exposed to challenges that can be unpredictable – including fires, pests, cattle grazing, logging, displacement and crop failure (see §5.9). They are also subject to precarious market opportunities and unregulated prices (detailed in §5.8). These conditions reduce their chances of securing economic capacity required for long-term investments. They also mean that smallholders and other people of low social ranking have less resources and opportunities to take part in district level decision-making processes (outlined in §8.6.1). State-based, and to a lesser degree NGO-based, informants also struggle to plan for the long-term and put blame partly on the broader context of fluctuating government policy, top-down decisions and internal problems within decentralised offices (§8.6.2). The latter includes issues with money flow and budgeting, inefficiencies in operational systems, under-resourcing, and assigned staff being reallocated without warning to different districts – stemming from employment contracts that give the government rights to redeploy. All of these factors impact on the trust that personnel are able to build with colleagues and other stakeholders, and limits their ability to plan beyond any given government term in office.

Perceptions and lived experience of social distrust and uncertainty affect how decisions which impact tree cover change are made. Together, they present two further constraints when thinking about solutions to tree cover change because they make it hard to organise a coordinated and holistic response, especially one which involves different types of local people as equal stakeholders. Investors or developers who cast visions for long term prosperity embody stability and certainty in otherwise uncertain conditions. Planning for the long term becomes something that is available to those with money and influence – indeed, there is an elite control of change, both in terms of development trajectories and tree cover. This is seen in how development initiatives are designed by influential actors (generally businessmen), legitimised by decision-makers (traditional authorities and key people within local government), and then imposed upon the landscape and less wealthy local people. The

decision-making processes, development plans and socio-political context (explored in Chapter Eight) illustrate the forces working outside of the forest-farm which have far-reaching influence over tree cover change. These are enabled by and contribute to social distrust and uncertainty.

In summary, these complex conditions form the backdrop to which farmers are adapting and fuel a local sense of powerlessness. This points towards the disparity in representation within decision-making forums, and how the economic interests of actors with social status are prioritised over those of smallholder farmers and others making forest-farm based livelihoods (Agarwal, 2001; Ihalainen, *et al.*, 2020). This creates a hierarchical governance structure that reproduces social differences (see §8.6.1), leaving the most marginalised local people excluded from decisions and playing out in variably subtle ways that reproduce social power inequalities. For example, MOFA offers more regular advice and practical assistance to vulnerable smallholder farmers, but they are not included within decision-making meetings which determine significant changes to crop demand that impacts on their livelihoods. This contrasts with the small-scale agribusiness farmers who receive less inputs, but are more easily granted secure land tenure and invited to partake in consultations where strategy is discussed and decisions about development are made.

9.4 Implications for conservation practice

This thesis offers insights which will be of interest to policy interventions that promote the conservation of tree and forest cover in southern Ghana. These are of immediate relevance to GWS (Ghana Wildlife Society) and RSPB for their work in Kwahu East, however, the findings are also relevant to forest conservation elsewhere in Ghana and in West Africa more widely. A typical goal of conservation is to enable farmers to keep more trees on their farms. My research shows that in Kwahu East, this is more complicated an ambition than it first appears.

Tree cover and composition is changing due to many factors, most of which are far beyond smallholders' on-farm decision making. As discussed in Chapter Eight, the factors which have the greatest influence over tree cover in Kwahu East are directly connected to the vision for development being pursued by investors, local NGOs, the MP and the District Assembly (DA).

This involves extensive infrastructure development projects, including one near completion that is set to become the largest hotel in West Africa, and which will soon be serviced by a new local airport with a 4km long runway. This vision is increasing the interest in tourism and the development of sites for tourist attractions. Real estate housing is similarly on the rise and has been for the last ten years, as richer community members erect mansion houses, many choosing locations that have picturesque views and involve the conversion of forest-farms. These are enabled by the existing town and district planning processes. Other key factors, as discussed in Chapter Seven, stem from the management of forest for timber production. There continue to be problems with logging enforcement, which combined with the complexity of tree tenure legislation and inaccessibility of tree registration, disincentivises farmers from keeping trees on their farms. Furthermore, composition of tree cover is being altered by the increase in reforestation using exotic timber species in on- and off-reserve areas. All these factors compound the complex livelihood challenges which farmers face and impact on their decisions about crop and tree management.

Since trees are often in the landscape because the farmers are there too, smallholders are potentially some of the greatest allies in efforts to conserve forests and tackle tree loss in forest-farm landscapes. In Kwahu East, there is a strong base of local interest in trees which could be supported and built upon. There is general enthusiasm from farmers to grow more trees and therefore an opportunity to connect with government departments to create the enabling conditions for this. The *okoro* (*Albizia zygia*), identified by the RSPB as one of the wood warbler's preferred places for feeding, is a tree which is often left to grow on farms and then removed for firewood or charcoal. Local communities are interested in growing more *okoro* trees in communal woodlots if land was made available. Many farmers are already organised in Farmer-Based Organisations (FBOs) and these structures could be used to distribute technical support, inputs, saplings and tree registration costs. They could also form the basis for locally-organised patrols to protect trees from fire and logging. Since tree tenure arrangements and timber logging are two of the biggest barriers to farmers keeping trees, GWS and the RSPB could work with national rights-based NGOs on civil society monitoring of logging practices, the accountability of SRAs and seeking legislation reform.

There are opportunities for conservation organisations to engage with some of the other factors affecting tree cover in Kwahu East. For example, the business model for tourism

development relies upon the forest being healthy to attract tourists, but the development of tourism sites, construction and privatisation presents a significant threat as it damages or clears large areas of forest-farm. This context adds to the challenges farmers experience in their livelihoods and reduces their ability to adapt. Alternative models exist, and several initiatives in Ghana have shown how tourism can support participatory forest governance through community-based forest management structures. One example is the CREMA model, which has worked well in Mole National Park (Northern Ghana), Lake Bosomtwe near Kumasi, and areas of the Western region (Baruah *et al.*, 2016). GWS has been involved in some of these projects and could bring this experience to Kwahu East as well.

9.5 Limitations and future research

Despite the fascinating findings of this research, it has been constrained in several ways. As discussed in Chapter Four, theoretical, methodological and practical limitations are opportunities for reflection. This process can inspire future research.

This thesis is the result of an interdisciplinary research project, co-supervised by a human geographer from the University of Cambridge (Bill Adams) and an ecologist from the Royal Society for the Protection of Birds (Juliet Vickery). The inspiration for the study was the work of RSPB scientists and their Ghanaian colleagues on the ecology of migrant birds in the trees and forests of Kwahu East. From the outset, I tried to design a research project that drew inspiration from academic political ecology, but that would also be understandable to professional researchers trained in conservation science. This proved challenging, as many such attempts at radical trans-disciplinarity have found (Adams, 2016). The result is a study which is inevitably limited in its depth in both fields. Thus, whilst I have explored narratives of environmental degradation throughout the chapters, I did not go into depth about how these influence agencies, which a more deliberate analysis of power would have provided. Instead, I focused on designing a project that provided a multidimensional understanding of tree cover change that could also be interpreted by people trained in natural science. I have therefore been sparing in my use of political ecology theory to interrogate my data. At the same time, I did not collect in-depth botanical information about trees and forest ecology

under different management regimes, which an approach more firmly rooted in ethnobotany, ecology or forestry science might have provided. This in part reflected my need to build on my training as a social scientist, and the requirements of the funding source, the University of Cambridge Doctoral Training Centre of the Economic and Social Research Council (ESRC). It also reflects the adoption of methods that played to my strengths as a qualitative researcher. As described in Chapter Four, the methodology I used was appropriate for the research questions I identified and responsive to both my personal circumstances and collaborative participation from research informants.

Spending time in the field with Kwame Boafo, a project officer for Ghana Wildlife Society (GWS), was invaluable. He has extensive knowledge about native trees, how they are used by local people and the impacts of the farming system on tree cover. Unfortunately, the time we had together was limited as he was primarily supporting the quantitative data collection of a Plant Sciences Ph.D. student. In terms of interdisciplinarity, there was in some ways an unhelpful logistic separation between my 'social' science research and that 'natural' science project. My work might have been enhanced if it had been possible to collaborate more extensively with Kwame, utilising his local ecological knowledge, bringing our two skillsets together in a more fully multi-disciplinary case study.

As discussed at length in Chapter Four, my positionality had a significant impact on how my research unfolded. True to form, it has also been a limiting factor in this final written thesis. My data uncovered information about the direction of development in Kwahu East and showed how this is impacting on tree cover in negative ways. These infrastructural projects are mostly being financed through Ghanaian businessmen. Whilst political ecology has long critiqued capitalism and its environmental impact, my position as a white British researcher makes it inappropriate to heavily criticise development trajectories that are driven by Ghanaian individuals, especially when they have the broad support of local communities, as is the case in Kwahu East. Instead, I have sought to shine a light on how complex the context is for these development initiatives and the factors affecting how they impact on tree cover. Indeed, I trust that these findings will be of interest to developers since tourism, like migratory birds, also relies on protecting trees and forest. I have raised questions about how power and wealth are distributed, whose priorities and interests are represented in decision-making spaces, and how these intersect to make poorer people more vulnerable. However, without

doubt there is more critical work to do on development trajectories in Kwahu East. Hopefully this will be done by Ghanaian scholars.

Even with these limitations, my research shows how conservation can utilise a political ecology framework for understanding environmental change within their own research practices. This would enable conservation scientists to approach ecological problems (for example, the decline of migratory birds) with an awareness of farmer agency and knowledge, and a curiosity about broader socio-economic constraints. Rather than looking for immediate solutions to a problem that has been perceived through one type of data collection, there is a need to ensure the problem has been identified and understood from different perspectives. Tools from participatory political ecology, as demonstrated in this thesis, enable this kind of enquiry.

This thesis by no means exhausts either the need or potential for further research in Kwahu East. One of my original ambitions with this research was to record the local ecological knowledge about native trees, by co-creating a manual and/or online resource by and for local people. I was unable to do this, however, the engagement from farmers in community meetings and findings from the survey show that there is strong interest in such a project. This aim could form the basis of a new piece of participatory research into farmer pedagogy and knowledge exchange. Such an initiative could be delivered through a collaboration between a Ghanaian university, Ghanaian NGOs who have an interest in local knowledge and forest protection, and the Forestry Commission.

Extensive research in recent years has shown that the best way to protect forests and trees is to enhance the rights of local people over them (FPP, 2019; RRI, 2020). Forests flourish where participatory forest governance structures exist which protect human rights, ensure there are equitable benefits and involve a diversity of local people in every stage of decision making (Bissell, 2020). The RSPB should incorporate this baseline assumption into their ongoing research on forests and habitats around the world. International conservation organisations have not always been leaders in supporting campaigns to enhance community land and tree rights – neither on the ground in countries where they operate conservation programmes or through their influence within governmental policy making spaces. Going forward, the converging ecological and social crises should embolden conservation

organisations like the RSPB to put their institutional weight behind locally led movements for participatory forest governance.

Over the course of my fieldwork, I learnt about numerous different local issues which have unexpected consequences for tree cover which would warrant further research. One of the most important is the ongoing conflict between herders and farmers in Kwahu East and across other areas of Ghana. Smallholders repeatedly complained that perceived intimidation from herders was leading to loss of farmland and that herder use of fire was causing vegetation change. These perceptions need interrogating, not least because people in Kwahu of mixed ethnicity, socio-economic background and education use derogatory language when talking about the herders, showing deep rooted prejudice and misunderstanding. Whilst there have been some studies to understand the conflict, there is a significant gap between academia and practice, since localised conflicts flare annually. In Kwahu East, these tensions are exacerbated by the response of the state armed militia, who are regularly brought into the area to disperse herders and cattle, displacing the problem temporarily to neighbouring districts. A study which brought members of different communities, including herders, together to discuss the conflict through a reconciliatory process would be an interesting and pertinent project. This is an example of how a broader landscape view that considers social factors can inform a research initiative that contributes towards increasing social trust and reducing livelihood uncertainty – two constraints which have far-reaching impacts on trajectories of tree cover change (§9.3).

9.6 Summary

This PhD research project has been a collaborative enquiry from conception to submission. It started with a conversation between the RSPB and geography academics at the University of Cambridge discussing the RSPB hypothesis that changes to tree cover in forest-farm areas in African wintering grounds could be negatively impacting on the populations of migratory bird species, like the wood warbler. Prior to the work of this thesis, the prevailing (if unofficial) view amongst conservationists and local decision-makers was that tree cover loss is closely connected to tree felling by local farmers. In contrast, this work has shown that the situation

in Kwahu East emerges from a more complex dynamic involving multiple actors, one in which farmers' attitudes and practices are more nuanced, and indeed often supportive of certain kinds of tree growth. These are limited by the broader social, economic and political context which is having a more significant impact on the trajectory of tree cover change.

The global context of increasing urgency to reverse ecological damage, which sees tree planting and retention as a silver bullet solution, coupled with the continued misunderstandings of local socio-economic contexts within conservation practice, provide the backdrop to this research project. Both the RSPB (with their focus on bird habitat) and those working to mitigate climate change (through forest restoration and tree planting) recognise that they do not fully understand the complexity of factors that affect the number, age and type of trees that make up tree cover in Ghanaian forest-farm landscapes.

This thesis shows how complex the different factors affecting tree cover are in one field site in south-east Ghana. Along the way, it has made different narratives of tree cover change visible. The aim was to inform practitioners working in conservation, forestry and agriculture, so that there is a better chance of these complexities being taken into account in the creation of interventions and policy instruments that strive for forest habitat protection and restoration. Whilst ornithologists are my main audience, they are one of many stakeholders who are concerned about tree cover in Ghana and elsewhere in West Africa. The findings and methodological approach of this research, therefore, are relevant to a wider audience of conservationists, development practitioners, campaigners and policy makers. The thesis argues that it is only by studying the complex dynamics within any given social-ecosystem that the conditions which lead to interconnected social inequality and ecological dislocation can be more fully understood and therefore confronted in a locally relevant way. Without this knowledge, both conservation and development interventions – whilst potentially reducing livelihood vulnerabilities and tree loss in some areas for a short time – will ultimately reproduce the same social and material inequalities, power structures and worldviews that lead to tree and biodiversity loss overall.

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Appendix 1 – Climatic Data Tables

These tables summarise the climate data collected at the Abetifi Meteorological Station between 2000 and 2017. The first table gives the monthly rainfall (mm) between 2000 and 2017. The second table gives the monthly maximum and minimum temperatures recorded between 2000 and 2017.

Monthly rainfall (mm) recorded at Abetifi Meteorological Station 2000-2017												
Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2000	47.5	0.0	112.5	122.9	119.8	353.5	163.9	61.8	191.4	210.9	10.9	0.8
2001	0.0	0.0	218.9	131.9	105.6	170.7	24.1	11.1	159.0	54.9	72.8	18.7
2002	13.2	18.2	156.9	123.8	203.6	263.5	136.5	101.4	140.6	199.2	29.5	25.0
2003	10.7	30.3	44.2	188.4	138.4	145.1	48.9	42.8	136.3	104.1	92.7	23.8
2004	80.5	76.8	111.6	107.8	115.1	103.4	100.8	138.3	271.7	162.6	49.4	57.7
2005	1.5	63.8	177.6	68.4	141.1	153.8	34.6	54.2	123.6	107.7	49.1	2.1
2006	102.4	23.2	182.4	95.0	236.1	119.7	108.5	14.5	229.4	134.9	53.4	6.3
2007	10.2	32.4	79.6	200.6	84.5	198.4	141.8	84.6	413.7	109.1	36.0	35.8
2008	0.0	10.8	165.6	182.3	189.0	256.5	76.8	127.1	164.9	210.8	3.3	51.8
2009	19.3	40.6	142.2	82.4	90.8	382.4	168.8	23.9	76.2	122.0	58.4	2.3
2010	41.4	59.0	144.1	115.7	140.4	105.8	108.5	89.0	295.1	359.0	101.7	67.6
2011	0.0	106.1	79.5	109.2	98.5	198.0	203.8	17.9	198.0	286.8	2.6	0.0
2012	1.1	14.2	63.9	140.6	283.7	195.5	26.4	91.9	163.9	134.7	97.8	15.3
2013	1.1	53.8	216.0	121.5	221.6	82.9	91.5	5.7	221.7	104.5	58.1	22.8
2014	20.6	20.1	58.2	125.4	121.4	398.4	83.5	106.7	223.0	190.1	110.3	41.3
2015	36.8	66.0	255.4	107.2	238.7	219.7	83.8	6.1	52.2	177.4	35.8	0.0
2016	0.5	3.5	269.1	184.2	154.4	140.0	78.7	22.1	278.4	204.6	54.2	16.6
2017	10.0	83.4	114.7	181.9	165.9	307.2	51.1	16.9	109.1	218.3	29.5	6.6

Year	Monthly minimum and maximum temperature (°C) recorded at Abetifi Meteorological Station 2000-2017																																			
	January		February		March		April		May		June		July		August		September		October		November		December													
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max												
2000	21.3	29.4	21.2	31.3	21.8	32.1	21.8	30.7	21.5	29.5	20.5	27.2	19.4	26.3	19.5	25.9	20.0	26.8	20.1	27.7	20.9	29.0	21.0	29.2												
2001	20.9	30.5	21.3	32.2	21.4	31.0	21.1	29.9	21.4	29.2	20.5	27.5	19.6	26.4	19.4	25.8	19.7	26.3	20.6	28.0	21.1	29.0	21.6	29.6												
2002	21.2	29.8	21.9	32.3	22.0	30.6	22.2	29.8	21.6	29.4	20.7	27.5	20.6	26.8	19.8	25.5	20.0	26.5	20.4	27.6	21.0	28.9	21.2	28.8												
2003	21.7	30.1	22.1	31.6	22.3	32.1	21.5	30.0	21.7	29.8	20.5	27.1	20.0	26.9	20.0	26.6	20.4	27.3	20.8	28.4	21.5	28.9	21.5	28.8												
2004	21.8	29.9	22.0	30.8	22.1	30.9	21.9	29.8	21.4	28.6	20.4	27.1	20.1	25.9	20.0	25.7	20.3	26.9	20.9	28.0	21.4	28.7	21.8	28.7												
2005	20.9	29.2	22.4	31.7	21.9	30.5	22.7	30.7	21.7	28.9	21.0	27.3	20.1	26.0	19.6	25.6	20.6	27.2	20.9	28.1	21.5	29.3	21.7	29.3												
2006	21.9	29.5	22.2	30.5	21.4	30.4	22.3	30.5	21.3	28.6	21.0	28.0	20.5	26.5	20.1	26.2	20.3	26.9	21.1	27.9	21.4	29.5	21.6	30.0												
2007	21.0	30.4	21.9	31.4	22.1	31.6	22.1	30.0	21.7	29.1	20.8	27.7	20.1	26.7	20.1	26.3	20.3	27.0	20.6	27.7	21.4	28.8	21.6	29.2												
2008	20.4	29.8	22.0	32.3	22.0	30.7	21.7	30.0	21.5	28.9	21.0	27.5	20.4	26.6	20.2	26.6	20.6	27.1	20.9	28.0	21.7	29.5	21.7	29.4												
2009	21.3	30.4	21.8	30.5	22.0	30.7	21.7	29.8	21.6	29.7	21.0	28.2	20.2	26.3	20.3	25.7	20.8	26.8	21.0	27.8	21.3	28.9	21.9	30.4												
2010	22.0	30.8	22.6	31.9	22.6	30.8	22.6	30.9	22.3	29.5	21.5	28.0	20.2	26.8	20.4	26.5	20.5	26.8	21.1	28.0	21.3	28.7	21.6	29.3												
2011	21.5	30.0	21.7	30.6	21.9	30.3	22.0	30.7	21.8	29.4	21.1	28.0	20.3	26.2	20.2	26.1	20.8	27.4	20.8	27.8	21.4	29.7	21.4	30.1												
2012	21.4	30.8	21.7	31.2	22.2	31.4	21.9	29.9	21.6	28.9	20.7	27.2	20.0	26.3	19.5	26.1			20.8	28.1			21.8	29.6												
2013	22.0	31.3	22.3	32.5	22.2	30.8	22.4	30.5	21.4	29.2	20.8	27.6	20.1	26.0	19.4	25.8	20.3	27.2	20.8	28.0			21.6	29.2												
2014	21.8	30.4	22.0	30.9	21.9	31.3	21.8	30.7	21.9	29.5	21.2	27.8	20.2	26.2	20.1		20.4		20.7		21.3		21.6													
2015	20.8		22.2		22.0		22.3		21.7		20.9		20.5		20.3		20.7		21.2		21.7		21.4													
2016	21.6		23.0		22.6		22.6		22.2		21.0		20.7		20.4		20.7		21.3		22.2		22.2													
2017	21.9	31.2	22.3	31.6	22.4	31.8	22.3	30.9	22.0	30.2	21.3	27.8	20.6	27.1	20.3	26.8	20.6	27.3	21.3	28.8	21.8	29.6	21.9	30.4												

Appendix 2 – Farmer Household Survey

I have included here the draft of my farmer household survey to give an example of the questions covered. The final version differed a little as I edited it on Qualtrics after my pilot.

Household Farming Survey

1. Age
 - 16-25
 - 26-35
 - 36-45
 - 46-55
 - 56-65
 - 65+

2. Gender
 - Male
 - Female

3. Town where you live
 - Abetifi
 - Bukuruwa
 - Kwahu Tafo
 - Nkwatia
 - Pepease
 - Other: (please state)

4. Town you were born:

5. Do you or your household members stay anywhere else during particular seasons? If so where and when?

Yes location _____ months _____ No

6. What is your role/position in the household? _____

7. Who is the Head of the Household?

8. Tell us about who is in your household:

Household members	Number	
	Male	Female
Number of children aged 0-4		
Number of children aged 5-15		
Number of adults aged 16-59		

Number of adults aged 60+		
Total numbers of the household		

9. Please describe how your household makes a livelihood – what is your primary work? What is your secondary work?

Primary work

Secondary work #1

Secondary work #2

10. How do you travel to your farmland?

Walk

Drive in personal car

Drive in taxi

Drive in a relative's or friend's car

Motorbike

Bicycle

11. How far away is your farmland? (journey time, describe where the land is)

12. How many years have you been farming in Kwahu East?

13. Has your farmland ever moved?

b) If so, why did it move?

14. What do you grow on your main farm (tick all that apply)

Cassava

Plantain

Cocoyam

Small vegetables (tomatoes, cabbage, peppers)

Cocoa

Palm

Bananas

Mango

Papaya

Pineapple

Avocado

Orange

Maize

Groundnut

Cashew nut

Other (please name)

15. Do you have any land near your home for growing crops? If yes what do you grow near your house? (tick all that apply)

Yes: (crop list appears)

No: (no crop list appears)

- Cassava
- Plantain
- Cocoyam
- Small vegetables (tomatoes, cabbage, peppers)
- Cocoa
- Palm
- Bananas
- Mango
- Papaya
- Pineapple
- Avocado
- Orange
- Maize
- Groundnut
- Cashew nut
- Other (please name)

16. Tell us about who carries out what labour tasks: who does what?	
<p>Who (tick one at a time to name their tasks; tick all that apply to this household):</p> <ul style="list-style-type: none"> - Head of Household (male) - Head of Household (female) - Men of the household (age 16-59) - Women of the household (age 16-59) - Men of the household (60+) - Women of the household (60+) - Male children of the household (5-15) - Female children of the household (5-15) - Hired male labour - Hired female labour - Other (please describe) 	<p>Tasks (tick as many as apply to each household member:)</p> <ul style="list-style-type: none"> - Cutting branches down for firewood - Felling trees for firewood - Carrying firewood to the house - Felling trees for charcoal production - Burning and packing the charcoal - Transporting charcoal to town - Felling trees to clear farms/fallows - Clearing farm/fallow shrub growth - Burning the farm - Planting crops on the farm - Tending to growing crops – weeding - Tending to growing crops – watering - Hunting rodents, other mammals or pests (e.g. setting traps) - Spraying crops with insecticide - Spreading artificial chemical fertilizer - Collecting water for farm tasks - Harvesting ground crops - Harvesting fruit - Cutting down palm trees - Harvesting palm wine - Harvesting palm oil - Distilling palm gin - Carrying crop (plantain, cassava etc) produce to the town - Carrying palm produce (oil, wine and gin) to the town - Other (please describe)

17. How many people in the household carry out farming labour tasks?

18. Where do you grow/keep trees and why?	
<p>'Where' tickboxes (tick all that apply):</p> <ul style="list-style-type: none"> - Within your house boundary/close to home - On fallow farmland - At farm boundaries - Intercropping trees with crops (name crops) - Within some crop fields (name the crop) - Around a farming shelter - As a main farming produce (e.g. teak, palm, cocoa) - As a woodlot (growing trees for a period of time, then cutting all at once) 	<p>'Why' tickboxes appear for each 'where' answer (tick all that apply):</p> <ul style="list-style-type: none"> To provide shade for people To provide shade for crops To grow fruit For other tree products (please name) To protect the tree from grazing animals To protect the tree from fires To use in medicine To use branches etc for firewood As a future investment (e.g. the tree remains standing until you need money/ resources from it, i.e. charcoal/timber, or the land it grows on) To nourish the soil To avoid soil erosion To provide wind breaks To demarcate your farm To provide shelter for people processing farm-forest products e.g. above the palm wine shelter For tree cash-crops (please name)

19. Which trees do you like to have on your farmland and why

Dropbox of local tree names (researcher can also carry picture cards to help farmers identify them)

Why (for each species of tree, same categories as above)

To provide shade for people

To provide shade for crops

To grow fruit

For other tree products (please name)

To protect the tree from grazing animals

To protect the tree from fires

To use in medicine

To use branches etc for firewood

As a future investment (e.g. the tree remains standing until you need money/ resources from it, i.e. charcoal/timber, or the land it grows on)

To nourish the soil

To avoid soil erosion

To provide wind breaks

To demarcate your farm

To provide shelter for people processing farm-forest products e.g. above the palm wine shelter

For tree cash-crops (please name)

20. What the top three reasons you have for cutting down a tree on your farmland (please rank your answers, with 1 being the most common reason and 3 being the least common reason)

- For firewood
- To make charcoal
- To stop it taking nutrients/water away from crops
- To reduce shade
- To create space for more crops
- To sell as timber
- Other (please state)

21. How long will you leave a section of farm to grow fallow for?

- 1 year
- 2 years
- 3 years
- 4 years
- 5+ years
- It depends: please describe _____

22. Have you ever planted a tree?

- Yes (please name what type, whether on the main farm or at the house, and why)
- No (why not?)

23. Have you ever had someone come and cut a tree down on your farmland for the Forestry Commission? If so, how did you feel about this?

24. Please tell me how far you agree with the following statements

	Strongly agree	Partly Agree	Partly Disagree	Strongly disagree	No opinion
Trees should belong to the farmer who farms the land					
The Forestry Commission respect farmers land when they remove trees					
I have faith in how the chief organises land					
There are too many trees in Kwahu					
The trees make Kwahu look more attractive					
The forest reserves should be kept free from farming activities					

It should be the farmer's decision whether to cut a tree down (not the Forestry Commission or Chief's)					
Farmers would take more care of trees if they had ownership rights over them					
The presence of Fulani herds makes me nervous/scared about going to my farm					
The rainy season is shorter than it was ten years ago					

25. Please tick yes or no to the following statements

	Yes	No
Herders or cattle have caused damage to my farmland within the last two years		
Hunters have damaged my farmland by setting fires in the last two years		
The Forestry Commission has caused damage to my farmland in the last two years		
I have had produce stolen from my farmland in the last two years		
My crops have failed due to changes in the rain in the last two years		

26. Is there anything else you would like to tell us about your farm or the trees within it?

27. Would you be willing to take part in a longer interview?

Yes: name and phone number, discuss availability

No

Appendix 3 – Written record of Bokuruwa mens' farmer meetings

Since the Farmer Community Meetings with men involved lengthy discussion about the possibility of establishing a new FBO in Bokuruwa, I offered to write up notes that captured the information which was shared by MOFA and the discussions which we had as a group. The men at the meeting agreed this would be helpful. Below are the notes I made, which I printed two copies of and gave to two literate participants to take forward.

Record of Bokuruwa Men's Farmer Meetings

These notes summarise key points from group discussions that took place over three separate meetings in October and November 2018 between Bokuruwa men farmers. At the third meeting staff from MOFA attended to give information about how to set up an FBO and this information is included below.

To set up a Farmer Association (Farmer-based Organisation, FBO) you need to:

- I. **Write a basic constitution**
- II. **Elect Executive Leaders**
- III. **Discuss how you will work together**

This document addresses these three areas one by one.

I. **Write a basic constitution**

The constitution should include the following:

- Name of the FBO
- Overall Purpose of the FBO
- Specific Aims and Goals
- List of members
- Dues (how much should be paid and how often)
- Other contributions people will give to the FBO (for example, if someone cannot pay the dues perhaps they could give something else)
- Benefits members will get from being involved
- Record of elected executive leaders
 - a. Chairman
 - b. Secretary
 - c. Treasurer
 - d. Organiser
 - e. Financial Secretary
- Term of Office (how long will the executive leaders be in post)

Once you have a basic constitution you can add more to it as the FBO develops and grows.

II. Elect Executive Leaders

MOFA's main advice was that the success of an FBO depends on how effective the leadership is. The FBO is vital as a link between MOFA and the community, it is important that the people you elect are able to communicate effectively. Effective leaders carry out their own tasks, keep a check on each other, and keeps excellent records. It is not up MOFA to tell you who the leaders should be: you know each other and yourselves, so you must decide who you think is best for each role. However, you must choose leaders who will help you, who will listen to MOFA and relay the information to you. You should not choose people who are selfish or who make decisions to favour themselves. There are three roles every FBO needs:

a) Chairman

The chairman must be:

- ✓ Of good character
- ✓ Trustworthy
- ✓ Good communicator
- ✓ Good at speaking to large groups
- ✓ Ready to serve the people
- ✓ Honest
- ✓ Has integrity
- ✓ Treats everyone equally
- ✓ Brave
- ✓ Has connections
- ✓ Shows concern for others
- ✓ Is a unifier
- ✓ Has a positive mindset
- ✓ Takes responsibility
- ✓ Good at calming people down and resolving conflict
- ✓ Checks that other people are doing their work

b) Secretary

The secretary must be:

- ✓ Organised
- ✓ Have strong reading and writing skills
- ✓ Keep excellent written records
- ✓ Keep record of who is getting benefits from the FBO
- ✓ Trustworthy
- ✓ Treats everyone equally
- ✓ Good at writing letters

c) Treasurer

The treasurer must be:

- ✓ Organised
- ✓ Have strong maths skills
- ✓ Keep excellent financial records
- ✓ Keep record of who has paid dues, when and how much
- ✓ Trustworthy

- ✓ Follow the decisions made by the FBO
- ✓ Be trusted to take the money to bank
- ✓ Keep money aside for projects that are being planned by the FBO

The FBO bank account should have at least two signatories, maximum three. If the FBO grows larger (over 25 members) you might want to consider also having the following roles too:

d) Organiser

The organiser must be:

- ✓ Good at motivating people
- ✓ Good at communication
- ✓ Good at interacting with members
- ✓ Treats everyone equally
- ✓ Is always ready to serve members

e) Financial Secretary:

The financial secretary and the treasurer work together to keep extremely accurate records of money coming in and out of the account. If you have a financial secretary, the treasurer role is split into two. Both people should have exactly the same records at all times.

III. Discuss how you will work together

At the first two meetings the group shared ideas about how the FBO should work. These are organised under the following sections: purpose; work ethic; other considerations.

a) Purpose:

The group came up with the following ideas about what the purpose of the FBO is:

- To unify the farmers in Bokuruwa so that they can work together to achieve success in growing and selling more produce
- Enables the farmers of Bokuruwa to have better access to advice and practical support from MOFA
- Gives the farmers of Bokuruwa a way of speaking to the chief and elders of the town about issues that are making their lives difficult and to secure land to create a communal farm
- To grow crops together on communal land (for example, on Bisia Hill) and sell the produce at a fixed market price in bulk
- To enable access to bulk market traders through pooling produce and selling it all together
- To overcome the problem that Bokuruwa currently has no market – by creating a market for themselves by working together and attracting traders to the town
- To enable the farmers of Bokuruwa to help themselves rather than waiting for someone else to come and help them, and to have a common voice
- To gain access to reduced price agric inputs from MOFA
- To gain a trustworthy financial reputation to increase the opportunities for getting bank loans and other financial support
- To connect farmers of Bokuruwa with each other, to work together and be one.

b) Work Ethic:

During the two meetings the following attitudes were mentioned as guidance for making the farmers association a success in regards to work ethic:

- Do not make excuses for missing communal labour or meetings
- Take responsibility for yourself
- Know your limits and do the work you say you will do
- Cooperate with each other
- Work together as a team, work together as one
- Show commitment
- Have a passion for the communal farm – treat it like your own farm
- Listen to each other
- Work together to find solutions to problems
- Always work towards improving yourselves

The members of the FBO too should also have the following character:

- Not quickly anger
- Good at communicating
- Tolerate each other and resolve disputes quickly
- No partiality in the group – sense of unity and fairness
- Have the mindset that you are working to improve yourselves, not waiting for the government or an NGO to come and give you money
- Make decisions that will benefit the FBO not any individual members

c) Other Considerations

The group also discussed how division of labour might work – whether to organise this by dividing the communal land into sections or whether to give different members different jobs depending on their strength and skills (for example, an older person might struggle to weed, so they could weed a small amount and then be more responsible for harvesting crops or preparing crops to sell).

Someone mentioned the problem of animals disturbing farms, so this issue needs to be thought about – you either need to protect your farm from animals (e.g. with a fence) or you need to work with the townsfolk to encourage people to be more responsible for their animals so they don't eat people's crops.

The FBO needs to decide how many dues should be paid by each member and how often. The FBO needs to consider membership and affiliation – for example, someone might not be able to commit to full membership but might still like to sell the FBO their own produce (this could be called an affiliation). The FBO needs to decide on rules and penalties for when rules are not kept – these might be fines, extra labour, or exclusion from the FBO.

Once the FBO is set up, MOFA will come and visit again to carry out training on conflict resolution and communication to ensure you are able to work together effectively.

Appendix 4 – Research Progress Report

I distributed this progress report (two pages of A4) to key informants, collaborators and gatekeepers when I returned to Kwahu in September 2018. The purpose was to let them know what I had found out so far and encourage them to continue engaging.



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rspb



GHANA WILDLIFE SOCIETY

Research Progress Report

September 2018



Overview

For the past six years the Ghana Wildlife Society and the RSPB, a UK-based international conservation NGO, have been monitoring bird numbers and tree cover in the forest-farm area near Pepease, Kwahu East. These organisations have become concerned that the number of trees in Kwahu are decreasing and want to understand better what is causing this. Since January 2018, Clare Bissell (PhD Candidate, University of Cambridge) has been carrying out geographical research in the towns surrounding the RSPB study site (see map insert overleaf). She is looking at the multi-dimensional drivers of tree cover change, exploring how different actors see the same landscape and the various practices that result in tree loss.



Clare Bissell (right) with a local farmer

This is a collaborative research project supported by the University of Cambridge, Ghana Wildlife Society, the RSPB and local stakeholders. The aims are twofold:

- I. To provide Ghana Wildlife Society and the RSPB with a holistic understanding of tree cover change, to inform their work with the ministries of the Government of Ghana to review national policy and legislation;
- II. To coordinate with stakeholders in Kwahu to pursue locally-relevant solutions that slow down further tree loss.

Research Activities

The research is taking place within the towns of Abetifi, Bukuruwa, Kwahu Tafo, Nkwatia and Pepease, and the surrounding forest-farmland. To date, the research team have carried out household farming surveys, interviews and farming observations across the aforementioned five towns. This has given Clare a good understanding of local people's perspectives on tree cover change. Over the coming months, the aim is to explore perspectives from the next level up, by interviewing local decision makers (traditional authorities, local government officers, NGO practitioners and Kwahu business people) and carrying out multi-stakeholder discussion groups.

Appendix 5 – Final Research Report

I distributed this final report (four pages of A4) in July 2019. The purpose was to collate the key findings and communicate them in an accessible way so that learning could be applied.



**UNIVERSITY OF
CAMBRIDGE**
Department of Geography





Research Report

July 2019

Overview

For the past six years the Ghana Wildlife Society and the RSPB, a UK-based international conservation NGO, have been monitoring bird numbers and tree cover in the forest-farm area near Bokuruwa, Kwahu East. These organisations have become concerned that the number of trees in Kwahu are decreasing and want to understand better what is causing this. Since January 2018, Clare Bissell (PhD Candidate, University of Cambridge) has been carrying out geographical research in the towns surrounding the RSPB study site (see map insert below). She is looking at the multi-dimensional drivers of tree cover change, exploring how different actors see the same landscape and the various practices that result in tree loss.



Clare Bissell with a local farmer



This is a collaborative research project supported by the University of Cambridge, Ghana Wildlife Society, the RSPB and local stakeholders in Kwahu East. The aims are twofold:

- I. To provide Ghana Wildlife Society and the RSPB with a holistic understanding of drivers of tree cover change, to inform their advocacy work and policy making with the ministries of the Government of Ghana
- II. To coordinate with stakeholders in Kwahu East to pursue locally-relevant solutions that slow down further tree loss.

Research Activities

The research took place within the towns of Abetifi, Bukuruwa, Kwahu Tafo, Nkwatia and Pepease, and the surrounding forest-farmland. Between January and December 2018, the research team carried out household farming surveys, interviews, farming observations, community meetings and multi-stakeholder action groups. These have involved participants from all five farming communities, as well local decision makers from the Ministry of Food and Agriculture, Forestry Commission, Kwahu East District Assembly, the MP, the Bryan Acheampong Foundation, The Rodhe Foundation and traditional authorities.

Findings

Across the data, participants agree that the number of trees in Kwahu is decreasing. The multi-dimensional drivers of this tree cover change can be grouped into the following broad themes, all of which interconnect in terms of both influence and impact:

Land and tree tenure arrangements

Official records for land tenure are not always accurate. Many farmers occupy farmland through a **verbal agreement** with the land owner (family head, chief or otherwise). **Trees belong to the government** unless they are registered with the Forestry Commission. These factors **put farmers off** keeping trees on their farms due to **lack of security and long term assurance of benefits**. Farming techniques are also affected by **insecurity**.

Legal and illegal logging

Many participants complained that **too many concessions** are granted and that they are **not monitored effectively**. This is sometimes due to the lack of capacity at the Forestry Commission, or **collusion between timber operators and those who have permitted access**. **Organised illegal chainsaw operators** come to harvest timber on farm, fallow or reserve land at times when people won't be there to interrupt or report them. In some parts of Kwahu East this is linked to **charcoal-making** as well.

Regulation and enforcement of tree-cutting practices

Adequate legislation is in place, however, it is **not always implemented and it is undermined by corruption**. The current system relies on local people reporting illegal tree-cutting activities, which can **put them at risk** from the tree-cutters or other **colluding actors**. The **accountability processes for timber contractors** is not robust enough. The Forestry Commission does not have the capacity to oversee every timber harvest.

Commodity demand

The **economic value and demand of timber and cash crops** drive tree cover change. These demands are **local, national and international**. There is also a problem with **supply efficiency**— especially for crop production: many crops waste on fields because farmers are unable to get them to the market.

Development, town planning and land use pressures

Land is in high demand for often incompatible uses: development, larger-scale farms, tourism, small-scale farming and herding livestock. Aerial images show the **rapid expansion of towns** over the past five years. Decisions about development lie with the traditional authorities and district assembly. Despite levels of development in recent years, **the gap between rich and poor remains**. Town planning does not consider **the cumulative impact over time of development** on the local tree cover, environment and ecosystem services. There are **annual conflicts between herders and farmers**. The fear of herders impacts where farmers want to farm (i.e. forest areas). The government's response does not provide a **long-term solution**, nor recognise that this conflict will be exacerbated by **climate change**. These incompatible land use pressures are squeezing farmers into smaller plots of land, pushing farms into remaining forest areas, **shortening fallow periods** and making keeping trees on farms more difficult.

Governance, trust and participation in decision-making

Local people do not often get a say in decisions that impact on their livelihoods and on the forest – for example, how land is distributed, to who, and which trees are felled under timber concessions. Decisions are generally made by the appropriate government office and traditional authorities. Furthermore, there are **feelings of distrust** within local communities, and between local people and people in positions of power. Both Agriculture and Forestry are keen to **support agroforestry but neither has the capacity/mandate** to do so. Forestry efforts prioritise **managing reserve** areas. Agriculture policy focuses on **increasing yield with modern agro-techniques**. All of these things contribute to **each stakeholder group feeling different levels of powerlessness** about confronting tree loss.

Uncontrolled (wild)fires

Fires are set deliberately by farmers, hunters and herders as part of their **livelihoods**. Fires are also started by accident. These **fires can spread causing damage** to forests, trees on farms and crops. There is **annual education about fire safety**, however, people are often unable to follow the guidelines for creating sufficient firebreaks due to **land scarcity or labour capacity**. Fires result in **increased grassland**, making farming much harder. Fire will increase with **global warming**.

Farming and livelihood practices

Local people cut trees for charcoal-making, firewood, to create space for farming and for timber. Whilst these impact trees, this research reiterates that **livelihood-making receives disproportionate blame** for tree loss when accounting for who is involved in decision-making, and the economic and environmental drivers of change.

“Now that all our farmlands are being sold for houses and developments, where will we farm in the next 10-20 years?”

“When the last tree dies, the last man dies”

“The important trees germinate themselves and you weed around them letting them grow. You take good care of them and they grow to be big trees. Then it is time for it's uses, but a chainsaw operator comes in the night and cuts the trees down. They don't give you anything, they even destroy your farm. So farmers are not to be blamed.”



“Timber contractors came to my farm and felled my plantain and palm when they extracted the trees for timber. They didn't ask my permission. I only found out through a friend and got no compensation.”

“If you don't have land, you can't grow trees. If the government came and said here is some land to grow trees, I would be very happy. If the only land you have is one acre of family land, you can't use that to grow trees as you and your family will go hungry.”

Reasons for Hope

Stakeholders view the causes of and responsibility for the decrease in trees differently. This influences how far individuals and collectives feel able to do anything about it. There is, however, a strong desire amongst the majority of participants to protect the remaining trees and enable the forest to regenerate across Kwahu. People believe that having more trees will contribute many benefits to local livelihoods and to Kwahu as a whole, including in the following areas:

- **Water availability:** regularity of rainfall; retention of moisture in the land for crops; water sources protected and clean; rainwater easily captured for household use.
- **Land quality:** healthy, fertile soil conditions; decrease in grass and difficult weeds; increase in natural fertilisers from wildlife and compost.
- **Human health:** medicinal values of different trees; decrease in the amount of chemicals farmers need to use; cleaner air, nutrients from trees can be used in diets (nuts, seeds, fruit etc).
- **Elemental protection:** trees provide windbreaks to towns and farms; fire-resistant trees, greenery and moisture will prevent fire spreading.
- **Tree-based livelihoods:** tree crops; sustainable timber production with local benefits; herbal medicines; fruit, nuts and seeds.
- **Biodiversity:** increased wildlife and therefore more bushmeat, snails, mushrooms, and herbs.
- **Sustainable tourism:** trees make Kwahu beautiful and attract people to visit; if done in a sustainable way, tourism could provide revenue that can both protect the forest and create jobs.



Ideas for Action

Tree cover change is a complex problem which requires a holistic solution. Simply planting trees will not work because it does not address the root causes of tree loss. It has been shown in other places (in Ghana and elsewhere) that increasing community ownership of trees has the greatest impact on protecting and regenerating forests. Three starter recommendations, therefore, are:

- I. **Explore possibilities for 'Community Forestry'** – where areas of forest are governed by the local community through participatory means. Community-based forest associations are responsible for managing forest, and receive equitable direct benefits from timber, non-timber forest products, and potentially tourism. One model is CREMA, facilitated by the Forestry Commission through Solidaridad (an NGO). This could involve increasing agroforestry, 'reforestation' using tree crops, native tree-planting and community knowledge-sharing about various tree uses.
- II. **Multi-stakeholder coordination** – between ministries, NGOs, traditional authorities and citizens, sharing resources and working together for a common vision. This might include actively supporting agroforestry, ensuring all stakeholders are involved in development planning, and organising mixed task-patrol teams to protect trees from illegal loggers and fires.
- III. **Alternative models of tree tenure and accessible tree registration** – coordinate with NGOs who specialise in community rights e.g. Civic Response, to incentivise farmers to keep trees.

Thank you

The research team would like to extend a **huge thank you** to everyone who has taken part in this research. It would not have been possible without you. If you would like to discuss the findings **please contact Clare Bissell on** [REDACTED]