



RESEARCH ARTICLE

The costs and values of life in South Sudan's militarised charcoal economy*

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Abstract

Charcoal economies in central-east Africa are deep and powerful: they connect military and state financing with everyday family cooking. This article, based on new fieldwork in the understudied charcoal economy in South Sudan, explores the hierarchies and systems of self-employed producers, cash-for-piecework workers, middlemen and transporters, large-scale investors, and the public and defence sector financiers, landlords, brokers and security providers who all work in this political economy of forestry and charcoal-making. Drawing on local colonial archives and extensive fieldwork over 2020–2022, we break down the forms of work, investment and exploitation across this historical post/colonial landscape of labour, tree cultures, land rights and regional trade. In doing this we expand and escape the dominant and neatening metaphor of the value chain; we present a wider view of the expansion of the armed, privatised state economy; and we highlight current debates over the value, commodification and sale of forests and rural life.

Keywords: – Charcoal; Africa; South Sudan; woodfuels; colonialism; military economy

Introduction

The violent expropriation of natural resources underpins central-east Africa's modern history of states and power. Oil and mineral extraction produce

* This research was supported by the British Academy's Heritage, Dignity, and Violence Programme (HDV190205) under the UK Government's Global Challenges Research Fund. We thank field supervisor Jok Gai Anai, field researchers John Mayom Akech and Beatrice Kaluma, and security advisor and environmentalist Sebit Richard Wilson Okumu for their research work over 2020–2022. We also thank Dr Adam Branch and the anonymous reviewers for their very helpful suggestions for revisions. Nhial Tiitmamer is currently working with the United Nations Mission in South Sudan and all views expressed are the authors' own.

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centralised revenues and are processed and consumed mostly elsewhere. Charcoal, however, is an energy resource that creates decentralised incomes and revenues; as such it transcends inter/national and local resource systems. It connects everyday family finances and food security, urban centres and deep rurals, the wider military economy that its production and sale funds, the fragmented local government powers that seek to tax and manage it, and the labour markets and transit systems that fuel the charcoal production economy.

African political economists often focus on the impacts of this extraction especially of oil and minerals across the region, because these modern forms of 'motive power' (in both senses of the word motive, power-generative and motivating) underpin contemporary dynamics of patronage politics and violence (see Wynn 2023). While oil and mining are central in producing the central cash-based systems that fund violent patronage in the Nile valley and the Congo river basin, forests and their products have been critically important in producing local systems of power that are intimately connected to people's day-to-day food and family life.

We argue that charcoal cannot just be discussed as an energy source and commodity to control: its specific decentralised production networks and labour dynamics, and its connections to histories and social lives of forests and homes, make charcoal a pervasive force in everyday life. Forests and trees are at the heart of community histories, definitions of land and borders, and political systems; they have also shaped the careers of the Central African Republic and South Sudan's older generation of military leaders whose authority was forged in the bush during long civil wars. Talking about charcoal therefore allows for a wider conversation over political ecology. Charcoal production is an everyday centre point of conversations over the meaning of ownership and the capitalisation of ecology as property; the marketisation of environments and rural social worlds; and conflicting definitions of ecological, economic and societal value.

In grounding discussions of environments and energy in the diffuse everyday practicalities of charcoal, we respond to a wider call for social thought on environmental destruction and for detailed analyses of postcolonial energy landscapes (Baptista 2018: 32; Ferdinand *et al.* 2020: 2). We demonstrate the importance of a historical approach to the energy landscape because, following Castán Broto (2019), energy systems are historically and geographically produced through not just immediate politics but also social life, labour systems and local history. Here we are drawing on contemporary energopower/energy landscapes' foci on the relationships between energy and political power, and the practical dynamics of state, electric, corporate and popular power in energy systems (Boyer 2019; Kirshner *et al.* 2020), and on the wide new field of developmental and sociological studies of fuel, poverty and the costs of energy for everyday people in Africa (see our wider project's comparative analysis: Branch *et al.* 2022). We move these discussions forward by taking up the moral economic and historical approach called for by these fields (building on Huber 2015; Baptista 2018; Castán Broto 2019). We place the charcoal production system within the context of a wider and historical resource landscape, including mahogany and teak, medicinal forest resources, water and soils,

sacred spaces and gold seams. This allows us not just to explore the historical dynamics of the armed politics of charcoal energy systems, but also to explore arguments over the value, ownership and capitalisation of rural worlds in central-east Africa. Charcoal is an ecological question, a lynchpin in household economies and a national security issue; it is at the centre of conversations over the moral and actual value of the world.

South Sudan

To build a wider, historical view of the power politics of charcoal, we undertook new research in South Sudan into charcoal production, including gathering archival evidence of colonial and postcolonial charcoal and forestry systems and workforce control from the South Sudan National Archives. We bring this together with new regional research across conservation, energy systems, political economy and development. This study is part of a new wave of research in South Sudan that studies politics along and beyond the value chain, from debt and monetised labour to shifting land and property rights and political rents (Badiey 2014; McMichael 2016; Deng 2019; Justin 2020; Leonardi 2020; Haysom *et al.* 2021; Kindersley & Majok 2022).

South Sudan's current political analyses generally pay very little attention to ecology but draw heavily on the idea of extraction. In this literature, South Sudan's natural resources and wealth are extracted from both the public good and their ecological context. This is most explicitly articulated around oil production. Since the 1990s, Sudan and then South Sudan's governments have been built on oil revenues from the borderland oilfields. In the south, political analysis often focuses on these oil revenues funnelled through state and private companies and the presidential office (Twijjnstra 2015; Boswell 2021; Gallopin *et al.* 2021; Craze 2023b). Research on the environmental and human damages of the oil landscape is much more limited (Moro 2009; Zwijnenburg 2020; Tittmamer & Kut 2021; Ajak *et al.* 2023; Zwijnenburg *et al.* 2023). Environmental debates in the public sphere are also focused on the various benefits and damages of natural resource exploitation. Recent heated arguments in 2022 over government deals to dredge Nile tributaries reflected long tensions over Sudanese colonial and postcolonial government plans for draining the Sudd swamp and selling water up the Nile Valley: canal-building in 1983 was an early target in the second civil war. The extraction and alienation of natural resources for central elite profit is a key part of longstanding popular grievances against the modern state. Dominant critiques of South Sudan's political system are also framed through extraction: of political power and local appointments to the central president's office, of national wealth to the towns and capital, and of political capital drawn from the ability to incite or control remote rural conflicts (see Craze 2023a).

This conversation over South Sudan's extractive economy often lumps resources together, as units of natural resources whose trade, control and profits can be (state-)managed: including electricity via dams, irrigation via canals, gold via small company mines in north-west and south-east South Sudan, teak, mahogany, gum arabic and coffee from growing commercial farms, and then,

of course, oil production via a combination of local and international companies. These national extractive resources are broadly distinguished from local environmental production systems of food, fish, bricks, rush and bamboo fences, honey, house poles and roofing materials, which sustain communities in the everyday, and do not generally fall under state control beyond being taxed at markets and checkpoints. We argue that charcoal lies across these systems. As a major rural export for cash income, charcoal connects small-scale, part-time producers with international commercial investors and state or rebel military actors, but unlike other common rural products it underpins national (especially urban) energy systems, and since the late 2010s it finances everyday military incomes via both production and checkpoints over a large part of South Sudan.

But research conversations are disconnected across this field. Discussion of South Sudan's environment mostly focuses on the impacts of climate change and deforestation, with a small literature on oil production's local medical and social impacts. South Sudan is facing some of most rapid impacts of climate change in the world, and there is a growing body of research focused on temperature rises, rainfall pattern shifts, and flooding and drought crises in recent years (Wenger *et al.* 2017; Tiitmamer 2021; NUPI 2022: 2). A lot of this literature ties these shifts to national deforestation and charcoal production. New research has documented accelerating deforestation over the 2013–2018 war and continuing economic crisis (Ochaya & Gale 2020: 7). Some reports are deeply pessimistic about the rate of forest loss, although others are more hopeful (for the former, UN Environment, 2018: 17, 134; for an optimistic view, Ochaya & Gale 2020: 7). Overall, however, most studies paint a picture of ecological crisis: as people's dependency on charcoal and firewood for food and incomes accelerates rapid deforestation and consequently disrupts water and soil systems (NUPI 2022: 2). These studies are fundamentally contemporary despite their tracing of historic climactic trends, and so are disconnected from new advances in histories of forestry and charcoal across Africa that trace continuities from the colonial period (e.g. Neumann 2002; Sunseri 2009; Mgaya 2016). Here we have tried to place South Sudan's immediate ecological crisis in not just social but historical context: exploring past fears over deforestation and a lack of control of energy systems and ecologies through the colonial and postcolonial periods, since the practical establishment of colonial state government in the 1920s. By looking back in time at past fears of ecological crisis due to deforestation and charcoal production, of course we are not arguing that the current climate catastrophe is not an immediate and extreme threat to all life; we seek to trace assertions of power and authority over charcoal and forestry production through generations.

A longer history of forests and power

In undertaking this expansion of the framing of charcoal politics in current political science work, we build on developments in environmental histories of colonialism. Historians have documented the rise of European conservation

and reserve policies since the 1930s that have structured governance and geographies through the following century in Africa and elsewhere (Neumann 2002: 28). These policies were rooted in (at least theoretically) fears over soil erosion, deforestation and environmental loss, but served in practice to assert government ownership of all non-privatised lands and the speculated wealth of the ground beneath (Mgaya 2016: 49). This also justified mass dispossession of community land through enclosure and forced displacement, echoing the same processes in Europe one to two centuries earlier (Kashwan *et al.* 2021: 6). These policies served to assert government control of resources and abilities to subsist: European colonial governments tried to portion out limited access to natural resources and space to residents for domestic and local needs, reserving control of corporate production and investment to the state and its private concession-making powers (Mgaya 2016: 50). To enforce this system, wildlife and conservation policies built warden, police and legal systems that attempted to surveil and intervene in rural life and production. New research on charcoal production politics and forest conservation has re-energised debates over green militarisation, the policing of wildlife and forest reserves via surveillance, armed patrols, fines, evictions and prosecutions (Anai & Tiitmamer 2022). The modern history of fears over ecological destruction of natural resources is deeply intertwined with how systems of power and ownership have been conceived and extended in Africa over the last hundred years (Garland 2008: 59).

This article makes two core contributions here: firstly, it directly connects debates in political and historical research on forests and charcoal; and in doing so, it centres how the workers along this charcoal production system themselves interpret the commodification of forests, the extractive energy economy and its wider impacts on definitions of society, work, rights and safe futures.

Methodology

This research stems from a British Academy Heritage, Dignity and Violence project 'Fuelling Violence to Fuelling Peace: Charcoal and Environmental Justice in East Africa', bringing together researchers from the UK, Uganda, South Sudan, Mexico, Ghana and Kenya. As part of this collective, our team – a UK-based historian, a multidisciplinary researcher based at the Sudd Institute in South Sudan and a small network of research assistants – investigated charcoal landscapes in South Sudan, focusing on the capital city of Juba and the major Nimule corridor southwards to the Uganda border. The 192 km road to the South Sudanese border town of Nimule was the first paved highway in South Sudan in 2012 and the government's top infrastructure priority after peace in 2005 as a fundamental import route and revenue stream. The highway travels through extensive forests through Central and Eastern Equatoria states, and runs alongside Nimule National Park, established in 1954 under British Condominium rule and extending across the Ugandan border.

Research began with Sudd Institute checkpoint data collection in Juba in November 2020, after COVID-19 lockdown regulations eased. There were no

data at all about charcoal imports into the capital. Researchers at checkpoints counted sacks and vehicles as part of their observations and from this they gained insights into the control of charcoal, who transports, by what means, when and why. This work was supplemented by the Sudd Institute team over 2020–2022 with market price checks along the Nimule corridor, and with detailed focus groups, questionnaires and interviews. Over this period, researchers met with around 100 local and military authorities, charcoal producers and traders, transporters and local residents (and charcoal consumers). Further research at five checkpoints in Juba was conducted in December 2022 to provide a more comprehensive data set.

We started our research from checkpoints because checkpoints rely heavily on the charcoal economy. Since 2013, South Sudan's protracted political crisis has seen government and military salaries go unpaid for long periods. This has continued since the 2018 peace deal, with rapid centralisation of political power in the presidential office. Charcoal production, transport, taxation and sale has become a key part of now-localised military and government incomes, and checkpoints have become a significant – potentially the biggest non-oil – revenue stream for the security, police and military across South Sudan since 2018 (Schouten *et al.* 2021: 7). Building bases of trust around core data collection at checkpoints, including during the 5–9pm peak import period (after civil police checkpoint offices have closed), allowed us to open up conversations about this economy.

After reviewing this contemporary data, the historian then explored the history of these ecologies in the understudied South Sudan National Archives in Juba, researching forestry and charcoal production documentation from the British colonial government and Sudan governments since the 1920s. These files opened a hundred years of connected conversations about the control of labour for the production and management of energy in government urban centres, and longstanding questions of control of land, water, soils and environmental damage. As such our work tested out ways to build a ground-up picture of charcoal systems, their histories, politics and social worlds.

The initial checkpoint conversations provided a starting point for understanding the charcoal systems that flow towards the region's towns and cities. These conversations raised three core questions that structure the rest of this article: What are the historical, current and future landscapes that this charcoal industry is drawing from, and constructing? Who is doing the daily labour of production and transport, and who is investing in and managing growing business interests in the sector? And what forms of value are being created, and destroyed, through this energy landscape?

The Forest edge as the Market Frontier

A contemporary history from the South Sudanese forest demonstrates how, in extracting forest resources for its everyday survival and profit since the late nineteenth century, the always-militarised state has carved out its lines of sight along roads and around towns. These moving edges of the forest are the front lines of enclosure and commodification of both land and labour,

and are where new relationships of dependency and exploitation are being explicitly constructed. Charcoal landscapes have involved transforming homelands, forest biodiversity and people's labour and relationships into monetised resources over the last century. This re-valuing raises immediate questions of what the future looks like, for forests, for workers and for the ecological debts that the charcoal economy creates.

Post/colonial topographies of urban state consumption

Starting research from checkpoints reflected the centrifugal pull of forest energy resources into urban economies visible through the historical record. This has expanded rapidly since the establishment of the earliest colonial state structures in then-southern Sudan in the 1900s. The growth of South Sudan's urban administrative centres has always required environmental destruction for their energy, produced and imported along the same routes as studied during the checkpoint surveys. Most of South Sudan's towns are built on the same sites as the first slave compounds and trading forts of armed slavers and ivory traders from the 1830s to the 1900s, and this landscape of colonial power was built of and fuelled by their surrounding woods.

Wood and charcoal continued to funnel into towns to fuel state administration since the formal establishment of regional colonial government over the 1930s. These small urban spaces boomed by the 1950s (at least proportionately to its estimated population of 2.7 million) and colonial paperwork over these decades is filled with concerns over the costs, consumption and control of wood fuels. In 1935, only four years after the end of punitive military campaigns that forced the surrender of all southern leaderships to British colonial rule, local administrators in Malakal town estimated that the growing centre consumed about 600 sacks of charcoal every month, based on imports from Shilluk and Nuer Fangak producers; merchants formally wrote complaining to the government about the sky-high costs of charcoal due to undersupply (Mamur Malakal 1935). In 1938, the same year that British administrators finally set up formal administrative systems and external borders across what is now South Sudan, the assistant conservator of forests for the White & Upper Nile territories estimated that civil, military and trade operations in Torit town required 3000 cubic meters of wood and charcoal fuel per annum (Assistant Conservator of Forests 1938). This demand for wood and fuel boomed through the Second World War and under the post-war colonial state, including for large numbers of established trees for railway sleepers from the Juba-Torit and Juba-Nimule corridors, and encouraged what the British governor of Equatoria Bernard Marwood called a 'concentration on extraction' at all costs, regardless of policy (Governor Equatoria 1946; Vidal Hall 1953).

Cycles of boom periods of urbanisation between times of intense violence – in the post-war 1950s, the post-war 1970s and the post-war mid-2000s – have created matching periods of deforestation crises around towns. For example, in 1951 a forestry officer was concerned at the Juba-Arua road's 'hateful and destructive' stripping of firewood from along the route, 'the appearance of one particular [area] so being altered that within 18 months it had become

quite difficult to recognize' even to British officials, let alone the people who called it home (Duke 1951). By 1955 the Juba neem forests were stripped and 'exhausted', and firewood and charcoal production had to be moved a further 15 miles outside the small town (El Banna 1955). Chief conservator of forests Mohamed Shawki (1955) noted that 'Juba wood is finished for the time being'. The history of urban settlement in South Sudan since the 1860s can be re-viewed through these escalating cycles of urban landscaping through deforestation.

Fuelling military economies

With towns and supply roads as the foundation of the state in South Sudan, the extraction of charcoal and wood around these spaces has been a constant feature of always-militarised government since the earliest Turkish governors and warlords since the 1870s, into the British Condominium rule from 1898 onwards. This colonial economy required extensive military power, both in violently pacifying southern populations and sustaining its nominally civil rule at the urban(e) centre.

Government has always been run on the cheap here, with its major costs being the supply and upkeep of military force; and this military force (whether rebel or state) has therefore consistently relied on local extraction for incomes, from the colonial and post-colonial militaries in the first civil war (1955–1972) through to the Sudan People's Liberation Army in the 1983–2005 civil war. During the 1990s and again in the 2010s soldiers stationed in the Nimule corridor made everyday cash from selling iron and tin sheeting from abandoned houses, schools and churches, and through making and selling charcoal (South Sudan Liberty News 23.2.2019). Seventy years earlier, near the Nimule corridor, a colonial conservator wrote to the Commandant of the Sudan Defence Forces about 'deforestation at Torit': 'the military authorities... being the largest consumers have presumably been the principal authors' (Smith 1938). Throughout the South Sudan National Archives a succession of military forces cut through forests for teak, wood and charcoal. In November 1970, assistant conservator Jadia Bazu despaired that 'all our efforts to collect logs felled by security forces were in vain' and that the logs were then stolen by the local rural council executives, who 'insulted us a lot' after 'we and our forest guards tried to stop the cars' (Adam Bazu 1970). By 1975 Bazu's colleagues were despairing at the scale of deforestation by the army, police, prison wardens and security forces at Jebel Kuruk near Juba: 'there is now mass destruction to the forests' (Acting Conservator of Forests c. 1975).

In approaching South Sudan's military charcoal economy through this modern history, the period between 2005 and 2011 – when the Southern Sudan regional government funded its bloated, fragmented post-war military workforce through oil revenues – becomes a very temporary state of affairs. The oil economy is already winding up: since 2011 oil revenues have fallen by 72 percent; the South Sudan government has sold oil futures via loans against predicted production and future sales; the budget deficit has been monetised (Eliste *et al.* 2022: 32). Central state oil funds are (generally) no longer dispersed

through the military, especially outside of key strategic commands and locations. To sustain a large military and security sector, Juba's central political coalition has encouraged self-funding via an economy of regional licensing, land leases and local taxations. This is most visible in the checkpoint economy, with numbers of recorded checkpoints increasing by 50% from 2011 to 2021 and more on the Juba–Nimule road (see Schouten *et al.* 2021; Craze 2023a). Logging and charcoal-making are now crucial incomes, as well as taxing local and international producers, and making deals with national and regional charcoal businesses for armed protection and transport. Working on the Juba–Nimule road, military commanders at the Pageri Peace Forum in March 2020 justified their facilitation of logging and charcoal-making as compensation for late and unpaid salaries for their rank and file (Ochaya & Gale 2020: 18–19). Charcoal has always been a central part of military self-funding.

The informal privatisation of forest carbon

Looking at the state economy from the forest shows how state government has always included private enterprise in South Sudan; as early as 1934 the Zeraf district commissioner planned to expand his own private charcoal business (Acting District Commissioner 1934). As the frontier of charcoal markets and the cash economy has incorporated rural areas, these areas undergo rapid commercialisation of charcoal production – well beyond small-scale and dispersed household consumption – that include government private enterprise. Medium and large-scale commercialisation has intensified with the construction of major highways since the 2010s, especially the Juba–Nimule highway and the Juba–Bor highway, and with the introduction of bulldozers and power saws (Pageri and Opari head chiefs 2020 int.).

The commercial charcoal sector is therefore a historic example of an informal public–private partnership: regardless of state and county-level banning orders, commercial traders and producers have benefited directly from purchasing licences, making deals for tax-free trade, and either renting military protection or employing military workers directly; the SSPDF is also itself a producer and trader (Pageri and Opari head chiefs 2020 int.; Oliver 2020 int.). Indians, Eritreans, Ethiopians, Ugandans, Sudanese and South Sudanese traders and producers are all involved in these business networks, since the 1960s but especially since South Sudan's incorporation into regional transport networks from the late 1990s (Oliver 2020 int.; Azo Joseph and Masindi Boma chief 2020 int.). Today, South Sudan state employees in the border post at Nimule are reportedly travelling directly to buy logs and charcoal for export (Oliver 2020 int.).

This state–private commercial sector has had the effective ability to privatise and commercialise land and forests. Even if the process is not actually legal and bypasses local community ownership, in practice local government authorities have been regularly leasing areas of land to commercial charcoal interests as private rental property, or providing temporary licences for production on specific land. Previously this illegal local commodification of land was mostly seen in property speculation around major towns and cities, or

in national-level prospecting licences for huge areas of land; now licences and leases are being given at a local level into forests away from towns (McMichael 2016; Deng 2019; Justin 2020). This is causing regular land disputes in Lokiliri, Lobonok, Magwi and especially the Moli areas; a head chief noted that they see recycled permits for the same area (Oliver 2020 int.). The military command at Kerepi also noted the rising number of county permits, and the rise of directly negotiated brokerage for access to land in exchange for small fees (of 50-150SSP per bag) to communities and individual land-owners (Anon 2020 int., Kerepi).

It would be misleading to suggest that any Sudan or South Sudan laws have ever been effective in managing either land or charcoal rights. Juba's state archives are filled with previous complaints between chiefs and government officials about 'hand sawyers' of wood and charcoal 'entering their area without any reference to them' (Duke 1951). But the rapid increase in the commercial exploitation of forests based on locally issued licences reflects the intensification since 2018 of the localised extractive economy as the basis for state and military incomes.

Wood and charcoal have therefore always been crucial to funding and sustaining South Sudan's modern military economy. None of this is to say that the current situation of mass deforestation is not much more sharply extreme because of the scale and mechanisation of production (see below) and the scale of demand, or that the current violence and damage is not immediately painful. But taking this longer view allows an understanding of how charcoal and firewood production is tied to the growth and sustenance of the modern military state. South Sudan's current military employment systems rely on this extraction and taxation of natural resources beyond oil: from fishing, coffee plantations and gold mines. Charcoal fuels all this work, and finances state urban systems and workers at the same time as outsourcing its costs via rural asset-stripping. The series of wars since the second world war have intensified this charcoal economy through rapidly expanding cities, the securitisation of the Nimule trade corridor and its integration with regional markets and export chains.

Work and Labour beyond the Supply/Value Chain

Research conversations with charcoal workers over 2020-2022 through the Juba-Nimule corridor consistently centred on labour systems in these charcoal economies, and specifically focused on the inequalities of who controls the production and movement of energy from and across this landscape, and who does the hard work of extracting it. If wood and charcoal fuels have underwritten military states for the last hundred years, these states have also depended on various forms of coercion for commercial production for their cities and militaries. Providing the supply needed for growing demand has required an increasingly large amount of work. But this popular emphasis on the labour conditions and power relations of work in charcoal production reflects a gap in studies of energy supply chains in militarised spaces. Many recent studies imply that militarised energy production and supply is cartel-

like, hunting the 'key actors' linked from 'top' to 'bottom' (Ochaya & Gale 2020: 11). Our contemporary historical research demonstrates a much wider and evolving labour network.

Exploitative labour systems have a long history in South Sudan. The need for hard cash has forced people into charcoal production since at least the 1930s. This was in part induced by local military and colonial administrative authorities who sought to expand charcoal production to lower prices and create better urban supply; by imposing cash taxation requirements, residents were forced to seek market work via charcoal-selling to be able to obtain hard currency (Acting District Commissioner 1933). Discussions of coercion into conscripted labour for charcoal production date back to the 1930s, as well as to supply the creation of the first administration buildings and roads. The charcoal workforce has also included displaced people and refugees from the 1930s to present. This is the period where waged labour for cash payment begins to more commonly arrive across South Sudan, especially around its administrative centres. Land tenure and scarcity was also used as a coercive tool: in 1940 colonial officials sought to make farmland access conditional on working for free for the government for charcoal and wood production for a number of days a year, including for women (First Southern Division Forestry Conference 1940). The need for creating 'persuasive' conditions for charcoal labour continued, and exploitation of workers for charcoal profits (by both commercial and government officials) is recorded in the local archives into the 1970s (Marshall 1949). In 1975 the long-suffering forest officer Jadia Bazu complained that prison officers in Juba were even using prisoners as free labour for charcoal production without permission (Adam Bazu 1975).

The extraction of charcoal power therefore has depended on an increasing exploitation of labour power. Locations with frequent conflict and displacement – where the above military actors are most frequently stationed – generate often-desperate workforces. In the Nimule corridor, residents have been in this precarious and complicated position throughout Sudan's post-colonial civil wars since the 1960s. Since the South Sudan civil war started in 2013, agricultural self-production has become increasingly risky as the Nimule corridor's crucial trade route has been hyper-secured and as armed groups have fought across Central Equatoria. Annual investments in farms can be completely disrupted by a few weeks of insecurity or military activity (Anon. 2020 int, Nimule). Other sources of income, including government work or trade along the Nimule highway, have also suffered from a combination of conflict and inflation (Anon. 2020 int., Kerepi).

These combined conflict, climate and economic shocks mean that everybody is attempting to find safe ground and secure incomes away from cycles of drought and flood, and this includes large herds of cattle moving southwards into Central Equatoria from Mongalla and Jonglei due to a combination of flooding and regional violence. In 2022 this seasonal grazing sparked a series of escalating tit-for-tat armed raids between armed local villagers and armed cattle keepers. After incidents in Ayii and Lokiliri, in early March 2022 local youths' raids on cattle camps killed around 20 people in the Magwi area, and the cattle herders retaliated by burning villages and displacing thousands

across Agoro and Panyikwara (Radio Tamazuj 2022a). By the end of April, there was an attempted raid on a cattle camp in the Jelle area, killing four, and retaliatory raids on both sides killed a further six young men, with blame laid on both Otuho and Dinka cattle leaders (Radio Tamazuj 2022b). Twenty more people were killed in Melijo village on 10 May after a cattle camp at Paranyiang was attacked; a week later raiders attacked cattle keepers at Mugali, and cattle keepers were suspected of killing two local police officers (Radio Tamazuj 2022c, 2022d).

Therefore, in the current post-war stasis, working people are having to navigate an inflating and cash-poor economy where family survival, education and healthcare costs depend on balancing cheap but labour-intensive food self-sufficiency alongside paid cash work within local commercial markets – depending on your location, these markets include piece-work in commercial groundnut or sesame farms, bricklaying and commercial fishing, in mining concessions, or in charcoal production. Charcoal production is a quick and high-yield cash alternative, especially as rural life is increasingly impacted by rapid climate change: seasonal rains are shifting, making agricultural production even more unreliable. The year 2022 was the fourth year in a row with above-normal national rainfall; in 2023 about 60 percent of the country (8 million people) were facing extreme food insecurity by the mid-year. On top of this, sustained inflation since 2015 has made accessing healthcare and education increasingly expensive.

This means that most of the people producing charcoal are generally still civilian locals (including the locally displaced), working on a small scale and generally still by hand (Azo Joseph and Masindi boma chief 2020 int.). Smallholder farmers make a few bags to earn some cash income or bridge harvests. Whole families are living in the forest during charcoal production. Women and children in particular are exposed not just to physical risks of harm but also to sexual and physical violence on production sites with large numbers of workers. Research has also noted workers' lack of recourse if their profit-shares or charcoal is stolen or left unpaid, especially by military or security employers (Anon. 2020 int., Rei).

These coercive and risky labour systems are the mostly invisible foundations of a much more visible system of mass-producers, transporters and exporters of charcoal. Only a very small number of investors – including government and military staff – are making significant incomes from mobilising this local cheap labour. In the Juba–Nimule corridor we encountered roughly a dozen large-scale business owners overseeing the production of about 1000 sacks of charcoal a month, generally via piece-work labour. This was equivalent to an income of about \$10,000 a month based on contemporary prices during research in 2020. The average large-scale reseller, purchasing from individual workers, was making about \$700 a month in 2020. Truck drivers were mostly foreign nationals from Ethiopia and Eritrea, with investment capital, transporting large quantities of charcoal in big trucks that carry between 50 and 100 bags with each bag weighing 70 kgs, and making 3–4 trips to Juba in a week. One of these traders interviewed during research was arrested in 2017 by South Sudan national security following the 2015 national ban on charcoal

exports; he had just bought 3600 seventy-kilogram charcoal sacks at a cost of about \$7435; on exporting these, he made a total of \$54,000. However, the majority of trade is run by South Sudanese men on motorcycles and motorised rickshaws carrying between three and thirty sacks; most interviewees had also bought the charcoal they were transporting, at a profit of about 2000 South Sudanese Pounds (about 5 dollars) per bag. All of these forms of intermediary and trade work require not just initial cash capital but political, social and gendered capital to navigate armed checkpoints at night, and (for some) to negotiate illegal trade across borders, generating specifically classed and gendered wealth inequalities and exploitations.

These visibly growing wealth inequalities, based on exploitative labour systems that underpin charcoal piecework production, are local symptoms of the economy's growing dependency on expropriation of resources from the earth, from taxes or from each other. Charcoal is a practical immediate income solution for many in a context of sustained risk to livelihoods, despite the charcoal economy often further damaging the prospects for their livelihoods and future generations' wellbeing (Pageri and Opari head chiefs 2020 int.). Residents discussed this degenerating cycle through a language of cost.

Costs, values and ownership

Throughout our contemporary research, discussions were centred on questions of value: the values and costs of charcoal as energy, the value of what was being destroyed versus the value of incomes in a time of chronic insecurity, and the comparative fundamental values of homes, lands and landscapes versus their value as natural resources. Secondly, conversations reflected tensions over the timescales of value – what is immediately valuable now within the energy landscape, for everyday incomes and school fees for children's futures, against the value of retaining recognisable landscapes and historical spaces and forest expertise that allow people to connect to their ancestors, histories and generational knowledge. Thirdly, these discussions demonstrated tensions over who has authority over charcoal systems: whether the state, as theorised within South Sudan, can own (or determine ownership of) the land and the soil, and enforce rules in this energy landscape. Together these conversations were over the possible limits of this statist modernity that marketises energy and land, and which costs up and commodifies forests and landscapes as sellable natural resources.

Charcoal's cost on the landscape is not a new conversation here. Charcoal production, including in the Nimule corridor since the 1960s, has always involved forest-stripping, often run by military and state authorities relying on coercive or desperate workers; at the same time, people (and these same authorities) have been worried for this environmental destruction, soil depletion, the disappearance of streams and changing rainfall that results. Mechanisation of logging since the 2010s in particular has allowed full clear cutting, with individuals, collectives and companies felling old trees as large timber and smaller wood for charcoal simultaneously. This stripping is a shift from earlier production methods that focused on mid-size trees with

over 7 cm diameter branches, which produces higher-quality charcoal and allows for cyclical harvesting (Anon. 2020 int., Moli Tokuro).

This forest-stripping has reignited concerns about forests' immediate capital value versus the value of long-term sustainable forestry, biodiversity and the historical landscape. Advancing clear cutting from Moli towards Opari, and across Pageri Payam, is stripping mid-term resources for house construction from the land. This means future costs for residents in house maintenance and construction, as materials need to be sourced elsewhere, and likely for cash (Anon. 2020 int., Pageri and Opari). In Moli Payam an administrative officer noted how immediate financial needs for cash incomes is putting future resources at risk, as well as risking desertification as species' replacement growth cycles are between 3 and 20 years (Anon 2020 int., Moli Tokuro). Wholesale forest clearance has also focused a conversation on both the specific and diffuse values of trees. In Pageri this conversation has focused on Mahogany (of family Meliaceae), Shea (genus *Swietenia* plus, *Vitellaria paradoxa*), Ardeb (*Tamarind indica*; in Acholi, cwaa), Lalob and Axil African (Eri) tree species, whose fats and vitamins, medicinal products, and spiritual and historical uses have less immediate cash value but are vital to social, medical and spiritual systems (Anon. 2020 int., Pageri and Opari; Anon. 2020 int., Moli Tokuro). Trees that produce sound-woods, essential for creating traditional drums and instruments, are also being cut (Anon. 2020 int, Moli Tokuro). In Nimule Payam interviewees were visibly and vocally upset about the cutting of oracle trees (Anon. 2020 int., Nimule). Madi oracle trees, the Melo (Pwoyo), are used as ritual places to bring rain or stop locust outbreaks, and this heritage is important to people's family histories and sense of self. Trees and forests are part of community histories and practices of self-defence; as well as sites of historical and contemporary refuge, Madi forests' largest trees provide spiritual protection – rituals performed underneath them during attacks will prompt the Aswa river to flood, preventing crossing. Local chiefs and elders fear losing harvests due to the destruction of oracle trees – as well as losing their authority as appear powerless to stop the logging.

Alongside their practical spiritual uses, forests and especially ancient trees are historical landmarks (Anon. 2020 int., Nimule). The cutting of ancient trees – some 300 years old – is destroying a historical geography and people's orientation within the landscape. A resident emphasised: 'there is visible desperation on the faces of all community members as they are not sure what the future holds' (Anon. 2020 int., Pageri and Opari). Via the stripping of charcoal from this forest corridor, the politics of energy in South Sudan is a fight over who gets to define what should be valued now: the value of health, history, faith and knowledge in the market economy.

The re-valuing of wood and wood fuels as cash assets is, as a local resident noted, part of how forests 'have been turned into individual property' for at-will private use (Anon. 2020 int., Nimule). The question of how forests should be valued also demands the question: who can control this marketisation of forests as urban building and energy supplies, and who has the right to determine control of this commonwealth? The common answer by government authorities in particular is that the state officially owns land, and also

has controlling rights to everything beneath the soil.¹ In this view, forest destruction is not just blamed on military-commercial production or insecurity, but is 'mostly due to weak, unenforced or disjointed forest policies' that fail to assert government over the industry and manage conservation (Anon. 2020 int., Pageri and Opari). In Kerepi, Payam authorities emphasised that the government should bring forest guards to 'do their job' (Anon. 2020 int., Kerepi).

In the face of immediate destruction and military-commercial predation, this demand for state intervention is understandable. It also falls into a pattern of discourses of state control over conservation since the colonial period. In the name of defining 'forest reserves' under government protection, British colonial authorities across the empire weaponised conservation concerns to force village resettlements, limit access to land and force people into commercial agricultural production. In southern Sudan, officials noted concerns over deforestation around towns – risking energy supplies – since the 1930s (Governor Equatoria 1938). By the 1950s the Equatoria Province government was imposing forest reserves, backed by the army – despite 'the people's failure to accept the government's view that all unregistered² land is Government land', and the rise of 'land hunger' among local residents forced away from their family forests and farms (Governor Equatoria 1953). Reserves were not for ecological wealth but for sustained charcoal and construction supplies for 'the growth of the population particularly in town and... the expansion in agricultural schemes' (Shawki 1956). Responses to residents and refugees burning charcoal for incomes were punitive: in 1975 a series of Congolese refugees making charcoal were arrested and imprisoned, and their charcoal confiscated and sold, with the profits going to the government (Hassan 1975; Rusumu 1975; Julu 1978).

Colonial government officials justified these interventions as 'conserving the capital wealth of the country', and this quantification and costing of national wealth as assets has accelerated in post-independence South Sudan under economics of ecosystems and biodiversity (TEEB) frameworks (Wordsworth 1945). TEEB advocates argue that market valuation of biodiversity allows for a full valuation of the environment in policymaking, where it is often overlooked (Kashwan *et al.* 2021: 13). In South Sudan, this has recently involved government efforts to control and restore teak plantations valued by UNEP at \$100 million US dollars per year in potential export returns, and most recently and controversially, the quantification of the worth of the Sudd wetlands, one of the largest tropical swamps in the world which supports the livelihoods of a significant proportion of the country's population and is a vital habitat and migration ground for what is now considered as the world's largest mammal migration which surpasses the Serengeti-Maasai Mara Migration of Wildebeest between Kenya and Tanzania (Madouk 2023). A 2017 TEEB-focused study valued the Sudd from about \$1 billion US dollars a year up to \$3 billion, including the worth of its carbon capital (Wenger *et al.* 2017: 4). In August 2022 the South Sudan Government signed a 10-year agreement with African Parks for the management of Boma and Badingilo National Parks, emphasising the vulnerability of wildlife and natural resources to illegal commercial exploitation, and commercial pressures to 'open habitats to

exploration' for oil and mineral resources (Al Arabiya 2011; Newswise 2016; African Parks 2023).

While these moves for environmental protection are broadly welcomed across South Sudan, they also provide steps towards turning this market-based conservation into financial instruments. Sudan and other countries in the region have been increasingly involved in carbon trading, biodiversity offsetting and 'debt-for-nature swaps' which have been part of sovereign debt restructuring systems since the 1980s debt crises in Latin America. There is a growing financial market for tradable assets based on conservation and climate futures bonds (Kashwan *et al.* 2021: 13; Urpelainen & Hebbale 2023). With South Sudan's oil reserves allegedly already mortgaged for loans against future production until 2027, this may provide a potential route to debt management and investments for the government (MEES 2015; Sudan Tribune 2020; SoftPower News 2022). However, it also requires enforcing conservation and tree-planting effectively to pay this potential mortgage: citizens in Eastern Equatoria have recently been encouraged by state authorities to restore their ecosystem by planting more trees themselves (Radio Tamazuj 2023). As they currently stand, these competing forms of value – the immediate value of charcoal in a collapsing economy; the human, animal and ecological value of a historic landscape; and the ecosystemic value of market-based conservation – cannot neatly coexist.

Conclusion

In South Sudan, charcoal is now at the centre of connected fundamental questions of military violence, forms of good government, land and water security, definitions of ownership and the rights to life, work, incomes and safe energy, in rural and urban areas. Energy – via water, forests, the sun and oil – is at the heart of current South Sudanese questions of good governance and commonwealth. As Agoku Christine Tabal recently asked, when reflecting on the destruction of forests as a current 'means for survival', open sewage dumping into the Nile and chronic pollution in oil production sites causing cancers and deaths: 'who is supposed to be held responsible?' (Stela Mandela 2023).

Approaching South Sudan's political economy via the decentralised, connective economy of wood and charcoal allows analysis to escape from immediate political personalities, short time-lines and top-down systems of militarised patronage that dominate current understandings. Like the distributory networks of petrol via water bottles and jerry-cans, charcoal is a mobile energy, but unlike petroleum energies, its production and consumption is diffuse, and has proven hard to control by successive military governments since the 1920s. The frontier of market capitalism has travelled with the military colonial state, and has relied on diffuse forest products for its energy; to discipline a paid workforce to produce this, it has created forms of dubious and often exploitative paid work that still sits alongside self-employment and self-sufficient production systems today. Exploring the political economy and theory of charcoal therefore allows a more interconnected understanding of these various forms of historic violence against habitats, people and historical geographies in the production of the modern state and capital economy. Finally,

thinking in forest time – via trees and charcoal that are much older than British colonialism – allows sight of historic dynamics that underpin questions of value, power and ownership.

Our study highlights the core tensions over immediate and long-term human and ecological security that are collectively central to ecological, economic and political futures in South Sudan. State impositions of ecological control continue to be effectively colonial (Garland 2008: 67). These reflections highlight a weakness in current policy on forest protections in South Sudan, which overwhelmingly recommend legal regulation and direct state intervention via border enforcement, the armed patrol of forest reserves and national parks, high taxations and zoning of protected forests (UN Environment 2018: 132). These recommendations would be familiar to colonial and postcolonial governments in Sudan, and follow a common postcolonial African state prescription of surveillance, policing, patrols, evictions, fines and prosecutions for ecological protection, called ‘green militarisation’ by its critics (Neumann 2002; Kashwan *et al.* 2021; Branch *et al.* 2022). Aside from the risks of abuses and corruption inherent within this model, this study demonstrates that this approach has repeatedly not worked, and likely will not work in the mid-term. The earliest colonial attempts to impose high tariffs and taxes on charcoal production were abandoned in 1929; a series of attempted bans on production failed repeatedly through the 1930s; Pageri and Opari head chiefs themselves noted a long history of attempts to ban illegal forest access by both government and community leaderships with no success (Director of Agriculture and Forests 1926; Mali Sudan 1929; Chief Conservator of Forests 1933; District Commissioner Malakal 1934; Pageri and Opari head chiefs 2020 int.). The customs service at the Nimule Border Post noted that ‘even before the Ministerial Order in 2018 from the Ministry of Trade and Industry banning the export of charcoal, the Statistics Department of the Customs Service couldn’t find any single clearance document for charcoal export and import’ (2020 int.). Eastern Equatoria State’s ban on illegal logging in August 2020 has been undermined by producers, traders and transporters using licences and receipts from other states or county offices, and working with military and police as a kind of private security in any case. Calls for legal regulation and official intervention imply the state is external to this economy, when in fact the charcoal economy has become a fundamental part of the state extractive economy and is increasingly how local and national authorities now power themselves.³

Charcoal research is dominated by projects that explore value chains and production systems ‘into’ cities, a rural to urban harvesting of data that reflects the extractive power dynamics criticised here. We suggest research that works from the other side, from within the frontier of production. A focus on labour relations, and thus the evolving forms and meanings of exploitation within the charcoal economy, would better articulate how this extractive political economy is powered.

Notes

1. The Council of Ministers chaired by President Kiir in 2023 declared the land belongs to the people and shall be regulated by the government. Based on public trust doctrine, people’s ownership is state or public ownership. Therefore, the land is literally owned by the state (see Tiitmamer 2023.)

2. The Unregistered Land Act of 1970 declared any land not registered across Sudan as belonging to the state. This was resisted across Sudan, particularly in Southern Sudan and Darfur. With the Comprehensive Peace Agreement in 2005, the question of land rights in Southern Sudan was deferred to the constitution making process during the interim period from 2005 to 2011. Despite South Sudan's independence in 2011, the land question is still contested. Most citizens argue that the land belongs to communities, while laws and policies recognize communal rights to land while still designating the government as owning the land and land-based resources, both surface resources like forests, and subsurface resources like oil and minerals.
3. This parallels similar calls for regulation in the oil sector where the government-run NilePet is a key actor.

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Cite this article: Kindersley N, Tiitmamer N (2024). The costs and values of life in South Sudan's militarised charcoal economy. *The Journal of Modern African Studies* 62, 247-267. <https://doi.org/10.1017/S0022278X24000405>