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Unfavourable Policies Constrain Post-Pandemic Recovery and Long-term Success of the Sorghum Value Chain

Technical Report

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August 2021

[+]Tegemeo Institute of Agricultural Policy and Development, Egerton University

Unfavourable Tax Policies Constrain Post-Pandemic Recovery and Long-term Success of the Sorghum Value chain

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Tegemeo Institute

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Acronyms

AGRA	Alliance for Green Revolution in Africa
ASALs	Arid and Semi-Arid Lands
ASTGS	Agriculture Sector Transformation and Growth Strategy
CGA	Cereal Growers Association
EABL	East African Breweries Limited
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
KBL	Kenya Breweries Limited
KCSAP	Kenya Climate Smart Agriculture Project
K-CEP	Kenya Cereal Enhanceent Programme
KRA	Kenya Revenue Authority
MoALF&C	Ministry of Agriculture, Livestock, Fisheries and Cooperatives
NARIGP	National Agricultural and Rural Inclusive Growth Project
NRC	National Research Council
SME	Small and Medium Enterprises
USAID	United States Agency for International Development
VAT	Value Added Tax
WFP	World Food Program

Abstract

Small scale farmers primarily do sorghum production in Kenya in areas with mid to low potential for crop farming. Most of these areas are semi-arid, making sorghum a valuable crop to improve smallholder farmers' livelihoods. Commercially oriented sorghum production did not start until the beginning of the past decade following the introduction of sorghum beer. At the time, favourable policies such as the 100% remission on excise duty for sorghum beer helped attract investments that trickled down to farming households. However, a 50% reduction in the remission of exercise duty in 2013 created a shock that the industry overcame over the next three years.

The government seeks to transform the agriculture sector into commercially oriented and competitive, generating higher income for farmers and improving their livelihoods. The sorghum value chain provides an opportunity to attain these goals, especially in the semi-arid areas where there is low potential for crop production. The sorghum value chain had grown to support over 85,000 enterprises, including farmers, retailers, distributors, agents, and researchers. Kenya Breweries Limited (KBL), at the time of this writing, has 47,000 sorghum farmers. In 2019, the farmers delivered produce to KBL, receiving Ksh 1.2 billion. In the same year, the value added by distributors was Ksh 1 billion, while retailers added Ksh 4.5 billion. In addition, the government received Ksh 9.8 billion as tax revenue in the same year. This demonstrates the rising importance of the sorghum value chain to the sector and the country's economy.

In 2020, the Covid-19 pandemic brought about significant socio-economic shocks in addition to the health shocks. The closure of hotels, restaurants, eateries and restricting the sale of alcohol had severe effects on the sorghum value chain. In addition, the Kenya Revenue Authority increased excise duty on alcohol (including beer made from sorghum) by 5% in October 2020 through inflation adjustment. This tax increase will be a more significant threat to the value chain if the trend continues – beer made from sorghum is highly price-sensitive, and any price increase due to tax increase will shift demand to illicit alcohol and ultimately lower demand from grain from farmers. As a result of the pandemic and challenging economic environment, KBL cut back on sorghum orders by 83% in 2020. This resulted in a 41% decline in the amount of money paid to farmers compared to 2019. Furthermore, the estimated losses of retailers, distributors, and agents were about 85% of the pre-pandemic levels.

Given the progress made in the sorghum value chain, investing in the value chain remains a safe bet to address food security and 'households' incomes, especially in the Arid and Semi-Arid Lands in line with the agriculture transformation agenda outline in the Agriculture Sector Transformation and Growth Strategy. To attain these goals, the government should institute policies that provide incentives, especially for private sector investments in the value chain. Such policies include increasing the remission of excise duty, a move that would result in a faster recovery from the effects of the pandemic and boost economic activity, which will improve the livelihoods of the farmers, distributors, agents, and retailers. This will boost the performance of the agricultural sector and the economy in general.

1. Sorghum production in Kenya

Sorghum is an important cereal crop utilized worldwide as food, feed and industrial raw material. The crop is fairly drought tolerant making it suitable in semi-arid areas of Kenya where the agricultural and environmental conditions are harsh for producing other food crops such as maize. Sorghum is one of the essential drought-tolerant crops and is often referred to as the '*camel of the plant kingdom'* (Fetene et al., 2011). The plant has for a long time been noted to be the most important cereal for human consumption, surpassed only by maize, wheat, rice and barley (Dicko et al., 2006). According to Timu et al. (2012), sorghum is one of the main staple food crops for the worlds poorest. For a long time, it has been considered a crop of resource-poor small-scale farmers and is grown predominately in Arid and Semi-Arid Locations (ASALs) (USAID, 2010). Under the Big Four Agenda and the Agriculture Sector Transformation and Growth Strategy (ASTGS), the government aims to increase smallholder productivity and incomes and improve livelihoods as a key policy objective. Sorghum farming provides an opportunity for attaining this objective, especially in the ASALs, where food insecurity is a significant problem and livelihoods are stressed. Sorghum is ranked fourth after maize, wheat and barley in Kenya in terms of cereal production and do well on a wide range of soils, including those with very low fertility. Therefore, the potential of sorghum to catalyze regional development and improve household welfare is considerably high.

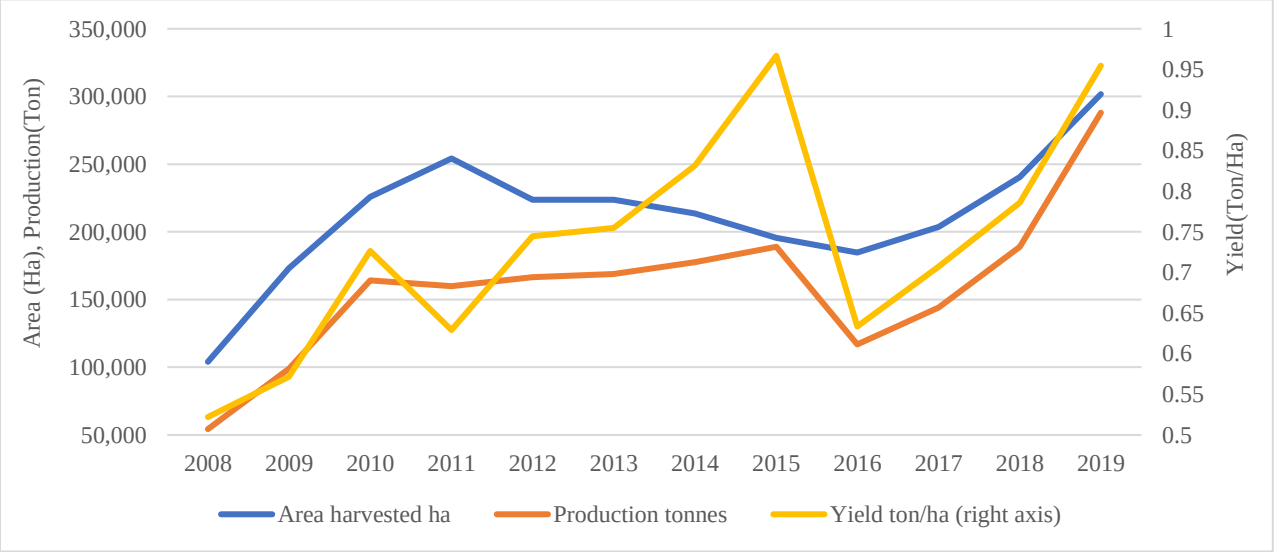
For a long time, sorghum has been a subsistence crop, produced just for domestic consumption, with no prospects of growing it as a cash crop. However, over the past decade, numerous interventions by the government, the private sector, non-governmental organizations, stakeholders in research and development partners were initiated to develop improved varieties, increase the quantity and distribution of the improved varieties, promote the sorghum as an income-generating activity, train farmers to improve sorghum production, as well as link farmers to input suppliers and traders through partnerships with the private sector. These interventions significantly improved the livelihoods of households in marginal areas engaged in commercial sorghum production. Therefore, the development of the sorghum value chain has served to improve the household welfare of about 47,000 contracted farmers, reducing their vulnerability to the effects of climate change, boosting their resilience, and improving food security in semi-arid regions in the country.

The year 2008-2010 registered a substantial increase in sorghum production due to changes in area harvested, which can be attributed mainly to the government's efforts to revitalize the crop as one of the high-value traditional crops. These interventions rolled out in partnership with the GIZ, provided improved variety seed, and were complemented with a ready market by East African Breweries Limited (EABL), pioneering using sorghum as a raw material for beer brewing. As a result, the overall effect at the farm level was an increase in return to farmers in ASAL regions from sorghum production (MoALF&C, 2015).

The growth was sustained until 2014 when the government introduced a 50% excise duty on alcoholic beverages made from locally produced sorghum, millet or cassava. This tax regime change affected the entire sorghum value chain, with farmers bearing the most significant effect after EABL stopped taking up new orders due to depressed consumer demand.

In recent years, sorghum production has grown. However, a key concern is that farmers do not realize potential yield gains of over 2.8 tons per hectare, especially from the improved sorghum varieties. It is evident that total production has primarily resulted from the increase in the area under cultivation, as shown in Figure 1. The increase in area under cultivation is driven by increasing demand due to industrial use for sorghum for beer processing.

Figure 1: Sorghum production in Kenya



Source: FAOSTAT, 2020

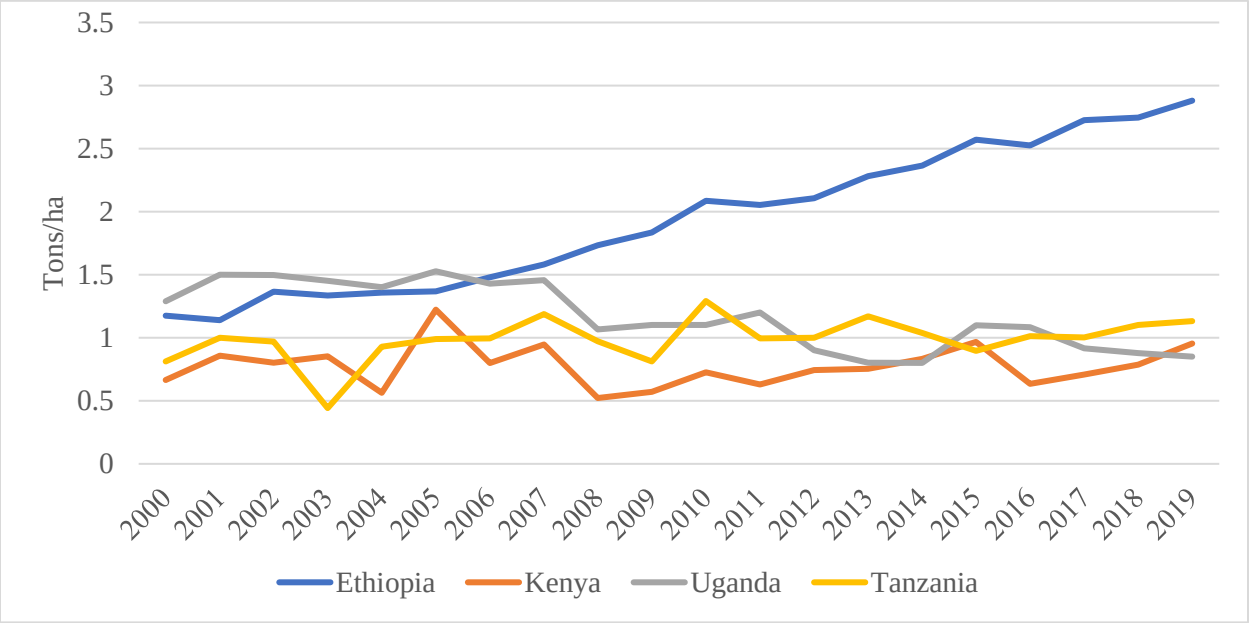
The Government of Kenya supported the development of sorghum beer because of two reasons. First, it promised potential health benefits by reducing health risks associated with the

consumption of illicit brews. Illicit brews have been blamed for addiction, loss of human resource potential, and death. Consumers from low-income households were likely to consume unregulated, dangerous brews that are cheap due to low income (Bryceson, 2002; Willis, 2003). The popularity of sorghum beer is due to affordability, especially for the consumers in the low-income bracket as a high-quality alternative to illicit brews. Secondly, it encouraged local sorghum production, which improved the incomes of sorghum farmers, created downstream employment opportunities in manufacturing, logistics, small businesses that empowered women and youth and helped the government attain its goals for poverty reduction (Orr, 2017).

Furthermore, the industry generated revenue for the government through taxes and levies on downstream activities, which compensated for the initial investment by the government. The overall economic contribution of the sorghum value chain to the Gross Domestic Product (GDP) in 2019 was Ksh 25.537 billion. The tax revenue to the government was Ksh 9.798 billion (KBL, 2020).

In the past two decades, Kenya lags the neighbouring countries in sorghum production (Figure 2). Ethiopia recorded the most significant growth in sorghum production (2.9 ton/ha in 2019) and its productivity compared to Southern and South-East Asia countries. On the other hand, sorghum productivity in Kenya had stagnated over time, except in the three years preceding the COVID-19 pandemic, when sorghum yields sustained some growth. However, a key concern is that farmers still realize average yields below 1 ton/ha. As a result, production increases are mainly from increases in area under cultivation. The increase in area under cultivation is driven by increasing demand for sorghum for local beer processing, but this demand still outweighs the local production with the gap field with imports mainly from Ethiopia (Njagi et al., 2019).

Figure 2: Trends in sorghum productivity in Eastern Africa



Source: FAOSTAT, 2020

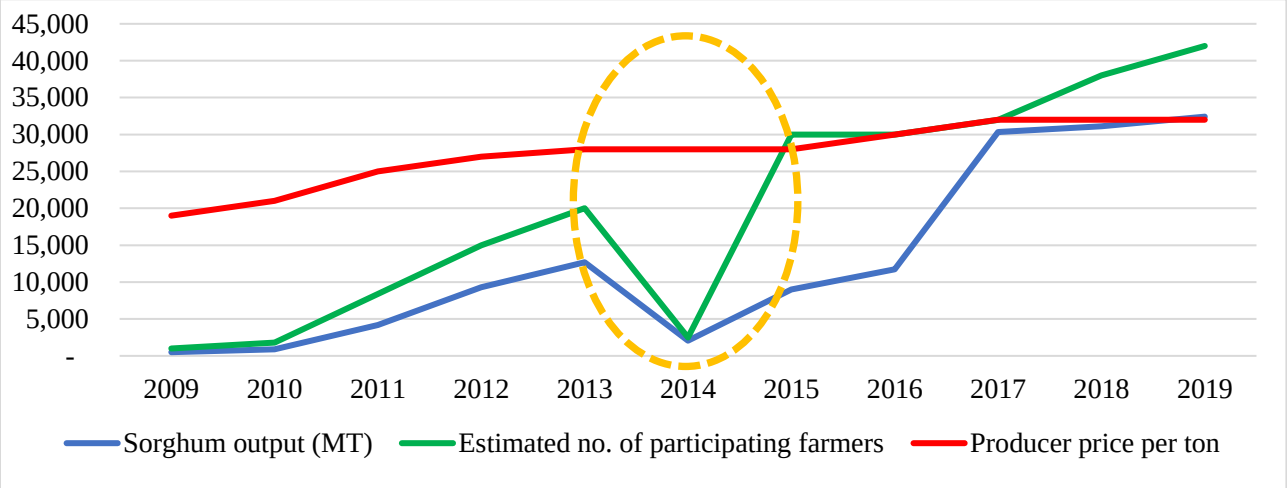
1.1.Growth in sorghum farming in Kenya

Like other cereal grains, farmers sell sorghum without undertaking any value addition. Before the growth of the sorghum beer market, industrial use for sorghum was mainly as animal feed, blending of food products, and bio-industrial products like syrup, bio-ethanol, and glucose (Odame et al., 2014). However, the sorghum beer industry development and growth in Kenya has opened commercial opportunities for farmers and other agri-entrepreneurs in the sorghum value chain. The growth was triggered by the government policy supporting sorghum for commercial beer brewing in 2006. The policy granted 100% excise duty on alcoholic beverages made from locally produced sorghum, millet or cassava.

The result of this supportive policy was an increased demand for sorghum by the private sector. Besides, the policy was an incentive for smallholder farmers to transform sorghum production to commercially oriented and competitive to improve their livelihoods. Figure 3 shows that sorghum production increased substantially post 2006 period. Increased income from sorghum production gave sorghum farmers opportunities for better housing, food and nutrition security, improved healthcare, and education for family members that would otherwise not be available.

The shock in the sorghum output in 2014 was due to a new tax regime that came into force in September 2013 through the Customs and Excise Act. A 50% excise duty was introduced on beer made from sorghum, millet or cassava. The government expected to raise Ksh 6.2 billion in tax revenue from duty on sorghum beer. As a result, the price of sorghum beer increased as the added tax was passed on to consumers who are primarily lower-income population. The demand for sorghum tumbled as the beer processors scaled-down processed volumes and reduced the contracts issued for farmers to sorghum production. This negatively impacted farmer and other actors in the value chain, like input sellers, grain aggregators, and transporters. Instead of raising revenue, the government lost Ksh 2 billion in foregone tax revenue due to losses accruing to the sorghum beer processors and others in the chain (Opiyo, 2014).

Figure 3: Growth in sorghum production



Source: KBL, 2020

The policy measure was rescinded in 2015, triggering an increase in the demand for locally produced sorghum as the value chain returned to the pre-tax conditions. Since then, the production has been increasing year on year. The quantity of sorghum produced increased by 260% between 2015 and 2019, from 9,000 tons to 32,418 metric tons (Figure 3). The number of farmers contracted by EAML to grow sorghum also increased by 40% over the same period, from 30,000 to 42,000 farmers. Farm-gate prices for the contracted farmers have also increased from Ksh 28 to 32 per kilogram. This growth in the number of farmers, sorghum production and price increase suggests welfare gains to farm households in Eastern and Western Kenya, the main sorghum producing regions.

1.2.Role of the private sector in the sorghum value chain

The investments in sorghum beer by EABL have been credited as one of the main reasons for this increase in farm productivity in recent years. Previously, much of the sorghum produced in the country was mainly utilized as food, with industrial uses being mostly for the manufacture of wax, starch, syrup, dextrose agar and edible oils. However, the utilization of sorghum for the production of sorghum beer created a sufficient demand to affect production decisions by producers, with the KBL demand an average of 60,000 MT annually by the end of 2017. Beneficiaries from these investments are spread across the entire value chain. The effects of the investments made by KBL in the sorghum value chain are discussed and evaluated to draw lessons for both the public and private sectors.

By 2011, there were only 19 released improved varieties in the market. The majority of farmers cultivated sorghum not as a commercial crop but as a drought-resistant crop best suited for harsh ecological areas such as semi-arid environments. A study by Tegemeo Institute in 2014 established that only 15 per cent of sorghum farmers in Kenya utilized improved sorghum varieties. With the majority of farmers cultivating less than two acres, the area under improved sorghum varieties was also low at 15%. By 2019, data from KEPHIS shows that there were 43 released improved varieties that could be accessed by farmers, with 17 improved varieties being released in 2016 alone. Public sector research institutes and universities released the majority of the improved varieties (90%). This was apparently in response to the growing demand by farmers for alternatives on improved sorghum varieties.

A key reason cited for the low adoption of improved varieties was lack of knowledge, access and credit constraints. KBL was able to overcome these challenges through contract farming. The contract was structured such that KBL partnered with universities and research institutions to supply agro-dealers and stockists with the desired varieties in different areas. The inputs were then provided to farmers on credit, with additional information on managing the crop in the field. This arrangement also helped overcome the challenge posed by weak extension systems, a critical channel to pass information and knowledge to smallholder producers. The partnership to develop improved varieties is expected to continue in response to farmers' growing utilization of improved seeds and the need to raise profitability among smallholder sorghum producers. Currently, farmers

contracted by KBL to supply sorghum undertake sorghum farming as a commercial enterprise. Switching to commercial sorghum production raises the profitability per acre by approximately 220% (Njagi et al., 2019).

Further up the value chain, a network of traders, dealers, bulk grain handlers, and transporters has been established. Traders and dealers are usually located at the county level in the main sorghum production areas. A significant role played by these intermediaries and small traders are aggregating sorghum from smallholder farmers. Once they have purchased sorghum from farmers, usually during the harvesting season, they sell on to wholesalers who are generally located in major towns. Wholesalers perform a similar function to small traders and dealers, but on a larger scale. They handle relatively large quantities of grain, and most have storage facilities. They then bulk and sell to retailers, grain millers and processors.

Beyond the processing of sorghum beer, a network of wholesalers and retailers exists to take the final product to consumers. This network also involves transporters and marketing agents. Overall, it is estimated that the beer value chains support about 80,000 enterprises. These include farmers, wholesalers, input stockists, beer distributors and retailers. The sorghum beer accounts for about 40 per cent of Kenya's regulated beer market.

The development of the sorghum value chain also impacts women and youth in terms of employment opportunities created along the value chain. Traditionally, sorghum was mainly cultivated by women. The commercial orientation of sorghum farming is likely to bring more significant benefits to women. In addition, it also provides a pull for youth to engage in sorghum production. Across the value chain, it is expected that the youth will find employment opportunities in transport, aggregation, marketing, and retail sub-sectors. The commercial orientation of sorghum farming will also benefit other sectors such as the livestock feed value chain. Currently, farmers contracted to plant sorghum for KBL can reduce their production costs by 83 per cent (Njagi et al., 2019). This reduction benefits all players in the value chain by making it more competitive. There is room to further lower these costs by increasing productivity per factor of production employed and adopting factor-saving technologies. It also means that processors can also access raw materials cheaply locally and can, in turn, ensure that the finished or value-added product is affordable.

2. Effect of commercial sorghum production on value chain actors

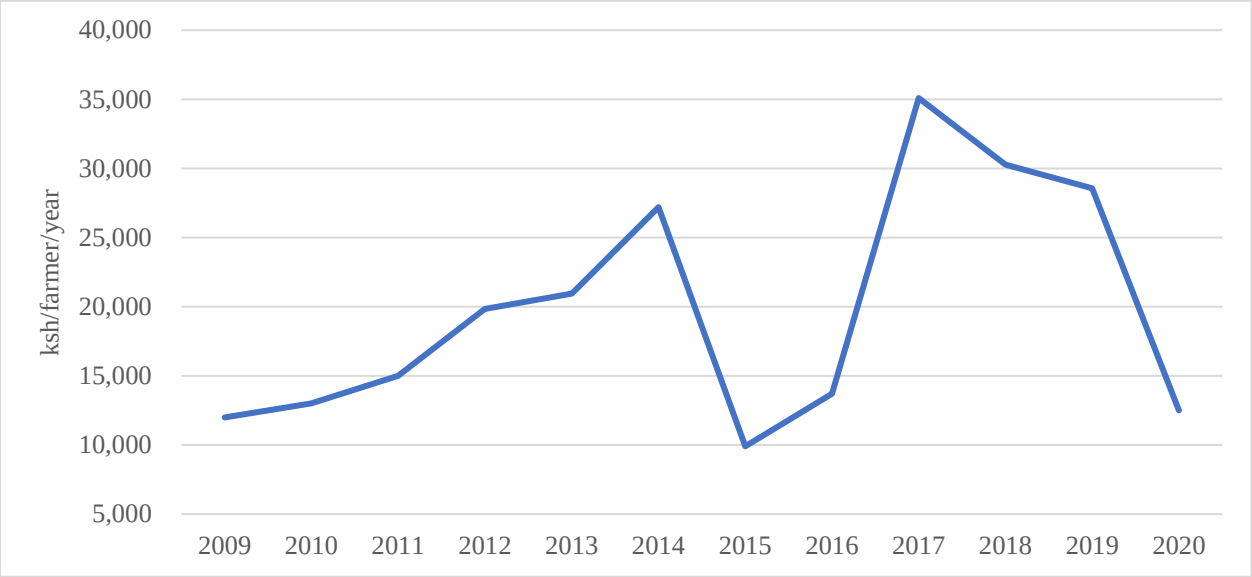
2.1. Impacts on livelihoods for sorghum producers

Many studies across the world have underscored the potential role of sorghum on household welfare. Opiyo et al. (2020) found that the adoption of improved sorghum varieties led to a 33% increase in household income among farmers in Eastern Kenya. Besides, the gains were higher (37%) in the hypothetical case that non-adopters decided to adopt. Mwadalu and Mwangi (2013) showed that sorghum could enhance food security in semi-arid areas of Eastern Kenya. Smale et al. (2018) found that the adoption of hybrid sorghum significantly led to increased yields, widened the range of food items consumed, reduced the share of sorghum in food purchases, and contributed to a greater share of the sorghum harvest sold. As such, the adoption of improved seed was associated with a shift towards consumption of other cereals and enhanced shares of marketable surplus. Additionally, promoting improved sorghum varieties among sorghum farmers growing local varieties has the highest welfare gains.

Figure 4 shows the trends in farmers' payout to KBL farmers for the last 20 years. The average farmer payout for the past decade was Ksh 20,774 per season. On average, there was a sustained increase in the value of sorghum sold per each contracted farmer from Ksh 12,000 to Ksh 27,192 between 2009 and 2014. The increase was a result of several interventions. First, in 2006 the government zero-rated alcoholic beverages made from locally produced sorghum, cassava or millet. This triggered a private sector response to invest in the sorghum value chain. As a result, demand for sorghum increased. Secondly, farm-gate prices for contracted sorghum farmers had increased by 47% Ksh19 in 2009 to Ksh 28 in 2014 in response to increased demand.

There was a significant dip in the payouts in 2015 due to a policy decision to introduce a 50% excise duty on Senator keg beer. In response to research evidence on adverse effects of 50% excise duty on sorghum beer, the government signed the Alcoholic Drink Control (Amendment) Act in May 2015, which changed the excise remission from 50 to 90%. The excise duty reversal in 2015 did not lead to immediate recovery for the value chain. There was a lag in the recovery, with the full recovery being registered in 2017 when the average payout rose to Ksh 35,000 per farmer per year. However, there has been a decline in payouts since 2017, with the most significant decline in this period recorded in 2020 due to the COVID-19 pandemic.

Figure 4: Trends in average sorghum payout per farmer per year



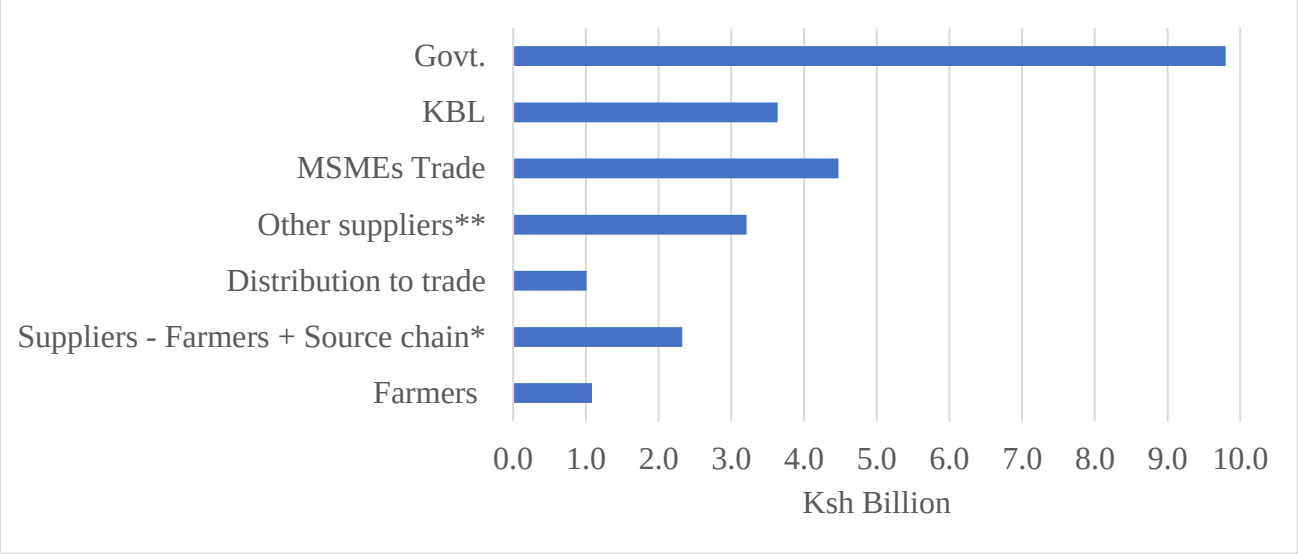
Source: EABL, 2021

2.2 Economic contribution of the sorghum value chain actors

Sorghum can reduce severe food insecurity in ASALs due to its tolerance to drought and ability to thrive under a wide range of soils. Opiyo et al. (2020) found that the adoption of improved sorghum varieties led to a significant increase in household's income (33.3%) and that the income gain was much higher among vulnerable households. This demonstrates the effect improved sorghum varieties can have on vulnerable households in generating welfare gains.

The sorghum value chain generated a total value-added estimated at Ksh 25.537 billion in 2019 through sorghum beer. The value-added represents almost 0.8% of agricultural GDP and 0.1% of Kenya's GDP. Figure 5 shows the benefit accruing to different stakeholders in the sorghum value chain. The contribution to value added by sorghum source chain suppliers (aggregators, farm input suppliers and support services-transportation to the processor) was Ksh 2.327 billion (9.1% of total value-added). Distribution to trade and other suppliers contribution to value-added was Ksh 1.008 and 3.210 billion, respectively. SMEs contribution to value-added was Ksh 4.473 billion (17.5%). Whilst sorghum processor (KBL) contributed Ksh 3.638 billion (14%) to value-added. During the same period, the total payout to farmers amounted to Ksh 1.08 billion (4.2% of the total value-added).

Figure 5: Total benefit in 2019 in Kshs (Billion) from Sorghum value chain



Source: KBL, 2020

2.2.1 Employment (Aggregators, wholesalers, transporters and retailers)

It has been estimated that sorghum beer accounts for about 40 per cent of Kenya's regulated beer market, with a supply chain that employs over 100,000 people (KEPSA, 2014), with the number rising to 357,000 persons in 2017 (KBL, 2017). The economic value generated through employee compensation was estimated at Ksh 4.3 Billion per month. Therefore, expanding the downstream activities in the sorghum value chain will likely expand activities for women and youth to attain gainful employment.

2.2.2 Tax revenue

The overall tax contribution from KBL in the financial year ending June 2019 was Ksh 45.5 billion, of which the sorghum value chain contributed Ksh 9. 8 billion (21.5%). A large proportion of the tax comes from excise duty (72%), with Value Added Tax (VAT) accounting for an additional 20%.

3. Public policies impacting the sorghum value chain

Policies and programs are established in particular political, social and economic contexts. As such, policymakers must understand that the context that can contribute to understanding policy implementation, uptake and impact by identifying policy levers, obstacles and windows of opportunity.

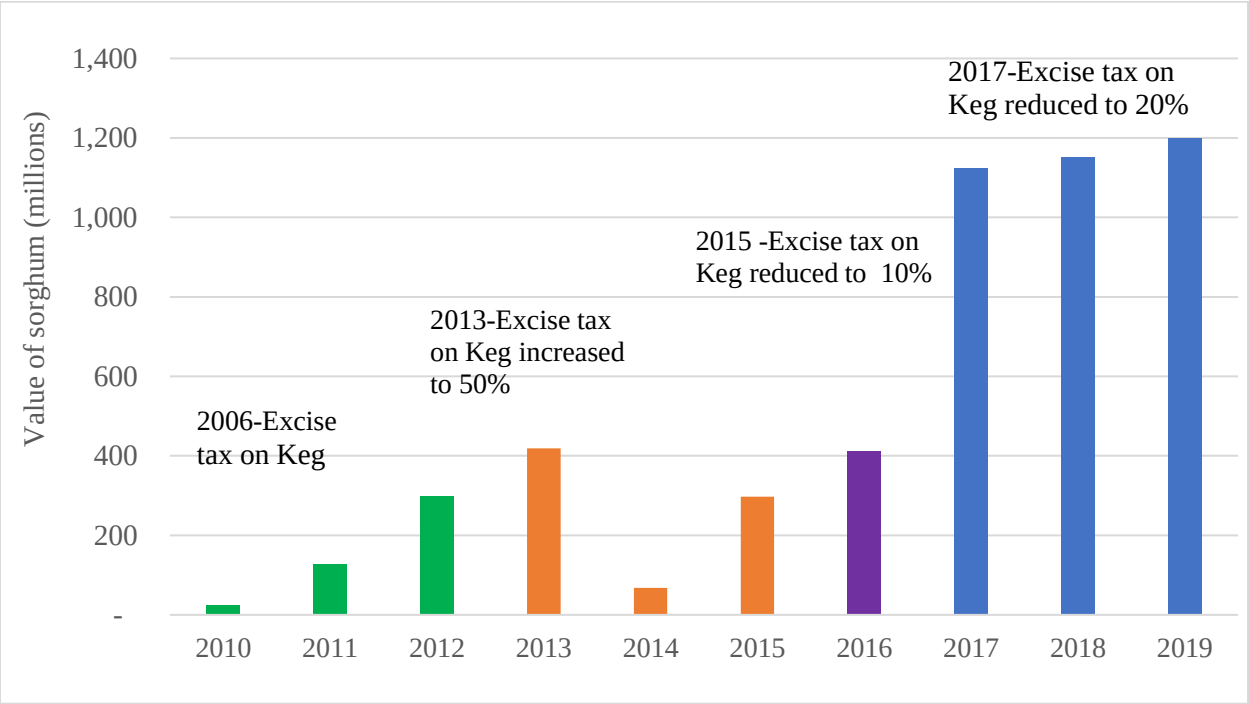
The Kenya Agricultural Sector Transformation and Growth Strategy (ASTGS) prioritize sorghum as one of the Climate Smart Agricultural (CSA) crops that can match the changing environment and increase food production. Together with the Big Four Agenda, the strategy aims to increase smallholder productivity and incomes through the commercialization of agricultural production to enhance value-addition and agro-processing, creating employment in agricultural value chains to transform rural economies into commercially viable concerns. As demonstrated earlier, the value chain registered significant gains due to favourable policy, especially the remission of excise tax on beer made from sorghum, millet or cassava. However, the government sometimes pursues policies that undermine these objectives. For example, in June 2020, the National Treasury proposed to reduce the excise duty waiver for beer made from locally grown sorghum, millet or cassava or any other agricultural produce from 80% to 60%. Although this measure was not implemented, in October 2020, the Kenya Revenue Authority increased exercise duty on among other exercisable goods and services, beer made from sorghum, millet or cassava or any other agricultural produce by 5%.

Further, a proposed minimum tax of 1% of turnover targeted small businesses with less than Ksh 5 million a year. Although this measure has been suspended following a judicial process, it would affect the majority of the SMEs in the value chain if implemented. As the policy proposals are intended to increase tax revenue for the government, attaining a balance between sustaining industry growth and revenue generation remains critical.

Understanding the effect of government policy is critical in ensuring that the government pursues fair policies for the industry. Figure 6 shows how the sorghum value chain has responded to the policies in the past. Sorghum production increased on the reduction of excise duty on sorghum beer. Other important policies that affect the sector include investment in research, extension

systems to train and equip farmers with knowledge and skills for commercial sorghum farming, inputs delivery systems and credit for farmers.

Figure 6: Demand for sorghum under various tax regimes



4. Shocks on the sorghum value chain

In this section, we demonstrate the potential effects of two significant shocks experienced from 2020. First, a global pandemic triggered a health and economic crisis worldwide. Second, the government taxation policies further shock the industry, still reeling from the effects of the pandemic. The potential effects are discussed as follows.

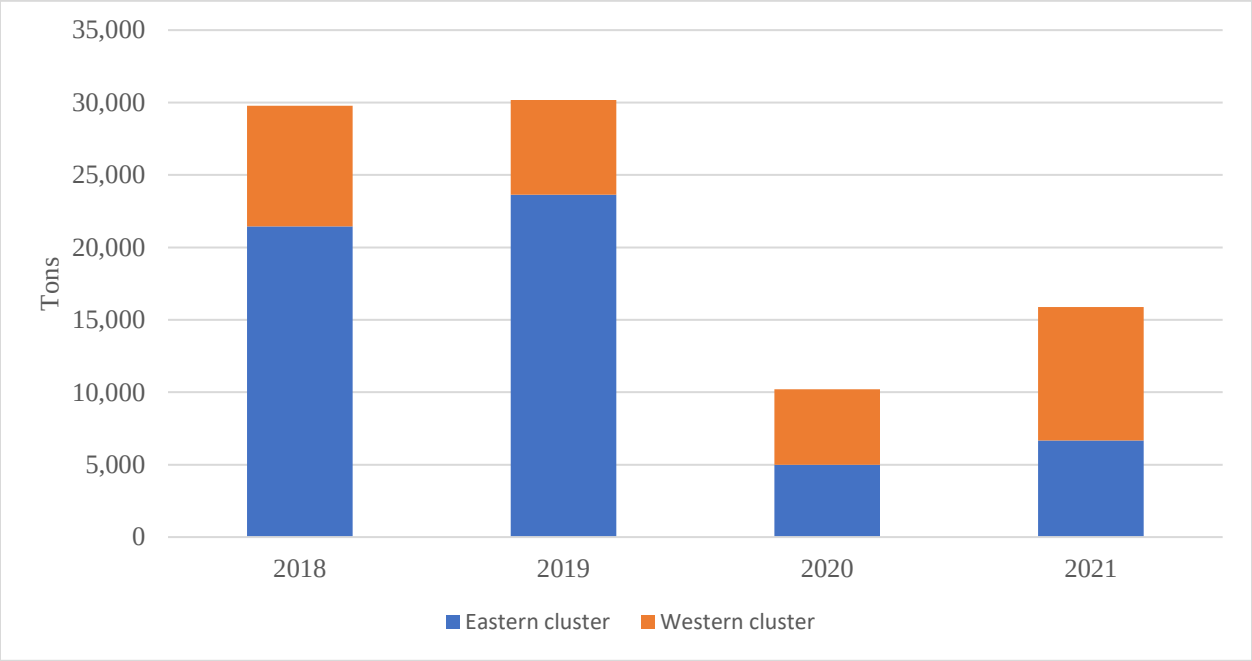
4.1 Implication of COVID-19 pandemic on the sorghum value chain

COVID-19 first broke out in Kenya in March 2020. In mid-March, the government announced restriction measures which included the closure of bars and hotels. These measures remained in place until August 2020, when some of the restrictions were lifted. These restrictions were then vacated in late September 2020, although working hours were restricted through a nationwide curfew. The announcement of stricter measures to contain the spread of the pandemic has continued following the second wave (October – November 2020), third (February to March 2021) and fourth (June to August 2021) waves.

The closure of bars, hotels, and the sale of alcohol affected the alcohol beverage industry, affecting the upstream activities. In addition, the closure of food outlets, restaurants and bars as a short-term containment measure of COVID-19 led to depressed demand for food and beverages in Kenya. The internal demand continued to fall further as many Kenyans lost all or part of their livelihoods due to the pandemic. These job losses affected low-income earners and informal jobs in urban areas disproportionately. This had a direct effect on the demand for low-end alcoholic beverages such as sorghum beer.

Beer processors responded by reducing their processing capacity, which directly affected the demand for sorghum. Furthermore, growers also cut back on production amid fears over depressed demand for sorghum, constraints in access to inputs and general uncertainty over the state of the economy. Figure 7 shows the trends in the volume of sorghum purchased by KBL. Businesses reduced orders by two-thirds when the country experienced the most severe effects on the economy due to the pandemic. Although the demand picked up in 2021, it is still depressed due to lockdown restrictions and scarcity due to production shortfalls in 2020.

Figure 7: Trends in volumes (tons) of sorghum purchased from farmers by EABL



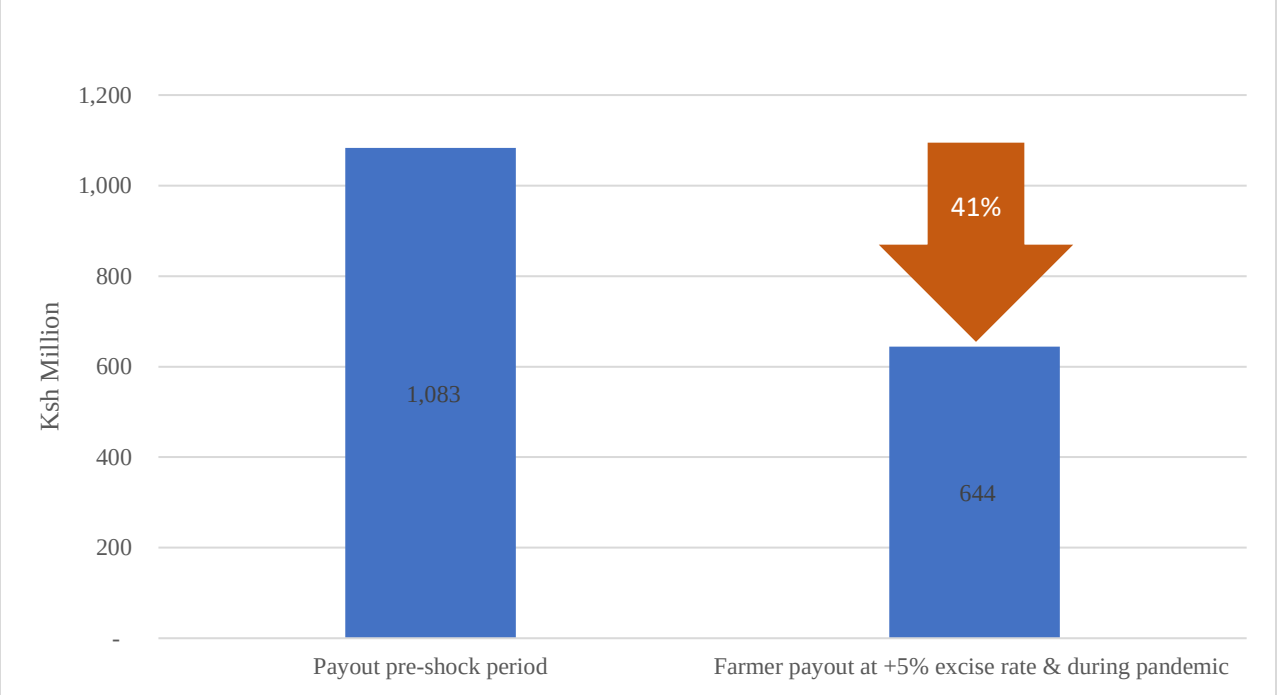
*2021 includes figure paid to May 2021

Source: KBL, 2021

The disruption of demand for products made from sorghum is causing grain surpluses to accumulate, putting pressure on the storage facilities, which often are not available among smallholder farmers. These effects are reducing farmer incomes. Moreover, those farm household income losses may be compounded by reduced off-farm income as a result of job losses that may affect some of these households.

The review of the impact of COVID-19 on farmers' income shows that forgone income from sorghum sale was Kenya shilling 439 million (Figure 8), which is about 41% of the pre-pandemic payout. The ideal response by the government at this point would be to create an opportunity to accelerate transformations in the sorghum value chain and the agriculture sector at large to build its resilience in the face of a range of challenges, including climate change.

Figure 8: Effects of COVID-19 pandemic on farmer revenue



At the farm level, the impact of COVID-19 on sorghum production range from reduction in area planted, production, yields and prices due to excess stock with depressed demand, farmer vulnerability and resilience, farm planning uncertainty and supply chain disruption of inputs/output markets. As of September 2020, the demand for white sorghum by EAML in Kenya had declined by about 2.2 million metric tons. As a result, about 23,689 contracted sorghum farmers (approximately three-quarters of the total number of contracted farmers) were negatively impacted.

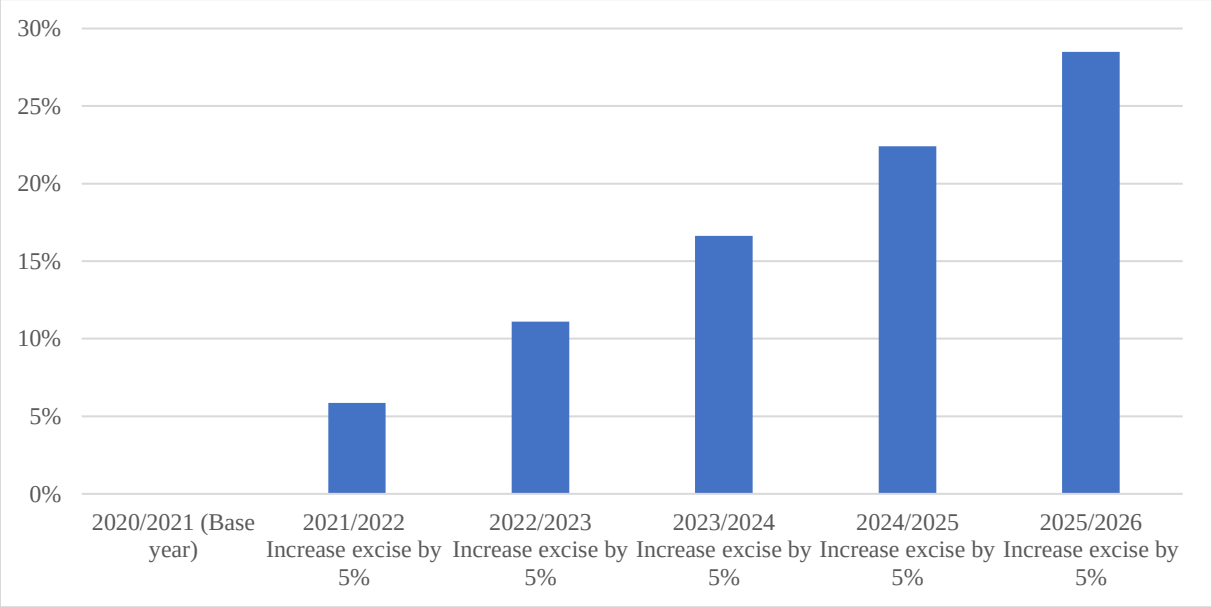
4.2 Implication of reduction in the excise duty remission

4.2.1. Farmers

The National Treasury eventually increased the exercise duty on alcohol by 5%. A higher tax rate drives consumer prices higher, shifting demand towards cheaper illicit and unregulated alcohol. In turn, processors in the formal alcohol space are likely to cut down on production due to reduced consumer demand. The reduction in processing capacity will then result in a reduction in the demand for the raw material. Reduced demand will not only lower sorghum prices but increase costs for farmers who may be forced to invest in storage and post-harvest handling of unsold produce. This was the case in 2014 and 2015 when the government reduced the exercise duty remission on sorghum beer. We simulate the effect of these inflationary tax adjustments year on

year for five years with the fiscal year 2020/2021 as the base year. Figure 9 shows that in five years, assuming the current inflation trend, the effective tax increase on senator keg will be close to 30% holding all factors constant. Assuming that the tax burden will be shifted to consumers, effective demand for senator keg will drop by a larger proportion than the tax increase. In effect, the investments such as the Ksh 15 Billion plant in Kisumu, the jobs along the value chain, as well as the projected increases in income for sorghum farmers will be jeopardized. KBL is expected to revise its sorghum intake and reduce its processing capacity, affecting expected government revenue through the excise tax.

Figure 9: Projected effective tax increase for senator keg assuming annual excise duty inflation adjustment



4.2.2. Other value chain actors

The main objective of the policy on waiver of the excise duty on sorghum beer in 2004 was to fight illicit brews by making sorghum beer that is affordable for people in the low incomes bracket. An increase in the price of sorghum beer is likely to push consumers back to illicit brews, whose prices remain cheaper outside the tax bracket. With the potential to increase consumer prices for sorghum beer, the increase in exercise duty will push consumers towards consuming illicit brews that are unregulated, dangerous, and cheap.

The policy would also affect other value chain players such as aggregators, input sellers, actors in wholesale and retail sorghum beer, including those offering logistics and warehousing services. As shown earlier, declining volumes produced and processed imply loss of business and revenue for downstream SMEs.

Government revenue collection is also likely to be affected. The government collects revenue, including cess, income tax and consumption tax, and the exercise tax. Contraction of business is likely to result in reduced tax revenue for the government.

4.3 Combined effect on proposed tax amid the COVID-19 pandemic on sorghum farmers

The changes in the exercise duty have been proposed at a most inopportune time. The COVID-19 pandemic has disrupted the economy in a way never experienced before. The demand for sorghum beer was already depressed, as explained earlier, due to the COVID-19 pandemic. Further increases in excise duty, as expected in 2021, will hurt the sorghum producers the most.

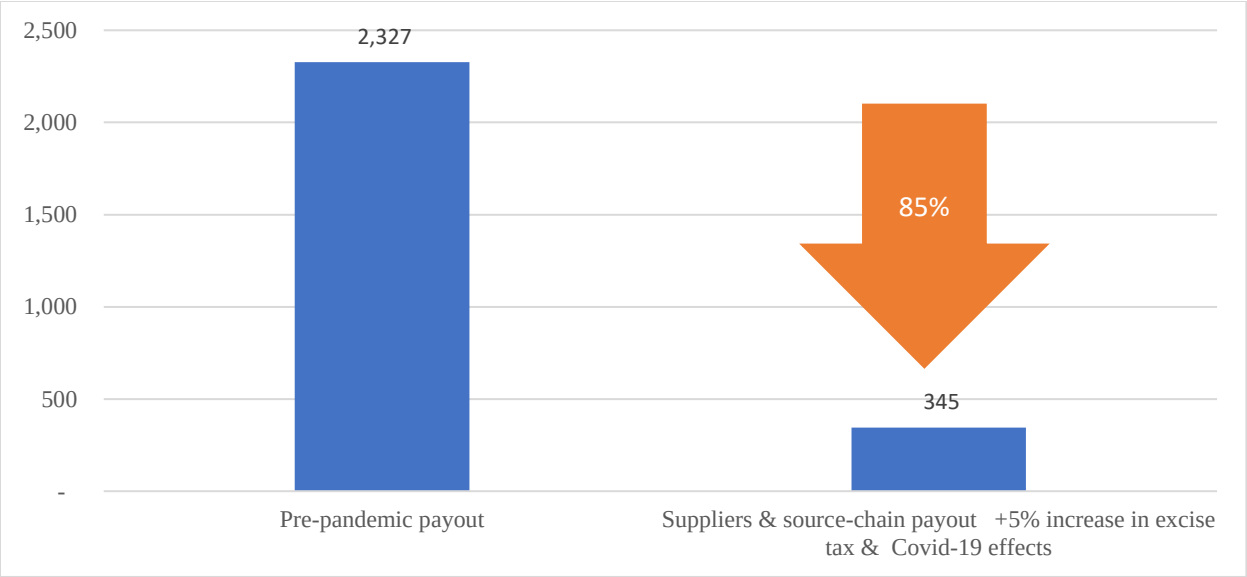
The simulation of the combined effects of the proposed increase in excise duty and COVID-19 pandemic on the income of sorghum farmers are presented in Figure 8. The forgone income for sorghum producers is estimated at about 56% of the estimated pre-pandemic income. The combined effect demonstrates that the value chain will take much longer to recover from the effects of the taxation policies implemented during the pandemic. A shock of this magnitude would take years to recover, especially when the agriculture sector is expected to lead the economic recovery efforts for the country.

4.3.1. Effect of policy on Intermediaries

As a result of both the COVID-19 pandemic and the tax policy changes, suppliers and other actors in the value chains encountered reduced income due to declining business, shrinkage in volume traded and higher operating costs.

Figure ***10*** shows the decline in income for suppliers and other value chain actors as a result of both the COVID-19 pandemic and inflationary excise tax increase at 5%. The net effect was a loss of 85% of the estimated pre-pandemic and pre-tax income.

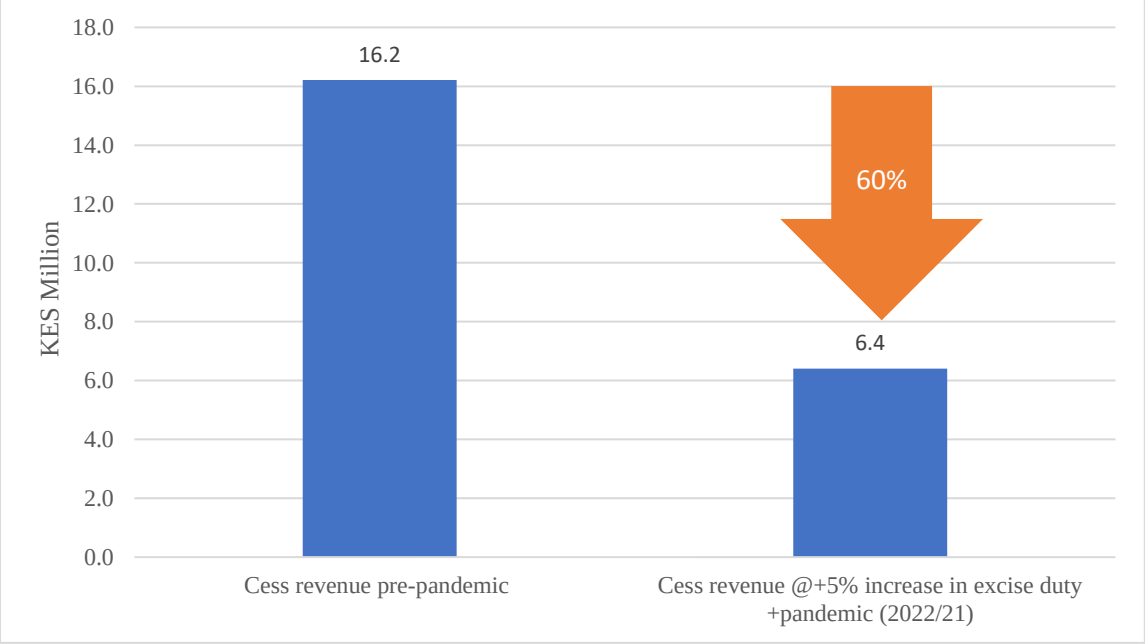
Figure 10: Income for suppliers and source-chain actors at current and proposed excise tax and COVID-19 effects



4.3.2 Effect of policy on tax revenue

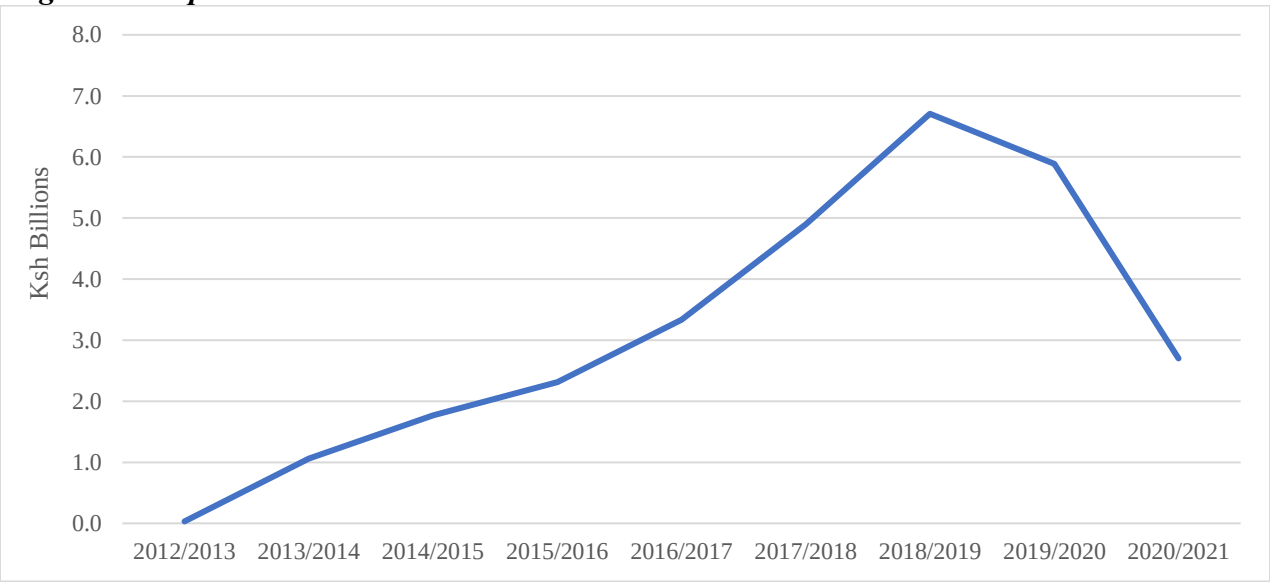
County governments also generate revenue from the sorghum value chain. Revenue collected from cess has been increasing on the backdrop of growing sorghum production. However, increasing excise duty by 5% and the pandemic decreased cess revenue by 60%, as shown in Figure 11.

Figure 11: Cess revenue collected by county governments at current and proposed excise tax



Similarly, the proposed tax increase's anticipated effect will see a reduction in the tax revenue generated from sorghum beer. Figure 12 shows the growth rate in exercise duty paid from sorghum beer by KBL.

Figure 12: Growth rates in excise tax revenue collected by the national government from sorghum beer production



The expectation of the tax revenue was a decline of 14% from that paid in 2019. A much significant decline is expected in the following year as a result of the effects of the COVID-19 pandemic and an unfavourable environment such as that posed by the decrease in exercise duty remission.

5. Summary and conclusion

Sorghum production in Sub-Sahara Africa is largely done by small scale farmers who seldom produce excess to sell. Thus limitations in production vary from conventional to commercial scales of production (Omoro, 2013). For example, sorghum farmers in Kenya face several constraints which vary in combination and degree from one area to another. According to Omoro (2013), traditional production methods, low technological adoption, environmental constraints and policy impediments are major reasons behind low sorghum production among small-scale farmers in Kenya. Similarly, drought severely hinders sorghum production in the world's semi-arid regions (National Research Council (NRC), 1996); a problem compounded by unpredictable weather patterns, soil characteristics, pests, and in some cases, socio-economic and political aspects.

Low sorghum grain yields could be attributed to production constraints such as limited access to fertilizer and quality seeds that stems from a lack of financial resources to invest in sorghum production (Omoro, 2013), awareness and distribution. However, producers under contract with EAML, as is the case of sorghum for malting, receive quality farm inputs from time to time and agricultural extension on improved varieties, best agronomic practices and use of complementary inputs. In return, they supply high-quality produce at a pre-agreed price. Other challenges include limited market incentives, low-quality seeds, poor agronomic practices, and crop infestation by pests and diseases (Muui et al., 2013). Furthermore, climate change is a threat to sorghum production in countries that rely on rain-fed farming and lack adequate adaptive capacity, such as improved agricultural inputs (Mundia, 2019).

These factors explain the general lag in sorghum productivity in Kenya, which should be urgently addressed for the enterprise to thrive. In addition, recent developments in policy (reduction of excise duty on beer made from sorghum, millet or cassava) and the outbreak of the Covid-19 pandemic also negatively impacted sorghum production farmers. Some of the immediate outcomes of these include the decline in planted area, yield, and prices due to disruption of the supply chain (inputs/output markets), farm planning uncertainty, and farmer vulnerability and resilience.

The commercialization of sorghum in Kenya also seems to lag behind other essential cereals such as maize, wheat, and rice. According to Rohrbach (2003), the lag in sorghum commercialization can be explained by factors such as low and variable production levels, high assembly costs, high processing costs, and uncompetitive grain prices. In addition, firms dealing in sorghum and its

products also face a myriad of constraints, including inconsistent quality of raw materials (sorghum grain), inadequate marketing resources and strategies, inability to exploit economies of scale and low competitiveness of products in the markets owing to high production/processing costs.

Given these constraints, the sorghum value chains remains a safe bet to address food security and households incomes, especially in the ASALs in line with the agriculture transformation agenda outline in the ASTGS. The government can increase productivity as well as smallholder farmer incomes through investments in the sorghum value chain. However, policy decisions continue to provide disincentives, especially for private sector investments in the value chain. Such examples include tax proposals that are likely to interfere with the demand for sorghum, which will affect the livelihoods of the most vulnerable farmers in the country.

The original intention of promoting these targeted value chains was to improve livelihoods for the rural poor – over 80% of the sorghum is grown by smallholder farmers in over 10 counties. *Jilishe kisha uuze* and creating value together slogan for increasing use of sorghum for home consumption and commercial milling had started to gain footage reducing reliance on maize as the main staple food. However, the contractual arrangement with farmers where price, quality, and market are guaranteed will not be sustainable with an unpredictable policy environment, potentially affecting the livelihood of the majority of these smallholder farmers.

The increase in the excise duty in 2020 and a potential increase in 2021 will be ill-timed. First, the value chains is yet to recover from the effects of the pandemic, having experienced lockdown restrictions in succession. It is unlikely that processors will review their production decisions in the short term, which will immediately impact farmers. Last year, the country was affected by desert locust, floods in addition to the COVID-19 pandemic. This year, the weather forecast for ASALs is not favourable. Its unlikely that the private sector will take riskier positions amid an increased tax burden.

Furthermore, several investments by both the public and private sectors will continue being adversely affected. The government, through support from development partners such as the World Bank and European Union, has also invested heavily in the sorghum and millet value chains through projects like Kenya Climate-Smart Agriculture Project (KCSAP), the National Agricultural and Rural Inclusive Growth Project (NARIGP) and the Kenya Cereal Enhancement

Project (K-CEP), and several counties have prioritized sorghum as an essential food and commercial crop under these projects. The success of these programs relies on the private sector investments to support the breeding of new sorghum varieties through their adoption to providing a ready market for output. However, industrial utilization has been the most significant factor to sustain demand, without which farmers face losses due to depressed prices. Moreover, the returns for private sector investments in sorghum beer processing will be adversely affected due to the lower rate of return to investment.

Lessons from the past can help address the current challenges. For example, it took the value chain about three years to recover from the 2013/14 shock when the government implemented unfavourable taxation policies. In that period, farmers registered huge losses, employment opportunities that were created in the value chain were lost, KBL, who was then the main processor of sorghum beer, scaled back production, and the government lost revenue in forgone taxes. Another disruption, so soon after, will cause irreparable damage to the value chain.

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