

Overcoming barriers to sustainable charcoal in Kenya



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Introduction

Kenya is seeking to modernise its cooking sector, which remains dominated by traditional biomass fuels that have significant negative impacts on land, ecology and greenhouse gas (GHG) emissions. A growing and increasingly urbanising population is demanding more charcoal, exerting increasing pressure on forests, farmlands and community rangelands from where it is sourced. Charcoal – produced in kilns by carbonising wood through pyrolysis – meets the cooking energy needs of over 80% of Kenya’s urban population (Wanleys Consultancy Services 2013). And the growing gap between supply and demand of the commodity will only expand unless action is taken. Imports from neighbouring countries fill some of this gap, but not all.

Kenya’s Second National Communication to the United Nations Framework Convention on Climate Change in 2015 on its nationally determined contribution to meeting the Paris climate goal, and its National Climate Change Action Plan 2018–2022, highlighted charcoal production as a main contributor to GHG emissions in Kenya (Government of Kenya 2018; Ministry of Environment and Natural Resources 2015). In addition, ecological impacts and land degradation from unsustainable charcoal production threaten future livelihoods because of declining yields, decreased biodiversity, and other impacts (Kiruki et al. 2017; Ndegwa, Anhuf, et al. 2016).

Putting the Kenyan charcoal sector on a more sustainable pathway calls for innovative approaches across the charcoal market chain to improve efficiency in harvesting, production, transport, distribution and consumption. Yet doing so is not easy: the sector remains informal, with little recognition in national economic reporting despite employing hundreds of thousands of people and generating hundreds of millions of US dollars (Njenga et al. 2013). Although it is an important source of livelihoods for some, the economic returns tend to be concentrated among larger producers and wholesale traders, while small-scale producers can be trapped in poverty (Ndegwa, Nehren, et al. 2016; Zulu and Richardson 2013). Moreover, the charcoal market chain is blighted by corruption whereby payment of bribes is common all along transportation routes.

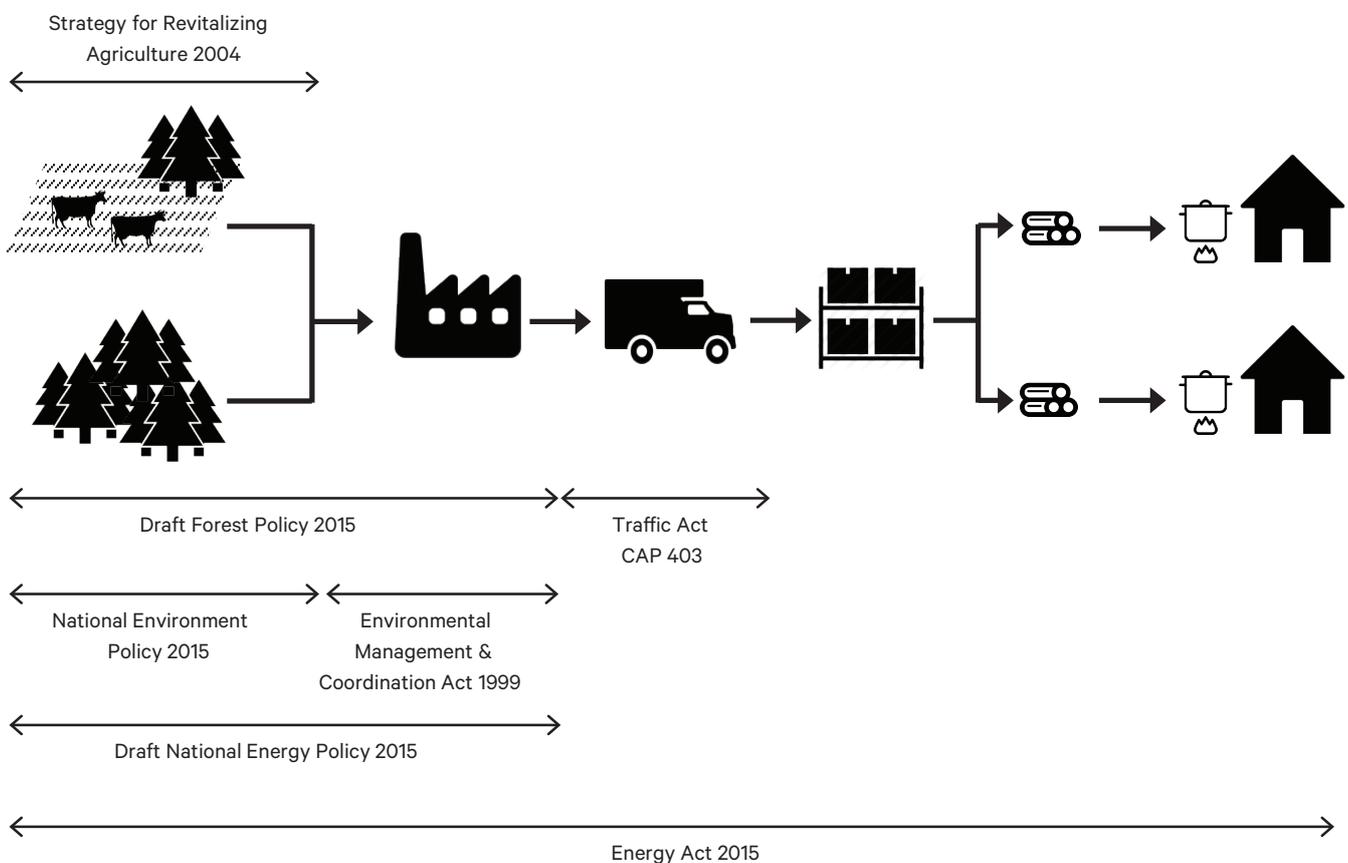
Through a mix of regulation, promotion of improved kilns and cookstoves, and support of alternative fuels, Kenya seeks a dual approach of increasing the sustainability of charcoal production, trade and consumption, while also providing opportunities for fuel switching (Ministry of Environment, Water and Natural Resources 2013; Wanjiru et al. 2016). In this brief, we explore the barriers to achieving a more sustainable charcoal sector. The brief is based on seven semi-structured interviews and targeted discussions during two workshops with stakeholders in the charcoal sector, as well as field observations and a review of documents.

Photo (above):
© SEI

Fuelling Kenya's cities

Charcoal production in Kenya begins with harvesting woody biomass from communal land, government forest and private land (Njenga et al. 2013). The woody biomass is then carbonised by pyrolysis in a kiln to produce a type of charcoal with typical kiln efficiencies (the ratio of charcoal mass output to dry wood-mass input) ranging from 10% to 30% (Bailis 2009; Ministry of Environment, Water and Natural Resources 2013). The charcoal is then transported in 50–90 kg sacks from production sites to urban and peri-urban sites. From there it is then distributed to consumers in a range of sizes, from whole sacks to 20 litre buckets to 2 litre tins. Efficiency in final use of charcoal for cooking depends on the stove technology that consumers own and prefer to use. Some entrepreneurs have started to make charcoal briquettes from charcoal dust created during production, transportation and distribution – amounting to roughly 25% of total original charcoal volume. Figure 1 shows the charcoal value chain.

Figure 1. Value chain and legal frameworks linkages



The increase of charcoal use in Kenya is largely a result of two factors: urban population growth and limited switching to alternative fuels. Between 1960 and 2017, Kenya's population rose more than sixfold, and the proportion of the population living in urban areas more than tripled.¹ In the 1980s, charcoal was used by 50% of the urban population (O'Keefe et al. 1984), but by 2002 this figure was reported to have reached 82% (Kamfor Company Ltd. 2002). Although liquefied petroleum gas (LPG), electricity and pellets burned in gasifier stoves are available as alternative fuels for cooking in urban centres, they have remained the preserve of high-income households. As such, charcoal continues to remain a major source of cooking fuel for urban households across all income levels (Dalberg Advisors 2018; Kojima et al. 2011).

¹ See <https://data.worldbank.org>.



Rarieda community-based organisation during a training on drum kiln technology, Siaya County, Kenya © HANNAH WANJIRU / SEI

Rapidly rising demand for charcoal has led to a widening supply-demand gap resulting in unsustainable charcoal production. Current demand, estimated at 16.3 million cubic metres (m³), is far above the current supply of 7.4 million m³ (Wanleys Consultancy Services 2013). And, by 2032, demand is expected to increase by 17.8% while supply is expected to increase by only 16.8%, widening the supply-demand gap from 8.9 million m³ to 10.6 million m³. The charcoal market chain is a vital source of employment for over 500 000 people, and generates over US\$ 427 million, yet it is barely recognised in formal national economic reporting and forecasting (Njenga et al. 2013).

Charcoal conservation efforts started in earnest in mid-1990s with the promotion of a more efficient charcoal stove – the Kenya Ceramic Jiko – by GTZ, the Kenyan Government, universities and other development partners (Karekezi and Turyareeba 1995; Tigabu 2017). But efforts to make the charcoal sector sustainable – that is, ensuring the charcoal that reaches homes and businesses is produced in a way that does not contribute to degradation of forests, lands and ecosystems – has only become a focal point for action in the last decade. A legal framework regulating the production of charcoal, the Forest (Charcoal) Rules, was established in 2009 (Government of Kenya 2009). Community forest associations or other common interest groups that registered as formal charcoal producer associations with the Kenya Forest Service receive a registration certificate. Transporters buying from these registered charcoal producer associations receive a certificate of origin, which they present to local Kenya Forest Service office to obtain a charcoal movement permit costing KES 500–1000 (US\$ 5–10) per trip.

Risks to achieving a more sustainable charcoal sector

We identify several barriers to achieving a more sustainable charcoal sector: limited financing, weak implementation of regulations, market competition and low capacity.



Charcoal for sale at Sosoma Junction, along Nairobi-Garissa Highway, Kitui County, Kenya © HANNAH WANJIRU / SEI

Limited financing for sustainable charcoal activities

The financing barriers relate to covering the cost of forest management interventions and supporting the purchase of improved technology for charcoal production (kilns) and charcoal consumption (cookstoves). There appears to be almost no financing available to fund the necessary interventions in farm forestry and reforestation to establish a sustainable supply of biomass for charcoal production, and to maintain forest cover. Meanwhile, efficient charcoal production technologies are very expensive for members of charcoal producer associations, who typically earn a low and unstable income and have little formal access to credit. Innovative financing mechanisms are widely considered vital to facilitate the purchase of these improved production technologies, but there are considerable obstacles to making formal lending solutions work within a largely informal sector. On the charcoal demand side, there has been greater success in consumer-financing schemes for efficient charcoal consumption technologies, such as improved cookstoves, but there are concerns about a distribution market marred by poor quality products. The irony of these financial barriers is that, if the sector were streamlined, the government would retain about US\$ 60 million with a 16% VAT, which potentially could be reinvested into the sector and thus used to lower financial constraints (Ministry of Environment, Water and Natural Resources 2013; Mutimba and Barasa 2005).

Weak enforcement of sustainable charcoal permits

A key regulatory barrier is weak enforcement of the formal permit system under the 2009 Forest (Charcoal) Rules. The system has done little to disincentivise production, transport and use of charcoal from unsustainable sources. Kenya's informal system of bribes – so well-established that producers, transporters and wholesalers have come to view it as an acceptable part of the charcoal trade

– exacerbates the situation. Meanwhile, the formal permit system is new, and the compliance requirements are often misunderstood by the traffic police and Kenya Forest Service officers tasked with verifying the validity of all movement permits. Officers are often individual beneficiaries of bribes, and, thus, may have little incentive to enforce a formal permit system that instead benefits the local or national government. Indeed, it is precisely because sustainable charcoal production offers a different financial model to that of the dominant informal and unsustainable charcoal trade – where traders, distributors and government officials pursue their own private economic interests at the expense of the public interest – that it meets so much resistance. Since devolved county governments were created in 2013, counties with charcoal production hotspots – such as Kitui, Narok and Kajiado counties – have started to establish and enforce their own regulations, with which local charcoal producer associations and transporters have to comply. It is yet to be seen if they will prove more effective and enforceable than the national regulations.

Competition from alternative cooking fuels

While a sustainable charcoal sector is an attractive proposition to some, others within the energy, public health and environment sectors view charcoal as a dirty fuel that should be fully replaced by much cleaner alternatives, such as liquid petroleum gas, ethanol, and biomass pellets burned in gasifier stoves. Interventions to make these alternative fuels more available and affordable, particularly in urban areas, may pose a

significant barrier to sustainable charcoal production. If alternatives capture a sizeable share of the urban household energy market, it might reduce demand for charcoal, with potentially negative implications for employment and livelihoods linked to charcoal.

Low capacity to comply with regulation

The final barrier to greater pursuit of sustainable charcoal production is limited capacity within charcoal producer associations to ensure compliance with formal regulations. These regulations require registered charcoal producer associations to establish a written constitution, develop a conservation and reforestation plan, and document the kiln technologies and tree species they use to make charcoal. As well as the additional expense involved, tracking biomass resources and developing forest management plans require significant expertise that many members of these associations lack. Meanwhile, creating a constitution that all members agree on is a challenge, especially as many fear formal regulation of informal and unregulated livelihoods.

Conclusions

Sustainable charcoal is widely considered a core element of Kenya's low-carbon and climate-resilient development ambitions. Until recently, meeting the household energy demand of a growing urban and peri-urban population has tended to outweigh concerns over degradation and deforestation in distant locations from unregulated production of charcoal. In the past, efforts to address the issue have focused on financing demand-side measures to reduce charcoal consumption, such as adoption of efficient cooking technologies. Supply-side measures that potentially have more impact on forest cover and GHG emissions are only recently gaining political attention.

Yet barriers to greater adoption of efficient and sustainable forest management, charcoal production and charcoal consumption practices continue to remain. Charcoal production in Kenya is a cottage industry comprising myriad decentralised, small-scale actors. Transport, wholesale and distribution is similarly small in scale and undertaken by thousands of different actors. The technological capabilities required to upscale sustainable charcoal production can nearly all be found in Kenya. Local manufacturers of more efficient (and appropriate) charcoal kilns do exist, although their products are not necessarily widespread. And the knowledge required to develop and manage forests in a sustainable manner certainly exists, although it is not necessarily in the hands of those who need it most, namely the owners or users of land where charcoal is produced. Sustainable charcoal faces considerable challenges in obtaining the finance needed for upscaling, and has trouble accessing capital due to perceived risks.

Coordinated efforts are required to strengthen the capacity of the implementing entities and charcoal producer associations, and to ensure that the enforcing agencies speak to each other in order to address any concerns that may be raised by actors in the market chain.

In the long-term, other, cleaner and more sustainable fuels may replace charcoal. But in the short- and medium-term, investments in sustainability of this important urban fuel are imperative to ensure that Kenya's natural forest resources are responsibly managed.

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