



# Bioenergy in Tea Processing in Kenya

## SUMMARY

**Kenya is the world's largest exporter of black tea, earning over USD 1.4 billion in foreign exchange from tea exports in 2018.**

Over 60% of Kenya's tea is processed at 70 independent factories owned by 650,000 smallholder growers, through their 54 farmer-owned companies. These companies are, in turn, shareholders in the Kenya Tea Development Agency Ltd (KTDA), a national holding company. Non-KTDA tea companies are represented by the Kenya Tea Growers' Association (KTGA). Most tea from both KTDA and KTGA members is sold via the 'Mombasa Auction', the world's second largest tea auction, under the framework of the East African Tea Trade Association (EATTA).<sup>1</sup> KTDA smallholder teas fetch an average price 20-25% higher than KTGA estate teas.

The processing of black tea requires significant quantities of thermal energy for leaf drying. As there are no government regulations or incentives regarding energy for tea processing, fuel choice is driven by technical, official forestry rules and regulations, financial and sustainability considerations at each factory, with fuelwood being the cheapest and most convenient option for tea production over the last few decades.

KTDA Holdings has a management services subsidiary, KTDA MS, which provides a range of management and technical services to the 70 smallholder factories. KTDA MS works with international partners to improve energy efficiency and to ensure that fuel sourcing is sustainable. With sustainably-produced wood becoming more difficult and expensive to obtain, even with KTDA and its factories planting some 20,000 ha of fuelwood plantations and woodlots (with a target of purchasing another 50,000 ha for fuelwood plantations), some factories have been motivated to use alternative bioenergy sources to achieve sustainable energy supply. Several KTDA factories supplement fuelwood with biomass briquettes as well as coffee husks, macadamia shells and other biomass energy residues. Further to a November 2019 tender<sup>2</sup>, KTDA MS has pre-qualified three suppliers of bioenergy briquettes made from sugar bagasse, sawdust and pineapple residues for its factories seeking supplementary bioenergy supplies, with a policy goal of achieving 20% non-fuelwood bioenergy substitution.

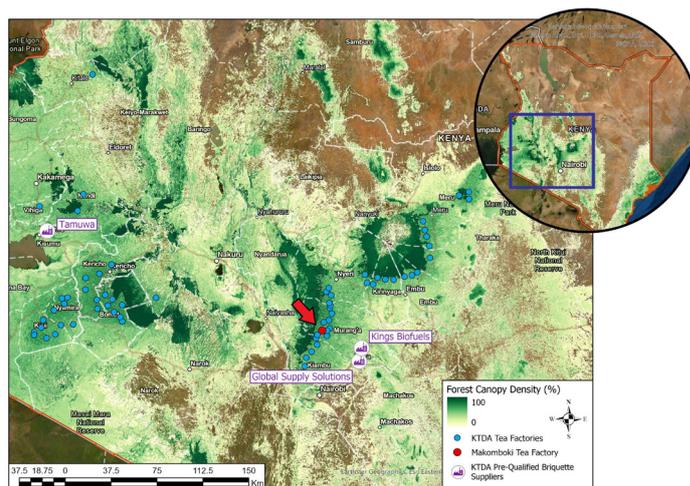
This policy brief analyses the policy and institutional aspects of the substitution of fuelwood with alternative forms of biomass in smallholder tea processing in Kenya, using KTDA's Makomboki Tea Factory in Murang'a County as the bioenergy case in Kenya's smallholder tea sector.

## SECTOR OVERVIEW

**Colonial settlers introduced commercial tea growing to Kenya in the 1920s.**

In preparation for independence, the sector was opened up to indigenous farmers from 1958, through the Special Crops Development Agency, which was replaced by the Kenya Tea Development Authority (KTDA) in 1964. KTDA was initially a government parastatal supported by the UK's Commonwealth Development Corporation (CDC), the World Bank and USAID. At least 51% of the shares in each KTDA tea factory were vested in the smallholder farmers who supplied those factories.

KTDA was privatised in 2002 as the Kenya Tea Development Agency (KTDA Holdings Limited), with eight subsidiaries. As the CDC and other international financiers wound down their investments in the early-1990s, their shares were reallocated to smallholder farmers as shares in 54 tea companies. Since privatisation, each of the 54 companies own at least one main factory, some with satellite factories (for a total of 70 factories), across a belt from central Kenya to the Uganda border (Figure 1).



**Figure one: KTDA factory locations by County (KTDA 2020)**

The farmers own shares in KTDA Holdings Ltd. From the outset, smallholder tea growers have, therefore, held majority shares in their own factories and set their own production targets, performance indicators, sales strategies and quality standards.

<sup>1</sup> Members companies and organisations come from Madagascar, Mozambique, Malawi, Tanzania, Burundi, Rwanda, DR Congo, Uganda, Kenya and Ethiopia.

<sup>2</sup> KTDA/193/2019 Request for Proposals For Supply And Delivery Of Briquetted Biofuels for KTDA Managed Tea Factories; KTDA/194/2019 Request for Proposal Supply and Implementation of Automated Fleet Management Solution for KTDA Managed Tea Factories

KTDA smallholder tea is recognised as one of the world's finest, most quality-assured teas, commanding some of the highest prices and consistently earning most of Kenya's estate-grown teas.

In contrast with large-scale producers (such as Unilever, James Finlay and Williamson), who produce most of their tea on estates using contracted labour and/or out-growers, KTDA farmers own their land, produce their tea, collectively own the processing factories and benefit jointly from the sale of finished products. This model has made smallholder tea a key driver of rural development in Kenya and has attracted the support of the Fairtrade movement,<sup>3</sup> The Ethical Tea Partnership, the Rainforest Alliance and development agencies such as Gatsby Africa and the IKEA Foundation.

The processing of black tea is an energy-intensive operation requiring significant quantities of heat for removal of moisture from the leaf. KTDA factories originally relied on fuel oil to supply this heat, which became increasingly expensive and unreliable. Between 2008 and 2014, KTDA switched all its factories to fuelwood, which is now the industry standard for almost all Kenyan tea processors.

Private tea estates typically set aside 20% of their land for growing fuelwood, primarily using eucalyptus spp. KTDA factories have now purchased and planted around 20,000 ha of woodlots/small plantations and procure fuelwood from farm woodlots owned by their members and neighbours. However, this only accounts for a fraction of their fuelwood needs.

KTDA requires around 236,000 ha of plantations to be entirely self-sufficient in fuelwood, i.e. 7% more than all private tree plantations in Kenya for all purposes (~220,000 ha). The fuelwood demands of the industry can therefore only be met by external sourcing. However, there is high pressure on Kenya's forest resources due to intense competition for land for agriculture and settlement, and the increasing demands of the tea sector and other commercial consumers. Fuel production from forestry investments has not kept up with demand, while the Government has restricted the use of wood from natural forests.

International tea buyers have meanwhile introduced more stringent sustainability standards in response to consumer concerns. The combination of supply constraints and consumer expectations have motivated KTDA factories to: 1) boost production of sustainably-grown fuelwood from their own plantations and woodlots; 2) improve energy efficiency; and 3) supplement fuelwood with alternative bioenergy sources. In response, at least 15 KTDA factories are now using alternative bioenergy sources, including at least three currently using sugar bagasse, pineapple leaf and sawdust briquettes, to reduce their fuelwood consumption. As part of a drive to reduce fuelwood consumption by 20% by 2022, Makomboki Tea Factory<sup>4</sup> in Murang'a County, one of the pioneers in alternative fuels, buys sustainably produced biomass briquettes and various biomass residues (e.g. macadamia shells) to supplement its fuelwood supplies to meet its thermal energy needs.<sup>5</sup>

## TEA SECTOR INSTITUTIONAL SET-UP

### **A strong institutional framework has been a key success factor for the Kenyan tea industry (Figure 2).**

Public sector actors include government ministries, agencies, institutes and regulators, whose task is to create an enabling environment by developing and implementing favourable policies, legislation and regulations, as well as providing research and trade promotion support. Every tea factory in Kenya is licensed through the Ministry of Agriculture's Tea Directorate on all aspects of production, processing, grading and export licensing. KTGA's 38 members represent private estates and their out-growers under local and international ownership, while KTDA represents 650,000 small-scale producers and their 54 tea companies.

KTDA has eight subsidiary companies serving its members and supporting the tea value chain:

- i. KTDA Management Services (MS) provides management support to the factories,
- ii. Chai Trading Company manages tea factories' primary sales and marketing,
- iii. Majani Insurance Brokers provides insurance to factories and individual farmers,
- iv. Kenya Tea Packers Ltd (KETEPA) purchases, packages and sells some tea from KTDA factories, mostly for the local Kenya market,
- v. Greenland Fedha provides micro-finance to KTDA members for small enterprises,
- vi. KTDA Foundation is KTDA's benevolent association and invests in and operates fuelwood plantations, purchases land and provides services to tea factories,
- vii. Tea Machinery and Engineering Company (TEMEC) provides machinery and technical support to the factories, and
- viii. KTDA Power Company develops and operates renewable electricity suppliers for KTDA factories.

<sup>3</sup> 26 KTDA factories are Fairtrade-certified and earned €1.27m in premiums in 2020 [www.fairtrade.net/impact/key-data-fairtrade-tea](http://www.fairtrade.net/impact/key-data-fairtrade-tea) and <https://ktdateas.com/our-markets>

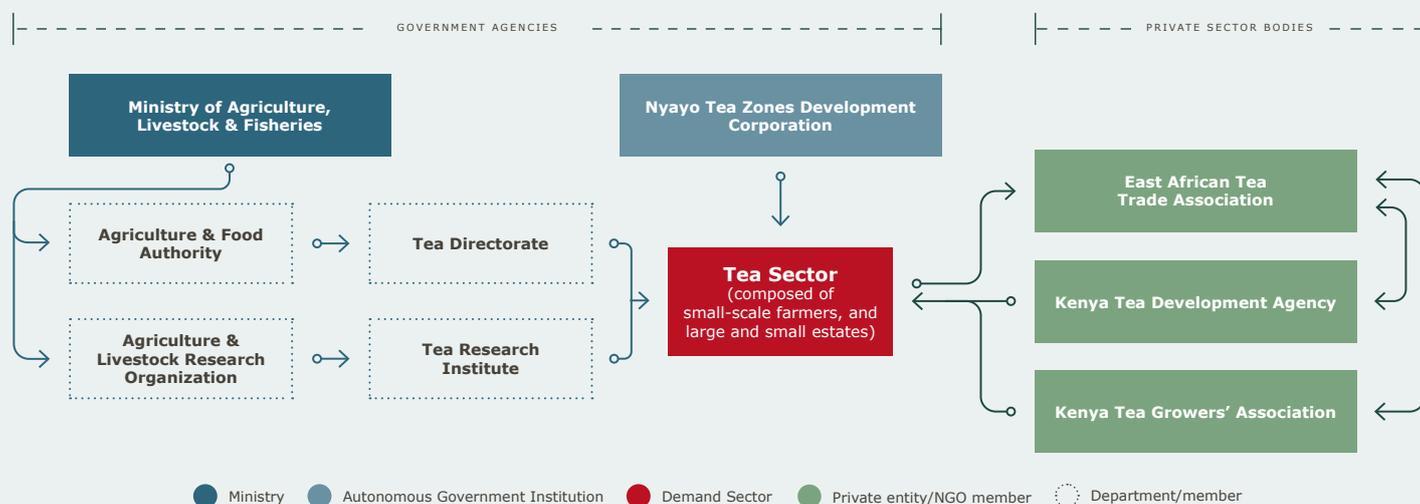
<sup>4</sup> Makomboki Tea Factory was opened in 1981 and is majority-owned by 5,060 smallholder farmers in Kenya's second-most densely populated rural county. Makomboki specialises in the black tea for premium markets, with Rainforest Alliance sustainability and Fairtrade certification, and consistently commands prices in the top ten of Kenya's 100+ tea factories.

<sup>5</sup> Discussions with Makomboki Tea Factory management, June 2020.

Most KTDA and KTGA tea is auctioned at the EATTA's Mombasa auction. KTDA factories can also choose to sell to other buyers, and about 20% of KTDA tea is sold on a bilateral

basis outside the auction. These non-EATTA sales are mostly specialty teas for expanding fair trade, environmental, ethical and organic markets.

**Figure two: Institutional framework for tea sector in Kenya**



## TEA SECTOR REGULATORY FRAMEWORK

**The regulatory framework for Kenya's tea sector is relatively light.**

The Crops Act (2013) covers all agricultural and cash crops, including tea. It replaced the Tea Act and makes the regulations for the tea industry more consistent with the rest of the agricultural sector. The Crops (Tea Industry) Regulations (2020) regulate the production, marketing and trade in tea, as well as registration and licensing matters. Bringing the tea sector under a single set of regulations has reduced unnecessary regulatory

burden, making it easier for the industry to comply and the government to enforce. The Agriculture Act provides the legal framework for a stable agricultural sector, by regulating for good management and husbandry practices. There are no specific regulations pertaining to tea. Smallholder tea factories are established as limited liability companies under the Companies Act (1978, revised 2015). This gives them leeway to set their own policies and strategies not only for tea growing, processing and marketing, but also for their sourcing and use of energy.

## INSTITUTIONAL FRAMEWORK FOR BIOENERGY USE IN THE TEA SECTOR

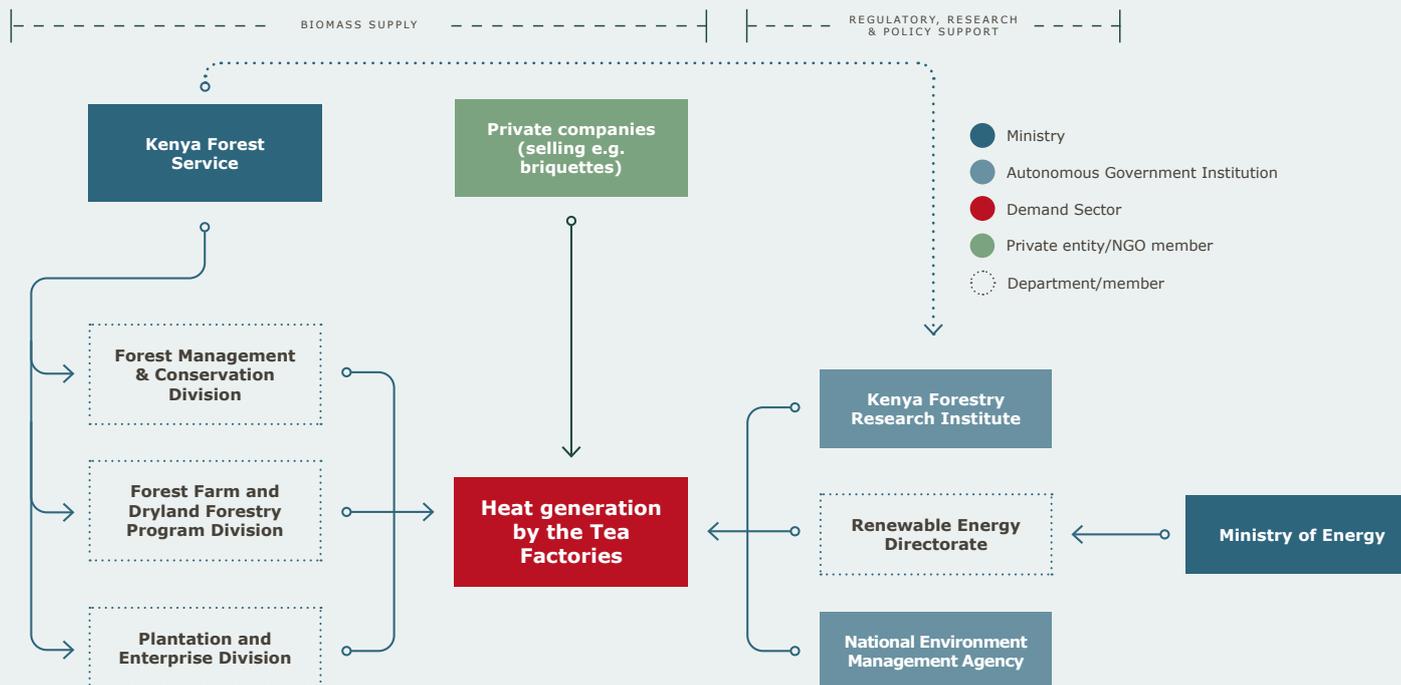
**The Ministry of Environment and Forestry (MoEF) is the apex body for all affairs concerning forestry resources in Kenya (Figure 3).**

Under MOEF is the (a) Kenya Forestry Research Institute, a parastatal organization that carries out research into forest products, including bioenergy, (b) the National Environment Management Authority (NEMA), a semi-autonomous agency that supervises, coordinates and implements environmental policies and regulations, including in tea growing and processing, and (c) the Kenya Forest Service (KFS), a parastatal founded in 2016. KFS is the paramount government body overseeing all of Kenya's forestry resources, and the regulatory, standards and licensing agency for private forestry production, protection and utilisation. KFS manages 135,000 ha of state-owned plantations, from which many KTDA factories purchase fuelwood.

Since switching from fuel oil, KTDA factories source fuelwood from (i) forest plantations on KTDA-owned land (20,000 ha), (ii) forest estates and woodlots owned by KTDA factories (individually or jointly), (iii) private farmers with their own plantations and woodlots, and (iv) commercial forestry companies, e.g. Kakuzi Ltd. Individual KTDA factories, as the shareholders of KTDA Holdings Ltd, can choose what sources and where to source their wood and non-wood bioenergy supplies.

The sourcing of loose residues like shells, husks and sawdust is a matter for the senior management at each factory. But to ensure consistent quality, quantity and price, KTDA organised a competitive tender for eligible briquetted biofuels in 2012, and again in 2019. Three suppliers were selected at a negotiated price of KES 15/kg of briquettes. Again, individual KTDA factories can choose to source briquettes from these facilities or not.

**Figure three: Institutional framework for wood use in tea sector in Kenya**



## IMPACT OF POLICIES ON BIOENERGY USE IN TEA PROCESSING

### There are no financial (or other) incentives for using bioenergy in tea processing in Kenya.

While imported solar PV, wind and small hydropower equipment enjoys reduced or zero import duties, machinery for briquetting, or for pyrolyzing biomass or for using solid forms of bioenergy (e.g. boilers, electronic controls and motors), receive no import duty or tariff relief. And the sale of fuelwood from commercial plantations (e.g. Kakuzi), coffee husks, etc. are subject to VAT. However, from 1 June 2021,

VAT on briquettes and briquetting machinery has been abolished. Fuel choice at each factory is therefore driven by straightforward availability, financial, sustainability and performance considerations, with wood being the cheapest and most convenient option for the last few decades. The substitution of fuelwood with other sustainable forms of bioenergy is therefore a response to the rising cost and supply uncertainty associated with fuelwood because of diminishing forest resources, and market sustainability requirements.

## RECOMMENDATIONS

### The following recommendations are proposed for policy, regulatory and market changes:

- Both KTDA and KTGA should accelerate sustainably-produced bioenergy fuel wood substitutes (especially sustainably-produced agriculture and forestry residues) to diversify their energy supply, reduce pressure on Kenya’s forest resources and enhance sustainability credentials for discerning international markets.
- KTDA, KTDA factories and individual tea farmers should be provided with direct support to encourage more planting and investment in commercial woodlots, to boost incomes and to ensure the wood supplies to tea factories are sourced sustainably and used efficiently; for example through better access to quality growing stock, extension support and financial incentives such

as co-funding grant schemes.

- Current on-farm tree seed provenances for wood fuel are old and new provenances need to be identified and acquired. KEFRI should be financed to research improve seeds and seed stocks for these species for on-farm plantings for fuel wood to supply tea sector factories. This could be done in conjunction with Tanzania, Rwanda, Uganda and Ethiopia.
- Tax breaks and other fiscal incentives should be introduced to reduce the cost of importing modern, efficient machinery for the processing and conversion of biomass fuels to thermal energy, to promote and ensure the clean and sustainable use of bioenergy in the tea sector, Kenya’s largest foreign exchange earner and leading rural employer.