WAVES
Woodfuels Overview
UGANDA
June 2019

Uganda
Woodfuels Overview

Technical Report

Ministry of Water and Environment

REPUBLIC OF UGANDA

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WAVES is a World Bank-led global partnership that aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts.
www.wavespartnership.org

Acknowledgements

This technical report was developed through a stakeholder driven process led by a Technical Working Group for the Uganda NCA Program constituted from Ministries, Departments and Agencies (MDAs) of Government. The work has received technical and financial support from the World Bank's Wealth Accounting and the Valuation of Ecosystem Services (WAVES) Partnership Program as part of Uganda's Natural Capital Accounting (NCA). The following institutions and individuals contributed to this report. Their contributions are gratefully acknowledged.

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Purpose and scope

The purpose of this paper is to provide data on the scale, value and employment contribution of woodfuels to the economy of Uganda, in order to assist the Government of Uganda (GoU) in the ongoing development of Natural Capital Accounts and the third National Development Plan (NDP-III). It is based on rapid analysis that was originally prepared to inform the Forest Investment Program in 2016.

Woodfuels are defined as fuelwood, charcoal and residues from agriculture and forest product processing. Derivatives such as pellets and briquettes are insignificant in Uganda so need not be quantified. The same applies to liquid and gaseous woodfuels such as black liquor, methanol, pyrolitic oil or products of gasification and pyrolysis.

Natural capital accounting (NCA) is the process of calculating the total stocks and flows of natural resources and services in a given ecosystem or region. NCA shows how natural resources contribute to an economy and how the economy affects natural resources. It is an approach that helps paint a broader picture of economic development than standard measures (such as gross domestic product) by measuring natural capital, recognizing its value and incorporating that information into national economic accounts and statistics.

The World Bank-led Wealth Accounting and Valuation of Ecosystem Services (WAVES) Partnership[1] is providing technical and institutional support to assist the GoU in producing natural capital accounts, analysing results and using the findings to inform policy.

Uganda relies heavily on natural resources for its energy supply, with the majority of the country's primary energy derived from trees. As part of the NCA process, it is therefore important to ensure that demand for wood-based energy is quantified and valued. This review paper sets out to estimate the scale of demand for woodfuels in Uganda, the value of the woodfuels industry and its employment implications. Separate research is required to quantify the stocks and flows of wood-based energy from sources to consumers. Taken together, these outputs will contribute to the development of the national forest accounts and NDP-III.

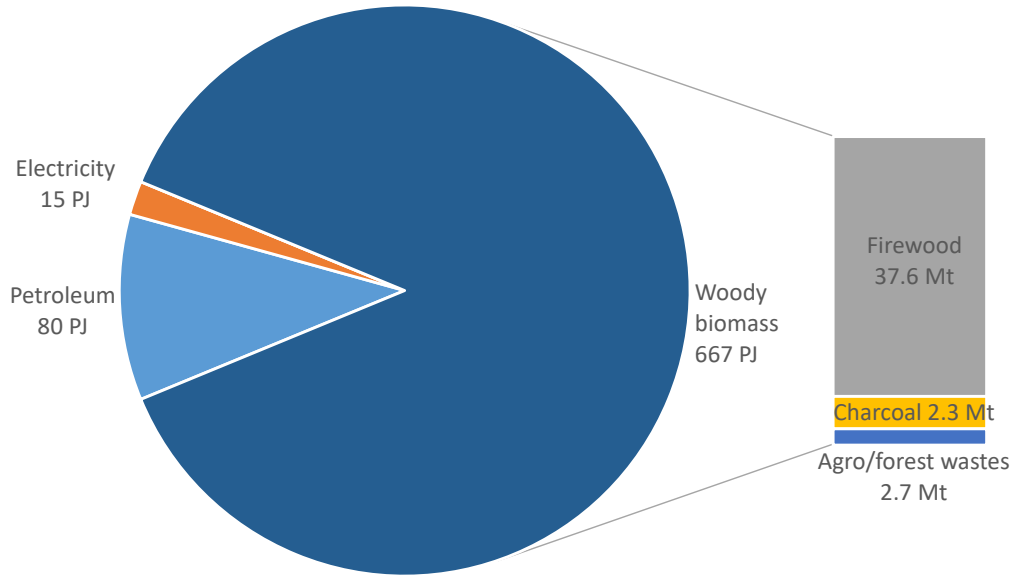
[1] www.wavespartnership.org/en/uganda

Industry overview

Demand for woodfuels

Extrapolated figures from Uganda's Statistical Abstract (UBOS, 2018, p. 143) suggest that total demand for woodfuels in 2019 (including both household and commercial uses) is 53.1 million metric tons (Mt) in 'fuelwood equivalent'[2], with an energy content of 667 peta joules (PJ). Total demand for all forms of energy is approximately 762 PJ.[3] Woodfuels therefore account for 88 percent (%) of all energy needs in Uganda - see Figure 1.This is only a slight reduction from a figure of 90% in 2012 (GoU, 2012) and illustrates the enduring importance of woodfuels for the country's energy security.

Figure 1: Primary energy demand in Uganda (2019)



Units are PJ for main breakdown (to left) and Mt air-dry for woodfuels (to right). For data and sources see Annex B.

Woodfuel demand comprises 37.6 Mt of fuelwood, 2.3 Mt of charcoal[4] and 2.7 Mt of agricultural and forest residues[5].

[2] 'Fuelwood equivalent' refers to the quantity of wood required to produce the fuel and is synonymous with 'round-wood' (Wood in its natural state as felled, with or without bark). A conversion ratio of 1:1 is assumed for fuelwood, Agri-residues and forest processing wastes, and a rate of 15% from air dry wood to charcoal (GoU, 2016).

[3] 762 PJ primary demand compares realistically with Total Final Energy Consumption of 622 PJ derived from World Bank (2019) data (529 PJ in 2015 extrapolated at the 2010-15 growth rate of 4.14% p.a.). Final consumption takes account of losses during transformation and distribution, so is always lower than primary demand.

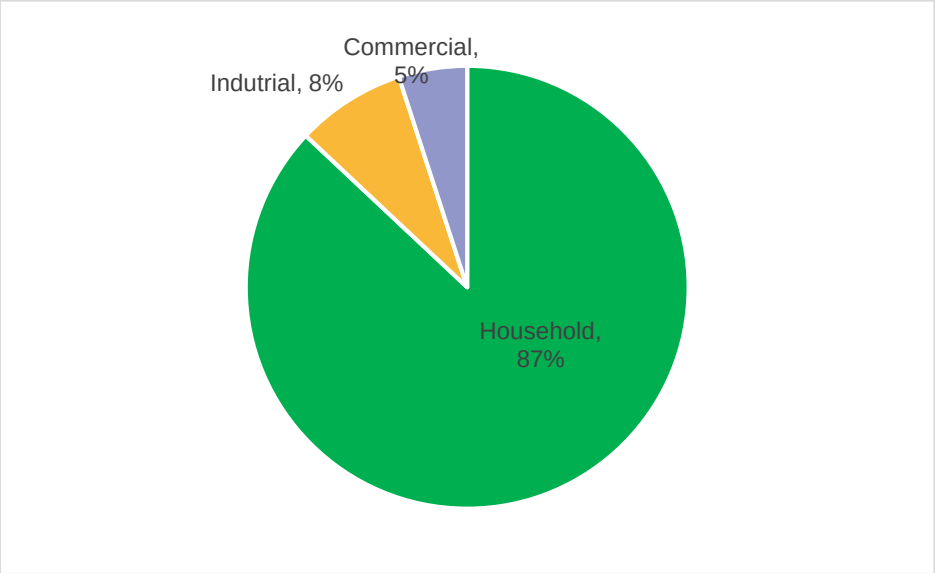
[4] 15.5 Mt in fuelwood equivalent.

[5] Agriculture and forest residues are not included in the UBOS Statistical Abstract, so have been separately derived from 2013 data in the Biomass Energy Strategy (GoU, 2013), extrapolated to 2019 assuming that demand tracks the rural population growth rate of 2.44% p.a. (UN DESA, 2018).

Woodfuel makes such a massive contribution to the national energy mix that "substituting other forms of energy (e.g. petroleum products) would have big implications on Uganda's foreign exchange reserves and balance of trade" (GoU, 2013). As an example, to replace the 667 PJ provided by woodfuels with imported liquified petroleum gas (LPG) would cost Uganda's economy more than US$11 billion for the fuel alone, even assuming a 50% improvement in appliance efficiency and excluding distribution and storage infrastructure.[6] This is 37% of GDP (UBOS, 2019).

The bulk of woodfuels (87% in fuelwood equivalent) are consumed by households, while industry and the commercial sector account for the balance (UBOS, 2018). See Figure 2.

Figure 2: Woodfuel demand by sector, fuelwood equivalent (UBOS, 2018)



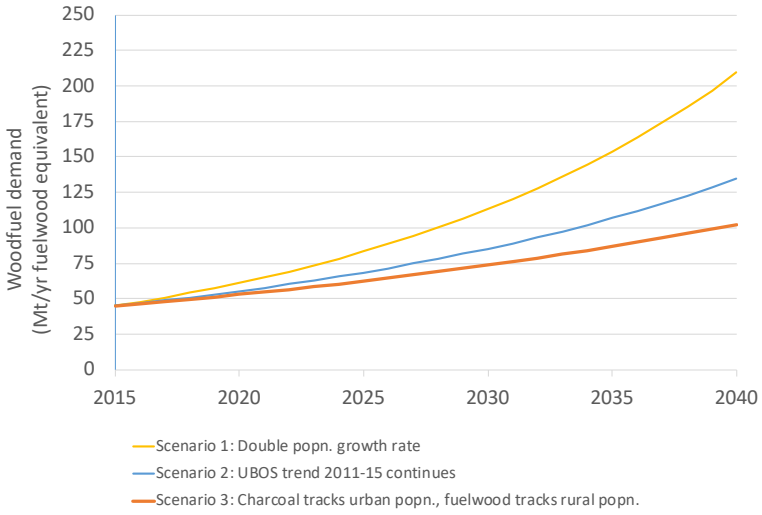
Growth prospects

Uganda's mid-2019 population of 40.3 million is expected to reach 70 million by 2040 due to a high growth rate of 3.2% p.a. (UBOS, 2018). The urban population of 9.8 million (24%) is growing at 5.6% p.a., and 41% of Ugandans are predicted to live in towns and cities by 2040 (UN DESA, 2018). This is significant in energy terms because urbanization in Africa is usually accompanied by a shift from fuelwood to charcoal as the main household fuel, with associated implications for wood inputs and the commercialization of supply chains. Other drivers of growing woodfuel demand are cultural preference, lack of affordable energy alternatives and rising wealth that leads to a shift towards charcoal. Even when charcoal users adopt LPG, heavy dependence on woodfuel is likely to continue: a recent study in Tanzania suggests that households switching from charcoal to LPG as their primary cooking fuel experienced only a 13% drop in charcoal consumption due to the phenomenon of 'fuel stacking' (the use of multiple energy sources alongside each other) (Alem, et al., 2017).

One scenario predicted by Kakuru (2014) sees woodfuel demand rising at double the rate of population growth, i.e. 6.34% p.a. (UBOS, 2018). The Annual Statistical Abstract (UBOS, 2018, p. 143) suggests a growth rate of 3.25% p.a. for fuelwood and 6.74% p.a. for charcoal. A third plausible scenario sees charcoal demand track the urban population growth rate (5.62% p.a.) and fuelwood demand track the rural growth rate (2.44% p.a.). Figure 3 compares these scenarios.

[6] Assuming a 50% efficiency gain, energy requirements with LPG would be 445 PJ. LPG energy content 25 MJ/l (ELGAS, 2019). Average global price US$0.63/l in June 2019 (globalpetrolprices.com, 2019).

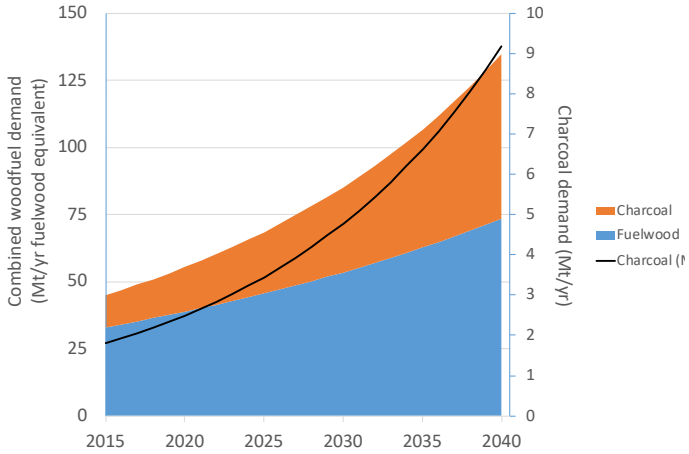
Figure 3: Projected growth in demand for woodfuel in Uganda, 2015-2040



As shown, woodfuel demand is projected to reach between 100 and 210 Mt/yr. of fuelwood equivalent by 2040, from a 2019 base of around 55 Mt. The absence of reliable data hampers accurate monitoring of past trends and this is reflected in the divergent predictions for the future. While the contribution of woody biomass may decline over time as a percentage of total energy consumption, the projections suggest that demand for woodfuels is still likely to at least double over the next 20 years.

Figure 4 below takes Scenario 2 (the extension of the UBOS [2018] trend) and breaks it down to show fuelwood and charcoal in terms of fuelwood equivalent (primary axis) and in actual tonnages of charcoal (secondary axis)[7].

Figure 4: Mid-range woodfuel demand projection (2015-2040), both combined and charcoal only



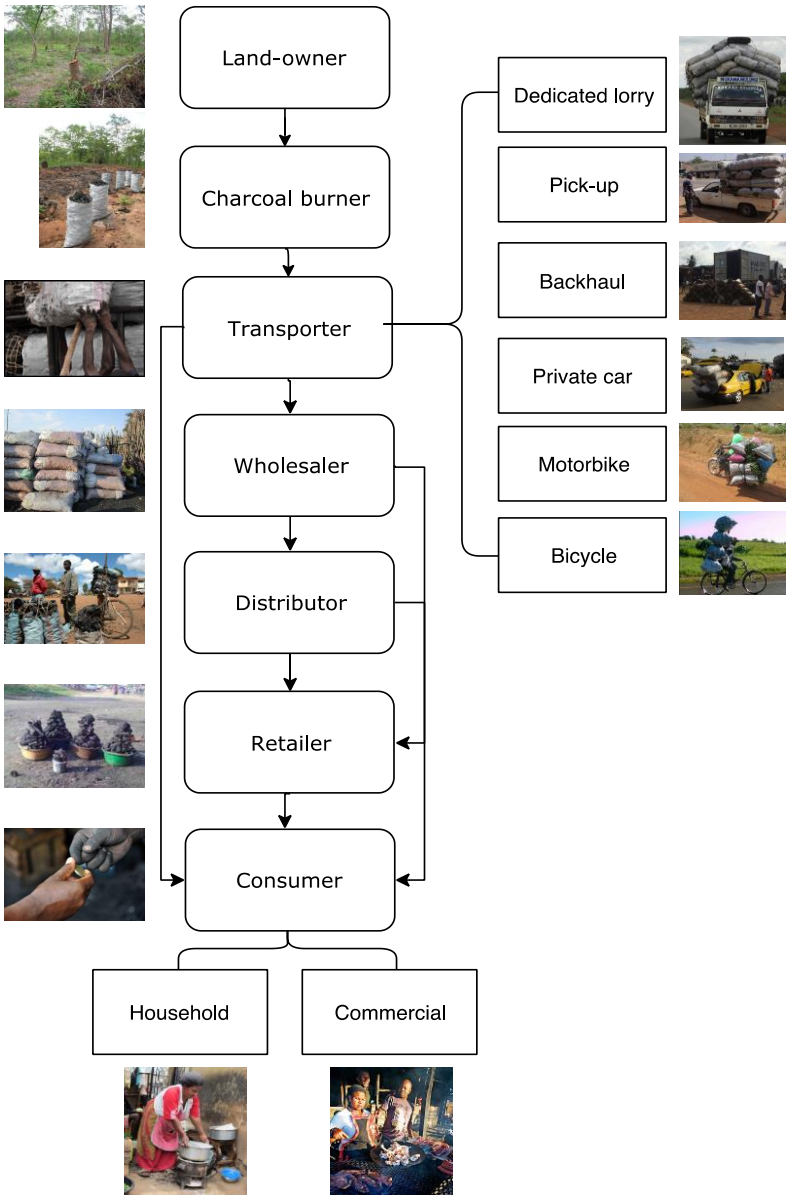
As in the previous chart, the projection suggests that combined demand for fuelwood and charcoal is likely to more than double to around 135 Mt in fuelwood equivalent by 2040. Demand for charcoal will rise dramatically (in black on the secondary axis), from 2.3 Mt in 2019 to 9.2 Mt in 2040, for the previously mentioned reasons of population growth, urbanization, rising wealth, cultural preference and lack of alternatives.

[7] Agri/forest residues are not included.

Charcoal value chain

Charcoal value chains from the source to the point of final consumption would historically involve as many as seven actors in a well-structured arrangement, as illustrated in Figure 5.

Figure 5: Generic charcoal value chain for Uganda



Value chains have become disrupted and more diverse due to stiff competition. Six variants of the traditional system have been identified, depending on the source and the market (JESE, undated). One trend is towards vertical consolidation to eliminate mark-ups by middlemen, and it is increasingly common for woodfuel collection, transport and delivery to be undertaken by the same players. Exploiting legal loopholes that allow unregulated transport of charcoal purportedly for 'personal use', large quantities of charcoal are now carried in small quantities on bicycles, motorbikes, public taxis and backhaul lorries. Large-scale urban wholesaling sites are now rare, reflecting the high opportunity cost of land that was previously used for inbound delivery, repacking and onward distribution. If demand keeps rising and weak controls on small-volume transport persist, further diversification of the value chain is likely as suppliers exploit multiple routes to market to gain a competitive edge.

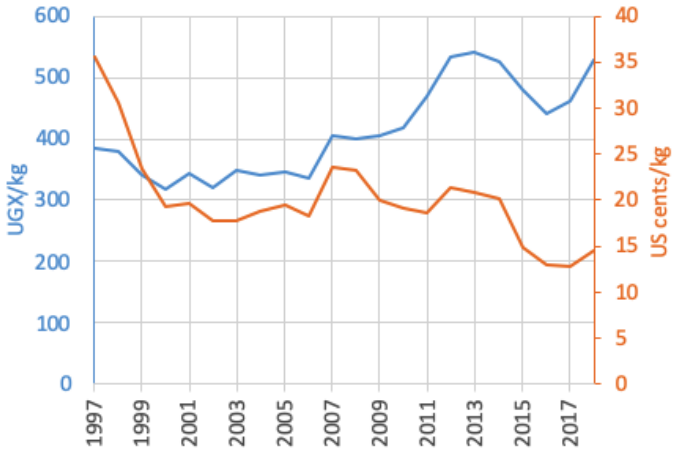
Value of woodfuels

100% of charcoal is traded and the average retail price in Kampala in 2018 was UGX 933/kg (USD 248/t) (UBOS, 2019). Meanwhile 11.8% of fuelwood is commercially traded (ibid.) and a retail price of USD 50/t is realistic (UNACC, 2015). It can be assumed that the same proportion of Agri/forest residues are traded, with an average price of USD 25/t (ibid.). Based on these figures and the consumption data from Figure 1/Annex B, the annual value of traded woodfuels may be **USD 810 million** (UGX 3.0 trillion). This comprises 2.3 Mt of charcoal worth USD 580 M, 4.4 Mt of fuelwood worth USD 220 M and 0.3 Mt of residues worth USD 10 M. The absence of reliable price data for fuelwood and residues is notable and these figures require verification.

Woodfuels are already included in Uganda's GDP calculations, where they are assigned a positive value based on total demand and average price (pers. comm., Sam Mugume, MoFPED). In reality, however, their net value may be negative in accounting terms, depending on the degree to which woodfuel extraction degrades forest stocks. This thematic paper is therefore part of a broader effort to build national forest accounts in which all stocks, flows and values can be considered to deliver a more accurate figure for net woodfuel value.

It is popularly believed that woodfuel prices are rising rapidly, with eye-catching headlines periodically warning of the severity of the squeeze on consumers[8]. Official data (UBOS, 1997-2018) in fact suggest that the price of charcoal in Kampala increased by a relatively modest 20% in inflation-adjusted terms in the 20 years between 1997 and 2017 (see Figure 6; data in Annex C).

Figure 6: Inflation-adjusted charcoal prices in Kampala (reference year 2010)



The chart shows a price spike in 2018 that was reportedly the result of high export demand from Kenya after a national charcoal 'ban' came into effect there. But even after this 21% year-on-year price increase[9], inflation-adjusted charcoal prices in 2018 were still lower than they were in 2012 and 2013. In USD terms, the price of charcoal fell by 59% from 1997 to 2018.

The trend from 1997 to 2018 shows a real-terms charcoal price rise of only 1.5% p.a. Most of the increase took place in 2007, 2011 and 2012, due to "an unfortunate combination of natural forces, heavy rains and lengthy dry seasons, an increase in costs of production and a subtle but highly influential hand of profiteering businessmen" (Daily Monitor, 2011). A further step up was seen in 2018 due to the

[8] e.g. "The charcoal price in Uganda has tripled during the last three years" (Global Environment Fund, 2013, p. 5); "Charcoal users feel price heat" (allafrica.com, 2017).

[9] From an average of UGX 768/kg in 2017 to UGX 933/kg in 2018 (UBOS, 1997-2018).

Kenyan demand effect. Steep price rises can therefore usually be linked to specific short-term effects rather than long-term underlying factors.

The relative stability of charcoal prices over the long term reflects stiff competition between suppliers and traders operating at high efficiency, consolidation within the supply chain, an increase in small load movement (especially using motorbikes) and a ready supply of woody biomass from land being cleared for farming and grazing. Uganda's rate of forest clearance is one of the highest in the world and this conversion of wooded land to agriculture and pasture generates massive quantities of low-cost biomass that can be used as fuel and suppresses prices. Shively et al (2010) found little evidence of differences in economic returns to charcoal makers operating in different districts of Uganda, despite popular views of differences in available supply of charcoal, suggesting that industry competition is intense and suppliers from all districts must price-match or lose market share.

Revenue collection from woodfuels

It is difficult to determine how much of the woodfuel industry value is captured by the government. "While it is not completely opaque, the charcoal industry is very challenging to study" (Shively, et al., 2010). "There is rampant and systemic corruption in the charcoal trade. The situation worsens during the periodic bans on production and trade where producers have to part with huge amounts as bribe to the police and county council security to deliver charcoal to the market. This diminishes the legitimacy of the charcoal business and leaves many producers and transporters vulnerable to economic exploitation" (JESE, undated).

Efforts to capture industry scale and value are hampered in part by a lack of clarity on the exact paperwork required to produce and trade in woodfuels. The National Charcoal Study (GoU, 2016) researched the understanding among 25 District Forest Officers and the two requirements most frequently cited were a charcoal production license and a movement permit, though several also mentioned a trading license and an unidentified 'declaration form'. The variation could be explained by differences in District Bylaws. Interpretation of the requirements among producers, transporters and traders seems confused. 40 different fees were identified by a sample of charcoal vendors (ibid.).

Data on non-enforced licenses, uncollected fees and 'private taxation' are not available for Uganda, though a study from Malawi suggests that 12% of the retail price of charcoal represents bribes to police, forestry and local council officials (Kambewa, et al., 2007), while research in Kenya has recorded equivalent figures of 15% and 26% (Bailis, 2005; Camco Advisory Services, 2013). Taking the average (18%) as an approximate indication for Uganda, private taxes on the woodfuels industry could be worth **USD 146 million/yr**. Further research is needed to know how this relates to total revenue collected by GoU agencies. It is possible that this figure is an overestimate, given that some major charcoal-producing districts (such as Masindi and Nakasongola) have reportedly done away with production permits (Shively, et al., 2010) so the rationale for making unofficial payments in lieu of legitimate paperwork may have been reduced. In Nakasongola, the District Local Government is not even attempting to issue charcoal burners' licenses or felling permits, and collection of movement fees has been outsourced to a private agent (pers. comm., District Forest Officer, 2016). Similarly, in Kamuli District, no production licenses or felling permits are being issued (pers. comm., District Forest Officer, 2016).

Employment in the woodfuels industry

A large number of people, especially the poor, are attracted to the woodfuels industry by the significant and fast-growing market opportunity, low entry costs, ease of access to weakly regulated resources and lack of options for formal employment or alternative livelihoods. An absence of Uganda-specific data means that employment figures can only be estimated based on averages for other countries.Across Malawi, Mozambique and Tanzania, for example, traded fuelwood requires an average labour input of 15 days/t while charcoal requires 64 days/t (MARGE, 2009; MARGE, 2012; Camco Clean Energy, 2014). Using the demand figures from Annex C below, this suggests that Uganda's woodfuels industry may employ **870,000 people** on a full-time equivalent basis (270,000 in commercial fuelwood value chains and 600,000 in the charcoal industry)[10]. Only 41% of charcoal producers are in fact engaged full-time (Kasimbazi, 2018) and the percentage is probably lower for commercial fuelwood suppliers. The actual number of people who work in the woodfuels industry on a part-time or seasonal basis is therefore much higher. The figures exclude unpaid labour for gathering fuelwood for personal use.

Up to 60% of employment and value is likely to be generated in rural areas (MARGE, 2009), particularly in the main sources districts for charcoal: Hoima, Kayunga, Kibaale, Kiboga, Masindi, Nakasongola, Luwero and Apac (Bagabo, et al., 2008), with more recent emergence of Gulu and Arua as the supply radius widens (Kasimbazi, 2018).

Over 100 species are known to be used for charcoal (Kasimbazi, 2018), with the best quality from slow-growing, dense dryland species, particularly *Combretum, Albizia, Terminalia* and *Acacia spp*. (Knöpfle, 2004), as well as *Maesopsis eminii*, *Milicia excelsa* and *Ficus spp*, plus eucalyptus and mango (Kasimbazi, 2018).

[10] Assumes full-time equivalent is 250 working days/yr. (261 weekdays minus 11 public holidays that fall on weekdays in a typical year).

Intervention Options

Despite the scale, value and growth trajectory of Uganda's woodfuels industry, it operates largely in the informal sector and prices are suppressed through the value chain. This discourages the type of investment that might result in modernisation, efficiency gains and better environmental and social safeguards. Formalisation of the woodfuels industry requires actions to reform governance alongside a package of practical interventions to support the positive development of the industry.

Woodfuels Governance Reform

With recognition, formalisation and a more level playing field, investors could be attracted to introduce more modern, efficient approaches and advanced technologies for production, conversion and end-use. Those who work in the industry could be afforded legal safeguards. State revenues in lieu of private taxes could be significant.

Rates of regulatory compliance in the woodfuels industry are currently low because the cost of adhering to the myriad rules on sourcing, movement and trade significantly exceeds the cost of evasion and private taxes. Woodfuels are uniquely over-regulated - 44 separate policies, laws, regulations and guidelines pertain to charcoal alone (Kasimbazi, 2018, pp. 17-18). Seven ministries and at least six agencies have a direct interest in woodfuel governance (Kazoora, 2013, p. 29). While charcoal is discussed in these institutions, strong and coordinated mechanisms to promote it responsibly as a major source of energy have not yet been actualized (JESE, undated).

While the apparent solution might be stronger enforcement to ensure compliance, regulations are likely to be unenforceable in their current form, given the divided responsibilities, complexity of oversight and capacity constraints in government agencies and the lack of incentives for those tasked with revenue collection. An alternative approach would be to lower the threshold of compliance through de-regulation. Regulations need to be sufficiently straightforward to be complied with and enforced, as a first step towards industry recognition and engagement.

Deregulation would require a change in perceptions among those who set policy, so they are to be convinced of the value of simplified, more pragmatic and implementable governance framework to increase compliance and promote participation of the woodfuel industry in the formal economy.

This requires:

1. ***Data generation:*** More credible and convincing data is needed on the social and economic significance of the woodfuels industry, both for which information is currently incomplete and unreliable. "The lack of up-to-date data that is readily accessible has greatly obscured the potential of the charcoal industry to contribute significantly to the country's revenue base" (JESE, undated). Such data include the size and value of the industry at different points in the value chain, the employment it supports (both directly and indirectly), implications for the livelihoods of producers and processors, revenue collected and foregone, the monetary flows generated from urban to rural areas (and the population migration this may be offsetting), the scale of displacement of imported energy with woodfuels, avoided carbon emissions from fossil fuels and less quantifiable factors such as national energy security.
2. ***Advocacy:*** Data on woodfuels need to be professionally packaged and presented to policymakers to communicate the contribution and relevance of woodfuels. The NCA valuation process is a useful first step. Rather than perpetuating the narrative that woodfuels represent a significant environmental threat, this should highlight the potential offered by woodfuels for a prosperous, low-carbon energy future, as a step towards building support for formalizing rather than further marginalising the industry.

Going beyond environmental professionals to include GoU trade, industry and revenue experts, this should highlight the avoided import costs of using woodfuels, the revenues foregone from the woodfuels industry, and the economic benefits of regularizing production and trade.

3. ***Governance Review:*** Data and advocacy should underpin a review of governance in which the implementability of current regulations and fiscal measures is evaluated, ideally leading to a simplified framework that can be more realistically applied by agencies that are suitably incentivised and resourced to do so. Stronger incentive mechanisms are needed for revenue collection from woodfuels, e.g. by re-investing a percentage of fees in the agencies responsible for collection; this could include commercially-incentivised third parties, with measures to avoid uncontrolled extraction.

Practical Intervention Options

Alongside the proposed governance review, practical intervention options to enhance the sustainability of woodfuels and support a stable and diverse energy blend include:

1. Assignment or creation of a single agency with oversight for commercial woodfuels, to avoid current overlaps and duplication;
2. Development of enforceable packaging standards for charcoal, with uniform bag weights and consistent fees;
3. Expanded technical and financial support for commercial tree growing on private land, from which woodfuels are a merchantable by-product; dedicated ‘energy plantations’ are not commercially competitive at present;
4. Greater support for industrial use of fuelwood, pellets and wood chip for thermal applications, with incentives to convert fossil fuel systems, to create a consistent market and investment incentive for sustainably sourced woodfuel;
5. Development of value-added markets for sustainably produced charcoal for urban retail and for bulk consumers concerned with responsible sourcing;
6. Commercial incentive packages for manufacturers and importers of high-tier cookstoves for fuelwood and charcoal that meet the minimum standards of the Uganda National Alliance on Clean Cooking (UNACC, 2015); and
7. Measures to reduce the cost of LPG adoption and use, including credit schemes for appliances and research into pay-as-you-go LPG technology.

Summary

Woodfuel demand in Uganda in 2019 is estimated to comprise 37.6 Mt of fuelwood, 2.3 Mt of charcoal and 2.7 Mt of agricultural and forest residues, with a combined energy content of 667 PJ and requiring 53.1 Mt of roundwood input. Demand is expected to more than double by 2040 in terms of fuelwood equivalent.

The annual value of traded woodfuels is estimated at USD 810 million, comprising 2.3 Mt of charcoal worth USD 580 M, 4.4 Mt of fuelwood worth USD 220 M and 0.3 Mt of residues worth USD 10 M. The government captures little official revenue from the industry and 'private taxes' on woodfuels could be worth USD 146 M/yr.

The inflation-adjusted price of charcoal in Kampala increased by a relatively modest 20% in the 20 years to 2017, though there was a 21% hike in 2018 that probably resulted from high export demand from Kenya, following tighter harvesting controls there. Inflation-adjusted charcoal prices in 2018 were nevertheless lower than they were in 2012. The relative long-term stability of prices reflects stiff competition between suppliers and traders operating at high efficiency, consolidation within the supply chain, an increase in small load movement and a ready supply of wood from land being cleared for farming and pasture, and from illegal extraction from gazetted protected areas.

Uganda's woodfuels industry may employ 870,000 people on a full-time equivalent basis (270,000 in commercial fuelwood value chains and 600,000 in the charcoal industry). Up to 60% of employment and value is likely to be generated in rural areas

The overregulation of woodfuels in Uganda means that the cost of compliance exceeds the cost of evasion and 'private taxes.' It is suggested that deregulation would lower the threshold of compliance, enable better enforcement and significantly increase state revenues. In addition, formalization of the sector, as well as creating a level playing field, could attract investors to introduce more modern, efficient approaches and advanced technologies for production, conversion and end-use. Increasing profitability would facilitate instituting legal safeguards for workers in the industry. A range of measures are required to generate data, advocate for reform, simplify governance and provide practical support to industry players.

The woodfuel industry is significant and growing, but a lack of reliable data on scale, value and economic and social contribution is indicative of the low priority it receives, and the marginalization and informality experienced by actors in the supply chain. The recognition of woodfuels in the NCA process can go some way towards valuing and legitimizing these contributions and informing rational policy debate that may help formalize and support the industry. A range of measures are required to generate data, advocate for reform, simplify governance and provide practical support to industry players.

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Annex B: Primary energy demand data

Table 1: Primary energy demand data

	Fuelwood		Charcoal			Agro/forest wastes		Total	
	Mt	PJ	Mt	Mt wood equiv.	PJ	Mt	PJ	Mt wood equiv.	PJ
Household	27.0	405	1.8	12.0	53.5	1.7	21.2	32.6	380
Industrial	3.7	54.8				0.66	8.3	5.5	81
Commercial	2.36	35.5					-	2.5	17
Totals (2013)						***2.3***	***29.4***		
Totals (2015)	***33.0***	***496***	***1.8***	***12.0***	***53.5***				
Totals (2019)	***37.6***	***563***	***2.3***	***15.5***	***69.4***	***2.7***	***34***	***55.8***	***667***
								Petroleum (PJ)	80
								Electricity (PJ)	15

Sources:

1. Agro/forest wastes demand for 2013 from GoU (2013), extrapolated to 2019 in line with rural population growth rate of 2.44% p.a. (UN DESA, 2018).
2. Fuelwood and charcoal demand for 2015 from UBOS (2018, p. 143), extrapolated to 2019 continuing 2011-2015 trend, i.e. fuelwood demand growing at 3.25% p.a. and charcoal demand at 6.74% p.a.
3. Biomass energy contents from GoU (2013): firewood 15 MJ/kg; charcoal 29.8 MJ/kg; Agro/forest wastes 12.6 MJ/kg.
4. Carbonisation efficiency 15% air dry from GoU (2016).
5. Population growth rates from UBOS (2018) with rural/urban projections from UN DESA (2018).
6. Petroleum consumption based on 2017 imports of 70.8 PJ, extrapolated to 2019 at 6.44% p.a. in line with average rate of increase 2011-2017. www.ubos.org/explore-statistics/statistical-datasets/14230/ (original data in cubic metres converted to PJ, for four categories of petroleum product).
7. 2017 electricity demand of 3,405 GWh from Umeme sales (minus exports), extrapolated to 2019 @ 9.3% p.a. based on recent trend. www.ubos.org/explore-statistics/statistical-datasets/14185/

Annex C: Charcoal retail prices in Kampala (1997-2018)

Table 2: Charcoal retail prices in Kampala (1997-2018)

Year	Q1	Q2	Q3	Q4	Ave.	CPI (2010= 100)	Price Adjustment factor to 2010	Charcoal price in 2010 terms (UGX/kg)	Rate to USD	US cents equiv.
1997	183	195	185	193	189	49.1	2.038	385	1,083	35.6
1998	207	185	178	174	186	49.1	2.037	379	1,240	30.5
1999	179	176	179	173	177	51.9	1.925	340	1,455	23.4
2000	172	171	163	177	171	53.7	1.862	318	1,644	19.3
2001	181	199	194	180	188	54.7	1.828	344	1,756	19.6
2002	182	161	179	174	174	54.5	1.833	319	1,798	17.8
2003	210	193	214	210	207	59.3	1.687	349	1,964	17.8
2004	216	215	199	210	210	61.5	1.626	341	1,810	18.9
2005	233	229	226	237	231	66.7	1.500	347	1,781	19.5
2006	240	210	256	253	240	71.6	1.398	335	1,831	18.3
2007	299	293	293	349	309	75.9	1.317	406	1,723	23.6
2008	350	300	347	365	340	85.1	1.175	400	1,720	23.2
2009	419	377	389	375	390	96.2	1.040	405	2,030	20.0
2010	438	407	419	410	419	100.0	1.000	419	2,178	19.2
2011	435	423	568	768	549	116.6	0.858	471	2,523	18.7
2012	752	688	667	702	702	131.3	0.761	535	2,505	21.3
2013	779	723	752	729	746	137.8	0.726	541	2,587	20.9
2014	741	718	734	792	746	142.0	0.704	525	2,598	20.2
2015	750	659	694	779	721	150.0	0.667	480	3,238	14.8
2016	772	730	627	667	699	158.5	0.631	441	3,417	12.9
2017	746	714	775	838	768	166.8	0.600	461	3,616	12.7
2018	885	925	1,000	923	933	176.3*	0.567	529	3,628	14.6

CPI = Consumer Price Index
* - 2018 CPI extrapolated

Sources:

1. Charcoal prices from UBOS (1997-2018) Quarterly Key Economic Indicators: www.ubos.org/publications/statistical/64/
2. CPI and exchange rates (1997-2013) from World Bank Development Indicators: datacatalog.worldbank.org/dataset/world-development-indicators
3. Exchange rates 2014 onwards from: www.exchangerates.org.uk

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