Chapter 1

Political Ecologies of Carbon in Africa

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Introduction

The last decade has seen a wave of forest carbon projects across the world, many in Africa. These have been a response to the pressing challenges of climate change mitigation. Conserving or enhancing forest carbon stocks is presented as a way both to reduce carbon emissions from deforestation and most importantly to offset emissions elsewhere. A range of new market-based mechanisms have been put in place to facilitate a variety of offset arrangements through payments and trade in carbon credits. This is occurring through a variety of institutional arrangements; some, such as the Clean Development Mechanism (CDM) and the Reduced Emissions from Deforestation and Degradation (UN-REDD and REDD-plus) process are formally linked with compliance mechanisms associated with international climate change negotiations and the Kyoto Protocol, while others are linked to voluntary carbon markets, regulated in different ways (see Arhin and Atela, this book; Fong-Cisneros, 2012). A mass of literature is now asking

how forest carbon projects are unfolding, how they might be most effectively geared to climate mitigation challenges and how forest users might benefit from them (e.g. Angelsen et al, 2009, 2012; Corbera and Schroeder, 2010, Blom et al, 2010; Sunderlin et al, 2014a, b; Luttrell et al, 2013; Pokorny et al, 2013; Schroeder and McDermott, 2014), as well as how such initiatives are presented in the media and policy discourse (Di Gregorio et al, 2013). At a larger scale, others have been examining the institutional architectures, funding mechanisms and regulatory and governance challenges of the new carbon economy, and its associated interventions (Karsenty, 2008; Angelsen 2008, 2013; Vatn and Angelsen, 2009; Boyd and Goodman, 2011; Goodman and Boyd, 2011; Boyd et al, 2011; Lederer, 2012a; Stripple and Bulkeley, 2013). Others have been tracking the effects of volatile carbon prices and the evolution of particular markets, highlighting in recent years the low prices and lack of market spread, as well as irregularities, scams and market politics (Stephan and Paterson, 2012; Peters-Stanley et al, 2013; Lane and Stephan, 2014).[1]

This book contributes to these debates through the exploration of empirical cases from Africa, but goes beyond them in two important ways. First, we situate our analyses within a broader understanding of political-economic processes, and particularly the commoditization of nature and environment. Second, we are interested in landscapes, and how forest carbon projects are interlocking with and reshaping these. Together, these political-ecological dynamics are generating a range of carbon conflicts that are at once both material and discursive. They have profound implications for whether and how

forest carbon interventions are designed in the future, and who will gain and lose from them.

Forest carbon policies and projects are part of a more general move to address environmental problems through attaching market values to nature and ecosystems. Under the rubric of the 'green economy' and conserving 'natural capital' (UNEP, 2011), a variety of payment and offset mechanisms are becoming a dominant mode for environmental policy and action (MA, 2005; Bateman et al, 2011), including payments for ecosystem services, and biodiversity and species offsets (Redford and Adams, 2009; Kosoy and Corbera, 2010; Brockington, 2011; Sullivan, 2013). Such commodification of environment and resources aligns with 'neoliberal' economic policies, in a particular phase of capitalism involving a combination of privatization, financialization and appropriation (McAfee, 1999, 2012; Harvey, 2006; Igoe and Brockington, 2007; Castree, 2008a, b; Fletcher, 2010, Büscher and Dressler, 2012; Büscher et al, 2012; Fairhead et al, 2012), and a recasting of the role of the state in environmental management. Forest carbon projects, often to date analysed in isolation, must be seen in this context.

However, they must also be situated as part of lived-in landscapes that intersect with such market-driven processes. In Africa, new carbon-focused interventions are taking place in forest landscapes with particular histories, embedded dynamic ecologies, social and property relations, livelihood practices, knowledge and understanding, and above all, politics (Fairhead and Leach, 1998; Ribot et al, 2006). The places now targeted for forest carbon projects also have long histories of external intervention in the name of environment and development, whether focused on colonial timber and mineral

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extraction, watershed protection, wildlife and biodiversity conservation, agroforestry, or modernizing forest-based livelihoods – each justified by particular views of forest use and change (Leach and Mearns, 1996; Fairhead and Leach, 1998). The material and discursive legacies of these past interventions have not gone away. Forest carbon projects do not arrive on a blank slate, but in places that have accreted layers of human-environment interactions, memories and imaginaries, institutions, rights and forms of authority.

By stepping back, and asking somewhat different questions to the burgeoning literature on forest carbon, this book is therefore interested in the political ecology-economy of forest carbon projects in historical context, as part of longer-term landscape change, intervention histories, and changing market and valuation processes. It asks: how is carbon commoditization and marketization interlocking with long-term pathways of landscape change and political economy, and so reshaping livelihoods and ecologies? Who are the winners and the losers? What new political and ecological dynamics are emerging as forests are re-valued for carbon? Or put more simply – amidst ongoing pathways of change – what difference does 'carbon' make?

The book explores and illustrates these questions through seven cases from across Africa that differ across a number of axes. They cover different project types: in relation to tree and land ownership arrangements, and whether the focus is on protecting or planting trees. They represent country cases at different points in integration with the UN-REDD process, and thus with different institutional and policy configurations. They cover a

range of national political-economic contexts, involving different state-market

relationships and patterns of centralization-decentralization, which both affect forms of

authority over forests. They also represent different histories of landscape and

intervention. In these different contexts, carbon conflicts occur everywhere – but they

take different forms.

The case studies are introduced in more depth below. The next section outlines the core

argument of the book, and why it matters.

Political ecologies of carbon in forest landscapes

Throughout this book we are interested in carbon as a substance with diverse meanings

and consequences, and a social and political life (cf. Appadurai, 1986). Carbon is part of

the carbon cycle, with particular physical and biological properties, and it is part of trees

situated in lived-in landscapes, with diverse cultural and economic attributes and values.

Yet carbon is also able to become a commodity, isolated from its ecological and social

matrix, and inserted into particular markets, acquiring a very different set of social and

political meanings. The book considers the historical and political context within which

this is happening, and how different people, from local forest users to project developers,

state agents and international policy actors, understand, become involved in and reflect

on this process, and stand to gain or lose from it.

The overt purpose and justification of carbon projects is to tackle global climate change. But they also have a far wider range of political-economic effects, associated with particular interests. The social and political life of carbon is deeply enwrapped with these. Thus, carbon is seen by cash-strapped states in Africa as a source of foreign exchange (Arhin and Atela, this book), allowing a new economic value of forest resources to be unlocked and deployed for economic growth under the sovereign control of the state. For donors and non-governmental organizations (NGOs), carbon enables a new round of 'missionary' development activity, as projects aim to rescue local ecosystems and livelihoods now claimed to be suffering from and contributing to the impacts of global change (Dzingirai and Mangwanya, this book). Carbon is also seen as a business opportunity for brokers, traders, consultants, private companies and others. As another element in Africa's commodity-led economic boom, carbon joins land for food and biofuels, minerals, and wildlife and ecotourism sites, as a potential source of investment. In the post-financial crisis world, with footloose capital looking for favourable returns, investments in Africa, including in carbon markets, are on the rise. This may involve a combination of foreign companies, speculative finance and domestic or regional elite capital.

As with any commodity boom, a so-called 'resource curse' threatens (Auty, 1993; Sachs and Warner, 1995; Humphreys et al, 2007), with opportunities for elite appropriation, rent-seeking and corruption and lack of accountability to citizens. Others have written of the 'aid curse' in similar terms (Djankov et al, 2008; Moyo, 2009). In the case of carbon, the two curses are potentially linked. Aid investments are geared towards, and indeed are

critical for, new enterprises that would otherwise be infeasible given the current state of carbon prices and the high costs of project start-up and capacity-building. Indeed in some circles, REDD initiatives are now talked of not as market-based approaches, but performance-based aid interventions (Angelsen, 2013). The combination of aid and private sector activity feeds expectations of new forms of commodity and markets, and aligns neatly with a new aid and development rhetoric in which global public goods are delivered through 'public-private partnerships'. Thus, markets are being co-constructed with particular relationships among states, private sector players and aid agencies and other international players in the contemporary political-economic context. Such interactions create 'friction' (cf. Tsing, 2005), emerging from contested, globalised interactions across differences of power and culture. They also bring together diverse actors in new forms of sometimes awkward engagement that result in resistance, conflict or negotiation, with diverse, contingent outcomes (see Nel, this book).

Policies and projects promoting forest carbon offsetting all assume and depend on the idea of carbon as a commodity: isolated, tamed, priced and exchangeable. The construction and marketization of carbon as a commodity also rests on and requires particular understandings of landscape and landscape history. In particular, assumptions of ongoing, one-way patterns of deforestation and degradation from the past into the future are critical to justifying project intervention, providing the so-called 'baseline scenario' of carbon emissions that would supposedly occur without it. Project documents generally portray forests as once plentiful but now under threat and likely to disappear unless outside agencies intervene. Moreover, they almost universally blame local people

and their practices, justifying interventions to modify, exclude, disenfranchise or even criminalize them. Carbon as a commodity is now assumed to offer the route to realizing value, and so protecting and enhancing forests, while generating trade profits for carbon's new project 'owners'. There is therefore an interlocking of particular ideas and discourses of forest cover change, and associated blame for it, with political-economic interests in carbon marketization and profits.

These processes of marketization are embedded in particular practices, many of which are peculiar to the burgeoning carbon industry. A highly technical language has developed of baselines, of stock measurement, of additionality, of reference areas, of leakage and so on (Angelsen, 2008; Calmel et al, 2010; Mercer et al, 2011; Lovell and MacKenzie, 2011; Ascui and Lovell, 2011; Olander and Ebeling, 2011). Different mechanisms – REDD+, the CDM, Voluntary Carbon Standard (VCS) and others – have developed their own detailed methodologies, based on a set of broader principles. These provide an accounting framework for translating carbon in forests into measurable credits that can be marketed, and for monitoring and verifying that the potential for climate change mitigation is actually taking place. The detail and complexity of these requirements, along with others designed to track and safeguard projects' social and environmental impacts, are such that a whole consulting and guidebook industry has developed to help project developers to navigate the process. We argue that this almost inevitably encourages project designs that make accounting for carbon easier. This pushes projects in particular directions, deeply affecting how they engage with landscapes (Leach and Scoones, 2013).

Thus, discourses and practices associated with forest carbon construct and, through justifying particular sorts of project, transform landscapes in particular directions. They create pathways, particular trajectories of intervention and change (Leach et al, 2010). They restructure ecologies, livelihoods and relationships between people, land and resources, and so property relations and institutions. The effects can amount to, and be interpreted in terms of, the phenomenon of green grabbing: whereby, at a particular moment in capitalist development, nature and resources become appropriated in a process of accumulation by dispossession, with 'carbon', once part of peoples' lived-in landscapes, becoming financialized and part of international markets to the benefit of others (Fairhead et al, 2012; Corson and MacDonald, 2012).

Elucidating this co-construction of carbon imaginaries, political economies and landscape re-working in particular African settings is the key aim of this book. But we are also interested in what these processes exclude. We are interested in the alternative ideas and values that exist around carbon, associated with particular people and interests. We are interested in the limits to 'tameability', and so market appropriation. We explore if, as part of dynamic ecologies, carbon might in fact be rather more 'unruly' than assumed. And we address the 'unruliness' of local forest users and their ideas which, grounded in their own logics and histories, may not be so easily captured and controlled. How, we ask, does this double unruliness of carbon and people manifest in processes of dissonance and resistance to the assumptions and actions of forest carbon projects?

Equally, we are interested in how these processes play out in particular local settings. Here, an ethnographic focus reveals not a one-way view, but a more complex and variegated picture of winners and losers. The book's chapters examine how carbon forest projects interact with forest-based livelihoods, whether around timber production, farming, forest product harvesting and so on, and how different social groups are involved, whether women or men, youth or elders, long-term residents or immigrants and members of occupational and ethnic groups are involved. Tracking these interactions reveals the importance of local institutions around tenure, property, labour and authority in mediating access and control over resources, and opportunities to benefit or not from project interventions (Cotula and Mayers, 2009; Bond et al, 2009; Larson et al, 2013; Dokken et al, 2014; Naughton-Treves et al, 2014; Sunderlin et al, 2014a, b). Some people are indeed being dispossessed but others are gaining in income, property and power; who this is and the alignments involved are sometimes surprising.

And while these interventions, and their political-economic drivers, practices and discourses, have become powerful pathways in African forest landscapes, alternatives continue. People's own discourses and practices – or subaltern pathways – involve different forms of landscape interpretation and use, grounded in different values and ideas about trees and land. These alternatives, we show, co-exist and interact with the discourses and practices of carbon projects: sometimes in overt contestation, resistance and protest, sometimes in quieter subversion, and sometimes in more tacit continuance of ways of life and living with forests, even as carbon commoditization proceeds apace.

It is these iterative intersections between politics and ecology, whereby politics shapes and reshapes ecology and vice versa, that form this book's analytical focus. These intersections occur across scales, from the local to the global, shaped by institutions and the wider contemporary political economy. Our argument therefore fits broadly within the wide-ranging field of political ecology (Blaikie and Brookfield, 1987; Forsyth, 2003; Peet et al, 2010; Robbins, 2012). Our emphasis on landscape and its discursive as well as material dimensions gives the analysis a special focus on knowledge and practice, whether in relation to local forest use or the development and implementation of projects and policies. The notion of pathways (Leach et al, 2010), as developed through the past and extending into the future, gives our analysis a historical dimension.

The chapters in the book reveal a range of carbon conflicts. Some involve struggles over resources and property as trees, land and rights and control over them come to be contested in new ways. Some relate to timeframes, with disconnects between project requirements to lock up carbon for the long-term, and local priorities for shorter-term livelihood flexibility and adaptability. Others relate to imaginaries and visions of what carbon is, what projects are really doing and of what landscape uses and futures are desirable. Carbon conflicts are therefore both material, and discursive.

Despite the huge industry, rhetoric, claims and well-meaning efforts around 'pro-poor' or people-focused forest carbon, the book shows that there is little prospect of this becoming a reality unless these carbon conflicts are addressed. This in turn would require a radical overhaul of how carbon projects are conceived, designed and implemented. Drawing

from the book's analysis, at the end of this opening chapter we identify a number of possible future scenarios and policy options for carbon forestry in Africa and beyond.

The following sections take elements of these arguments in turn, clarifying key concepts in relation to aspects of literatures on carbon, environment and beyond, and introducing how the book's case studies speak to these themes. To begin with, we introduce the different cases from across Africa.

Introducing the cases

Following a chapter that provides an overview of the contemporary policy scene for carbon forestry in Africa and more broadly, the book explores seven cases. These are located in seven countries across East, West and Southern Africa (see Figure 1.1). Each has particular characteristics in terms of ecological setting, project development and the roles of different actors, status in terms of market involvement and certification, and plans for benefit sharing and community development, and overall project type. These basic project features are summarized in Table 1.1.

<INSERT TABLE 1.1 HERE>

A central set of distinctions in Table 1.1 relates to project type, in the sense of how, and where, carbon is to be sequestered or offset. The cases cover a range of categories which we label as follows. A first is 'fortress carbon', where carbon and its ongoing

sequestration are to be protected in existing forests, with clear boundaries to exclude other activities. The Sierra Leone Western Area Peninsula Forest (WAPFoR) project, focused on protecting a long-established dense humid forest reserve now re-valued for carbon, is a clear example of this approach, as is the Tanzania Kilimanjaro project. In a second category, 'ranching carbon', the focus is also the protection of carbon in existing trees in demarcated land areas, but alongside other resources, such as wildlife. The dry forest carbon 'ranches' of the Kenya Kasigau project and Zambia LZRP project offer examples here. A third category involves 'farming carbon' where trees are planted anew – like a crop, albeit one that requires long-term protection. This may be on individual farms – as in the Kenya KACP project, which additionally invokes soil carbon - or in plantations – as in the Uganda case. The Ghana case involves both individual farm and plantation planting. A final category we term 'protected tree carbon'. The Kariba REDD project in Zimbabwe exemplifies this approach, where the valued carbon is sequestered and stored by protecting individual trees, but amidst multi-use landscapes in which people live and work.

Although there is some overlap, these are significant categories in relation to the arguments in this book. By involving different ways of storing carbon, they present different technical challenges and methodological implications for measurement, monitoring and verification. More importantly, the categories imply quite different relationships between carbon, trees, people, rights and landscapes. They therefore also make relevant different opportunities and challenges in taming and commodifying carbon, and in negotiating access and control arrangements. And as we shall see,

unruliness – in ecologies, and communities – therefore makes itself manifest to different extents and in different ways in these different intervention types.

The cases also highlight other important contrasts. They are sited across a range of places (Figure 1.1) with different ecosystem characteristics and dynamics. At the most humid end of the spectrum, Sierra Leone's WAPFoR involves old-growth, dense humid tropical forest. Moving into the forest-savanna transition zone, the Carbon Credit Project in Ghana is situated in a forest-savanna mosaic where seasonal fire is a major factor in ecological dynamics. Similarly the Uganda case is in a humid savanna area. A transition between savanna and dry ecologies where woodland and grassland co-exist in patterns shaped by scanty and variable rainfall provides the setting for the KACP in Western Kenya, while drier vegetation and highly variable rainfall characterize the Kenya Kasigau project, the Kariba REDD project in Zimbabwe and the LZRP project in Zambia. Finally, the Mount Kilimanjaro carbon project in Tanzania covers a mixture of montane and lowland forest.

The cases involve projects developed by different actors and alliances. Several are led by private companies, although in some cases with support also from NGOs or international agencies (e.g. the KACP, Ghana Carbon Credit project, Kariba REDD in Zimbabwe, the Kenya Kasigau, and the Zambian LZRP project). The Uganda case involves private forestry companies leasing government land, assisted with some development finance. In contrast, both the Sierra Leone and Tanzania projects are led by public agencies, and NGOs.

The projects are targeting a range of carbon market schemes and opportunities, and are at different stages in involvement or certification in relation to these. Thus, a number of the projects are already certified and selling carbon credits, including the two Kenyan projects, Kariba REDD in Zimbabwe, the Uganda projects and the LZRP project in Zambia. Of the other cases, the Carbon Credit Project in Ghana originally hoped to sell credits to voluntary markets, but in the end applications for certification stalled, and the project itself collapsed with no credits sold, at least for now. Both the Kilimanjaro project in Tanzania and the WAPFoR project in Sierra Leone are developing schemes to seek VCS certification, aimed at targeting voluntary markets and, in the Sierra Leone case, corporate environmental responsibility deals with companies operating in the country.

All the cases claim the intention of community benefit – either through shares of carbon credit sale revenues, or in other forms. But given the varied stages and statuses of the projects, it is not surprising to find that these plans are also very varied, and in some cases vague and ill-formed. Several of the projects (the KACP and the Ghana Carbon Credit project) planned direct financial benefits to local people, though often at very meagre levels. In contrast, others – such as the Kenya Kasigau and Zimbabwe Kariba REDD projects – have plans that divide carbon revenues amongst community institutions, the project developer and other actors. The other cases envisage no direct financial benefits but instead expect to secure community engagement through funded community projects. Many of these are geared to 'alternative livelihoods' intended also

to reduce pressure on the use of forest resources so that the latter can be protected for carbon.

The cases therefore give good coverage of the array of project types, settings and development activities found in the African forest carbon scene today. This range adds to and complements other recent case studies and reviews, whether Africa-focused or broader (Kanninen et al, 2007; Angelsen, 2008; Angelsen et al, 2009; Brown, 2013; Pham et al, 2013; Murdiyarso et al, 2012; Sunderlin et al, 2014a, b). Much of this now large literature is operational in focus, interested in improving projects. Other works take a more critical stance, but are often focused on individual examples (e.g. Corbera and Brown, 2008; Nel and Hill, 2013). By taking a comparative and critical perspective across a set of African cases, we are able to explore in greater depth a number of key themes relating to the discursive, practical and political intersections of landscapes, livelihoods and markets, as we now go on to elaborate.

Landscapes and narratives

We argue in this book that carbon is situated within historically-constituted landscapes. But what is meant by 'landscape'? The term has become a buzzword in recent debates about carbon forestry, 'climate smart' agriculture and environmental management more generally, entering the lexicon and policy approaches of major international agencies such as CIFOR (2014), the International Union for the Conservation of Nature (IUCN, 2014), the United Nations Environment Programme (UNEP, 2014), the World Bank

(2014) and the CGIAR Research Program on Climate Change, Agriculture and Food

Security (CCAFS). For these agencies, a landscape conveys an area in which diverse

resources and goals are to be managed in an integrated way. Thus for the World Bank:

> A 'landscape approach' means taking both a geographical and socio-economic
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> approach to managing the land, water and forest resources that form the
>
> foundation – the natural capital – for meeting our goals of food security and
>
> inclusive green growth. By taking into account the interactions between these core
>
> elements of natural capital and the ecosystem services they produce, rather than
>
> considering them in isolation from one another, we are better able to maximize
>
> productivity, improve livelihoods, and reduce negative environmental impacts
>
> (World Bank, 2014).

Such a spatially-based planning approach is, as in this definition, compatible with a

commoditized approach to carbon and other resources and landscape features – all of

which constitute elements of 'natural capital' to be managed in an integrated and thus

more efficient and cost-effective way. Others see the key role of landscape approaches as

providing tools to manage trade-offs – including between environment and development,

conservation and livelihoods – through rational spatial planning and the allocation of

different areas to different uses. They emphasize their value in integrating and

reconciling poverty alleviation goals with those of forest resource protection and

enhancement – including for carbon (Sayer et al, 2013; CCAFS, 2013).

In contrast, and drawing on literatures in historical and political ecology, cultural geography and anthropology, we argue for a notion of landscape as simultaneously material, social, historical, and discursively produced, representing social imaginaries, cultural inscriptions, social identities and embedded politics (Williams, 1973; Cosgrove, 1984; Duncan and Ley, 1993; Crumley, 1994; Demeritt, 1994; Mitchell, 1994; Braun and Castree, 1998; Ucko and Layton, 1999). And, as a consequence, rather than simply providing neat rational planning tools, landscapes and understandings of landscape features, priorities and change are often contested. Contests over landscape visions often have long histories; contemporary conflicts over carbon in Africa, for example, may carry the legacies of struggles over domination from the colonial era or before (Luig and van Oppen, 1997; Offen, 2004).

Landscape features and forms are shaped by interactions between people, their social relations and practices, and ecosystem elements and dynamics – in soils, vegetation, water and so on. As political ecology approaches emphasize, such human-ecology interactions, and so landscapes, are shaped by institutions, political economies and struggles over resources, at local, regional and global scales (Blaikie and Brookfield, 1987; Mehta et al, 1999; Ribot and Peluso, 2003; Robbins, 2012). Environmental historians and historical ecologists emphasize the importance of particular historical contexts to such interactions, and the legacy of past relationships for present landscapes (Grove, 1997, Crumley, 1994; Balée, 2006). Historical approaches often reveal landscapes assumed 'pristine' actually to be deeply human-influenced, or anthropogenic (Offen, 2004). This certainly applies to forest landscapes in Africa, where both large

forest expanses and patches of woodland once assumed to be 'natural' have been shown

to be anthropogenic landscapes influenced by people's past settlement, livelihood and

everyday practices, enriching as well as degrading – according to particular social and

cultural values (Fairhead and Leach, 1996, 1998). As historical practices and social

relations leave legacies on which subsequent practices build, anthropogenic landscapes

can be seen as complex '*palimpsests*' embodying the ongoing outcomes of shifting

social-ecological interactions over time: 'a vertical or horizontal layering or stratigraphy

of [anthropogenic] signatures and patterning etched on the surface of the earth, deep into

the soil… or above the surface fixed in the layers of vegetation' (Erickson and Balée,

2006, p187).

Thus in Sierra Leone, the WAPFoR reserve (Winnebah and Leach, this book) contains

the sites of long-abandoned pre-colonial settlements whose inhabitants' planting of cotton

and kola trees is still visible in vegetation patterns in the dense humid forest. In the

forest-savanna mosaic of Ghana, where the Carbon Credit Project is located, forest

patches often overlie old settlement sites with their enriched soils and historically-

reduced fire risk (see Fairhead and Leach, 1998; Chouin, 2009). As Kijazi, this bok

discusses, humans have continuously inhabited the slopes of Mt. Kilimanjaro for the last

2000 years (Odner, 1971). Histories of immigration and human settlement have

progressively transformed forest into a primary-, secondary-, and agro-forest (*vihamba*)

mosaic that some have hailed as a highly sustainable land-use system (Fernandes et al,

1984). Yet, current fortress conservation presumes a return to an ideal pristine forest

reserve.

Landscapes are also cultural, representing particular ways of seeing, replete with symbols and cultural imagery, that interplay with broader beliefs, cultural practices and morals (Cosgrove, 1984). Such ways of seeing often embody ideas about social and moral relations, such that 'landscape constitutes a discourse through which identifiable social groups historically have framed themselves and their relations with both the land and with other human groups' (Cosgrove, 1998, pix). While this definition was originally associated with a particular, European idea of 'landscape', anthropologists, cultural geographers and others have since emphasized the co-existence of and contestation between diverse landscape ideas and discourses, including in African forest settings (e.g. Fairhead and Leach, 1996). These may be associated with different local social groups, or with local forest users vis-a-vis state, international or policy agencies, who develop perspectives on landscape that reflect their own cultural backgrounds and social positions and interests. Thus, for example, on Mt. Kilimanjaro, the state views the landscape as an important space for development and conservation – settler farm estates on the lower slopes, and protected reserves on the upper slopes – with local people's settlements sandwiched in between. In contrast, local forest users see both settler and conservation estates as alienated ancestral lands.

Particular landscape perspectives are often incorporated into narratives or storylines about landscape change, including ideals of how a landscape ought to be, and ideas of blame, victimhood and heroism for bringing about certain kinds of change (Roe, 1991). Such narratives draw on selective forms of knowledge and theorization of change,

whether emanating from formal science or from local experience and people's knowledge. They can be critical in justifying – or contesting – policies and interventions (Keeley and Scoones, 2003). In Africa, environmental narratives incorporating moral judgements about people's assumed destruction of 'natural' landscapes have often been used to justify policies that remove resource control from local users (Leach and Mearns, 1996). Indeed in all the cases discussed in this book, local people are blamed for forest destruction, justifying market incentives or regulatory enforcement to ensure forest protection.

Forest carbon has given new life to longstanding policy narratives about African environments, and about forest landscape change in particular. The widespread storyline about forest decline at the hands of local users found in each of our case studies has been elaborated repeatedly since early colonial times. It draws on longstanding scientific and popular ideas and practices that see forest vegetation as 'natural', with people's use constituting disturbance and degradation, only accelerated by population growth (Leach and Mearns, 1996). Portrayals of forest cover and quality as declining, linearly, rapidly and recently, from an earlier state of 'intact' forest repeatedly construct deforestation as an urgent problem requiring external intervention. Long-established, widely-circulating figures suggesting that only 13 per cent of West Africa's 'original' forest cover remains (Sayer et al, 1992) are joined by more recent claims, for instance, that 'Around the turn of the century, West Africa had some 193,000 sq. miles (500,000 sq. km) of coastal rainforest but today [they]... have been largely depleted... Now... only 22.8 percent of West Africa's moist forests remain, much of this degraded' (Mongabay, 2012, p1), or that

the Guinean Rainforest of West Africa had, by 2000, reduced to 18 per cent of its original area (Gockowski and Sonwa, 2010). Since early colonial times such convictions of rapid and ongoing forest loss from an 'original' baseline have driven policies to halt deforestation and conserve what are assumed to be remaining forest fragments, whether to safeguard hydrology, agro-ecological productivity, timber or biodiversity 'hotspots' (Bakarr et al, 1999; Conservation International, 2008). Today's new round of carbon-focused initiatives are similarly justified by narratives of rapid forest loss: that 'Africa's tropical forests are an important store of carbon... [yet] Africa's forests are being lost at around three times the world average' (Mercer et al, 2011, p73).

Forest carbon projects arguably rely even more strongly on deforestation narratives than previous forest policy interventions, since these are necessary to construct a 'baseline scenario' against which sustained or increased carbon stocks can be measured and verified (see below). Thus in the justifications for each of the case study projects, we find narratives about likely ongoing deforestation in the absence of project intervention. For example, the feasibility study for the Ghana Carbon Credit Project claimed that: 'Rates of deforestation in West Africa are among the highest in the world. Ghana's tropical forest cover has decreased from 8 million hectares at the beginning of the 1900s to about 1.6 million hectares in 1990, and the deforestation rate is high: nearly 65,000 hectares per year. Virtually all forest currently left is located in forest reserves' (TREES, 2010, p10). Commenting that 'Today's situation in the project area... shows a small scale patchy structure of different vegetation types' (TREES, 2010, p22), forest patches were assumed to represent 'remnants' of past extensive forest areas. In Sierra Leone, the scoping study

for the WAPFoR project drew on satellite data to infer a (9 per cent) loss of forest cover

in the project area since 2000 (OBF, 2012, p12). Such recent deforestation fitted logically

with widely-repeated discourses of one-way deforestation – for instance, that '50 per cent

of the country has conditions suitable for tropical rainforest, but less than 5 per cent is

still covered with... closed forest' (Sayer et al, 1992, p944). Projecting forward to 2031

by linking this historical deforestation to population growth (OBF, 2012, p4), the study

produced baseline deforestation scenarios that suggested a sufficient level of 'avoided

deforestation' to justify the carbon project. In Mt. Kilimanjaro, the GEF/UNDP

sustainable land management project (Kijazi, this book) argued that 'The ecosystems and

watersheds of the Kilimanjaro are experiencing an extensive process of degradation and

deforestation' (GEF, 2010, p2) – attributed to rapid population growth, land use change,

poor land management practices, unsustainable harvesting of natural resources, and

climate change. The proposal used a high baseline deforestation rate of 6 per cent per

year, although without explaining the origins of this figure. In the same way in Uganda

(Nel, this book), forests were cast as 'degraded' in order to allow for production zones of

the forest reserves to be planted with exotics by companies as part of forest carbon

projects, resulting in widespread eviction and displacement of local people. While such

narratives contain elements of truth, the assumption of one-way, linear forest loss

overlooks both the inappropriateness of asserting an 'original' forest cover in landscapes

subject to deep vegetation-climate fluctuations going back centuries (Fairhead and Leach,

1998), and far more complex, multi-way landscape interactions in more recent times.

We also find longstanding narratives about local forest-climate relationships – the impact of forest cover and quality on local hydrology, watersheds, weather systems and fire regimes – reinvoked in carbon project justifications. In Ghana, the project is justified as safeguarding micro-scale weather systems offering stability in rainfall patterns and protecting against wildfire risk. In Sierra Leone, the WAPFoR project slogan, 'water in the forest is life', justifies forest protection to preserve the watersheds that provide urban water supplies. Such justifications draw on a mix of (often contested) scientific theory and popular ideas. In carbon projects, such local forest-climate interrelationships are sometimes linked upwards and outwards to global climate change – in imaginative and scientifically-dubious ways. Thus, in Tanzania the melting of glaciers on Kilimanjaro is portrayed as an effect of local deforestation, while forest watershed protection in Sierra Leone is now discursively linked to protecting forests for global climate change. Given that the relationship between local carbon stocks and global climate is hard to understand and explain – for project staff, policy-makers and publics alike – it is perhaps not surprising that the off-the-shelf narratives about local forest-weather links are inserted into project communications, discussions and reflections in their place – even when they fly in the face of decades of scientific research.

In these ways, African deforestation narratives are now being invoked and indeed strengthened in a new global political and policy context. And they have acquired a new sense of urgency and drama, now interrelated with global climate crisis and the struggle to tackle it. Similarly, discourses of local blame, extending back to colonial times, are being reinvigorated. These often focus on so-called 'slash and burn' farming – itself a

negative description of longstanding and in many parts of Africa, sustainable bush-fallowing practices (Richards, 1985; Fairhead and Leach, 1998; Palm et al, 2013). In many regions it is no longer practised, as socio-economic and demographic change has contributed to transformations towards more intensive farming systems. Nevertheless, forest carbon project discourses have strikingly brought 'the slash and burn farmer' back to life, re-imagined as the key villain responsible for forest loss and threat, whose ways external interventions must now seek to amend. In our cases, we find project documents invoking such narratives about slash and burn farming even where it has not existed for decades. For instance, while the World Bank's Country Environment Analysis (CEA) of Ghana blames slash-and-burn agriculture for the loss of more than 50 per cent of the country's original forest cover (World Bank, 2006), farmers in the forest-savanna transition zone now rarely practise this and when they do, it is in longstanding bush fallows, not old-growth forest (Hashmiu, this book). In Kilimanjaro, various intervention documents make reference to 'poor farming practices' (Kijazi, this book). This is in sharp contrast to evidence from socio-ecological studies (Hemp and Hemp, 2008) that the Chagga home gardens there are one of the most sustainable farming systems in the world. In the Kenyan Kasigau, the LZRP Zambia and Kariba REDD cases, for example, the project design documents each emphasize the need for the project to curb the exploitation of the dryland forest through slash and burn practices and small-scale charcoaling by often extremely poor local residents and migrants (see Atela, chapter 6; Mickels-Kokwe and Kokwe; and Dzingirai and Mangwanya, this book).

In many of our cases, alternative, marginalized or even hidden narratives, including those of local forest users, tell quite different stories about landscape change. These draw on different forms of understanding, embedded in the material practices and political ecologies through which people live with and shape landscapes in the contexts of their histories and livelihoods. Thus, forest patches in mosaic landscapes are, according to local perspectives and ecological and historical evidence, often not remnants at all but the outcome of vegetation enrichment in grassland, linked to settlement and everyday practices and their effects on soil, fire and vegetation (Fairhead and Leach, 1998; Chouin, 2009; see Hashmiu, this book on Ghana). Local landscape narratives often include such possibilities of human enrichment. They also invoke a sense of context and site specificity, and of cycles, variability, diversity, and non-linear dynamics, rather than a one-way decline of forest cover. Such cyclical interactions between ecologies and land and vegetation use, influenced by diverse drivers, provide dynamic contexts into which external project interventions slot. Thus, for example in the Carbon Credit Project area in Ghana (Hashmiu, this book), there was a dominance of savanna grassland early in the twentieth century. By 1983, the area was heavily forested, with cocoa interspersed with large shade trees. A dry period and a build-up of grass in savanna patches then enabled a massive forest fire, radically transforming the landscape back to a much more open form with 'forest islands' associated with past settlement sites and sacred areas. These open areas became dominated by maize in the context of relatively high prices and market opportunities, and because cocoa was vulnerable to savanna fires. Yet tree planting for carbon has required fire protection, enabling also a re-investment in cocoa. Carbon trees

also help provide shade for older cocoa varieties that require it. However, newer varieties do not need shade, threatening the future of this carbon-cocoa intercropping system.

As this example illustrates, local landscape processes also encompass inherent unruliness in ecologies, trees and therefore carbon. The dynamics of fire, soils and vegetation are often non-linear and unpredictable. Local practices have often co-developed with such dynamics and indeed are attuned to making livelihoods amidst them. This involves knowledge, but also adaptability and flexibility – to 'hitch a ride' on nature (Richards, 1985) and live with uncertainty (Scoones, 1995) – and to shift activities, practices and uses to suit changing ecological – and political-economic – opportunities and constraints. Such adaptability in the decision-making of local land users, often required from season to season, or over timescales of a few years, contrasts strongly with the requirements of forest carbon projects. These are very dependent on long timeframes, with projects seeking to protect a given area of forest land, or maintain trees planted for their carbon, over timescales of 20-30 years, to meet carbon verification requirements. The idea of a 'project' that lasts 30 years is itself strange – carbon projects do indeed take highly projectized forms, yet where else in rural development would one find a project expected to sustain itself for so long? (Mickels-Kokwe and Kokwe, this book).

For local users, a static, stock-based land use over such timescales is alien both to ongoing farming and livelihood decision-making, and to social and property relations. There is a sense of 30 years being a very, very long time away – beyond the lifespan of

many current farmers – thus raising challenging issues around generation and inheritance. The Kenyan KACP case is an example here (Atela, chapter 4, this book). The project is expected to unfold over 20 years, during which farmers must plant and care for trees on their farms. Yet most are women aged between 40-60 years, and unlikely to benefit directly from the project at completion. Such intergenerational uncertainty is complicated by the fact that the youth who are expected to take over project engagement are interested in more immediate returns, and often have a very different relationship to the land compared with their parents.

In the histories of Africa's forest landscapes, current carbon projects are often only the latest in a series of interventions. Thus, for example in Zimbabwe, Kariba REDD is happening in a setting that has experienced multiple displacements and population movements, from those linked to colonial settlement of white farmers, to displacements due to the Kariba dam construction and the establishment of national parks, to more recent movements due to land reform (Dzingirai and Mangwanya, this book). WAPFoR in Sierra Leone has been a forest reserve since 1916, with successive waves of production and protection interest focused on timber, watershed protection, biodiversity and now carbon (Winnebah and Leach, this book). In the Mount Kilimanjaro case (Kijazi, this book), the recent carbon interventions are happening in a landscape with a long history of land alienation for settler estate farming and the creation of protected areas. Most recently, in 2005, the national park was massively expanded, and this was followed by a tree-cutting ban on all private and public lands in the region. In historical ecology terms, forest landscapes can therefore be read not just as layered human-

ecological interactions, but also as layered external interventions. As the cases reveal, the legacies of past interventions in terms of ecologies, tenure relationships and people's attitudes to the state, amongst other factors, in turn influence how more recent interventions focused on carbon unfold. At the same time, these projects are not just 'more interventions'; the carbon focus also makes some important differences.

Carbon constructions and imaginaries

What then is the meaning of carbon in the context of such interventions? How is carbon defined and understood? How is it imagined, viewed and constructed as part of different narratives, and in relation to particular practices – those of projects, and those embedded in landscapes and livelihoods in alternative ways?

The notion of 'imaginaries', as explored in cultural studies, is helpful here. Social imaginaries refer to collective visions of attainable futures (Taylor, 2004); they are at once descriptive of how things might unfold, but also prescriptive, suggesting guides for action or policy (Harvard, 2012). More specifically, socio-technical imaginaries can be defined as 'imagined forms of social life and social order that center on the development or fulfilment of innovative scientific and/or technological projects' (Jasanoff et al, 2007, p1). Interventions to value carbon and link its trade to the mitigation of climate change can be seen as just this kind of innovative endeavour, in turn requiring specific socio-technical imaginaries of carbon to suit them.

The core imaginary of carbon, co-constructed with the field-level initiatives explored in this book, is as a commodity. Thus, 'Markets in greenhouse gas emissions are organized around carbon dioxide equivalence to create 'exchange value' and a fungible commodity that can be traded across products and projects' (Newell et al, 2012, p4). What is required for a market in carbon credits to function is commensurability (Lohmann, 2009), so that a tonne of carbon conserved in a forest is equivalent to that emitted, for instance, from an industrial factory in Europe or the USA. This is not straightforward; it requires extracting and isolating carbon, conceptually and materially, from the territories, histories, economies and politics in which it is embedded, and from dynamic cycles that involve oceans and atmosphere as well as vegetation, so that it can be re-conceptualized and financialized as tradeable units. The concept of 'ton of carbon dioxide equivalent' (tC02e) widely used in climate change market and policy literature captures this idea of equivalence. As Bumpus (2012, p17) points out, 'carbon offsets create a commodity and value out of a piece of nature – carbon dioxide in the atmosphere – that if achieved properly, *does not exist*' (emphasis in original). This is because several 'types' of carbon in an offset project are supposed to cancel each other out: the carbon that continues to be emitted by the offset credit buyer, and the carbon that would have been emitted if it had not been displaced by the project activity (e.g. carbon in trees associated with avoided deforestation). These 'types' of carbon exist materially in different places, forms and conditions. Carbon markets rely on constructing them as equivalent, and so exchangeable.

For forest carbon projects to render the carbon that cycles through forests into exchangeable tC02e involves a series of discursive and practical moves. A first involves abstracting the trees that constitute 'carbon stocks', and the sequestration processes that reduce atmospheric carbon, from wider landscapes and their dynamic ecologies. Second, carbon needs to be re-conceptualized as a 'unit' of nature that is amenable to exchange. Castree (2008b, p280) terms this process of categorizing and separating out a thing from its supporting context 'individuation'. Subsequently, these individuated units need to be financialized – re-imagined and valued in monetary terms. Financialization is the process of drawing into financial circulation aspects of life that previously lay outside it; of attempting to reduce all value that is exchanged (whether tangible, intangible, future or present) into a financial instrument. Financialization has been identified as a critical precondition for the emergence and operation of diverse offsets and markets for 'nature' (Igoe et al, 2010; Büscher, 2011; Sullivan, 2011).

Abstraction, individuation and financialization are thus three essential processes involved in the commoditization and sale of carbon. Yet carbon commoditization is distinct from the commoditization of bits of nature for many other purposes – such as a tree for timber, to ensure its effective governance or market sale (Bumpus, 2012). Whereas timber units retain essentially the same materiality throughout the commoditization process, carbon units need to be (re)imagined as equivalent to emissions reductions in distant places. This gives carbon commoditization a peculiar character, interlinking it with the quite novel imaginaries associated with the new global carbon economy (Bridge, 2011; Goodman

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and Boyd, 2011; Newell et al, 2012; Knox-Hayes, 2013; Kama, 2014) and contemporary forms of neoliberal nature (Buscher et al, 2012).

The same 'bits' of nature are also part of quite different imaginaries. Thus, the trees, soils, vegetation and atmospheric processes now being imagined, valued and commoditized in terms of carbon are simultaneously embedded in lived-in landscapes whose inhabitants value them in quite different ways, according to diverse socio-cultural perspectives and 'collective visions of attainable futures'. Thus, the same group of trees might be valued by women as an important source of gathered products, important for the current and future food security of their households; by elders and others as markers of historic settlement, places of social memory and ancestral worship important to securing future community prosperity; by entrepreneurial youth as potential timber resources that could be sold for economic value, or by others as providing cool shady places where spirits reside. These distinct ways of valuing are not commensurable with each other, and indeed may be the subject of ongoing negotiation and debate in local social and political life.

The case studies reveal many examples of such local cultural valuations and negotiations. For example, the Kenyan Kasigau case reflects a diversity of perspectives differentiated by wealth (Atela, chapter 6, this book). Poorer community members value the dryland forest for the immediate goods of charcoal and firewood, expecting the project to compensate them for the loss of this use value. Wealthier households, by contrast, value

forests in terms of recreational and environmental service benefits, as well as highlighting the importance of forest shrines on the hills.

Crucially, though, none of these diverse expressions of value are compatible with those of carbon simply as an exchangeable commodity. Hence, as forest carbon projects emerge onto the scene, bringing with them the peculiar carbon imaginaries outlined above, mutual incomprehension and tension is almost inevitable. On the one hand, the complex and peculiar manoeuvres of carbon commoditization and their links with carbon credit markets are difficult to understand, let alone explain simply – something that can challenge even project developers, and certainly their outreach workers. On the other hand, as projects arrive in communities they meet both very different imaginaries of landscape and ecosystems, and the legacies of communities' past experiences of external interventions, and the ideas conditioned by these. Creative responses result.

For instance, in attempting to describe and pin down what and where 'carbon' is, villagers in Tanzania identify it with 'charcoal air' (*hewa ukaa* or *gesi ukaa* in Kiswahili), resonating with recent climate mitigation campaigns. People from Badu and Dumasua villages in Ghana were told it was 'the smoke you see from an aeroplane, to be absorbed by trees and turned into cash' as part of project promotion. Villagers in Sierra Leone associated carbon with 'the mists you see above forests in the morning', but also with 'the trees growing in the forests, that foreigners want to harvest for money'. The notion of carbon as a kind of extractive resource, that foreigners seek to discover and take away to sell, rather like a mineral, surfaced frequently in both the Sierra Leone and Zambia

cases, reflecting, perhaps, people's long experience of foreign mineral extraction in these countries' political economies and histories. Carbon, in this sense, is just the latest in the long line of bits of nature that foreigners have come to extract and sell. In a similar vein, others associate carbon directly with the people – usually foreigners, or elites – interested in it. In Zambia, project promoters are referred to as *BaCarbon* – the carbon people. In Sierra Leone, villagers asked researchers – initially presuming them linked with the rumoured carbon project – whether they were 'Reg (aka REDD) who has come to buy our carbon'.

In some cases, project outreach workers have taken up and elaborated on such local narratives in attempts to make carbon projects more locally legible, and to encourage project acceptance by communicating project messages in terms that might have local traction. Thus, in the WAPFoR project in Sierra Leone, project workers built on local ideas about carbon as 'smoke' in messages that the carbon project would 'clean up smoke' globally. While such attempts might be applauded as instances of local extension workers' innovative cultural brokering (Lewis and Mosse, 2006), they are also replete with instances of mis-translation and the creation of further ambiguity and confusion. Moreover, there is a fine line between explanation and education, persuasion and coercion. The case studies provide several examples of carbon projects' so-called 'awareness campaigns' that became, in practice, geared to disciplining and control.

What all the cases illustrate, in different ways, are the major challenges of bridging global carbon commoditization imaginaries, with local imaginaries embedded in landscapes and

livelihoods. These make carbon projects even more difficult to incorporate into local settings than many of their predecessor interventions in forest-farmland areas. Carbon projects easily become further examples of alien interventions introduced by outsiders who bring peculiar ideas – as have many prior interventions in wildlife conservation, agroforestry, or rural development before. Such earlier interventions also brought initially alien ideas – the notion of 'biodiversity', for instance – but these more readily found traction and translateability into local languages and conceptual framings. Carbon projects come with a more deeply alien and largely unfathomable logic, which, when struggles to accommodate fail, are easily dismissed as the bizarre ideas of ignorant, though clearly profit-seeking, outsiders.

Generating value: Techniques, measurements and their consequences

These relationships between carbon and its commoditization, and narratives about landscape change, are in turn deeply interlocked with the practices and techniques of measurement in carbon projects, as 'the creation of exchangeable tC02e relies on the implementation of project activities and the processes of calculating, justifying and verifying emissions reductions' (Bumpus, 2012, p16). Tensions have to be navigated between the materiality of the carbon and the real world contexts in which it is reduced or sequestered from the atmosphere, and the institutional requirement, set by carbon standards, to assert that a reduction has taken place against the baseline (non-intervention) scenario. This requires what Bumpus (2012, p20) describes as a 'hemming

in' of carbon dynamics, achieved through a range of practices and methodologies for measurement, monitoring and verification.

Numerous measurement and monitoring, reporting and verification (MRV) procedures and protocols have been developed to legitimate the production and sale of carbon. These are associated variously with the REDD+ process, CDM and VCS standards, and with a range of carbon project types. Our case study project types all fall within what the CDM calls 'agriculture, forestry and other land use' (AFOLU) approaches. AFOLU project categories and associated methodologies include 'Afforestation and Reforestation' (A/R) under CDM, or the VCS equivalent 'Afforestation, Reforestation and Revegetation' (ARR). This involves planting trees or otherwise converting non-forest to forest land, or increasing carbon stocks in woody vegetation (CDM, 2013). By contrast, REDD-type projects involve avoiding 'unplanned' conversion of forests to non-forest areas (deforestation), or reduction of carbon stocks (degradation) (VCS, 2013a). If the project involves avoiding otherwise planned logging or farming, it counts instead as Improved Forest Management (IFM) or Agricultural Land Management (ALM). These categories cover the range of project types we have identified in our case studies, although as discussed above, the cases vary in which, if any, standards and therefore measurement protocols they have sought to use.

AFOLU approaches have been developed by a particular constellation of climate modelling, environmental economics, biological, accountancy and project management expertise − as represented on the AFOLU committees for both the CDM and the VCS

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advisory groups (VCS, 2013b). The associated measurement and verification methodologies and practices can be understood as having a social and political life that co-develops with that of carbon-valued-as-a-commodity (Leach and Scoones, 2013). Measurement and modelling of carbon – as sociologists of science have observed for other fields of modelling – is a social process that incorporates and affirms certain social, political and moral assumptions, while excluding others (Morgan and Morrison, 1999; Magnani and Nersessian, 2009; Morgan, 2009).

While approved methodologies vary in detail, all share a set of basic elements (see also Arhin and Atela, this book): *Demarcating the project boundaries* and their spatial extent; *Ensuring land eligibility* – in relation to vegetation and tenure; *establishing a baseline* – including a change scenario in the absence of project activity, and a reference area; *demonstrating additionality* – providing assurance that the claimed carbon effects would not have happened without the project; *quantifying carbon emission reductions* through new project activities; *assessing leakage* that might occur through displacement of activities from the project site, and *evaluating non-permanence* – assessing the risk that the project's carbon sequestration effects will not last. These generic methodological elements themselves carry with them particular assumptions about forests and landscapes, and carbon as a commodity. Equally, their application necessarily relies on particular practices in collecting and interpreting data. As the case studies demonstrate, methodological protocols and practices thus help to shape and affirm certain landscape narratives and potential pathways of change, while excluding alternatives.

Thus, for instance, we have already seen how the construction of baseline scenarios in both the Sierra Leone WAPFoR project and in the Ghana Carbon Credit Project reinforced longstanding narratives about linear deforestation. 'Additionality' assessments contributed further. In the Ghana case, the project argued for additionality by deploying the standard narrative around deforestation in the area, evoking an image of a past pristine forest being converted to savanna, especially by 'slash and burn' agriculture. Any intervention to protect so-called 'remnant' forest tracts or plant trees to replace assumed lost forest is thus seen to reverse the trend. This was despite the feasibility study's satellite analysis which was more uncertain, finding that 'the natural forest and the teak plantations within the project area are not identifiable, and the project area vegetation cannot be distinguished from the outside project vegetation. This leaves room for some interpretations which would negatively impact the feasibility of a carbon project' (TREES, 2010, p23). The study also questioned whether project activities were really distinct from the 'common practice' of tree planting, community forestry and agroforestry projects in the area, dating back over decades (Hashmiu, this book).

In Sierra Leone, the scoping study argued for additionality on the grounds that:

> the WAPFoR is currently under severe pressure, especially from rapid urban expansion/encroachment into the reserve. The business as usual scenario is characterized by low levels of law enforcement, little staff capacity, little human resources, little financial means for effective protected areas management.

Consequently, there will be limited means to mitigate emissions without the project (OBF, 2012, p8).

Again, this argument reworks long-established narratives about ongoing deforestation problems that can be 'solved' only by external intervention – in this case the imposition of strengthened forest protection mechanisms. In both these cases, practices for measuring and accounting for carbon stocks, assessing leakage and evaluating non-permanence pushed the projects towards focusing on (or imagining landscapes as) static, stable and easily measurable, ignoring more uncertain dynamics.

Such disciplining effects of 'hemming in' by project practices are not confined to 'top-down' approaches; they can equally happen when measurement, monitoring and verification is conducted through 'community' assessments using so-called participatory methods. Indeed such participation is required by the Climate, Community and Biodiversity (CCB) standard, and was attempted in the Kenyan KACP case where farmers were expected to complete detailed farm-level records about farm management practices, feeding into more advanced technical accounting procedures. In the Zambia LZRP case, NGO-facilitated workshops provided data on community involvement in forest use which fed into the project design. Yet despite participatory rhetoric, the assumptions of the measurement protocols tend to prevail, and in turn to reinforce certain types of project. Thus, methodologies helped to push the WAPFoR project in Sierra Leone and the Mt. Kilimanjaro project in Tanzania towards their 'fortress carbon' approach, while in Ghana what might have been a 'tree protection carbon' or more

flexible mosaic landscape approach became instead an easily measurable and controllable 'plantation carbon' project.

Regardless of their particular assumptions, the very multiplicity and complexity of standards, measurements and MRV techniques can be bewildering. CDM, VCS and other voluntary and private approaches are constantly multiplying, with methodologies continuously evolving and being updated. The respective websites have plenty of documents and guidance sheets to download, but these are not for the faint hearted given their length, multiplicity, and sometimes obscure terminology and technical requirements. In response, NGOs and consultancy firms have produced a large array of guides and manuals to help project developers navigate these challenges (e.g. Ingram et al, 2009; Pearson et al, 2009; Calmel et al, 2010), while opportunities have blossomed for consultants to conduct project development operations. Indeed, consultants have been involved at various stages in all our case study projects. The co-existence and layering of multiple private, official and voluntary accreditation processes, each with their own standards, methodologies, application forms and procedures, consultants and brokers, in turn adds to the institutional complexity, ambiguity and competition over carbon project development. New and specialist sources of expertise are required – in measuring, accounting, GIS mapping, modelling, and so on. While in some cases this has provided new learning and employment opportunities for local and national researchers and consultants, very often the simplest solution for projects has been to turn to the burgeoning international groups offering such services, in turn supporting the growth of this part of the new global carbon political-economy.

In this context, the practical and funding difficulties of carbon project development in African resource-poor settings are very high. Indeed in some of our case studies, these have proved insurmountable: The Carbon Credit Project in Ghana failed to seek formal accreditation, partly because of the complexity of the process, while in other projects accreditation processes have led to long delays. The need for donor funding to contribute to start-up costs reinforces the reliance of forest carbon projects on external actors. This in turn reinforces the tendency for carbon projects to be seen as not locally owned, and foreign.

Furthermore, in some of our cases, project developers have explicitly claimed the complicated technical requirements as a justification for excluding local communities. In both the Tanzanian and Zambian cases, technical complexity was seen as too difficult for local communities to understand and engage in, so legitimizing their non-participation. In the Zambian project, for instance, donors resisted local plans to develop decentralized GIS capabilities. Control over measurement techniques and practices thus supports control over project directions by the global carbon industry that stands to benefit from them. This further undermines democracy and accountability in forest carbon projects, reinforcing their contribution to local disenfranchisement.

Creating markets

Generating value from carbon means creating markets. But this is not straightforward.

Markets are constructed through complex socio-technical processes; they are embedded

in social relations and governed by politics (de Alcántara, 1993; White, 1993; Guyer,

2004, 2009; MacKenzie et al, 2007; Mitchell, 2007; Böhm and Dabhi, 2009). Carbon

markets, just as any other, are not just the result of supply, demand and resulting prices;

their rules and operation are actively created by a range of players and practices

(MacKenzie, 2009, 2010; Callon, 2009; Lederer, 2012b).

As the previous section showed, a range of measures and metrics is used to establish

carbon as a commodity that can be traded. These interact with accounting mechanisms

and practices to give carbon value in a market (Lovell and McKenzie, 2011; Lansing,

2012). A carbon market must operate in ways that all market actors can comprehend.

This requires a set of strategic simplifications and boundary definitions. In a process of

containment and 'taming' (cf. Çalışkan and Callon 2009, 2010), carbon that was unruly

and dynamic in its original context becomes controlled, auditable and tradeable. This is

how value is created, and can in turn be appropriated.

How the market is constructed in turn defines who can participate and on what terms. At

each step there are processes of inclusion and exclusion. Much of this is mediated by

particular forms of expertise, as many people become enrolled in market construction,

along with the tamed commodities concerned. Markets are constituted through the

coming together of different actors in different configurations: financiers, project

developers, consultants, brokers, guarantors, aggregators, regulators and more. These

market players each have different interests, and must appropriate value from their engagement. In the complex world of carbon markets there are multiple players spread across the world. Only some can meet the standards required, only some can comply with the accounting and audit requirements, only some can therefore appropriate value. As a market becomes more elaborate and more spatially dispersed it becomes increasingly removed from local contexts, and the possibilities of local forest users – notionally the 'owners' of the carbon – to become involved is progressively diminished. These market networks are governed by power relations that influence the possibility of negotiation. While 'benefit-sharing' protocols may be included in the project specifications and may be a requirement of the standards, the ability to demand a share is affected by the contours of power that construct the market. NGOs and others have pushed strongly for 'safeguards' to provide standards for equity and transparency in market operations, but despite their incorporation into key formal frameworks (such as the Warsaw Framework for REDD), adherence and implementation again depends strongly on power relations, and is often weak.

Again, these socio-technical and political processes of market formation are not peculiar to carbon markets. However, as a novel market around a commodity that only has value in the context of a complex offsetting arrangement operating at a global level, carbon markets are perhaps especially complex, and subject to flux and negotiation (Spash, 2010; Lansing, 2012).

Since their emergence, carbon markets have had a rocky ride. Initially seen as a speculative opportunity, they attracted plenty of attention, including from those with little interest in forests and climate change. With the failure of international climate negotiations to forge an agreement, there are no formal compliance markets and only a few operating voluntary markets, while carbon prices have dropped precipitously. This means that market-focused carbon schemes are being constructed on a very fragile base, propped up by hype, hope and future expectation. As already discussed, many project developers cannot rely solely on selling carbon credits to meet their costs under current price projections, and business models have had to shift. Increasingly, public support is being required to bolster carbon projects, through government led REDD+ programmes, supported by the international community and aid/climate finance (Fong-Cisneros, 2012), presented now as 'performance-based' aid involving 'public-private partnerships' (Angelsen, 2013). Therefore, like many markets, they are not 'free' as in the neoliberal imagination, but linked to state interests and international public financing.

Of course carbon markets are not the first attempt to commoditize rural forest resources in Africa. These new markets build on previous layers of marketization, pushed at various points by different interests. Thus, for example in Ghana, timber concessions in the project area had allowed timber trees to be sold off to contractors under the Timber Resource Management Act. The new carbon project was seen very much in this light; indeed was initiated by a timber contractor under a similar model. In Sierra Leone, the area now targeted for carbon had previously been a timber reserve. Equally, in Tanzania and Zimbabwe, previous interests in forest and wildlife conservation have coloured the

way new markets have developed. In Zimbabwe, the project developers are associated

with safari companies, and see the fortunes of the carbon project building on, and linked

to protecting wildlife for lucrative game hunting. Their model for community profit

sharing is derived from an earlier experience with benefit sharing through wildlife

utilization, the famed CAMPFIRE initiative (Dzingirai and Mangwanya, this book).

Histories of markets and experiences of commoditization therefore shape how new

markets are formed.

As already discussed, all case study projects are planning on selling carbon credits into

internationally-approved carbon markets, whether through the CDM or the VCS.

However, most have found it difficult to get approval. This is a complex, elaborate and

expensive process, and only four case examples had gained some form of accreditation

by mid-2014 (Table 1.1). The start-up costs of establishing a project have proved

especially challenging for project developers, given that much reduced carbon revenues

are likely to flow perhaps only two or three years after the project is established. This is

perhaps the most costly period too, with requirements for surveying the area, evaluating

carbon stocks and flows and so on, as well as brokering deals with authorities and local

communities. Across our cases, project developers complained that they were finding the

going tough, and that external finance was essential. A variety of sources have been

deployed, including a mix of public, aid funds, personal and venture capital finance and

business sponsorship as part of corporate social responsibility and environmental

programmes. This is high-risk financing, and project developers noted that standard

forms of business credit and support were not available. However, the 'green' label

certainly helps the business proposition, and each of the case study project websites and publicity literature is full of statements about tackling climate change and assuring environmental sustainability.

Most project developers are passionate about the potentials of their projects to protect the environment and the planet. They see themselves at the forefront of innovative environmental management and climate mitigation responses, although often on the basis of a rather simplistic narrative of environmental conservation. Some see themselves as ecological and social missionaries, helping to save poor farmers and their environments. Thus again, the projects and the markets to which they are linked are not operating in the abstract; they are deeply embedded in particular discourses about environment and development, as well as providing profits and business opportunities. While there are inevitably multiple contradictions, and a certain amount of 'greenwash', especially in media campaigns and publicity materials, this socio-political context of market creation is important to appreciate.

The role of the state

Despite the marketized character of forest carbon projects, the state is far from absent. Indeed, carbon makes a difference here too, driving particular interests, opportunities and kinds of state involvement not always seen in other environment-development interventions. Capturing value from carbon depends on a peculiarly large and complex array of social and political relations, in which elements of the state play critical roles.

In general, states are required to uphold the property rights required by markets, as well as to sanction investments and regulate the conduct of operators. A functioning, Weberian bureaucratic state is often assumed in the design of projects, and, just as with 'ideal-type' markets, the assumptions are often found wanting. This is especially true in Africa where post-colonial states have been characterized as clientelistic, predatory, neo-patrimonial and corrupt, representing a 'politics of the belly' (Bayart, 1993; Chabal and Deloz, 1999). Equally, states may proclaim a 'developmental' role – including around carbon investments and climate change mitigation. Yet even such labels are too simplistic. A more nuanced analyses sees states not as singular, unitary authorities, but made of multiple individuals, groups and interests (Boone, 2003; Das and Poole, 2004), each negotiating with each other through complex and shifting alliances and networks (Hansen and Stepputat, 2001). These intersect with the interests of foreign capital and investment, as well as local leaderships, often of multiple, overlapping forms.

Amidst such complex state-business-investment interactions, the ideal-type neoliberal model fostered by carbon projects quickly unravels. But at the same time things can get done, and 'working with the grain', accepting that state politics and bureaucracy does not replicate a liberal ideal makes much sense (Booth, 2011; Kelsall, 2013). Elites, inside and outside the state, become crucial as brokers and negotiators, able to cut deals between state officials and investment, subvert regulations, and establish authority; perhaps not totally within the rules but sufficient for it to work. In practice, most carbon projects – indeed most development projects – must operate under such conditions. That these do

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not meet the full requirements of the assumptions and plans means that the focus must shift to working out what happens, learning by doing. The trouble with carbon projects is that there is limited room for manoeuvre, as the audit and accounting requirements imposed are so strict, so there have to exist parallel worlds of realities on the ground and the idealized plans and proposals. As the case studies show, this can result in severe tensions.

Some particular state interests are at play in forest carbon projects. Central states see new commodities as a source of rent, through licensing, tax and so on. In many African economies, the recent commodity boom has spurred growth, on impressive scales. While carbon cannot match gold, diamonds and other minerals, it is seen in the same light, especially in settings where extensive forest resources are deemed 'underutilized'. Bringing the forest – which of course is not underutilized at all in most instances, as forest livelihoods of diverse sorts depend on it (see below) – into the realm of commodity trading means that, like minerals, it can become an important source of state revenue. Carbon funds also potentially create new money in addition to aid, and although, as we have seen, most projects depend on classic development finance at least in their start-up phases, carbon funds offer the prospect of long-term, sustainable finance not subject to the fickle whims of aid flows. Locked in for the long-term, there are real incentives to sustaining the asset, while new carbon finance allows this to happen. Thus, protecting forests and wildlife areas, often neglected in government financing due to swingeing cuts imposed by structural adjustment conditionalities, can now happen, with forest guards employed, fences constructed and management regimes imposed. In Tanzania and Sierra

Leone this configuration of state interests and external finance is now reshaping landscapes, recreating the 'fortress conservation' of past times (Kijazi; Winnebah and Leach, this book), while in Uganda (Nel, this book) the recruitment of private companies to implement carbon projects within forest reserves assists the state with its revenue streams, policing and community relations.

As different departments try to cash in on carbon funds and struggle over technical domains, so carbon projects expose varied interests within the state. Most REDD initiatives are overseen by an environment ministry or a forest department. Suddenly such parts of government are apparently flush with money and the status that comes with external interest and technical authority, with new vehicles, refurbished offices and *per diems* being paid out at endless meetings. This can bring resentment and competition, as in the cases of Zambia and Zimbabwe, where ministries such as agriculture had dominion over the rural areas, and carbon is now seen as competing as a commodity with maize, tobacco or cotton. With all ministries trying to seek investment, the balancing of a forest protection strategy under a REDD programme and an agricultural expansion and investment programme are not easy to square. Such conflicts are in turn played out in patterns of landscape change and control.

At the local level, local governments often become intensely involved – especially in decentralized jurisdictions where they have notional, if contested, control over land and resources. This proved critical in a number of the project cases. In the Kilimanjaro case, there is a conflict between the Regional Commissioner/ Regional Administration and

local government. By declaring a 'climate crisis', the former has now taken over oversight of all forest activities, including forest carbon projects, although, by law, forestry activities should be undertaken by local (district and village) governments. This disenfranchisement of local governments and communities is therefore at the centre of current forest conflicts in the area (Kijazi, this book).

Local governments may also be cash starved, if funds do not flow from the centre. Thus, for a new carbon project to offer revenue sharing with the local government authority around a commodity that they notionally control ensures that interests are aligned. In the Zimbabwe case (Dzingirai and Mangwanya, this book), for example, the Rural District Council as the notional land holder of the communal areas is a partner in the project. The argument is that this allows for local democratic control through councillors, who are accountable to the people, and so benefit-sharing is assured. However, this governance arrangement does not please everyone. Elite in-migrants, often with close connections to political party factions, oppose the carbon project, arguing that tobacco growing, which requires forest clearance, is the future. Yet the Rural District Council and carbon project partners have the backing of the chief, who sees carbon as a source of benefit to him personally and the communities loyal to him in a way that tobacco growing by migrants is not. These carbon conflicts, in Zimbabwe as elsewhere, therefore involve multiple competing interests, with the state interceding in different ways and in different forms.

These wider interests are also driven by the potential individual gains to be made from carbon projects. Political elites may form alliances with a project, or against it, depending

on how they see their interests being played out. For example, the project developer in Ghana alleged that the ruling party attempted to sabotage the project through denial of financing and later an arrest by the Bureau of National Investigation, because of perceived links with the political opposition (Hashmiu, this book). In Kilimanjaro, Tanzania, the call to preserve carbon is supported by an alliance of the state and a large UNDP/GEF project (Kijazi, this book). This has effectively reinforced existing criminalization of small-scale woodfuel collection, timber harvesting and charcoal making, and promoted the provision of alternative fuels. The latter are provided by richer business entrepreneurs from outside the area, and local villagers lose out. Meanwhile, elites with close connections with state officials are able to subvert logging bans and continue their extractive businesses unhindered. Formal and informal rent seeking among different state agencies seeking to retain climate aid money has led to power struggles in the government bureaucracy. As these have played out, carbon funds and forest governance powers have become concentrated with the Kilimanjaro park authority and the regional administration, opening up the opportunity for corruption and rent capture. This has happened at the expense of democratic governance of forests, as elected district and village councils have lost their powers. In all cases, although taking different forms, we see such intertwining of party politics, bureaucratic competition, business interests, land and ethnicity, revealing carbon projects as new sites for political struggle. These socio-political conflicts can be seen as an inevitable corollary of carbon projects, given the plurality of diverse interests and social and political relations amongst different local, national and global actors required to realize value from carbon.

This wide array of relations means that carbon projects, often in remote rural locations where state agents are thin on the ground, can take on state-like functions and characteristics. This may involve providing social services (schools, health posts), security (forest guards, poaching patrols) and quasi-democratic functions (consultative committees, community groups), as shown across all the case studies. Projects – with varied mixes of private, NGO and public sector staff and characteristics – may also undertake environmental planning, review, assessment and governance functions that the state might have been expected to assume. Carbon projects can be welcomed as preferable to previous arrangements, as in the case of the Kasigau project in Kenya (Atela, chapter 6, this book). Here people had been excluded from local wildlife resources thanks to a centralized regime and deprived of state services, so many welcomed the project and its associated community benefits. By contrast in Uganda (Nel, this book), the establishment of projects resulted in exclusions and evictions, although in some instances, in these 'zones of awkward engagement' (cf. Tsing, 2005), renegotiations with local company and state officials took place.

Carbon projects – like other forest projects – change relationships of power, representation and accountability, including between communities and the state (Agrawal et al, 2012; Marino and Ribot, 2012; Ribot and Larson, 2012). They reconfigure local politics and interests, and with this who has control over resources. In some of our cases this results in an essentially private actor, often a private company, gaining control over land and trees that were once in the hands of communities and traditional chiefs – as the Ghana example shows. In other cases, carbon projects act to recentralize power,

extending the reach of the central state, over and above local decentralized authorities. We see this in the cases from Tanzania and Uganda, and also Sierra Leone, where the WAPFoR project is reasserting and enabling government control over the forest reserve and, on the grounds that the project is on government land, denying any local rights to participate in shaping project activities.

Landscapes are recast and shaped through such political processes. Yet quite how this plays out is highly dependent on the context, including histories of state formation, patterns of decentralization and forms of elite control. A particularly important factor is the nature of the land – and tree – tenure system in place, a theme to which we now turn.

Tenure: Negotiating rights and access

Carbon markets rely on the trading of property: carbon as a commodity must be owned. Yet the peculiar characteristics of carbon – constructed as a commodity through discursive processes, and subject to diverse imaginaries – complicate its tenure. How, for instance, might one seek to define ownership of 'the mists one sees above forests in the morning'? How are people to define rights and stake claims over 'carbon' when it is so hard to understand, and its value embedded in such diverse and distant relationships? These characteristics configure and add significant ambiguities to the process of negotiating rights and access over forest carbon, adding to those that already pervade tenure systems. For the individual property rights on which many market regimes rely are far from the reality in rural Africa. Instead, tenure systems involve complex, socially and

historically-embedded mixes of state, communal and individual ownership. Rights over

land and trees are layered and overlapping, often contested and usually ambiguous,

existing in a pluri-legal setting (Berry, 1989, 2002; Peters, 2004, 2009; Lund, 2008; Sikor

and Lund, 2010; Peluso and Lund, 2011).

So how does carbon become property, and so enter markets in the cases we have

examined? There are different routes, depending on the type of project (see Table 1.1). In

some cases, carbon is 'farmed', as part of agroforestry and tree planting efforts. Thus

carbon rights become aligned with individual rights over trees. This may seem simple,

given that most such trees are planted on people's individual plots or homestead gardens.

Yet tree tenure, even in such settings, is complex, with some trees individually owned,

while others may have access and use rights: for fruits, non-timber forest products, or

social activities (Fortman, 1985; Unruh, 2008).

In other projects, the carbon is enclosed as part of a 'ranching' or 'fortress' conservation

arrangement. A marked boundary or large fence is put up around the area, and is guarded.

These sites – as in Kasigau, Kenya, LZRP, Zambia, WaPFOR, Sierra Leone or the

Uganda examples – are either former large-scale farms or ranches owned individually

under freehold title arrangements, or conservation or forest areas, demarcated as state

land. Here carbon rights are linked to land rights. But again these may be less clear than

first imagined, despite obvious demarcation and cadastral authority. Other competing

rights may exist that cut across the fences, supported by claims based on earlier periods,

and confirmed by customary law and spiritual authority. Grave sites, past village

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settlements, particular trees, wetlands or caves, for example, may be used as evidence that others have rights over the areas, beyond those signalled in state land registries or proclamations.

These competing claims are often accepted by the formal land owner as part of a local social deal that allows, for example, rainmaking ceremonies at sacred sites, visits to burial grounds at particular times of year, and the use of the area for harvesting of forest products or other livelihood activities. So for example in Kasigau in Kenya, people are permitted to attend sacred shrines and grave sites, even though these are on hills within the project boundary. In Mt. Kilimanjaro, people have since colonial times had access to the forest reserve for livelihood and cultural uses – collecting fuelwood and livestock fodder, accessing traditional ceremony sites, collecting medicinal herbs or repairing indigenous irrigation furrows that originate in the forests. They view such access as their customary right.

Such social access arrangements redefine the sharp lines of forest boundaries and cadastral surveys into something much more fluid. However, such fuzzy boundaries recognizing overlapping claims are poorly aligned with the imperatives of carbon projects, which must protect carbon value as exchangeable private property and assure its presence for decades. Land holders and carbon beneficiaries are therefore forced to rethink the security of their resource, making it only rational to reassert the boundaries and create a more fortress-like arrangement that excludes others' access or regulates this with much more rigour. We see this in the Kilimanjaro case, where longstanding access

has recently been curtailed by new carbon initiatives: all men have been banned from going into the forests, while women have been given very restricted access. Indeed for some, the requirements of carbon projects, and the funds that follow, allow for the imposition of long-desired controls. While a more community-based approach may have been the default in the past, partly the consequence of lack of funds to do anything else and partly because joint management approaches were heavily backed by donors, officials have often hankered after a more traditional exclusionary, often militarized, approach to conservation. In the Sierra Leone case, this is exactly what has happened, with the WAPFoR project enabling a long-desired major expansion in the numbers of forest guards, now armed and given police support.

Another type of project aims to appropriate carbon value from community held resources. This presents some of the most challenging tenure issues. Across our case studies, 'communal' land is held in different ways – as party of chiefly 'stool' land with minimal central state interference (in Ghana), as a hybrid arrangement between traditional authorities and the local state (as in Kenya, Tanzania, Zambia and Zimbabwe) and as a patchwork mix between private, community and state land, with unclear boundaries. The Kenyan KACP case (Atela, chapter 4, this book) represents a situation whereby the carbon accounting procedure is based on individual land holdings, linked to 'carbon rights' and associated payments. However, more than half of the land in the project area is held customarily and legitimized by traditional passage of use rights from one generation to the other. Customary land rights are held by individual families but land is often used communally. Given that residue incorporation and vegetation retention

in these farms are some of the key carbon-generating activities, should farmers allow communal grazing of land during the dry season or instead conserve residues for sequestration, and individual benefit? Such conflicting land and resource tenure arrangements may create significant social conflicts as the commoditization of carbon creates incentives to privatize and individualize resources.

Deals made with 'communities' thus present real challenges, as it is often not clear who the community is, what authority the notional leadership has over land and resources, or how such a community may be changing over time. Contemporary arrangements of course reflect past histories, and especially particular patterns of colonial rule. Thus in countries where indirect rule dominated, such as Ghana, chiefly authority is significant; deals that stretch across different stool areas are problematic, as are commitments by the central state (Kasanga and Kotey, 2001). In Sierra Leone, parallel situations prevail across most of the country, but the Western Area where the case study project is situated is an exception: this was once a British Crown Colony, and all land is still formally owned by central government. In former settler economies, such as Kenya and Zimbabwe, there was once a clear division between white-owned freehold land and communal land (the reserves, or tribal trust land), although the state had jurisdiction over these areas, allowing chiefs at different times some level of control over land allocation and adjudication (Berry, 2002; Peters, 2004). Tanzania and Zambia represent situations where land is held by the state (sometimes through local government under decentralized arrangements), but traditional authorities have been granted substantial control on customary or 'tribal' lands. Depending on wider politics and the power and imperatives

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of the state, these arrangements vary over time. Land rights and markets involve many 'vernacular' interpretations (Colin and Woodhouse, 2010). 'Tradition' – and with this customs, practices, rules, regulations, community and forms of authority – were, and still are, often 'invented' to suit particular circumstances (Chanock, 1991; Hobsbawm and Ranger, 1983). When a new carbon project arrives it must slot into this layered history and experience, negotiating access and authority accordingly.

Forest landscapes are in part accretions of past tenure relations. Past authority can be reinvoked if new forms of control are imposed that affect particular interests, or new forms of value are realized. We see this in many of the cases, in the context of disjunctures between project assumptions and imperatives around state or individual control over carbon, and complicated tenurial realities. Suddenly a long-abandoned grave site becomes a central bone of contention, or previously hidden forest uses become criminalized and resentments rise, or past disputes between different chieftaincies or headmen become regalvanized, as it suddenly becomes important to assert authority over once peripheral but now newly-valuable areas. A landscape always has a long, layered history replete with different memories, meanings and claims. Sometimes new disputes revive even pre-colonial histories, with conflicting assertions of power and control over an area based on different groups' often highly stylized unwritten versions of the distant past.

Given these multiple jurisdictions and types of authority, and competing, layered histories of claims in African rural settings, it is not surprising that conflicts over land and

resources are perennial, continuously negotiated and renegotiated, with outcomes depending on the power relations between the different actors (cf. Berry, 1989, 1993; Peters, 2004, 2009; Sikor and Lund, 2010; Peluso and Lund, 2011; Boone and Lund, 2013; Boone, 2013). Carbon projects not only find it difficult to navigate these complexities and conflicts, but often fuel them, adding further dimensions. Thus, for example, in the Ghana case, the project introduced new actors by leasing land and carbon rights to 'absentee owners' – including urban based professionals, church groups and others with no historical relationship to the area (Hashmiu, this book). In Kasigau, Kenya (Atela, chapter 6, this book), the project in effect dismantled the state-based institutions for land control and imposed new ones, adding a new layer of jurisdiction and multiplying ambiguities. In Zambia, the strengthening of private property rights for carbon acted to weaken customary controls over land, replacing local institutions. This opened the door to other forms of 'land grabbing', making it easier for private investors to come in and make deals with the local state (cf. Fairhead et al, 2012). The converse can also happen. In Zimbabwe, the alliance of the carbon project with local traditional leadership and decentralized state authorities has had the effect of preventing land grabbing by outsiders, and the project was seen by local inhabitants as a way of halting the influx of migrants into the area, protecting 'indigenous' rights (Dzingirai and Mangwanya, this book).

In these ways, questions of property rights and tenure are at the heart of carbon conflicts. Carbon interventions (re) shape resource access and control, and interplay with the politics of land and trees in ways that create and legitimate new forms of social order, and

contestations over authority (cf. Boone and Lund, 2013). Conflicts unfold as carbon

projects attempt to impose the neat market-based property arrangements that they require

onto complex, ambiguous, rural tenure discourses and practices, and the ambiguities of

carbon itself as a commodity. Forest landscapes are re-shaped in the process. But this

happens in very varied ways, depending on historically-derived configurations of power

and authority in particular areas, and is open to ongoing negotiation. The new forms of

control that are derived from forest carbon projects therefore are not all-powerful: the

unruliness of people and politics, as well as of nature, can undermine neat plans. Nor are

the winners and losers predictable; this reflects multiple factors and the particular

diversity of interests at play. Similar variation arises when, as next, we reflect on the

differential impact of carbon forestry projects on livelihoods.

Diverse livelihoods and styles of resistance

In the sometimes rather simplistic rhetoric of the 'pro-poor' impacts of carbon projects,

there are narratives about 'benefit sharing', 'community-based' impacts and

'empowerment'. These are also central emphases in the safeguards and standards

adopted, at least in principle, by many carbon project frameworks. Such narratives have

become standard in development more generally, but as the widespread critique of

community-based resource management has shown (Nelson, 2010; Dressler et al, 2010),

simplistic assumptions have to be rejected in favour of a much more differentiated view.

Communities are not uniform, but intersected by diverse axes of difference – from wealth

to gender, age and ethnicity. Diverse institutions are associated with powers of inclusion

and exclusion, shaping resource access and control (Ribot and Peluso, 2003; Hall et al, 2011). Analysis of livelihood impacts must attend centrally to such institutional and political processes (Scoones, 2009).

In these respects, the analysis of livelihood impacts – and sometimes resistance to negative impacts – in our cases reveals many continuities with past rural development interventions. Yet here too, carbon makes important differences. The business-oriented character of many projects, and the idea that profit is being made by distant outsiders, brings a greater sharpness to local debate about who is gaining and who is losing. Carbon projects typically involve new development actors unfamiliar with past lessons. And the ambiguous, hard-to-fathom processes that give value to carbon both fuel local anxiety, and make resistance hard to focus.

In this context of continuity and change, the cases find that winners and losers are not necessarily as expected. In none of the cases does 'the community' line up against, or indeed with, 'the project'. Rather, there is a diversity of livelihood interests and ways of relating to forests and ecosystems embedded in people's settlement histories and social positions. Sometimes unexpected alliances form. Thus, in Zimbabwe, support for the project comes from indigenous food crop farmers and their chiefs, as a way of keeping at bay rapacious migrant tobacco and cotton farmers (Dzingirai and Mangwanya, this book).

Project designs often overlook such differences, either casting communities as unitary or adopting rather simplistic views of who are the 'culprits' and who should be the 'beneficiaries', in ways that leave certain groups excluded. Thus, for example in Ghana, migrant sharecroppers may not own land but are important land users; shifting land to a carbon reserve unwittingly displaced them. In Zambia, immigrant charcoalers are perhaps the major threat to carbon resources. Yet such itinerant livelihoods were difficult to understand and control by a project focused on 'community' structures (Dzingirai and Mangwanya, this book). In eastern Kenya, transhumant pastoral livelihoods were disrupted by a project focus on resident agriculturalists, despite the fact that both had claims on the area (Atela, chapter 6, this book).

In projects that involve the allocation of farmland for tree growing, resource access and control arrangements mean that only some people can participate. This is usually larger landowners who can afford to allocate portions of their farms to trees, while retaining areas for food crops. Very often it is male land 'owners' who participate, and women who manage smaller garden areas, do not directly benefit while those without land, including youth, hoping to inherit portions of their fathers' plots, are disenfranchised. This was the case in Ghana (Hashmiu, this book), where older indigenous men could afford to allocate land to carbon trees, whereas women, youth and migrants needed the land to grow food crops. Thus, carbon projects can have gendered and age-specific consequences, with the value being appropriate by some but not others.

The cases illustrate many other forest-linked livelihood activities, important to different people – from beekeeping, foraging and small game hunting to dry season or drought relief cattle grazing, and selective timber harvesting for house construction or boat building. As recent studies have shown, the value of forests beyond carbon can be considerable (Sunderland et al, 2014; Jagger et al, 2014). Small-scale extraction may not jeopardize the carbon stock significantly, but in forest-savanna and dry forest zones the threat of fire often means that project developers act to exclude such people. New security arrangements – fences, guards and anti-poaching patrols – sometimes act to criminalize such livelihoods, creating resentment and conflict. This may have a contradictory effect in practice. For instance if fire management is not taken seriously, the build-up of grass in the absence of grazing or controlled burning may create a major risk to carbon stocks – a live issue in the Ghana case study. Equally, by making foraging, hunting and grazing illegal, those who continue to practise such livelihoods do it under cover. In order to flush out game, create patches of grazing and clear areas rapidly, fires may be set, causing more damage. Thus, new regulations, creating new forms of exclusion and changes in livelihood use, may change the ecology, and so restructure the landscape.

Accepting that carbon forestry projects must protect their newly valued resources, offering alternative livelihood options that do not affect the carbon stock is invariably part of project designs.[2] Indeed, showing that such alternatives exist is crucial to the argument that carbon is being stored at higher levels than would have happened without the project. Thus, across our cases there is an array of alternative livelihood interventions,

most part of standard development repertoires. Some involve alternatives to using a protected forest area, such as beekeeping and hive construction or mushroom growing in village areas; some involve reducing forest destruction, including improved-efficiency stove, brick making, bread oven, fish smoking, tobacco curing and charcoal manufacturing technologies; some involve changes in agricultural practice, including 'conservation agriculture' or agroforestry, that allow for increased carbon sequestration or that intensify agricultural production (such as improved irrigation technologies) or that increase the value of farm production (such as negotiating better prices); others provide new livelihoods that are not dependent on forest, including the financing of motorbike taxis, and the inevitable chicken, garden and craft projects for women; and finally others are focused on gaining community acceptance, through investments in building schools, clinics and grinding mills, as part of a corporate social responsibility/public relations drive.

As the case studies show, such livelihood interventions face persistent problems. These are not exclusive to carbon projects, reflecting the long, hard experience of rural development more generally. However, very often new carbon projects are run by those with limited rural development experience, so old mistakes are repeated. Thus activities sometimes become captured by particular elites, entering local political struggles. Some fail to produce a viable source of income and therefore do not replace carbon-consuming alternatives. Communities, as noted, are far from uniform, and so activities geared to assumed 'community needs' fail to articulate with people's livelihood priorities. Activities sometimes assume particular gendered and age requirements based more on

stereotypes than real aspirations, and so are rejected. And they may require substantial labour that in reality is not available, particularly for smaller households, those with young children, the aged, sick or infirm. Thus livelihood activities can miss their target of being 'pro poor', by failing to understand the different constraints of the differentiated poor within an area. The case studies illustrate many such instances. Most fundamentally, though, they show that due to false narratives and misperceptions about forest use and change and their interrelationships with 'carbon', livelihood interventions are often based on illusory premises. The design assumptions of increasing carbon sequestration by often significant percentages through such efforts are, as we see in the cases, therefore way off the mark.

The disconnects between project promises and livelihood impacts, as well as local experiences of resource appropriation, can lead to deep local resentment. The resulting carbon conflicts take on different forms, from outright challenge to a project to more passive, hidden forms of resistance (Scott, 1990). Of the cases in this book, the Tanzania case showed the most overt forms of resistance, as villagers mobilized to demonstrate against coercion associated with fortress forest protection, particularly the use of violence by park rangers. This went as far as digging trenches in the road to stop tourist vehicles entering the area, along with suspected arson and sabotage within the now enclosed forests. In Sierra Leone, equally, aggression towards forest guards have been reported, as people become frustrated by the imposition of the new boundaries to the forest reserve. Other cases show a pattern of outward public acceptance, but continued foot-dragging that makes a project difficult to implement. Local negotiation and accommodation may

take place, where plans are amended, rules relaxed and informal practices accepted; yet these may only emerge where flexibility and discretion is permitted for project workers (Nel, this book).

Public media have been used in both promotion and resistance to projects. Project developers are quick to highlight that their efforts are pro-poor and green in their public proclamations, even styling themselves as 'missionary' ecologists and developers (Dzingirai and Mangwanya, this book). Many use high-profile community investments – such as schools or clinics, opened with fanfare – as public demonstrations of project value. In their public relations efforts, projects also seek to distance current activities from past interventions that have foundered and gained a bad reputation. Thus in Zimbabwe, the Kariba REDD project is at pains to point out that despite obvious similarities, it is different to the wildlife utilization CAMPFIRE schemes of the past that became riven with conflicts and accusations of improper fund appropriation and lack of benefit sharing (Dzingirai and Mangwanya, this book). But resistance may also deploy similar tactics: highlighting similarities with past failures, and spreading rumours about projects' 'real' intentions. In Zimbabwe, local people used dramatic terms, arguing 'they are here to kill us', and playing into the racially tinged politics of such efforts. In Sierra Leone (Winnebah and Leach, this book), journalists and NGOs have used newspapers and radio to associate the WAPFoR project with 'carbon cowboys' – companies allied with allegedly corrupt state officials who have developed schemes elsewhere in the country geared to profit at the expense of communities. Carbon projects in Africa are often interpreted by publics amidst wider media discussion of corruption, scams, and in

the West African context accusations of projects being '419s' (a colloquialism for a fraudulent arrangement invoking this section of the Nigerian criminal code).

These are of course similar to responses to coercive environment and development projects of the past. But what difference does carbon make? One differentiating factor is the casting of carbon projects in such global, generic terms, linked to narratives about global climate change and hard-to-grasp valuation of 'carbon', that they are more difficult to apprehend and respond to at the local level. Another is that benefit flows are over such long time frames compared with the day-to-day and seasonal nature of livelihood decisions. Thus, the high-sounding objectives of carbon projects are often meaningless to local people. This creates situations in which project, and local, objectives often fail to connect, increasing the potential for conflict. Yet it can be difficult for local people to know what, exactly, to resist; certainly not the need to do something about climate change – with which most people, if asked, concur. Instead, conflicts themselves tend to focus in on day-to-day project practices and livelihood impacts.

Thus overall carbon projects have diverse impacts on livelihoods, resulting in a variety of conflicts and styles of resistance. Carbon conflicts take on many forms therefore, depending on the historical and political context, experiences of past interventions, and the form of appropriation that the carbon intervention takes, and so the changes in authority, tenure and access that result. Carbon projects thus reconfigure social, political, ecological and even cultural and symbolic dimensions of landscapes in complex ways.

Understanding carbon conflicts therefore requires an integrative approach – as taken by each of the chapters in this book.

Before moving to the cases, however, we want to conclude this opening chapter with some reflections, emerging from across the case studies, on future policy scenarios.

Conclusions

There are number of possible responses to the findings of the cases in this book, and the broad implications laid out in this chapter. In this concluding section, we outline three.

The first would argue that carbon forestry projects will inevitably fail due to their inbuilt contradictions. Attempts at appropriating value from carbon that is already owned and used by others is bound to be resisted. Carbon projects are in other words 'green grabs' (Fairhead et al, 2012), whereby carbon is appropriated notionally for environmental ends, but in practice to meet commercial imperatives.[3] Such a 'grab' alienates land and resources, reduces access and results in inequalities within and between groups. The result is inevitably struggle over authority and a contest for benefits between different players. The relationships between land, territory, identity and citizenship are challenged, with major political and social implications. The consequences of any such intervention will, almost inevitably, be conflict, no matter what 'livelihood diversification' activities and 'benefit sharing' options are offered. With the failure of the pure market-based approach to carbon project development due to declining prices and high start-up costs,

arguments to treat carbon forestry as an aid-funded 'public good' initiative run by private sector investors appear fraught with contradictions. While few deny the imperative of addressing climate change, the offset market approach through carbon forestry projects in remote rural locations in Africa is so prone to failure through leakage, lack of permanence, project failure and resistance by unruly ecologies and people, that justifications that the global public goods of carbon emission reductions should override local costs to livelihoods look extremely shaky. Instead, mitigation at the point of emission may make much more sense if climate challenges are to be addressed. The environmental consequences of excess consumption and untrammelled growth cannot be addressed in Africa, where other developmental challenges exist. Thus, the argument would go, the apparently neat 'neoliberalization of nature' discourse, based on processes of financialization and marketization, at the heart of carbon forestry projects is deeply flawed, results in inequitable outcomes and may in fact not deal with climate change effectively anyway. The conclusion under this first response would be to abandon carbon projects, and revert, as many indeed have done, to more traditional livelihood and rural development projects that support sound forest management, but with local interests at the heart of design and implementation – and leaving climate change mitigation to be addressed elsewhere.

A second response would accept that high-level international policy concern around climate is mobilizing considerable resources for forests and rural development in unprecedented ways, and that this needs to be capitalized upon. The climate-forest intersection is therefore a major opportunity to develop innovative solutions that benefit

local people, improve the sustainable management of forest resources and boost climate mitigation efforts. The role of offset schemes and private sector actors also brings in new mechanisms, expertise and funding into a sector that has been in the doldrums. Rather than taking a pessimistic view, 'win-win' options should actively be sought out. This means bringing lessons for project design developed in previous eras – around community-based forestry, joint forest management, on-farm agroforestry and so on – to bear, but making them more 'climate smart'. As with previous experiences, issues of forest governance, and tenure in particular, are essential components, so a more sophisticated, socially-informed approach is required. This means more community participation in planning and design and an approach to decentralizing and managing benefit-sharing so that disenfranchisement, alienation and exclusion do not happen. This response represents a pragmatic approach that accepts that climate-driven projects are a feature of the current environment-development context, but aims to adapt projects and policies to bring governance and participation issues more centre stage, so that these new interventions result in wider benefits for rural livelihoods.

A third response takes a different stance, and derives from a rather different starting point. It accepts the critique of the first response, and so argues for a need to address head on the politics of marketization and financialization, avoiding a naïve acceptance of market-based offset solutions. But it also takes a pragmatic stance in suggesting that there are things that can be done, as long as we accept that all players are political, and that conflicts over carbon, just as any other resource, are inevitable. Climate finance for mitigation – through a range of market and non-market mechanisms – provides, such a

response argues, a useful route to investing in new patterns of resource use, if a rather more acute political analysis of winners and losers, inclusions and exclusions takes place. This third response then starts from the concept of landscape with all its social, political, cultural and ecological dimensions, and asks 'what should this landscape look like in a world where carbon matters?' And it starts from a recognition of 'carbon' not as a commodity like any other, but open to radically different imaginaries. This is different to starting from a landscape as a rational planning tool, carbon as a commodity in a notional market or from a project developed in abstraction. Lived-in landscapes, as discussed earlier, have histories, layered experiences and interventions, and so must be addressed holistically, and through a socio-political lens. At stake may be radically different worldviews – encompassing different meanings of carbon, and priorities around global vs. local, or profit vs. livelihood, concerns. An inclusive and deliberative approach would have to be at the centre of such an approach; one that is cognisant of such differing views, interests and politics. This would involve discussing diverse futures, from the standpoints of different people and things; debating the views of women and men, elders and youth, richer and poorer, the state and local groups, as well as finding ways of bringing nature and the broader planetary environment into the conversation.

By thinking about future pathways for a particular landscape, trade-offs, obstacles and existing and potential conflicts would be incorporated. The aim would be to construct multiple 'imagined' landscapes across scales and over different timeframes, and so generate different, perhaps conflicting but sometimes compatible, pathways to sustainability. Asking the question 'what do future carbon landscapes look like?' opens

up the debate about imaginaries, livelihoods, resource use and political dynamics, linking local contexts with global issues. In this sense, carbon, almost because of its abstraction, can act as a valuable discursive commodity, a boundary object, around which debates around local sustainability within planetary boundaries (cf. Rockström et al, 2009) can unfold, but always highlighting that the negotiation of such pathways will be intensely political (Leach et al, 2010). Carbon conflicts, therefore, should not be a surprise that challenges neatly laid plans, but should be embraced in an agonistic politics of dispute and deliberation (Mouffe, 2005) around resource use and rural livelihoods (Holmes and Scoones, 2000). Such an approach would clearly be a radical departure from the status quo, and would mean a fundamental rethinking of the carbon forestry approach. It also implies a rather different perspective on 'landscape' than the managerialist notions currently being peddled. However, it does pick up on and draw experience from a long tradition of critique of market-based and top-down planning solutions, as well as novel practice in resource management and rural development (Scoones and Thompson, 1994).

The aim of this book is not to provide policy recommendations, but to unpack fast-unfolding experience in a number of cases and draw some rather wider, analytical lessons. This chapter has attempted to do this, drawing on all the case studies that follow. The cases in different ways suggest elements of all three of the responses highlighted above, some veering more to one than the others depending on the context. Certainly overall, the critique of the simplistic offset market approach comes across loud and clear across the cases, and so there is wide support for the first response outlined above. But authors do not go as far as rejecting carbon forestry interventions out of hand. That said,

there is great caution observed for the reformist stance of the second response. The real

challenges of taking politics seriously are highlighted again and again, and simplistic

approaches to 'participation' and 'governance' fixes to replace a 'technical' or 'market'

fix are rejected. It is therefore the third response that resonates most clearly with many of

the contributions of this book. The 'politics of carbon landscapes' approach has yet to be

fully elaborated, and certainly remains to be tested on the ground, but it offers some

prospect, drawing on long experience in a range of fields, for revitalized carbon forestry

approaches where carbon conflicts are emphasized in the context of a political ecology

approach to livelihoods and landscapes.

[1] See: www.redd-monitor.org/2014/01/09/global-carbon-markets-have-shrunk-in-value-by-60-since-2011/;
www.redd-monitor.org/tag/boiler-room/ (accessed May 26 2014);

[2] http://blog.cifor.org/21257/are-alternative-livelihoods-projects-effective#.U4MkA01OXIV (accessed 26 May 2014).

[3] www.redd-monitor.org/2014/03/20/redd-could-lead-to-a-carbon-grab-new-report-from-the-rights-and-resources-initiative/ (accessed 26 May 2014)