



Forest facts



Truck with sacks of coal on the way from Dosso to Niamey, Niger. Photo: Anders Roos.

Charcoal Use in Africa: Balancing Energy Needs, Livelihoods, and Sustainability

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- Charcoal use in Africa is on the rise, representing almost 27 percent of the continent's forest harvests.
- Many households, especially in cities, use charcoal as the primary energy source, or combined with other energy sources.
- The production, transport, and trade of charcoal generate informal employment income for millions of low-income people in Africa.
- Charcoal also has disadvantages: The production can degrade forest ecosystems and household air pollution from charcoal stoves harms human health.
- This research brief describes aspects and significance of charcoal value chains in Kenya and Niger.

A sustainable charcoal sector necessitates enhanced technical processes and the implementation of effective and fair regulations. These improvements require that stakeholders' needs are well understood and that they are included in the decision-making processes.



Charcoal Dynamics in Africa: A Vital Energy Source

Charcoal is a convenient and cost-effective energy source for millions of people across Africa. Despite losing 70-90 percent of its energy content during production, charcoal has a considerably higher energy density than wood. This makes transportation from forested regions to urban centers cost-effective. The use is consequently mounting with population increase and urbanization. Transport of charcoal also takes place into areas with a low forest cover, like the Sahel region. The production, transport, and trade of charcoal generate jobs and income for millions of people on the continent.

Charcoal in Africa

Approximately 90% of Africa’s forest harvest is used for energy, with only 10% for industrial purposes. Almost one-third of this energy wood becomes charcoal, a production that has nearly doubled between 2000 and

2020. A recent study examined charcoal value chains in southern Kenya and south-eastern Niger, focusing on supply chain processes and prerequisites for more sustainable practices in the future (see Figure 1).

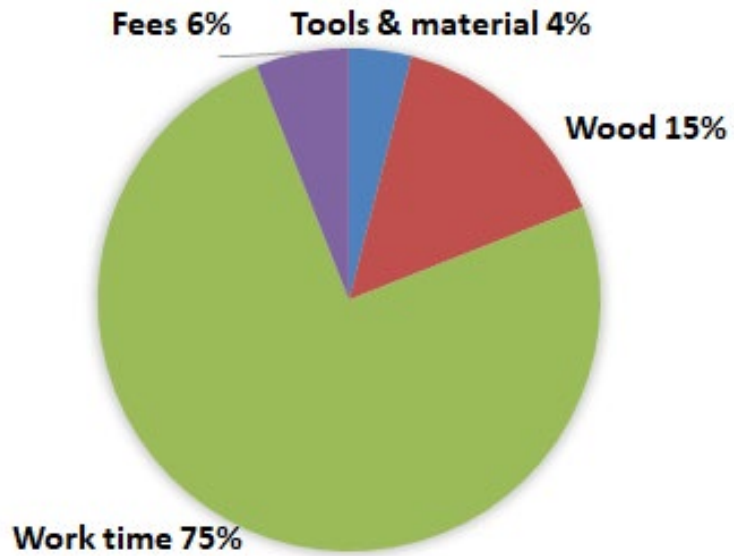


Figure 2: Cost Shares in Small-Scale Charcoal Production in Kenya

Charcoal Value Chains, and Regulatory Measures

In Kenya, as in many African countries, charcoal production is primarily conducted by small-scale informal enterprises using basic methods and hand tools like axes, machetes, shovels, and buckets. Labor is the dominant input in the production (Figure 2). The process involves felling and cutting the trees into short pieces, stacking them, and covering them with grass and soil. Carbonation occurs with limited air supply under supervision, and after about five days, the charcoal is extracted, cooled, and packed in sacks for sale.

Producers earn modest incomes and have few alternative livelihoods due to their lack of resources and education. Charcoal production becomes for this reason a main source of income for food, housing, and school fees, often supplemented by agriculture, work in construction, or in the tourism sector. Although it provides household income this work usually does not lift producers above the poverty line of USD 2 per day (Mutta et al. 2021). Many, like one female producer who stated, “I would prefer another profession, but it was not possible because I cannot read or write,” take up this work out of necessity rather than choice.

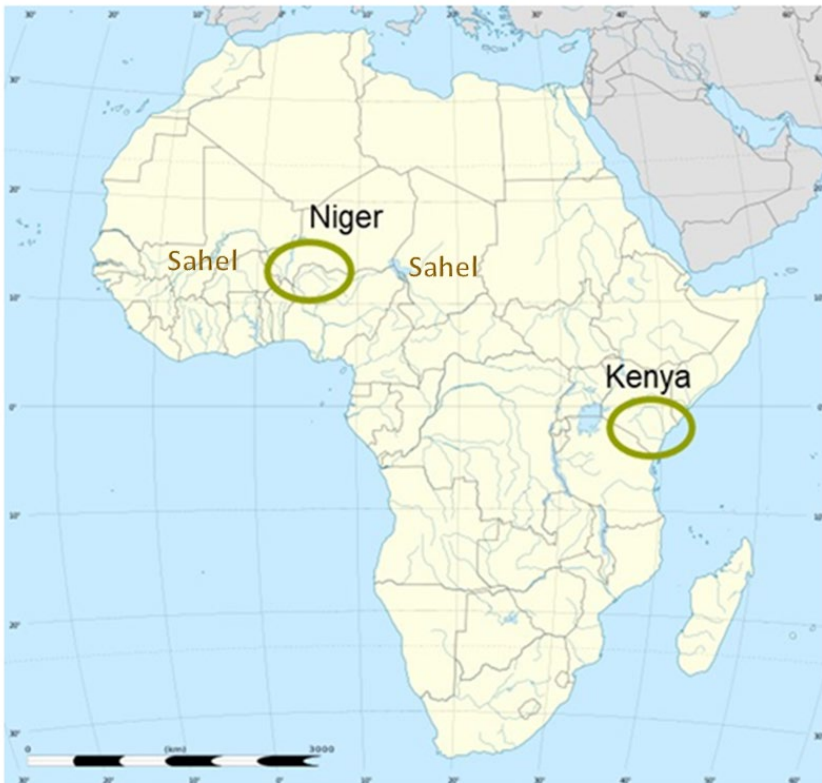


Figure 1: Map illustrating the locations for the study

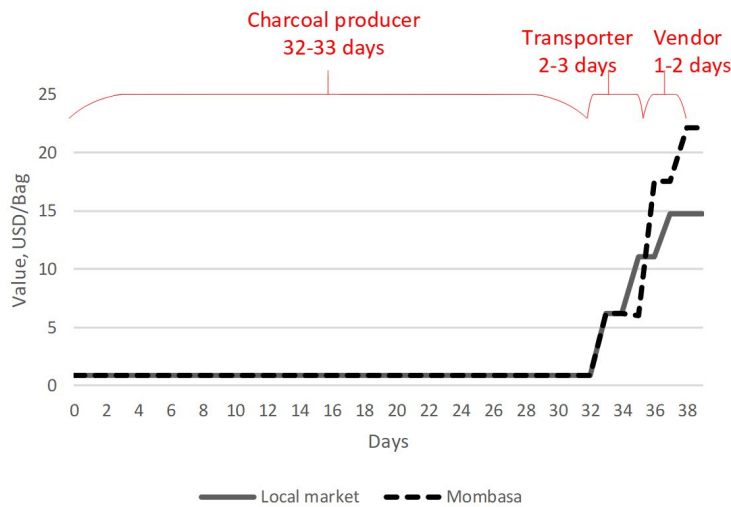


Figure 3: Value addition from unprocessed wood to charcoal, sold in towns and cities.

Despite its lower societal standing, success in the charcoal business requires specific skills, from how to select the right tree species to meticulously managing the carbonization process. Challenges include ensuring high product quality, preventing over-burning, and to applying a successful marketing strategy (Roos et al., 2021).

After production, charcoal is transported to urban markets through various means: women balancing

sacks on their heads, motorcycles (called ‘boda-boda’ in Kenya), pickup trucks, and lorries for bulk transport. Powerful intermediaries often control long-distance transport to cities, handling large quantities that may cross national borders. The economic value of charcoal increases significantly from the modest cost of raw wood to the market price in the city (Figure 3).

In retail settings, charcoal is repackaged into smaller quantities and

sold in plastic bags or small buckets (Figure 4). It is primarily used in households, as well as in restaurants and small cafes.

The journey of charcoal from the forest to the end consumer highlights its significant sustainability impacts. It affects the condition of the forest and the livelihoods of those who depend on charcoal production, as well as the final users who rely on this affordable fuel source.

Charcoal trade

Substantial quantities of charcoal are traded across national borders. In Niger, situated on the fringes of the expansive Sahara Desert, significant charcoal imports are recorded from the forested neighboring nations of Burkina Faso, Benin, and Nigeria (Larwanou et al., 2021). Only 28 percent of the charcoal consumed in five southern Niger towns is of indigenous origin, with approximately half being sourced from Nigeria. The sustainability of these trade flows is questionable, given the trend of population growth and diminishing forest areas in all countries within the region. The escalating trade activities underscore the need for more coordinated charcoal policies between the involved countries.

Navigating Challenges for a Sustainable Charcoal Sector

The charcoal industry in both Niger and Kenya features advantages and drawbacks. On the positive side, it serves as a livelihood for individuals and households engaged in production, transport, and sales. It provides a crucial albeit limited income to cover crucial expenses. For consuming households with limited financial capacity, charcoal stands out as an accessible and flexible energy source. It circumvents the need for costly investments in gas or kerosene stoves, while electric stoves, with their prohibitive costs and unreliable power supply, even remain less feasible. However, it is common practice to combine charcoal with other energy sources, so-called “fuel stacking”.



Figure 4: Charcoal repacked into small bags

Drawbacks involve potential forest depletion, and indoor air pollution, resulting in respiratory issues and millions of premature deaths, especially among children and women (Gordon, 2014).

Efforts to address these problems have been tried, such as the 2018 ban on charcoal production and trade in Kenya. However, this decision brought unintended consequences, with income decline and dissolved charcoal producer groups, which could contribute to more sustainable production. Charcoal prices also soared, worsening urban household poverty, and creating an unreliable charcoal supply. Despite the ban underground charcoal trade emerged in response to the demand, leading to the eventual lifting of the ban in the summer of 2023.

Looking ahead, numerous initiatives aim to establish a more sustainable energy supply in African households. These initiatives involve developing

efficient and clean stoves, improving charcoal production methods, exploring sustainable forestry management for energy production, and establishing business models for sustainable charcoal production.

The double-sided impact of the charcoal sector on people and the environment warrants diverse actions by policymakers and stakeholders for improved sustainability:

- Implement sustainable models for sustainable forestry and charcoal production, emphasizing on efficiency and climate-smart techniques.
- Promote technical and market skills among small-scale producers.
- Develop energy sector policies for equitable access and benefits, especially for vulnerable groups.
- Prioritize research and development for sustainable and clean energy sources to meet household needs.

- Coordinate regional collaborations among countries and key stakeholders for a sustainable charcoal trade and energy future in Africa.



Figure 5: Signpost to a producer association for charcoal. These associations regulated production and managed reforestation until the charcoal ban in 2018. Photo: Anders Roos.

Keywords Africa, bioenergy, energy policy, supply chains, sustainable livelihoods

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